



The effect of a pain management program in reducing the pain in patients with multiple sclerosis

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Abstract

Pain is common symptom in multiple sclerosis (MS) which is experienced by the sufferers in all stages of the disease. Therefore, multidimensional and comprehensive treatments are necessary in order to reduce the pain; via programs including of pain management. The aim of this study was to investigate effect of the pain management programs in reducing the pain symptoms in patients with MS. 10 MS patients were chosen using convenience sampling method from those registered in MS clinic of Ghaem hospital in Mashhad. Then, they were divided randomly into the experimental and control groups. The experimental group participated in 12 sessions of 45 minutes per session to receive the pain management education programs. Data were gathered using a numerical rating scale of pain, symptom checklist-90- Revised (SCL-90-R) and physical symptoms subscale of the general health questionnaire. The results showed that pain mean score of patients reduce significantly after receiving the education. The effect of intervention was 0.79 for numerical rating scale, 0.67 for the somatization subscale of SCL-90-R, and 0.52 for physical symptoms subscale of general health questionnaire. That is, the intervention reduced pain meaningfully in all measured parameters. Based on the obtained results, the pain management education can decrease the amount of pain in MS patients. It is recommended to consider this treatment as a part of this group's main treatment and rehabilitation programs.

Keywords: Multiple Sclerosis, Pain, Pain Management

Introduction

Multiple sclerosis is one of the most common neurological disorders and is considered as the major cause of disability in young adults [1]. This is a chronic, progressive disorder of central nervous system that occurs due to the loss or injury of myelin sheath in brain and spinal cord. It results in problems and difficulties in transmitting the nervous signal and creates

numerous debilitating symptoms [2]. The symptoms can be physical or mental and may be cognitional in some illnesses and problems [3]. Severity and type of symptom depend on the area which is affected in nervous system and include lack of sensitivity or altered sensation (such as numbness in members, tingling, weakness in muscles), muscle spasm,

difficulty in movement and balance, difficulty in speaking, vision problems (such as double vision, blurred vision nystagmus) severe fatigue, cognitive impairment, mood instability, and depression [4].

Pain is one of the most common symptoms of this disease and is considered as one of the most important and influential factors affecting the patients' quality of life and psychological health [5,6]. Several studies have reported different prevalence rates for this symptom. O'Conner and colleagues [7] have reported the rate of 26 to 86 percent. However, Solaro and the colleagues found out that over 75% of the patients with MS experience pain and this symptom may exist in all stages of the disease. In another study, the results showed that more than 86% of the patients suffer pain [8,9]. The difference between the rates of pain prevalence in these patients is due to the diversity of definitions and the applied methods [7]. Physical pain reported by patients is often debilitating, widespread, and chronic and also depends on the area affected in nervous system [10]. Some researchers [7] believe that the patients experience 4 kinds of pain: central neuropathic continuous pain, central neuropathic intermittent pain, musculoskeletal pain, and mixed neuropathic and non-neuropathic pain. Sullivan and his colleagues found out that 5.27-58% of patients experience the central neuropathic pain among which headache and pains related to inflammation of optic nerve are so popular [10]. However, they may experience some other types of pain, even the ones with a psychological origin (with no physical causes [7].

Etiology of pain in MS patients suggests that their pain may be caused by inflammation, neuropathic pain associated with damage in Central Nervous System (CNS), spasticity pain, spasm and cramps in muscle, and muscle pain [11]. The pain can influence the patients' quality of life, social interactions, appropriate use of leisure time, social activities, taking the responsibilities in family, career and educational life and the psychological health, by interfering in person's mental and emotional functioning [5,12]. Warnell and colleagues' [13] study

suggested that among the MS patients who report pain, 40% have severe difficulty in working, 34% in communicating with the others, and 44% in sleeping.

Since it is a recurring, debilitating, and progressive disease, conducting programs adhered to medical treatments and symptom management, seems necessary for improving the quality of life in MS patient. Pain management program is a part of the self-care program for the MS patients that can be effective in improving their quality of life and overall well-being [14]. The program combines learning about psychology of pain, health function and self-management of pain related problems, guided practice on underlying goals and moving towards them, identifying and changing the inappropriate beliefs and ways of thinking, relaxation therapy, and changing the habits which reinforce disability [15]. The aim of the program is to empower and prepare the patients in order to manage their health and self-care. Managing and controlling the annoying chronic situations by those who are directly living in the circumstances, is the latter approach's main idea. In other words, since a better management leads to a better control over the symptoms and improvement in the quality of life, the main purpose of pain self-management is to help life, the main purpose of pain self-management is to help themselves [16]. Studies based on the cognitive-behavioral principles, have shown the effect of pain management programs in improving the experience of pain, mood, coping strategies, negative attitudes towards pain, and the activity level [17,18]. Rehabilitation programs such as vocational rehabilitation and physical intervention can be also considered effective in treatment of pain [18]. Some of the studies have suggested that pain management program can reduce the disability and psychological distress dramatically and improve the physical performance indicator as well [17,19]. Furthermore, barlow and colleagues [20] reported the effect of MS patients' self-management in improving health condition and reducing depression. Thomas and colleagues'

findings confirm the effect of this cognitive-behavioral based approach in increasing the received self-efficacy in fatigue management [21]. In another research, Bombardier and colleagues investigated the efficacy of telephone counseling with a focus on distress and fatigue management, exercise, providing social and communicative support, decreasing anxiety and using drugs on mental health and reducing the fatigue in MS patients. The findings indicated a rise in effect of activities in improving their health, mental health, and distress management [22]. In this regard, Finlayson and colleagues also found out that fatigue management training can help the patient in managing the debilitating symptoms [23].

Although most pain treatments have focused on medication and have been done by physicians, the high costs of medication, medications' side effects such as drowsiness, mood changes, hypotension, dry feeling in mouth, insomnia, mental-physical irritability, drug dependence, and drug abuse have been always considered as problems by patients, their families and professionals. In addition, experts believe that we need all specialists in various fields such as psychology, medicine, and therapy together to implement and perform a comprehensive and multidimensional program for reducing the chronic pains [10,24]. Recently, the necessity of multidisciplinary interventions including psychological based interventions along with medication, have been proven in decreasing the pain, increasing the patients' efficiency and self-sufficiency [4]. In a clinical trial, Beykmoradi and colleagues [25] studied the effect of progressive muscle relaxation in reducing the pain in women with MS. The findings showed this method decreases the patients' pain. In another research, Nadimi and colleagues [26] showed that Cognitive Behavioral Therapy (CBT) and Dialectical Behavior Therapy (DBT) group therapy can lead to a decrease in MS patients' depression.

Since pain treatment is also important for other therapists and can be only possible through collaboration between different groups, the aim of this study was to evaluate the effect of pain management program in collaboration

with the experts from various fields, such as psychology, physiotherapy, and medicine on reducing pain symptoms in MS patients. No similar study has been reported in Iran yet, so the results, if confirmed, would be a great value to all experts who are engaging in MS treatment and rehabilitation to reduce the patients' pain and improve their quality of life.

Method

The quasi experimental study was an applied research with pre and post test employing a group as control. The population consisted of all MS patients in Mashhad, 2013. In order to constitute the statistical sample, all the patients diagnosed by MS and registered for treatment in MS clinic of Mashhad Ghaem hospital were interviewed and invited to take part in the project by explaining the research purposes to them. Totally, 16 patients accepted to participate in the study. They were asked then to attend the Alami counseling and psychological service center to fill in the questionnaire and give more information. When all the participants were present, the aims of the research were explained again. Then, the researcher asked them to respond the Jensen and colleagues' pain numerical rating scale [26], Symptom Checklist-90-Revised (SCL-90-R), and physical symptoms subscale of the General Health Questionnaire (GHQ) (pre-test). In the next step, the participant were divided randomly into tow experimental and control groups. The participants in both groups were homogeneous in terms of age and the MS outset. The experimental group was exposed to pain management intervention performed by a psychologist, a physician, and a physiotherapist, attending 12 sessions of 45 minutes (3 sessions per week). After the trial period, both groups' participants were asked to fill in the questionnaires (post-test). It seems necessary to mention that 3 participants in the experimental group (with total number of 8 members) did not continue the project to the end. So, 3 questionnaires of the control group were accidentally omitted in order to achieve

a more harmonious outcome. The final analysis was performed by 10 participants.

The dependent variable, pain, was measured using following tests:

The pain numerical rating scale developed by Jensen and colleagues [26]. In this scale the patients are asked to grade their pain intensity on a numeric value (zero to 10). Zero shows no pain is experienced and 10 means the highest possible degree of pain. The results have indicated the scale's appropriate reliability and validity in pain assessment, especially the pain in difficult and chronic illnesses such as MS and cancer. There is a high correlation between this scale and other pain related measures [27]. *Symptom Checklist-90-Revised (SCL-90-R)*: the test consists of 90 questions measuring the 9 dimensions of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, aggression, phobia, paranoid thoughts, and psychosis. In order to measure the patients' complains of recurring headaches, muscle aches, pain in heart or chest zone, and the pain in the back, the somatization subscale was used in the study. Every item is graded on a scale of 5, from zero to 4. The validity and the reliability of this questionnaire have been confirmed previously [28].

GHQ-28 is a famous test in measuring the general health and contains four subscales: physical symptoms, anxiety, depression, and social malfunction. In this study, the physical symptoms subscale which measures 7 items such as patients' headaches, weakness, lassitude, and fatigue was used. Every item is graded on a scale of 4, from zero to 3. The validity and the reliability of this questionnaire have been confirmed in several studies [e.g. 29,30].

Intervention

There were 5 members in the experimental group who received 12 pain management group training sessions after performing the pre-test. Meanwhile, the ones in control group did not receive any intervention. Since pain management is so widespread, training sessions were conducted by a team which included a psychologist, a physician, and a physiotherapist. A mixture of medication and

psychological treatments was considered, too. Techniques used during the therapy sessions included cognitive-behavioral strategies, physical interventions, and training coping strategies. Cognitive-behavioral strategies contain training (discussing the medical/mental/social implications of pain, about the disease and providing social support, seeking information about pain and problem solving), skill training, cognitive-behavioral practices (setting behavioral goals, cognitive pattern of pain, the introduction of gate control theory of pain, biofeedback/heat feedback training, mental imagery, identifying and dealing with automatic thoughts) and generalizing and maintaining the strategies learned. Physical intervention included massage skills, physiotherapy and simple postural/stretching physical exercises for 10 to 20 minutes and teaching the coping strategies such as relaxation therapy, distraction from pain and assuring themselves about the pain's end. In medical interventions the management of commitment to take to prescribed drugs, issues related to drug tolerance, drug withdrawal, drug dependency, drug abuse, and drugs' side effects were instructed. The intervention program, based on pain management, was taken from the "recommended guidelines for pain management programs for adults", prepared by the British Pain Society [15].

Data analysis was performed using covariance test SPSS-16 Software.

Results

The participants were 6 women and 4 men in range of 25-30. The mean age of participants was 41.33 (SD of 14.5) in experimental group and 93.33 (SD of 34.5) in control group.

The statistical assumptions' evaluation of the amount of reported pain in a numerical pain rating scale showed that the prerequisite for the equality of variances (using Levene's test) and the similarity of the regression line slope were the same for both control and experimental groups (the interaction between the experimental condition and

the control variable is not meaningful) and hence, using covariance analysis was permitted ($p > 0.05$).

The results of analysis of covariance (ANCOVA) for the pain numerical rating scale are presented in Table 1.

Table 1 Summary of ANCOVA to determine the effect of pain management in reducing the patients' pain symptoms by controlling the pain variable in pretest (pain numerical rating scale)

Sources of Variations	SS	df	MS	F	p-value	η^2
Pre-test's Pain Scores	0.024	1	0.024	0.02	0.88	0.03
Main Effect (training)	31.29	1	31.29	27.46	0.001	0.79
Remained Error	7.97	7	1.13			

ANCOVA results showed that by eliminating the effect of pain scores as the main control variable in pre-test, the influence of the major training variable on pain scores in pain numerical rating scale of post-test is meaningful. In other words, the results indicated that regarding participants' membership (experimental-control) the observed difference between the participants' mean scores of pain is meaningful at post-test with 99% confidence ($p > 0.01$). The intervention efficacy was 0.79.

The results of statistical pre assumptions for

the amount of reported pain in SCL-90-R's somatization subscale showed that the pre-condition of equality of variances and the similarity of regression line slope is the same for both control and experimental groups and hence, using covariance analysis is permitted ($p < 0.01$). The results of covariance analysis (ANCOVA) to determine the effect of pain management in reducing the pain symptoms in SCL-90-R's somatization subscale are presented in Table 2.

Table 2 Summary of ANCOVA to determine the effect of pain management in reducing the pain symptoms by controlling the pain variable in pre-test (SCL-90-R's somatization subscale)

Sources of Variations	SS	df	MS	F	p-value	η^2
Pre-test's Pain Scores	53.21	1	53.21	2.30	0.17	0.24
Main Effect (training)	342.16	1	342.16	14.82	0.006	0.67
Remained Error	161.59	7	23.08			

The ANCOVA results showed that by eliminating the effect of pain scores in pre-test as the primary control variable, the main effect of training is meaningful in the SCL-90-R's somatization subscale of pain scores in post-test. That is to say regarding participants membership (experimental-control) the observed difference between the participants' mean scores of pain is meaningful at post-test with 99% confidence ($p > 0.01$). The intervention efficacy was 0.67.

The results of the statistical pre assumptions

for the amount of reported pain in GHQ's physical pain subscale showed that the pre-condition of equality of variances and the similarity of regression line slope is the same for both control and experimental groups and hence, using covariance analysis is permitted ($p < 0.01$). The results of covariance analysis (ANCOVA) to determine the effect of pain management in reducing the pain symptoms in GHQ's physical pain subscale are presented in Table 3.

Table 3 Summary of ANCOVA to determine the effect of pain management in reducing the pain symptoms by controlling the pain variable in pre-test (GHQ's physical pain subscale)

Sources of Variations	SS	df	MS	F	p-value	η^2
Pre-test's Pain Scores	5.95	1	5.95	1.67	0.23	0.19
Main Effect (training)	27.54	1	27.54	7.67	0.02	0.52
Remained Error	24.48	7	3.54			

The ANCOVA results showed that, by eliminating the effect of pain scores in pre-test as the primary control variable, the main effect of training is meaningful in the GHQ's physical pain subscale of pain scores in post-test. That is to say regarding participants' membership (experimental-control) the observed difference between the participants' mean scores of pain is meaningful at post-test with 99% confidence ($p > 0.01$). The intervention effect was 0.52. Put differently, the intervention was able to relieve the pain symptoms in MS patients.

Discussion

The aim of study was to evaluate the effect of a comprehensive pain management program in reducing pain in patients with MS. The obtained results showed the effect of intervention on reducing pain symptoms in patients with MS in experimental group compared with the control group. In other words, the program could significantly relieve somatization, pain symptoms, and the reported pain in numerical rating scale in experimental group. This finding was consistent with the studies of Barlow et al [16], Barlow et al [20], Finlayson et al [23], Sullivan et al [10] which showed that a comprehensive and multi-dimensional pain management intervention program can be helpful in reducing pain in MS patients. These researchers found out that comprehensive pain management programs can effectively help the patients managing their symptoms and improving the quality of life and health due to their holistic approach and paying attention to individual's both psychological needs and physical problems simultaneously.

Managing the symptoms is one of the most important aspects of pain management program which includes clinical assessments and identifying patients' needs, expectations, and perceptions [31]. Therefore the management includes the need to control the symptoms in order to avoid repetition, the patient's perception of the disease, modifying perceptions and expectations, the patient's ability to accept treatment and committing to

treatment program. Many cognitive errors such as catastrophizing, sense of lack of control over pain, and insufficiency in controlling pain are the results of negative automatic thoughts. Studies show that pain management training can improve patients' inadequate knowledge and inappropriate attitudes and is able to reduce their pain to some extent [27,32].

Although lots of symptoms can be relieved by medication, training lets patients cope with symptoms, provide them with satisfaction and safety, improve drugs' efficacy, help them to have better treatment choices, and adjust their expectations [33]. Psychological management which consists of the items of cognitive/behavioral therapies, adjusting unfavorable thoughts, problem solving, planning, stress management, communication, coping strategies, relaxation therapy, and distraction techniques, can be considered effective in treating anxiety, depression, and post traumatic stress disorder in which, the patients' perception of pain is affected [25]. Many psychological treatments help the patients to identify their irrational and dysfunctional thoughts which are the symptoms' triggers and substitute them for more correct thoughts. Many studies have confirmed the effect of cognitive restructuring techniques in improving the MS patients' attention deficit, communicational skills and memory deficits [21,26].

Cognitive restructuring techniques help patients identify their negative dysfunctional thoughts about pain, challenge them, and replace them with positive thoughts [34]. Evaluating the patients with chronic pain by using the cognitive/behavioral treatments for managing pain, became vivid that encouraging the patient's belief about his/her negative and illogical thoughts about pain, is associated with pain relief, physical disability reduction, and depression [33].

Studies show that active coping strategies such as attempting to undertake tasks despite pain, and not paying attention to pain have corresponding results. Accordingly, guiding

the patients in using the coping strategies would result in reducing pain severity and increasing tolerance. Relaxation therapy, which is the most functional cognitive/behavioral coping Skills can reduce cramps and tension in muscles. Researches indicate that relaxation therapy decreases anxiety and muscle tension, increases self-control, and allows the person to experience vitality and revitalization [18, 29]. Through training, patients would learn how to control stress and severe cramps in some certain muscles which play crucial roles in pain [32].

Stress management training is another coping strategy which is applied for breaking the pain-stress cycle. When there is some pain, the person experiences more stress in his usual daily life and physical reactions to stress can exacerbate pain. Evaluating the effect of stress and pain management by using self-training techniques shows significant improvement in MS patients' quality of life (evaluating pain, stress, and stress perception) [33].

It is also reported that, comparing the control group and teaching self-exercise at home are effective in improving the MS patients' quality of life and relieving pain [34]. Bassak-Nejad et al [35] studied the effect of cognitive-behavioral stress management training on MS patients' chronic fatigue. Findings showed the effect of this method for fatigue improvement. In this regard, Khezri-Moghadam et al [36] also demonstrated that Mindfulness-based stress reduction method can relieve depression and anxiety in this group of patients.

Rehabilitation reduces the disabilities resulted from neurological deficit and the risk of relapse and increases patient's function maintenance [37]. Physiotherapy, which includes physical activities, can stimulate the brain's sensory pathways and leads to distraction from pain and improvement of physical well-being [38]. Mathiowetz et al reported the effect of the activity-based interventions (maintaining energy) for reducing fatigue, increasing efficiency, and improving the quality of life in MS patients [39]. Hayden et al also reported the effect

of pain management physiotherapy item in reducing pain [40].

Conclusion

Taken as a whole, the results of present study indicate the effect of pain management program in reducing MS patients' pain symptoms. It seems that in patients who suffer severe illness accompanied with serious psychological or physical deficit, an effective treatment requires attention to physical and psychological aspects of pain and the factors affecting them. Achieving this goal needs involvement and engagement of specialists of various fields. It would be possible through comprehensive and integrated programs such as pain management. Therefore, the present program can be used as a supplement to medication and can be considered as a part of MS patients' rehabilitation and empowerment program. However, further studies are needed to evaluate the efficacy of this intervention in other populations of MS patient. Future studies should be conducted on larger samples, more control groups, and follow-up sessions. In addition, the use of instruments with more psychological and physiological factors and investigating the role of mediator factors in pain perception seems necessary. Small size of sample, lack of consideration of gender and follow-up duration can be mentioned as the limitations of present study.

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Contribution

Study design: GA, FMM

Data collection and analysis: GA, FR

Manuscript preparation: FMM, SB

Conflict of Interest

"The authors declare that they have no

conflicts of profits."

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