Iranian Journal of Health Psychology
Vol. 3, No. 2, Serial Number 6, p.119-126, Autumn2020-Winter 2021

Received: 04/16/2020
Accepted: 08/23/2020
Paper type: Research Paper

The Effectiveness of Cognitive-Behavioral Stress Management Training on the Resilience of Patients with Multiple Sclerosis

Maryam Hajilou[1], Hasan Ahadi*[2], MohammadReza Seirafi[3], Saeed Shahbeigi[4]

Abstract

Objective: Multiple sclerosis is a chronic and disabling disease. The purpose of the present research was to examine the effectiveness of cognitive-behavioral stress management training on the resilience of patients with multiple sclerosis

Method: This research was a quasi-experimental design with pre-test, post-test and follow-up, and a control group. The statistical population included female patients with MS referred to the Dr. Shahbigi Neurology Clinic in Tehran. 30 patients were selected by purposeful sampling method and assigned to the two groups experimental and control group randomly. The experimental group underwent ten sessions of stress management training based on the Cognitive Behavioral Model. Data were collected using the Connor Davidson Resilience Scale. Research data were analyzed using Mixed Repeated Measures ANOVA.

Results: The results revealed that cognitive-behavioral stress management training can significantly enhance the resilience of patients with MS.

Conclusion: Therefore, the use of cognitive-behavioral stress management training can be effective in improving the resilience of patients with MS.

Keywords: Multiple Sclerosis, resilience, stress management.

Introduction

Multiple sclerosis (MS) refers to the lesions that accumulate in the brain and spinal cord throughout the disease (Salehi, Almasi-Hashiani, Sahraian & Eskandarieh, 2020). MS produces characteristic lesions that affect more than 2.5 million people worldwide (Moosazadeh, Esmaeili, Nasehi, Abedi & Afshari, 2017). The studies on MS epidemiology revealed an almost universal increase in prevalence and incidence of MS over time; and suggest a general increase in the incidence of MS in females (Alfredsson & Olsson, 2019). Iran is considered as a country with high MS prevalence (51.52 per 100000) in the Middle East (Etemadifar, Sajjadi, Nasr & Fereidan-Esfahani, 2013). Most studies address issues that are still unknown or need to be better understood, as the etiology and pathogenesis of MS (Harirchian, Fatehi, Sarraf, Honarvar & Bitarafan, 2018). It is hypothesized that MS is a multifactorial disease and it is believed several environmental factors and genetic risk factors, as well as their interaction, are the causes of disease. Some of the risk factors of MS are included lack of sunlight exposure, exposure to infectious agents, smoking, immunization, hormonal factors, nutritional

1.Department of Health Psychology, Karaj Branch, Islamic Azad university, Karaj, Iran
2. Department of Health Psychology, Karaj Branch, Islamic Azad university, Karaj, Iran
3. Department of Health Psychology, Karaj Branch, Islamic Azad university, Karaj, Iran
4. MD, Neurologist, Fellowship Of MS, Tehran,Iran
*Corresponding author: Hasan Ahadi , Email:Dr.ahadi@kiau.ac.ir

habits, and psychological stress (Marrie, Garland, Schaffer, Fransoo, Leung & Tremlett, 2019). Empirical and clinical reports also quite consistently confirm the association between disturbances in stress regulation processes and MS (Marrie et al., 2019). There is a connection between emotional stress with the exacerbation of neurological symptoms, mediated either by stress-induced inflammatory factors, which impair the nerve conductance of demyelinated axons or by mechanisms implicated in somatization disorders (Senders, Sando, Wahbeh, Peterson Hiller & Shinto, 2016). Prolonged stress leads to hyper physiological levels of cortisol (Blankespoor, Schellekens, Vos, Speckens & de Jong, 2017). This alters the effectiveness of cortisol to regulate both the inflammatory and immune response because it decreases tissue sensitivity to cortisol (Blankespoor, Schellekens, Vos, Speckens & de Jong, 2017).

Since MS is usually diagnosed in young adults and increasingly in adolescents, it is important to consider that personal development, which is crucial for young adults, maybe affected and overshadowed by the diagnosis (Black & Dorstyn, 2015). Various areas of life, such as education, work, relationships, and social participation, need to be adjusted to gain a new sense of coherence that necessarily has to include MS (Gajofatto et al., 2019). Studies examining patients' adjustments to MS demonstrated a wide range of possible reactions to the diagnosis and different levels of resilience (Black & Dorstyn, 2015). Indeed, evidence indicates that higher levels of resilience are related to lower psychopathology in adults newly diagnosed with MS (Rainone et al., 2017).

Psychological resilience is the ability to mentally or emotionally cope with a crisis or to return to pre-crisis status quickly (Campbell-Sills, Cohan & Stein, 2006). Resilience exists when the person uses mental processes and behaviors in promoting personal assets and protecting self from the potential negative effects of stressors (Clauss-Ehlers, 2008). Resilience is protective factors that modify, ameliorate, or alter a person's response to some environmental hazard that predisposes to a maladaptive outcome (Connor & Davidson, 2003). Resilience can stem from adverse life events, such as parental loss, and cause negative effects on well-being (Davydov, Stewart, Ritchie & Chaudieu, 2010). However, the emerging concept that resilience develops through adversity (Denz-Penhey & Murdoch, 2018) is one that has filtered through to the performance context. In this context, individuals face a variety of stressors, and importantly, in some instances, that is, disease, the individuals actively put themselves in these stressful situations and are forced to develop this quality.

An individual's ability to reduce stress, cope with stressful situations, and achieve resilience is called stress management (Blumenthal, et al., 2016). Given the significant contribution of stress to psychosomatic diseases, appropriate responses to stressful stimulants contribute to the improvement of the patients' health (Gloster, Klotsche, Aggeler, Geisser, Juillerat, & Gaab, 2019). Among the different intervention approaches for managing stress, interventions that use cognitive-behavioral techniques are the most effective (Riley, Park, Wilson, Sabo, Antoni & Cope, 2017). Cognitive-behavioral interventions specifically deal with negative emotional responses by correcting irrational cognition (Graham, Sorenson & Hayes-Skelton, 2013). Cognitive-behavioral interventions aim to change cognition and subsequently reinforce active coping skills and appear to be effective at enhancing individuals' psychological resources and responses (Terp, Hjärthag & Bisholt, 2019) which can eventually lead to increased resilience in individuals. Stress management program with the cognitive-behavioral approach includes elements such as awareness of stress, relaxation training, identification of dysfunctional thoughts, cognitive restructuring, problem-solving process training, assertiveness training, anger management, and time management (Riley, Park, Wilson, Sabo, Antoni & Cope, 2017). These techniques help modify and correct false interpretations of the

events occurring in the environment and develop new perspectives (Firth, 2014). The patient thus understands that complexity and ambiguity are two major characteristics of most situations in life and then learns to tolerate this ambiguity and uncertainty and have more cognitive flexibility; ultimately, he learns to use these new behavioral and cognitive perspectives as a coping response to stress-causing events (Terp, Hjärthag & Bisholt, 2019). Therefore, this approach can be effective in increasing the level of resilience. However, although some of the studies have indicated the effectiveness of cognitive-behavioral-based stress management training on reducing anxiety (Mehraban, Bahmani, Azimian & Rezasoltani, 2015), depression (Valizadeh, Sohrabnejad, Mehraban & Ahmadboukani, 2015), and stress (Anagnostouli, Babili, Chrousos, Artemiadis & Darviri, 2019) in MS patients, no study has examined the effects of cognitive-behavioral-based stress management training on enhancing resilience in the patients.

Therefore, resilience is a capacity for resistance to stress and disaster and is of particular importance in an MS patient; because resilience can increase the ability of MS patients to adjust to the disease and overcome its difficulties. However, it seems that in MS patients, cognitive-behavioral stress management with various cognitive and behavioral techniques can help increase resilience by reducing stress levels. Given the importance of resilience in these MS patients and the lack of a study on the effectiveness of cognitive-behavioral stress management on resilience in MS patients, the present study was designed to investigate the effectiveness of cognitive-behavioral stress management training on increasing resilience in MS patients.

Method

The present study was a quasi-experimental, pre-experimental, post-experimental, and follow-up study with an experimental group and a control group. The population of this study included all female patients with MS referred to Dr. Shahbigi Neurology Clinic in Tehran. According to the inclusion criteria for entering the study, 30 patients were selected by purposeful sampling method. They were randomly assigned to two experimental and control groups (15 in each group). The experimental group underwent cognitive-behavioral stress management training. Intervention sessions were held weekly and each session lasted 90 minutes. All participants completed the Connor Davidson resilience scale in the previous, next, and two months after the intervention sessions. The inclusion criteria were: suffering from MS, passing at least 6 months since the diagnosis of the disease, not using other psychotherapy methods at the time of the study, and no previous participation in therapeutic sessions like relaxation or cognitive therapy in the past 6 months. The exclusion criteria were: having medical procedures or conditions that make the participants ineligible for the study, a history of acute psychiatric disorders (such as psychotic, bipolar and major depressive disorders), suffering from other medical severe illnesses except for MS such as cancer, absence of more than two sessions during the intervention, and unwillingness to continue research.

Ethical statement

All individuals gave consent to participate in the intervention program voluntarily and were informed of the intervention process. The participants were assured that their information will be kept confidential. The participants were briefly explained about the study process and its goals. It was explained that if participants are reluctant to continue, they can stop taking part in the study at any time. It was also mentioned that at the end of the study, the results would be revealed to participants. This article is written based on Ph.D. thesis and has a code of ethics committee number IR.IAU.K.REC.1396.89. Connor Davidson Resilience Scale was used in this study.

Connor Davidson Resilience Scale (CD-RISC): The CD-RISC contains 25 items, all of which carry a 5-point range of responses, as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4) (Connor & Davidson, 2003).The scale is rated based on how the subject has felt over the past month. The total score ranges from 0–100, with higher scores reflecting greater resilience.

The subscales or factors of the scales included: personal competence, tolerance of negative affect, secure relationships, control, and spiritual influences. Alpha reliability was observed as for factor 1, α=0.80, factor 2, α= 0.75, factor 3, α = 0.74, factor 4, α=0.69, and overall α=0.89 in a study (Connor & Davidson, 2003).

Implementation

The training program included 10 sessions of cognitive-behavioral stress management training. Cognitive-behavioral stress management therapy refers to a group of stress management therapies that focus on the cognitive and behavioral approach. Stress management enhances people's ability to reduce tension and adapt to stressful situations. This intervention consists of elements such as increasing stress awareness, relaxation training, identifying dysfunctional thoughts, cognitive reconstruction, problem-solving training, self-expression skill training, anger management, self-management, and activity planning. It also includes a set of techniques used to reduce the stress experienced by individuals or to increase their ability to cope with problems. The training protocol was under the Practical Guide to Stress Management Group Therapy based on the Sarah McNamara's Practical Program including 6 sessions that were conducted under the program proposal and based on needs assessment and with the agreement of the participants, four additional sessions were held within the framework of the Cognitive Behavioral Model and the core program as follows. The intervention was conducted in ten 90-minute sessions once a week for three months by the researcher. The procedure is summarized in Table 1.

In this research, the mean and standard deviation were used in the descriptive part, and the Clemogrov-Smirnov test to examine the normal distribution of variables, Levene's test to examine the equality of variances, Mauchly's test to verify the assumption of sphericity of the data, and Mixed Repeated Measures ANOVA to investigate the research hypothesis were used at the inferential level. Statistical results were analyzed using the SPSS-21 software.

Results

The results of the research showed that the mean (and standard deviation) of the age of patients were respectively 37.29 ± 6.13 in the experimental group and 38.27 ± 6.64 in the control group. Table 2 presents the mean and standard deviation of resilience for patients affected by MS in control and experimental groups based on the pre-test, post-test, and follow-up stages.

As seen in the table, there is an obvious difference between the mean posttest scores in the control and experimental groups; in the experimental group, the mean scores of resilience in posttest and follow-up are higher than the scores of the pretest. Before presenting the results of Mixed Repeated Measures ANOVA, parametric test presumptions were examined. According to the results of Levene's test, the presumption of equality of intergroup variances has been observed for the posttest and its insignificant results for all variables (p>0.05). Results of the Clemogrov-Smirnov test also indicated that the distribution of the variables was normal (P <0.05). In contrast, the results of Mauchly's sphericity test demonstrated the nonsignificance of the test for the resilience variable (p>0.05). This means that the sphericity assumption was met for the implementation of the repeated measures of ANOVA, so multivariate analysis of covariance can be done.

As Table 3 shows, the results of repeated measures of ANOVA indicated that the Time factor (F=23.11, df=1, P=0.001), Group factor (F=16.34, df=2, P= 0.001) and the interaction of the Time and the Group (F=4.18=, df=2, P= 0.01) were significant respecting resilience. These results represent that there was a significant difference between groups' resilience in the pre-test, post-test, and follow-up stages. Similarly, the Bonferroni post-hoc test was employed to determine the difference between Time factors.

As Table 4 shows, Post-hoc tests using the Bonferroni correction showed that the difference in the effect of intervention from pre-test to post-test and follow-up was significant, but the difference in resilience scores in post-test to follow-up was not significant; on the other hand, after two months, the effect of intervention remained stable (Table 4).

Table1. The content of cognitive-behavioral stress management sessions for patients with MS

Sessions	The content of the Sessions
First Session	Introducing the Group Therapist and Getting to Know Each Other, General Program Information, Description of Program Structure, Stress and Function - Breathing and Relaxation - Understanding Stress and the Need to Learn Coping skills, Summarizing, Assigning Homework.
Second Session	Homework Assessment, Benson Stress-Relief techniques, Mental Stress Coping Techniques, Summarizing, Assigning Homework.
Third Session	Homework Assessment, Relaxation with Diaphragmatic Breathing, Physical Coping Strategies (sleep quality and its promotion, caffeine consumption, familiarity with the menstrual syndrome, exercise, and lifestyle enhancement), Summarizing, Assigning Homework.
Fourth Session	Homework Assessment, Gradual Muscle Relaxation, Planning, and Time Management, Summarizing, Assigning Homework, and Snack Time.
Fifth Session	Homework Assessment, Diaphragmatic Breathing, Social Skills, and Interpersonal Relationships, Summarizing, Assigning Homework.
Sixth Session	Homework Assessment, relaxation with Imaging and Diaphragmatic Breathing, Self-Esteem Promotion, Prevention and Treatment of Anxiety and Depression, Summarizing, Assigning Homework.
Seventh Session	Homework Assessment, Relaxation with Imaging and Diaphragmatic Breathing, Review Symptoms and Effects of Stress, Relationship between Thoughts and Emotions, Summarizing, Assigning Homework.
Eighth Session	Homework Assessment, Gradual Muscle Stress Relieving, Cognitive Disturbances, Negative Thoughts and Behaviors, Negative Thought Identification Practice, Summarizing, Assigning Homework.
Ninth Session	Homework Assessment, Diaphragmatic Relaxation, Differences between Logical and Irrational Self-talk, Logical Thoughts Replacement Steps, Practical Logic Thoughts Replacement, and Homework and Reception Homework, Summarizing, Assigning Homework.
Tenth Session	Homework Assessment, Diaphragmatic Relaxation, Definition of Coping, Effective Coping Types, Ineffective Coping Types, Discussion of Coping Intervention Strategies, Summarizing.

Discussion

The present research has been aimed at determining the effectiveness of cognitive-behavioral stress management training on increasing resilience in MS patients. According to the findings, cognitive-behavioral stress management training was effective in increasing resilience in patients with MS. The results

Table2. The mean and standard deviation scores of the resilience of control and experiment groups

Variable	Phases	The control group		The experimental group	
		Mean	SD	Mean	SD
Resilience	**pre-test**	44.26	16.54	44.41	11.46
	post-test	43.33	14.42	50.03	15.30
	follow-up	45.93	17.96	51.91	14.04

of this study are in line with other research findings that indicated the effectiveness of cognitive-behavioral-based stress management training on reducing anxiety (Mehraban, et al., 2015), depression (Valizadeh, et al., 2015), and stress (Anagnostouli, et al., 2019) in MS patients.

In explaining this finding, it can be stated that cognitive-behavioral-based stress management can be used to correct and change the way people look at stressful events, promote strategies for coping with stress and reduce the physical stress responses helps maintain a person's health (Mehraban, et al., 2015). Cognitive-behavioral-based stress management can be effective in enhancing resilience through an increased sense of control, self-esteem, adaptive coping, and social support while reducing anxiety in these patients (Anagnostouli, et al., 2019). In this study, by using behavioral strategies such as relaxation, stress management, and relaxation of muscle tension, patients' anxiety was reduced (Harirchian, et al., 2018). Also, concerning stress-related physical symptoms, patients were able to identify and to understand that relaxation is incompatible with stress, thus enhancing their resilience (Valizadeh, et al., 2015), which is effective in helping individuals face adversity and in promoting emotional health, like anxiety and depression.

From another point of view, it can be stated that stress management training affects patients' attribution style, so that they are more optimistic and confident in dealing with stressful events, viewing the events as manageable, and therefore coming up with more coping strategies, which leads to increased resilience and more adaptability to the environment (Terp, et al., 2019). It can also be said that stress management planning is a type of control program in which, the biological roots of stress are used to teach people how to cope with stress to reduce the unpleasant aspects of tension (Mehraban, et al., 2015). Since a wide range of behaviors can affect stress, learning the necessary skills can control stress and change the level of resilience by changing one's assessment system. Finally, it can be said that multiple sclerosis, like other chronic diseases, has both physical and psychological symptoms (Harirchian, et al., 2018). However, previous research has shown that cognitive-behavioral stress management training has an impact on reducing the levels of anxiety and stress and improving the quality of life in the intervention group, as compared with the control group (Gloster, et al., 2019). As a result of this, cognitive-behavioral stress management training appears to be useful in improving these patients' psychological problems (Riley, et al., 2017), this, in turn, can be effective in enhancing resilience in patients with MS.

Resilience is generally the ability of a complex system to demonstrate positive outcomes in the face of adversity (Denz-Penhey & Murdoch, 2018). Resilience has been described as processes and patterns of positive adaptation in development,

Table3. The results of repeated measures ANOVA for resilience

	Sum of Squares	Mean square	F value	P-value	Eta-squared
Time	3077.23	3077.23	23.11	0.001	0.49
Group	4186.10	2093.05	16.34	0.001	0.40
Time × Group	3771.44	1885.72	4.18	0.01	0.14

Table4. Post-hoc test using Bonferroni correction for comparing different times in resilience

Variable	Time	Interval	Difference of means	P-value
resilience	Pre-test	Post-test	2.77	0.05
		Follow-up	3.69	0.04
	Post-test	Follow-up	.86	>0.05

during, or following threats to adaptation (Davydov, et al., 2010). Some indicate resilience as the protective factors, processes, and mechanisms that contribute to a good outcome despite experiences with stressors that carry significant risks for mental ill-health (Clauss-Ehlers, 2008). Resilience enables the individual to benefit from his or her adaptive skills and turn stressful situations into opportunities for learning and growth, and control stress by focusing on the problems. A resilient person can confront the stresses, challenges, and events of his or her life, as well as being actively involved in his or her environment (Campbell-Sills, et al., 2008). Some studies reported that the process of resilience has changed over time in MS patients and that it can help maintain mental health after unpleasant and painful experiences (Black & Dorstyn, 2015).

Conclusion

Based on the results of this study, cognitive-behavioral stress management training was effective in enhancing resilience in patients with MS. According to this, it is suggested that cognitive-behavioral stress management therapy as a selective and complementary therapeutic approach in medical management and should be employed to manage the associated psychiatric problems in patients with MS. One of the limitations of the present study is that the research has investigated the patients with MS referred to Dr. Shahbigi Neurology Clinic in Tehran; so, there is a constraint regarding the possibility of generalizing the results. Furthermore, the sampling method and the mere use of the questionnaire have been another constraint. The results of this research are considered as important implications of education and promotion of mental health in patients affected by coronary heart disease.

Acknowledgment

This article is written based on a doctoral dissertation and has a code of ethics committee number IR.IAU.K.REC.1396.89. All participants in this study are gratefully acknowledged.

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