**RESEARCH ARTICLE**

# Effects of Stress Reduction Therapy Based on Mindfulness-Based Stress Reduction (MBSR) on Emotion Regulation Strategies, Perceived Stress, And Quality of Life of Patients with Multiple Sclerosis

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## Abstract

**Multiple Sclerosis is an autoimmune disease and patients experience emotional disorders and difficulty in cognitive-emotional regulation during their illness. The aim of the present study was to determine the effects of stress reduction therapy based on Mindfulness-Based Stress Reduction (MBSR) on emotion regulation strategies, perceived stress, and life quality of patients with Multiple Sclerosis (MS). The participants in this study were 30 people with MS (experimental group: 15, control group: 15) enrolled in MS Soceity of Shiraz located in Fars Province in Iran. The experimental group received 8 sessions of MBSR training, once a week for 90 minutes over 56 days and the control group received no interventions. Results of covariance analysis for the effect of MBSR treatment on emotion regulation strategies showed a significant difference in the variables of self-blame (P=0.001), acceptance (P=0.005), and positive reappraisal (P=0.001) between the experimental and control groups. However, no significant differences observed between the two groups regarding the variables of mental rumination (P=0.54) and adopt a perspective (P=0.72). Results of the present study showed that MBSR therapy increases some dimensions of quality of life and reduces negative emotion regulation strategies and perceived stress. Therefore, this intervention could be useful in MS patients by increasing their health and reducing stress.** ***ASEAN Journal of Psychiatry, Vol. 23(4), April 2022: 1-8.***

**Keywords: Mindfulness-based stress reduction therapy; Emotion Regulation Strategies; Perce- ived Stress; Quality of Life; and Multiple Sclerosis.**

## Introduction

Multiple Sclerosis (MS) is an autoimmune and chronic inflammatory disease of the central nervous system that has higher morbidity rate in young women than men [1]. This chronic and progressive disease causes damage to the myelin tissue of the brain and spinal cord, leading to a wide range of neurological symptoms such as blurred vision, muscle weakness, and sensory disturbances. Symptoms of multiple sclerosis can affect a person's daily functioning and well-being, in severe cases it can paralyze the patient and require a wheelchair. In this situation, the patient may not be able to take care of himself [2]. Efforts and strategies are needed to coping with this disease. Many patients are not able to make and pursue these strategies, therefore, their personal lives are endangered or subject to serious changes. These changes can include changes in quality of life, the regulation of emotion, personality traits, anxiety, stress, and tension [3]. Diagnosis of MS as negative stressors will have a serious impact on the physical and mental health of patients. A recent research has shown that patients with this disease experience a high level of mental and emotional disorders and difficulties with regulating their emotions [4]. Emotion regulation refers to the set of processes through which individuals seek to monitor, evaluate, and redirect the automatic flow of emotions to their needs and goals [5]. Difficulties with regulating emotions involves a wide range of defects including: Low emotional awareness, difficulties in accepting negative emotional experiences, inability to control impulses, difficulties in achieving the desired goals, and inability to regulate negative emotions [6].

In general, it has been reported that mental health and quality of life in MS patients are significantly lower than the healthy population as well as people with other chronic diseases. Mindfulness-Based Stress Reduction therapy is one of the therapies that has been developed for specific medical conditions in patients with chronic pain. This method introduced by Zinn in 1979 and at the start used for nervous tension management, it has evolved to cover the treatment of a variety of health related disorders including: depression, chronic pain, autoimmune diseases, blood pressure, and diabetes mellitus [7]. This method helps patients to create, maintain and improve the quality of life, reduce stress and even improve the function of the immune system. Therefore, due to the increasing prevalence of multiple sclerosis and the occurrence of psychological problems, psychological tailored intervention is necessary to improve the psychological aspects and quality of life of these patients. In this regard, we aimed to determine the effects of stress reduction therapy based on MBSR mindfulness on emotion regulation strategies, perceived stress, and life quality in patients with MS disease.

**Methods**

A cross-sectional study was conducted from April to July 2019 in the county town of Shiraz, Iran. Research method was quasi experimental, nonrandomized and conducted on experimental and control groups. The participants in this study were 30 people with MS experimental group:15, control group:15 enrolled in MS Society of Shiraz located in Fars Province in Iran. Random multi-stage cluster sampling was used for sampling. Mindfulness-Based Stress The experimental group received 8 sessions of MBSR training, once a week for 90 minutes over 56 days and the control group received no interventions. The data collection tool was a questionnaire. In the first sessions of MBSR therapy, the researcher evaluated the appropriateness of the treatment for the patient, introduced the history of MBSR therapy and highlighted the necessity of this program. The next sessions was devoted to practicing body checking and perception and creative responding, practicing breathing, practicing sitting meditation, thoughts in a different way and discussing plans for continuing the exercises. Criteria for inclusion in this study were: diagnosis of multiple sclerosis by a specialist physician, being between 20 and 55 years old, having literacy, treated between three to five years, and agreeing to participate in this study in written form. This study was reviewed and approved by the Institutional Review Board of Fars MS Society (No-1399120c).

**Instruments**

*Cognitive Emotion Regulation Questionnaire*

The Cognitive Emotion Regulation Questionnaire (CERQ) is a multidimensional questionnaire which measures the cognitive emotion regulation strategies or cognitive coping strategies someone uses after having experienced negative events or situations [8]. Contrary to other coping questionnaires that do not explicitly differentiate between an individual's thoughts and his or her actual actions. Different versions of CERQ for adults, adolescents and children have been designed.The questionnaire assesses nine itemes: Self-blame, Blaming others, Acceptance, Refocusing on planning, Positive refocusing, Rumination, Positive reappraisal, Putting into perspective, and Catastrophizing. Responses are given on a 5-point Likert scale ranging from 1 “(almost) never” to “(almost) always. Accoring to a previous study, the reliability of the questionnaire using Cronbach's alpha coefficient was 0.85,this value for the items of the questionnaire ranged from 0.83 to 0.88 [9].

*Perceived Stress Scale*

This is a self-reported scale to measure the global level of perceived stress. This scale has 14 items and each item is answered based on a five-point Likert scale none, low, medium, high and very high, these options are scored 1, 2, 3, 4 and 5, respectively. This scale includes two factors; Perceived Helplessness negatively phrased items and Perceived Self-Efficacy positively phrased items. This scale is significantly correlated with life events, depressive and physical symptoms, access to health services, social anxiety and low life satisfaction. According to a previous study, the reliability of the questionnaire using Cronbach's alpha coefficient was 0.86 [10].

**MS quality of life - MSQOL-54**

MSQOL-54 is a multidimensional, widely-used, Health-Related Quality Of Life (HRQOL) measure that combines both generic and MS-specific items into a single instrument. This 54-item instrument generates 12 subscales along with two summary scores, and two additional single-item measures. The subscales are: physical function, role limitations-physical, role limitations-emotional, pain, emotional well-being, energy, health perceptions, social function, cognitive function, health distress, overall quality of life, and sexual function [11]. The summary scores are the physical health composite summary and the mental health composite summary. The single item measures are satisfaction with sexual

function and change in health. The 12 subscales of the MSQOL-54 show good internal consistency with Cronbach's alphas ranging from 0.74 to 0.95. In order to analyze the research data, the data obtained from the questionnaires and analyzed in descriptive and inferential sections using SPSS26 software. In the descriptive section, the mean, standard deviation, skewness and elongation for the variables were calculated and the statistical method of analysis of covariance was used to test the hypotheses. The research hypotheses included the following: a) MBSR treatment has a significant impact on emotion regulation strategies b) MBSR treatment has a significant impact on perceived stress c) MBSR treatment has a significant impact on life quality of patients.

**Results**

Before testing the research hypotheses, in order to explain the situation of the studied groups, the normal distribution of research variables was examined using skewness and elongation. In this study, the values of skewness and elongation of variables were between +2 and -2; therefore, the distribution of research variables is normal. Therefore, it can be assumed that the default of data normality is provided for performing covariance analysis. Levin test was used to evaluate the homogeneity of variances (Table 1). The results of this test on research variables cognitive emotion regulation strategies, perceived stress and dimensions of quality of life in patients with multiple sclerosis were calculated and significant level of F statistic was greater than 0.05. Therefore, it should be said that the error variance of the groups was equal to each other and no difference was observed between them. Therefore, the homogeneity of variance for all variables in the experimental and control groups was not significantly different and the assumption of homogeneity of variance was approved. Examination of covariance homogeneity using Box's M test revealed equal variances (Box's =16.86, P= 0.119).

**Table 1. Levin test results to investigate homogeneity of variance**.

| Result | P value | F static | df | Variable |
|---|---|---|---|---|
| approve | 0.67 | 0.231 | 1 | Positive emotion regulation strategies |
| approve | 0.71 | 0.07 | 1 | Negative emotion regulation strategies |
| approve | 0.61 | 0.252 | 1 | Perceived Stress |
| approve | 0.06 | 3.624 | 1 | Physical function |
| approve | 0.14 | 2.364 | 1 | Role limitation due to physical problems |
| approve | 0.13 | 2.229 | 1 | Role limitation due to mental problems |
| approve | 0.06 | 3.695 | 1 | Pain |
| approve | 0.15 | 2.31 | 1 | Psychological well-being |
| approve | 0.06 | 3.54 | 1 | Energy |
| approve | 0.09 | 3.297 | 1 | Understanding health |
| approve | 0.8 | 0.04 | 1 | Social Performance |
| approve | 0.65 | 0.6 | 1 | Cognitive function |
| approve | 0.24 | 1.171 | 1 | Health changes |
| approve | 0.91 | 0.061 | 1 | Health stress |
| approve | 0.61 | 0.203 | 1 | Sexual function |
| approve | 0.23 | 1.432 | 1 | Satisfaction with sexual function |
| approve | 0.42 | 0.0651 | 1 | Overall quality of life. |

Results of covariance analysis for the effect of MBSR treatment on emotion regulation strategies showed in Table 2. The results of this test in Table 2 have shown a significant difference in the variables of self-blame, other-blame, acceptance, positive reappraisal and reassess between the

experimental and control groups. However, no significant differences were observed between the two groups regarding the variables of mental rumination, adopt a perspective, catastrophic perception, and refocus on planning.

**Table 2. Results of covariance analysis for the effect of MBSR treatment on emotion regulation strategies.**

| Eta coefficient | P value | F static | df | Total squares | Variable |
|---|---|---|---|---|---|
| 0.345 | 0.001 | 21.44 | 1 | 549.22 | Self-blame |
| 0.298 | 0.001 | 18.8 | 1 | 457.43 | Other-blame |
| 0.021 | 0.511 | 1.81 | 1 | 122.17 | Mental rumination |
| 0.035 | 0.653 | 1.09 | 1 | 99.35 | Catastrophic perception |
| 0.35 | 0.005 | 26.65 | 1 | 673.11 | Acceptance |
| 0.44 | 0.001 | 31.42 | 1 | 873.3 | positive reappraisal |
| 0.37 | 0.001 | 27.24 | 1 | 672.39 | Reassess |
| 0.02 | 0.725 | 1 | 1 | 87.61 | Adopt a perspective |

Results of covariance analysis for the effect of MBSR treatment on perceived stress showed in Table 3. The test results in Table 3 show that after adjusting the effects of the pretest, the value of F for the group became significant (F=32.078), (P<0.001). In other words, after removing the effects of the pretest, there was a significant difference between the scores of all subjects in the posttest and the partial square (effect size) for the effect of the independent variable on the dependent variable is 0.543, which shows 54.3% of the changes in the dependent variable are explained by the independent variable.

**Table 3. Results of covariance analysis for the effect of MBSR treatment on perceived stress.**

| Eta coefficient | P value | F static | df | Total squares | Variable |
|---|---|---|---|---|---|
| 0.18 | 0.02 | 6.03 | 1 | 49.62 | Pre-test |
| 0.54 | 0 | 32.03 | 1 | 263.7 | Group |
| - | - | - | 27 | 222.97 | Error |

Results of covariance analysis for the effect of MBSR treatment on the dimensions of quality of life showed in Table 4. As shown in Table 4, there was a significant difference between the experimental and control groups for the variables of quality of life (physical function, pain, mental well-being, energy, health perception, cognitive function of health changes and overall quality of life), but significant difference between the dimensions of role limitation due to physical problems, mental problems and social function was not revealed. This finding indicates the effectiveness of mindfulness-based stress reduction therapy on increasing the variables of quality of life in patients with multiple sclerosis.

**Table 4. Results of covariance analysis for the effect of MBSR treatment on dimensions of quality of life.**

| Eta coefficient | P value | F static | df | Total squares | Variable |
|---|---|---|---|---|---|
| 0.26 | 0.005 | 9.52 | 1 | 231.25 | Physical function |
| 0.06 | 0.241 | 1.174 | 1 | 417.69 | Role limitation due to physical problems |

| | | | | | |
|---|---|---|---|---|---|
| 0.05 | 0.764 | 1.729 | 1 | 652.87 | Role limitation due to mental problems |
| 0.26 | 0.065 | 9.438 | 1 | 942.14 | Pain |
| 0.29 | 0.005 | 11.651 | 1 | 763.12 | Psychological well-being |
| 0.24 | 0.017 | 8.42 | 1 | 851.32 | Understanding health |
| 0.07 | 0.006 | 2.24 | 1 | 142.34 | Social Performance |
| 0.44 | 0.123 | 21.611 | 1 | 2098.31 | Cognitive function |
| 0.47 | 0.001 | 23.171 | 1 | 4473.21 | Health changes |
| 0.09 | 0.001 | 2.168 | 1 | 144.62 | Health stress |
| 0.47 | 0.11 | 22.253 | 1 | 2178.29 | Sexual function |
| 0.56 | 0.001 | 24.622 | 1 | 4328.7 | Satisfaction with sexual function |
| 0.36 | 0.001 | 15.352 | 1 | 967.89 | Overall quality of life. |

## Discussion

The aim of this study was to evaluate the effectiveness of stress reduction therapy based on MBSR training on emotion regulation strategies, perceived stress and quality of life in patients with MS in Shiraz. The research hypotheses are examined below.

Hypothese a) MBSR treatment has a significant impact on emotion regulation strategies.

The results of covariance analysis for the effect of MBSR treatment on negative emotion regulation strategies showed that MBSR could have an increasing effect on positive emotion regulation strategies and also a reducing effect on negative emotion regulation strategies in patients with multiple sclerosis. Similar results have been reported in other studies [12]. It has been reported that mindfulness training leads to increased metacognitive awareness and reduced rumination, stress, dysfunctional skills and negative thoughts [13,14]. According to a previuos study in Iran, the MBSR program has continuous significant effects on emotion regulation ($P$<000) [15]. Mindfulness leads to a decrease in the frequency of negative automatic thoughts and an increase in the ability to drive out those thoughts and ultimately psychological well-being. Observing, describing, action with awareness, and nonjudgmental acceptance are components that highly correlated to mindfulness skills.

Hypothese b) MBSR treatment has a significant impact on perceived stress.

About the effect of MBSR treatment on perceived stress, the results of this study showed that the perceived stress score of the MBSR-experimental group was significantly lower than that of the control group. Therefore, MBSR training has been able to reduce perceived stress in patients with MS. Consistent with the study results, a significant positive association between MBSR training and stress reduction reported [16, 17]]. In MBSR, people learn to develop acceptance and compassion rather than judging their experience; and create momentary awareness instead of automatic guidance. These abilities contribute to increased psychological flexibility and reduced in depressive symptoms and perceived stress [18].

Hypothese c) MBSR treatment has a significant impact on life quality of patients.

About the effect of MBSR treatment on quality of life of patients with multiple sclerosis, our results revealed that increases the overall quality of life in these patients. However, in some subscales, no significant relationship was observed between this treatment and those subscales role limitation due to physical, mental, and social functioning problems. The results of Ghazagh study showed that MBSR treatment is effective in reducing fatigue and increasing some of the subscales including; physical functioning, role in relation to physical and mental energy, mental well-being, health threats, and satisfaction with sexual function ($P$<0/05). Similar findings reported in Senders et al and Kolahkaj et al studies. In explaining the above results, it should be supposed that performing mindfulness exercises creates new patterns of self-regulation. Health-related effects of mindfulness include improving immune function, lowering blood pressure, reducing headaches, reducing muscle tension and disability, lowering cholesterol, and lowering cortisol [19]. Pain is one of the strongest predictors of poor quality of life in MS patients. Meditation exercises can divert the patient's attention to the recipient of the muscles being targeted, and bring together the sensory dimensions of the pain experience from the stimulus assessment warning reaction and reduce the pain experience through cognitive reassessment [20].

In addition to pain, another factor that affects the health of these patients is the rejection of the disease. This therapy helps patients become aware of their thoughts, feelings, and body senses and accept their illness by increasing awareness through mindfulness exercises and accepting experiences without judgment [21, 22]. Studies have shown that psychosocial factors such as mood and self-efficacy and coping problems affect patients' quality of life more than biological variables such as weakness. Therefore, paying attention to psychological, social and psychiatric issues is a vital part of health-related quality of life [23, 24]. The main limitations of the study included the following: drugs used by these patients could have an effective role in the process of their recovery, it was not possible to control the drug and eliminate its effect [25]. Excessive physical restraint and lack of supervision of members outside of the sessions prevented them from performing some behavioral exercises, including relaxation in the interval between sessions.

**Conclusion**

Finally, it can be concluded that MBSR therapy increases positive emotion regulation strategies and quality of life dimensions (physical function, pain, mental well-being, energy, health perception, cognitive function, health changes, health stress, function sexual satisfaction and sexual quality and overall quality of life) and reduces negative emotion regulation strategies and perceived stress.

**References**

1. Gold SM, Willing A, Leypoldt F, Paul F, Friese MA. Sex differences in autoimmune disorders of the central nervous system. InSeminars in immunopathology. Springer Berlin Heidelberg. 2019; 41(2): 177-188.
2. Dehghani A, Nayeri ND, Ebadi A. Features of coping with disease in Iranian multiple sclerosis patients: a qualitative study. Journal of caring sciences 2018; 7(1): 35-39.
3. Blankespoor RJ, Schellekens MP, Vos SH, Speckens AE, deJong BA. The effectiveness of mindfulness-based stress reduction on psychological distress and cognitive functioning in patients with multiple sclerosis: A pilot study. Mindfulness 2017; 8(5): 1251-1258.
4. Petersen M, Kristensen E, Giraldi L, Giraldi A. Sexual dysfunction and mental health in patients with multiple sclerosis and epilepsy. BMC neurology 2020; 20(1): 1-9.
5. Fancourt D, Garnett C, Spiro N, West R, Müllensiefen D. How do artistic creative activities regulate our emotions? Validation of the Emotion Regulation Strategies for Artistic Creative Activities Scale (ERS-ACA). PloS one 2019; 14(2): e0211362.
6. Yap K, Mogan C, Moriarty A, Dowling N, Blair-West S, et al., Emotion regulation difficulties in obsessive-compulsive disorder. J Clin Psychol 2018; 74 (4): 695-709.
7. Querstret D, Morison L, Dickinson S, Cropley, M. Mindfulness-based stress reduction and mindfulness-based cognitive therapy for psychological health and well-being in nonclinical samples: A systematic review and meta-analysis. Int J Stress Manag 2020; 27(4): 394-398.
8. Garnefski N, Kraaij V. The cognitive emotion regulation questionnaire. European journal of psychological assessment 2007; 23(3): 141-149.
9. Jermann F, Vander LM, d'Acremont M, Zermatten A. Cognitive emotion regulation questionnaire (CERQ). European Journal of Psychological Assessment. 2006; 22(2): 126-131.
10. Fliege H, Rose M, Arck P, Walter OB, Kocalevent RD, et al., The Perceived Stress Questionnaire (PSQ) reconsidered: validation and reference values from different clinical and healthy adult samples. Psychosom Med 2005; 67(1): 78-88.
11. Vickrey B, Hays RD, Harooni R, Myers LW, Ellison GW. A health-related quality of life measure for multiple sclerosis. Quality of life research. 1995; 4(3): 187-206.
12. Malinowski P. Neural mechanisms of attention control in mindfulness meditation. Front Neuroscience. 2013; 7: 8-18.
13. Wells A, Papageorgiou C. 13 Metacognitive Therapy for Depressive Rumination. Depressive rumination. 2003; 7: 259.
14. Anvari S. Efficacy of mindfulness based on stress reduction on rat disorders in patients with irritable bowel. Int j humanit soc 2017; 5(03): 56-60.
15. Shahidi S, Akbari H, Zargar F. Effectiveness of mindfulness-based stress reduction on emotion regulation and test anxiety in female high school students. J Educ Health Promot. 2017;2,6-13.
16. Venkatesan A, Krymis H, Scharff J, Waber A. Changes in Perceived Stress Following a 10-Week Digital Mindfulness-Based Stress Reduction Program: Retrospective Study. JMIR Formative Research. 2021; 5(5): e25078.
17. Chen YH, Chiu FC, Lin YN, Chang YL. The Effectiveness of Mindfulness-Based-Stress-Reduction for Military Cadets on Perceived Stress. Psychological Reports 2021; 00332941211010237.
18. Janusek LW, Tell D, Mathews HL. Mindfulness based stress reduction provides psychological benefit and restores immune function of women newly diagnosed with breast cancer: A randomized trial with active control. Brain, Behavior, and Immunity. 2019; 80: 358-373.

19. Tatta J, Willgens AM, Palombaro KM. Mindfulness-and-Acceptance-Based Interventions (MABIs) in Physical Therapist Practice: The Time Is Now. Physical Therapy. 2022; 4: 3-8.
20. Oded Y. Integrating mindfulness and biofeedback in the treatment of posttraumatic stress disorder. Biofeedback 2018; 46(2): 37-47.
21. Gil-González I, Martín-Rodríguez A, Conrad R, Pérez-San-Gregorio MÁ. Quality of life in adults with multiple sclerosis: a systematic review. BMJ open 2020; 10(11): e041249.
22. Dekeyser M, Raes F, Leijssen M, Leysen S, Dewulf D. Mindfulness skills and interpersonal behaviour. Pers Individ Dif. 2008; 44: 1235–45.
23. Ghazagh M, Zadhasan Z. The Effect of Group Mindfulness-Based Stress Reduction Program on the Quality of Life and Fatigue in Patients With Multiple Sclerosis. Avicenna Journal of Nursing and Midwifery Care. 2019; 27(1): 35-44.
24. Kolahkaj B, Zargar F, Majdinasab N. The effects of mindfulness-based stress reduction (MBSR) therapy on quality of life in women with multiple sclerosis, Ahvaz, Iran. Journal of Caring Sciences 2019; 8(4):213-218.
25. Senders A, Hanes D, Bourdette D, Carson K, Marshall LM, et al., Impact of mindfulness-based stress reduction for people with multiple sclerosis at 8 weeks and 12 months: A randomized clinical trial. Multiple sclerosis journal 2019; 25(8): 1178-1188.

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