



# The Effectiveness of Acceptance and Commitment Therapy on Pain Severity, Perceived Stress, and Aggression in Patients with Multiple Sclerosis in Isfahan, Iran

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## Quantitative Study

### Abstract

**Background:** Multiple sclerosis (MS) is the most common neurological disease. The aim of this study was to determine the effectiveness of acceptance and commitment therapy (ACT) based on pain severity, perceived stress, and aggression in patients with MS.

**Methods:** This experimental research was conducted with a pretest-posttest design. The study population included all patients with MS referred to health centers in Isfahan, Iran, in 2016. The study participants consisted of 60 patients selected using convenience sampling. The participants were divided into two groups (30 patients in the experimental group and 30 patients in the control group). The data collection tools included the short-form McGill Pain Questionnaire (SF-MPQ) and Perceived Stress Scale (PSS). Data analysis was performed using multivariate analysis of covariance (MANCOVA) and analysis of covariance (ANCOVA).

**Results:** The results showed that ACT was effective in reducing pain ( $F = 28.22$ ;  $P < 0.01$ ), perceived stress ( $F = 5.16$ ;  $P < 0.03$ ), and aggression ( $F = 6.86$ ;  $P < 0.01$ ) in patients with MS, and these results were persistent in the follow-up period.

**Conclusion:** ACT is effective in reducing pain, perceived stress, and aggression in patients with MS.

**Keywords:** Acceptance and commitment therapy, Pain severity, Perceived stress, Aggression

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### Introduction

Multiple sclerosis (MS) is one of the most

common neurological disorders, most commonly occurs in the ages of 20-40 years, and women are almost twice as likely to be affected as men. The pathology of this disorder is characterized by demyelination in a scattered manner, and more than 5.2 million people worldwide are affected by MS

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(Kenner, Menon, & Elliott, 2007). Localized weakness, tingling, numbness, sudden blurred vision in one eye, and loss of balance are the primary symptoms of MS and are usually transient and disappear within a few days to a few weeks (McCabe, 2005). MS affects different aspects of the patients' lives, and may lead to sensory and motor dysfunction as well as psychopathological signs and symptoms. MS is unpredictable and may have life-changing impacts as it usually affects the best time of the patients' lives and gradually causes disability, and unfortunately, there is no definite cure for it (Rasova, Havrdova, Brandejsky, Zalisova, Foubikova, & Martinkova, 2006.). Moreover, 80% of people with this disorder have some degree of disability (Rickards, 2005). MS has an unknown cause and a progressive nature with periods of relapse and recovery. Throughout their lives, the affected people experience diverse physical and mental impairment resulting from the disorder that greatly affect their daily functioning, family and social life, functional independence, and planning for the future (Tepavcevic, Kostic, Basuroski, Stojisavljevic, Pekmezovic, & Drulovic, 2008). People experience varying degrees of stress, which has a critical impact on patients with MS. Pain management is one of the priorities of treatment. According to the International Association for the Study of Pain (IASP), pain is a hidden feeling and an emotional experience associated with acute or potential tissue damage. This definition emphasizes pain as a bio-psychological experience and the sign of tissue damage (Shekar Beigi, 2011). The pain resulting from MS is a severe problem with negative effects on the quality of life (QOL) of patients and may cause stress, extreme fear of pain, and illness that sometimes may lead to aggressive behaviors; these uncontrolled behaviors are a response to fears and perceived stress resulting from illness and pain in patients with MS (Farzin Rad, 2010). Stress is defined as an adaptive response to an external factor that bears physiological, behavioral, cognitive, and

psychological consequences for each individual. It can even drive the person out of normal state and increase the risk for development of tumor cells, and therefore, negatively influence the survival of patients with cancer (Sehatnia, 2010). Research studies have shown that stress is a very complex process that may affect the lymphatic system as well as other paths, especially in patients with MS; therefore, stress reduction should be a priority in the treatment of these patients (Mirzaei, Neshatdoost, Kalantari, Nematolahzade Mahani, Jabalameli, & Mehrollahi, 2012). Stress and inability to cope with pain and other problems resulting from MS may lead the individual toward aggression; therefore, aggression is regarded as a complication of chronic disorders such as MS that should be controlled using appropriate treatment methods so that the patient can relax and a more desirable healing procedure can be attained (Ghamari-Givi, Fathi, & Senobar, 2014). One of the components influenced by MS is increased aggression. Aggression is a defensive behavior expressed in response to danger or threats. Aggression is a learned behavior supporting the person in a way that violates the rights of others. Aggressive behavior is typically punitive, reproachful, domineering, and hostile. Some examples of aggressive behaviors include threatening or insulting behavior, physical punishment, mocking smiles, and sarcastic statements. The origin of aggression is anger; when anger causes harm to others it is called aggression. Various treatments are used for the problems associated with MS. Instead of focusing on changing psychological events, these interventions are aimed at directly changing the function of these events and the individual's relationship with them, through strategies like concentration, acceptance, and cognitive fusion (Mo'tamedi, Rezaemaram, & Tavallaie, 2012). Acceptance and Commitment Therapy (ACT) is a type of behavioral therapy based on acceptance and aimed at operationalizing experiential avoidance and trying to control irritating experiences. This

method of therapy helps the clients to give a less real meaning to their thoughts and emotions, and learn how to observe their reactions to psychological distress, and improve their commitment to life values (Hayes & Wilson, 1994).

## Methods

In the present research, an experimental design with pretest-posttest and a control group was used. The experimental and control groups were matched using a simple random method. A pretest was performed in both groups before conducting the experimental intervention, and a posttest was performed at the end of the intervention phase. The statistical difference between pretest/posttest scores was examined for each study group. The effectiveness of ACT was applied as the independent variable to determine its impact on reducing pain intensity, perceived stress, and aggression (dependent variables) among patients with MS. The study population included all patients with MS attending the health clinics in Isfahan, Iran, in 2016. The sample included a total of 60 MS patients who were selected using convenience sampling method. From among all patients with MS, 100 patients were selected, then, the study instruments were administered and 60 patients who had the lowest scores on these tests were selected as the study sample. From among these, 30 were selected for the experimental group and 30 for the control group.

**Short-form McGill Pain Questionnaire:** The short-form McGill Pain Questionnaire (SF-MPQ) was developed by Melzack in 1997. It consists of 20 phrases that measure respondents' perception of pain in the four dimensions of sensory pain, emotional pain, pain evaluation, and varied pain. The short and revised form of the SF-MPQ was designed by Dworkin et al. (2009). A Cronbach's alpha of 0.85 has been reported for the total scale. Reliability estimates in all domains (sensory, emotional, etc.) were above 0.80. The SF-MPQ consists of 15 questions and the two sensory and affective

subscales. It is scored on a 4-point Likert-type scale ranging from 0 (no pain) to 3 (severe pain) (Dworkin et al., 2009). In the present study, a Cronbach's alpha of 0.81 was calculated for the total scale, indicating its good reliability.

**Perceived Stress Scale:** The original version of the Perceived Stress Scale (PSS) includes 14 items assessing a person's feelings and thoughts in relation to the events and situations that have occurred during the past month. The scale contains 14 items of which 7 items are positive and 7 items negative. Each item is rated on a 5-point scale ranging from 0 (never) to 4 (very often). Some of the Items of the PSS are reverse-scored (4, 5, 6, 7, 9, 10, and 13). Klein reported Cronbach's alphas of 0.86, 0.77, and 0.83 for the 7 positive items, 7 negative items, and all items, respectively (Cohen, Kessler, R& Gordon, 1997.). In the present study, a Cronbach's alpha of 0.70 was found for the total scale, indicating the good reliability of the PSS.

**Ahvaz Aggression Questionnaire:** The Ahvaz Aggression Questionnaire (AAGQ) is a self-reported paper and pencil scale. This questionnaire was made by Buss and Perry (Buss & Perry, 1992). It contains 30 questions of which 14, 8, and 8, respectively, measure anger, aggression, and hostility. The AAGQ is rated on a 4-point scale ranging from 0 (never) to 4 (always). In Iran, Zahedifar, Najarian, and Shokrkon (2000) reported the psychometric properties of the scale to be good.

## Results

The mean (standard deviation) age of the subjects in the experimental and control groups was 54.17 (11.02) and 52.63 (10.18) years, respectively. Their minimum and maximum age was, respectively, 49 and 58 years in the control group and 48 and 58 years in the experimental group. Regarding education level, most participants in both groups [12 (30%) in the experimental and 9 (40%) in the control group] had a high school diploma. Descriptive findings, including the mean and standard deviation estimates, are presented in table 1.

**Table 1.** Mean and standard deviation of study variables

Type of training	Pretest		Posttest		Follow-up	
	Experimental Mean $\pm$ SD	Control Mean $\pm$ SD	Experimental Mean $\pm$ SD	Control Mean $\pm$ SD	Experimental Mean $\pm$ SD	Control Mean $\pm$ SD
Pain intensity	41.70 $\pm$ 5.02	41.40 $\pm$ 5.97	29.30 $\pm$ 6.76	41.50 $\pm$ 7.00	51.00 $\pm$ 9.43	47.20 $\pm$ 9.31
Perceived stress	43.60 $\pm$ 6.93	42.20 $\pm$ 7.12	37.60 $\pm$ 4.61	40.50 $\pm$ 6.23	47.00 $\pm$ 10.94	43.60 $\pm$ 6.33
Aggression	45.60 $\pm$ 14.00	43.80 $\pm$ 10.23	29.80 $\pm$ 15.90	42.40 $\pm$ 12.54	45.40 $\pm$ 7.67	43.00 $\pm$ 15.72

SD: Standard deviation

The null hypothesis regarding the equality of variances in the participants' scores on the study variables was confirmed; that is to say, the assumption of equality of variances is confirmed for the scores of both the experimental and control groups. However, due to equal sample sizes, violation of the assumption of equality of variances has no impact on the analysis of covariance (ANCOVA). All significance levels are above 0.05; therefore, the assumption of normality is confirmed for the distribution of pain intensity, perceived stress, and aggression scores for both groups of participants. The interaction F-test for homogeneity of regression slopes is not significant for all study variables. Therefore, it can be concluded that there is no interaction between groups and pretest scores; in other words, the homogeneity of regression slopes is accepted for all variables.

As you can see in table 2, while controlling for pretest significance levels for all tests, the results indicated a significant difference in at least one dependent variable (pain intensity, perceived stress, and aggression) between the experimental and control groups ( $F = 9.00$ ;  $P < 0.0001$ ). In the next step, three one-way ANCOVA were conducted in the context of MANCOVA; the results are presented in table 2. The effect or difference in size is equal to 0.54, in other words, 54% of individual differences in posttest scores of pain intensity, perceived stress, and

aggression are related to the effect of the independent variable. The statistical power is equal to 0.98.

The results indicated the positive effect of ACT on pain intensity ( $F = 28.22$ ;  $P < 0.01$ ), perceived stress ( $F = 5.16$ ;  $P < 0.03$ ), and aggression ( $F = 6.86$ ;  $P < 0.01$ ) in patients with MS.

## Discussion

The study results indicated a reduction in the mean posttest scores of pain intensity, perceived stress, and aggression in the experimental group compared to the control group; this is consistent with the findings of previous studies (Irandoost, Neshat-Doost, Nadi, & Safary, 2014; Anvari, Ebrahimi, Neshatdoost, Afshar, Abedi, 2014; Dousti, Gholami, & Torabian, 2016).

This finding can be explained in terms of a large body of evidence indicating the important role of acceptance in the reduction of the amount of pain experienced by patients with MS. ACT is a therapeutic approach that utilizes behavior modification to create flexibility (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The acceptance and commitment model emphasizes acceptance, present moment awareness, and engagement in activities consistent with personal values. Acceptance appears to be the key factor involved in therapeutic gains in terms of reducing the effect of painful experiences on emotional functions that predict one's performance in the future.

**Table 2.** Results of multivariate analysis of covariance

Name	Value	df (Hypothesis)	df (Error)	F	P	Eta-squared	Statistical power
Pillai's trace test	0.540	3	53	9.00	0.0001	0.54	0.98
Wilks's Lambda	0.460	3	53	9.00	0.0001	0.54	0.98
Hotelling's T-squared	1.17	3	53	9.00	0.0001	0.54	0.98
Roy's largest root	1.17	3	53	9.00	0.0001	0.54	0.98

df: Degree of freedom



**Table 3.** Results of one-way analysis of covariance

Variable	Source of change	MS	df	SS	F	P	Eta-squared	Statistical power
Pain intensity	Pretest	296.96	1	296.96	7.62	0.01	0.23	0.75
	Group	1099.54	1	1099.54	28.22	0.0001	0.53	0.99
	Error	974.06	55	38.96				
Perceived stress	Pretest	315.53	1	315.53	15.95	0.001	0.39	0.97
	Group	102.18	1	102.18	5.16	0.03	0.17	0.58
	Error	494.46	55	19.77				
Aggression	Pretest	593.03	1	593.03	2.99	0.09	0.10	0.38
	Group	1360.42	1	1360.42	6.86	0.01	0.21	0.71
	Error	4954.13	55	198.16				

df: Degree of freedom;

With regard to the effectiveness of ACT, Dahl, Wilson, and Nilsson (2004) showed the significant effect of a four-hour experience of this therapy, relative to other therapeutic approaches, on reducing the experience of pain in patients with MS. McCracken, Vowles, and Eccleston (2004) found that acceptance has two components (voluntary pain acceptance and engagement in activities). The first component concerns the extent to which pain is allowed to be experienced without trying to manage it or avoid it. The second component refers to maintaining everyday life activities along with the experience of pain. In addition, research studies have noted the importance of acceptance-based strategies in reducing pain and perceived stress symptoms in the presence of pain. The results of these studies show the important role of acceptance, especially in terms of psychological performance. Patients who report a higher tendency to experience negative psychological phenomena, including aggression and unpleasant emotional expressionless, thoughts, and memories show better social, physical, and emotional performance. Hayes (1993) also believes that, rather than focusing on removing harmful factors, ACT helps clients accept their controlled emotions and cognitions, relieve themselves from the control of verbal rules that have caused their problems and stop struggling with them. Acceptance and commitment are essentially process-oriented, and clearly emphasize the improvement of

the acceptance of psychological experiences and enhancement of commitment through increasing meaningful, flexible, and adaptive activities, irrespective of the content of psychological experiences; this is not the focus of cognitive behavioural therapy (CBT). In addition, the goal of ACT is not to increase realistic, effective, and logical thinking, or encourage emotions, but rather to reduce avoidance of psychological experiences and improve awareness of these experiences and focusing on the present moment, nonjudgmentally and without struggling.

The present study had some limitations, including time limitations that did not allow for a follow-up examination on the study results and a shortage of previous findings. We suggest that future studies on ACT use larger samples and longitudinal designs to find more evidence on the efficacy of this approach. Future studies can compare the effectiveness of this approach with that of other behavioural therapies.

## Conclusion

ACT is an effective approach in reducing pain intensity, perceived stress, and aggression in patients with MS. Patients with MS and chronic pain who accept unpleasant psychological experiences without trying to control them report better daily functioning and less experience of pain. Therefore, it can be concluded that although medical and pharmacological treatments may be more effective than psychotherapy in reducing physical symptoms, physical complaints, and

aggression in patients with MS, acceptance and commitment can also have a significant effect on these variables.

### Conflict of Interests

Authors have no conflict of interests.

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