

## Effectiveness of psychological training combined with gradual muscular stress relaxation technique on quality of life of patients with multiple sclerosis

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### Abstract

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**Background:** Multiple sclerosis (MS) is one of the most common chronic diseases of the central nervous system. The aim of this study was to determine the effectiveness of psychological training combined with gradual muscular stress relaxation technique on QOL of patients with MS.

**Materials and Methods:** This triple-blind, controlled, clinical trial was conducted on 60 patients with MS who were members of the Multiple Sclerosis Society of Yazd Province, Iran. The subjects were selected through convenience sampling method and with the consideration of the inclusion criteria. The participants were randomly divided into 2 groups of experimental (30 persons) and control (30 persons). The experimental group received 12 sessions of psychological training combined with gradual muscular stress relaxation technique (2 sessions per week), but the control group received no intervention. The data collection tools used consisted of a demographic characteristics form and the Multiple Sclerosis Quality of Life-54 (MSQOL-54) questionnaire. The questionnaires were completed before, immediately after, and 3 months after the training. Data were analyzed using the statistical tests of student's t-test, Pearson correlation, and repeated measures.

**Results:** QOL score in the experimental and control groups were  $50.86 \pm 14.78$  and  $56.25 \pm 13.09$  before the intervention ( $p=0.141$ ),  $68.49 \pm 11.81$  and  $55.76 \pm 13.37$  immediately after the intervention, and  $67.80 \pm 11.90$  and  $55.06 \pm 12.83$  three months after the intervention, respectively. This difference was statistically significant ( $P < 0.0010$ ). Moreover, repeated measures statistical test showed a meaningful increase in QOL score in the experimental group in the 3 measurements ( $P < 0.0001$ ).

**Conclusions:** The implementation of psychological training intervention combined with gradual muscular stress relaxation method in patients with MS increases QOL. Therefore, it can be used as a beneficial intervention method for improving the QOL of patients with MS.

**Keywords:** Multiple Sclerosis, Training, Psychological, Relaxation, Quality of Life

### Introduction

Multiple sclerosis (MS) is an autoimmune, inflammatory, chronic, and progressive disease which occurs in the form of neural damages or damaged myelin in the white matter of the brain, spinal cord, and optic nerves (1-5).

MS is one of the most important central nervous system diseases, one of the most common neurologic diseases in humans, and

the most common illness leading to inability in young people (6).

In south west Asian countries, the incidence of this disease is approximately 51.52 in 100,000 persons (7). The main cause of this disease is

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not yet known, but genetic and environmental factors have a role in its occurrence (8, 9).

Iran is among the countries with high MS incidence rate, which ranges from 5.30 to 74.28 per 100,000 persons, and the reason for this is still unknown (10). Although the prevalence of MS is high in the age group of 20 to 40 years, the symptoms of this disease may also be observed in childhood and middle age (11). The prevalence of MS in women is higher compared to men due to hormonal and immune system-related factors. The ratio of MS incidence among women to men has been reported as 2 to 1 in some sources (12), and 4 to 1 or 3 to 1 in other sources (13). Quality of life (QOL) is a multidimensional concept the meaning of which stems from the beliefs and ideas of the individual, and thus, it must be evaluated through the perceptions of patients (14). This concept includes physical health, psychological states, independence, social relationship, and personal and religious beliefs (15), and is comprises different constructs such as social, physical, psychological performance, overall health perception, and social opportunities (16).

The QOL of patients is considered as an index for the quality of healthcare and part of disease control programs; therefore, measuring the physical health of these patients alone is not enough. QOL includes notions beyond physical health, and it is necessary to measure QOL as an important consequence separately (17).

Chronic diseases such as MS decrease the QOL of patients (18, 19). Today, governments and health systems all over the world pay attention to improving patients' QOL, increasing physical, mental, and social welfare of individuals and the society through health and treatment services and modern treatment methods, and decreasing consequences of illnesses (19, 20).

The effect of psychological intervention on the improvement process of chronic physical illnesses has been confirmed (19). Due to the expansion of the health psychology field, psychologists have a more active role in the

treatment process of patients (21). Most mental-social interventions are based on the traditional approach of medicine which is designed for treatment, damage, illness, disability, and malfunction. Psychological training interventions show a paradigm change which follow a comprehensive approach based on competence, focus on health, participation, management, and rehabilitation (22). The provision of suitable medical and psychological information in psychological training interventions can improve patients' satisfaction and decrease their psychological symptoms (23).

Another investigation showed correlation between physical fatigue and physical disability, and psychological fatigue and depression in these patients; physical fatigue is a predictor of physical disability during a 1-year time period (24). More than 90% of patients with MS experience fatigue, and 50% to 60% report this problem as the worst symptom of the disease which has a severe impact on their daily activities and performance, and QOL (25). Sa performed a review study on the psychological aspects of MS (26). Sa concluded that treatment methods such as psychotherapy, cognitive behavioral therapy (CBT), increasing confrontational behavior, self-control therapy, and drug therapy are effective on the improvement of psychological status and QOL (26). Many psychological factors have a role in the QOL of patients with MS; therefore, damages and physical disabilities should not be the sole focus of researches. New intervention studies should be designed which consider the QOL and health of these patients (27). Most scientific and research investigations on behavior interventions have been focused on psychological-social actions including QOL, fatigue, or depression. However, it can be clearly stated that part of the biological processes such as inflammation, endocrine-nerve disorders, or brain damage are among the neural-psychological symptoms of MS (28).

Therefore, psychological intervention methods can have a distinct role in this respect. Although national and foreign researches have been conducted in this regard, the researchers did not find a study which investigated the effectiveness of psychological training intervention combined with gradual muscular stress relaxation technique on the QOL of patients with MS. Therefore, the goal of the present study was the determination of the effectiveness of psychological training intervention combined with gradual muscular stress relaxation technique on the QOL of patients with MS.

### **Materials and Methods**

The present study was a triple-blind, controlled, clinical trial. The target population consisted of patients with MS. The statistical population consisted of all patients with MS who were members of the Multiple Sclerosis Society of Yazd Province, Iran, located in the Baghaipour Speciality and Super Speciality Polyclinic in Shahid Sadoughi Hospital in the year 2015.

The statistical sample, based on methods of sample size determination, included 60 patients with MS who were members of the Multiple Sclerosis Society of Yazd Province. The subjects were randomly divided into two groups of experimental (30 persons) and control (30 persons) with the consideration of the inclusion and exclusion criteria. A permit was obtained from the authorities, and written consent forms were obtained from the subjects after sufficiently explaining the goals and methods of the research, then, they were invited to participate in the study. The inclusion criteria included lack of another physical disease, lack of any mental and psychological diseases, lack of reaching the acute phase of the disease, at least one year history of affliction with MS, lack of use of corticosteroid for 2 months prior to and during the study, lack of pregnancy in women, lack of history of cigarette, alcohol, and drug addiction, age of 20-40 years, education level

of at least middle school, lack of use of ecstasy drugs and cognitive treatments during the study, lack of participation in yoga and relaxation classes, special sport activities, and lifestyle and adjustment techniques in the past 6 months, lack of hearing and speaking problems, undergoing treatment and lack of modification of medication during the study, of Expanded Disability Status Scale (EDSS) score of 0.5-4, and Iranian nationality. The exclusion criteria included lack of regular participation in educational classes, the occurrence of special problems for the patients during the study period, lack of willingness to continue the study, and occurrence of an accident for the patient during the last 6 months.

The study process is summarized in the following steps:

A. Before the intervention: After selecting the subjects in accordance to the inclusion and exclusion criteria, they were randomly divided into experimental (30 persons) and control (30 persons) groups. First, psychology and neurology specialists interviewed and examined the patients. Then, both groups filled a demographic characteristics questionnaire and the Multiple Sclerosis Quality of Life-54 (MSQOL-54). The validity and reliability of the Persian version of the MSQOL-54 has been approved in Iran (29). This questionnaire includes 54 questions which are scored on 2-point to 7-point Likert scales. The QOL score is determined based on the scores for the two combinatory fields of physical health and mental health. Scores of the 14 fields and the two combinatory fields range from 0 to 100 and higher scores show a better status. Sanglji et al. studied the relationship between disability and QOL in patients with MS in the Multiple Sclerosis Society of Tehran, Iran, using the MSQOL-54 (30). Heidari Soursh Jani et al. also used this questionnaire in their investigation of the QOL of patients with MS in Esfahan, Iran, and confirmed the validity of this tool ( $r = 0.86$ ) (31). In the present study, the MSQOL-54 was used in order to measure the participants' QOL. These questionnaires

were completed by the subjects during the session before the educational intervention in the abovementioned center after the interviewer provided sufficient explanation.

B. The intervention: The psychological training package which was approved by specialists in the field of psychology and medicine was performed in the experimental group during 12 90-minute sessions (45 minutes speech and 45 minutes group discussion), 2 sessions per week. The gradual muscular stress relaxation technique was performed in the experimental group for 3 months, once per day in the presence of the researcher, and the subjects completed a self-report checklist. The control group received no education in this period and had no knowledge of the education of the experimental group.

C. Immediately after the intervention: In the session after the end of the intervention, the questionnaires were again filled by both groups in the presence of the interviewer, and both groups were interviewed and examined by psychology and neurology specialists.

D. Follow-up step. In the follow-up step 3 months after the intervention, the questionnaires were filled by both groups in the presence of the interviewer and both groups were interviewed and examined again by psychology and neurology specialists. The collected data were coded and entered into the computer, and analyzed in SPSS software (version 17, SPSS Inc., Chicago, IL, USA) using chi-square test, t-test, repeated measure, and the Pearson correlation coefficient. Furthermore, based on ethical principles, after 3 months of follow-up and data collection, the 12 educational sessions were held for the control group. Because of the triple-blind nature of the study, the questionnaires were filled in the presence of the interviewer.

## Results

In this study, 60 individuals in two groups of experimental (30 person) and control (30 persons) participated. Among the experimental and control group participants, 24 (80%) and

23 (76.7%) were women, 7 (23.3%) and 9 (30%) single, and 18 (60%) and 15 (50%) homemakers, respectively. In the experimental group, 18 (60%) subjects had high school education, and 12 (40%) had university degrees. In the control group, 16 (53.3%) participants had high school education, and 14 (46.7%) had university degrees. In the experimental group, 6 (20%), 19 (63.3%), and 5 (16.7%) individuals had, respectively, good, average, and weak economic status. In the control group, 5 (16.7%), 20 (66.6%), and 5 (16.7%) individuals had good, average, and weak economic status, respectively. Moreover, 2 (6.7%) and 1 (3.3%) subjects in the experimental and control groups, respectively, had a history of MS in the family. The average and standard deviation of age of the subjects was  $32.92 \pm 6.73$ . This average was  $33.60 \pm 6.28$  in the experimental group and  $32.033 \pm 6.403$  in the control group ( $P = 0.343$ ). The age of subjects at the onset of the disease in the experimental group was  $27.53 \pm 7.04$  and in the control group was  $25.87 \pm 5.76$  ( $P = 0.320$ ). The duration of the disease in experimental group was  $6.03 \pm 4.16$  and in the control group was  $6.03 \pm 4.21$  ( $P = 0.987$ ). Mean BMI in the experimental and control groups was, respectively,  $23.60 \pm 3.68$  and  $24.27 \pm 4.33$  ( $P = 0.519$ ). EDSS score in the experimental and control groups was, respectively,  $2.35 \pm 0.238$  and  $2.29 \pm 0.346$  ( $P = 0.437$ ) (Table 1).

Statistical analysis of demographic and disease data using chi-square test for qualitative variables and student's t-test for quantitative variables showed that the experimental and control groups had no meaningful difference before the intervention ( $P > 0.050$ ). Furthermore, t-test results showed no statistically significant difference between the two groups in terms of average QOL score before the intervention ( $P = 0.141$ ). However, this difference between the two groups was significant immediately and 3 months after the intervention ( $P < 0.0001$ ). The QOL score had greater increase in the experimental group compared to the control group.

**Table 1:** The demographic characteristics and illness information of the two groups

Demographic and disease information	Frequency of group	Experimental		Control		Total		P-value
		Number	Percent	Number	Percent	Number	Percent	
Gender	Male	6	20	7	23.3	13	21.7	P=0.754
	Female	24	80	23	76.7	47	78.3	
Marital status	Single	7	23.3	9	30	16	26.7	P=0.771
	Married	23	76.7	21	70	44	36.4	
Education	High School	18	60	16	53.3	34	56.7	P=0.602
	University	12	40	14	46.7	26	43.3	
Occupational status	Unemployed	3	10	2	6.7	5	8.3	P=0.868 not valid
	Student	3	10	4	13.3	7	11.7	
	Homemaker	18	60	15	50	33	55	
	Employee	3	10	5	16.7	8	13.3	
	Self-employed	3	10	4	13.3	7	11.7	
Economic status	Good	6	20	5	16.7	11	18.3	P=0.987
	Average	19	63.3	20	66.6	39	65	
	Weak	5	16.7	5	16.7	10	16.7	
MS history in family	No	28	93.3	29	96.7	57	95	P=1
	Yes	2	6.7	1	3.3	3	5	
Statistical indexes		Experimental group (Mean ± SD)		Control group (Mean ± SD)				P-value
Age		33.6 ± 6.284		32.033 ± 6.403				p= 0.343
Age of disease onset		27.533 ± 7.045		25.867 ± 5.758				p= 0.32
Disease duration		6.033 ± 4.156		6.033 ± 4.206				p= 0.987
BMI		23.599 ± 3.685		24.272 ± 4.329				p= 0.519
EDSS		2.35 ± 0.238		2.29 ± 0.346				p= 0.437

BMI: Body mass index, EDSS: Expanded disability status scale

In addition, repeated measures results showed a significant difference in the mean QOL score of the experimental group between the three

different times ( $P < 0.0001$ ). However, this difference was not significant in the control group ( $P = 0.587$ ) (Table 2).

**Table 2:** Comparison of mean quality of life score in the experimental and control groups at three different times

Group	Experimental (Mean ± SD)	Control (Mean ± SD)	t-test
Time of investigation			
Before the intervention	50.865±14.785	56.251 ±0.961	p=0.141
Immediately after the intervention	68.488±11.81	55.761±13.370	p<0.00001
Three months after the intervention	67.8±11.90	55.0633±12.831	p<0.00001
Results of repeated measures test	p<0/00001	p=0.587	-

### Discussion

In this study, statistical comparison of the two groups showed no significant difference between the groups in terms of some variables before the intervention (Table 1); this result

shows the randomness of selection of subjects for each group. The results of this study showed that psychological training combined with gradual muscular stress relaxation technique increases the QOL score in the experimental group compared to the control

group. Furthermore, the present study results showed a significant difference in QOL score between the two groups in the three measurements. This meaningful difference indicates the impact of psychological training combined with gradual muscular stress relaxation technique on increasing the QOL score in the experimental group in different times after the intervention. This finding signifies that psychological training intervention is effective on improving QOL of patients with MS which is in agreement with the results of other studies in this field. For example, the results were in agreement with findings of Somrarnyart (32) and Schulman et al. (33). In a controlled clinical trial, Masoudi et al. investigated the effect of family-centered empowerment model on QOL and self-efficacy of 70 family caretakers of patients with MS (34). Independent t-test showed no statistically significant difference in QOL and self-efficacy of control and experimental groups before intervention; however, this difference was significant after the intervention ( $P = 0.001$ ). Paired t-test results were significant in the experimental group before and 3 months after the intervention ( $P = 0.001$ ); however, this difference was not significant in the control group (34). Soleimani et al. conducted a controlled clinical trial on the effectiveness of self-control therapy on QOL of patients with MS (20 individuals in the experimental group and 20 individuals in the control group) (35). They found a significant difference in the average score of QOL of patients with MS compared with the control group; the QOL score of patients with MS had increased significantly (35). Sa, in a review study on psychological aspects of MS, reported that treatment methods such as psychotherapy, self-control therapy, and drug therapy are effective on the improvement of psychological status and QOL (26). There is no doubt that an important psychological problem in this group of patients stems from increased physical and psychological problems which prevent a sense of control over daily conditions of life.

Therefore, their medical and rehabilitation programs are disrupted. Generally, psychological interventions provide patients with a better understanding of their status and daily life. This gives patients a sense of peace and causes them to have a more active role in self-management and prevention of disease recurrence. Psychological intervention increases compulsive performance of patients. The psychological interventions in the present study had an effect on compulsive performance through components such as compulsive adjustment, gradual muscular stress relaxation, stress management, problem solving, hope, personal relationships, sport activities suitable for these patients, and etc. The increase in QOL score in the experimental group was due to the patients gaining a better understanding of their thoughts and emotions, more positive beliefs, their strengths, learning logical inference and realistic assessment of events, and positive attention towards life and family during education sessions, and gaining peace through gradual muscular stress relaxation.

### Conclusion

The execution of psychological training combined with gradual muscular stress relaxation technique is simple. Thus, this intervention program is recommended as a treatment method for patients with MS to increase their QOL score and have positive effects on their QOL.

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**Conflict of Interest:** None declared

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