**Original Article**

# The Effectiveness of Acceptance and Commitment Therapy (ACT) on Disease Perception and Adherence to Treatment Among Patients with Multiple Sclerosis

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## *Abstract*

**Introduction**: Multiple sclerosis is a common disease of the central nervous system. The aim of this study was to determine the effectiveness of acceptance and commitment therapy (ACT) on illness perception and adherence to treatment among patients with multiple sclerosis.

**Method:** The present study was a quasi-experimental with pretest and posttest design. The statistical population of this study were all patients with multiple sclerosis under the auspices of the MS Society of Tehran in 2019. Forty-five women with multiple sclerosis were purposefully selected and randomly divided into two groups: acceptance and commitment therapy (n=15) and control group (n=15). Data were obtained with the revised illness perception questionnaire (IPQ-R) and the multiple sclerosis treatment adherence questionnaire (MS-TAQ). The repeated measurement analysis of variance and SPSS.22 software were used to analyze data.

**Result**: The results showed that the acceptance and commitment therapy was effective on illness perceptions ($p<0.001$) and adherence to treatment ($p<0.001$).

**Conclusion**: It can be concluded that effectiveness of acceptance and commitment therapy focus more on the outcome of the thought or how the person relates to their thoughts rather than on the content of the thought or attempt to eliminate it.

**Declaration of Interest:** None

***Keywords***: Acceptance and commitment therapy, Disease perception, Adherence to treatment, Multiple sclerosis.

## *Introduction*

Multiple sclerosis (MS) is a common disease of the central nervous system (1). The main cause of this disease is a damage to the myelin sheets of nerve cells that transmit neuron messages within central nervous system. In this disease, many areas of the nervous system are damaged and hard tissue is replaced with damaged myelin (2). The prevalence of this disease around the world is estimated to be two and a half million people according to the MS Atlas and its prevalence rate in Iran is reported to be 5.78 out of every 100,000 people (3). The disease is progressive and almost irreversible and has different clinical manifestations in different people, the most important of which are, fatigue, movement disorders, visual impairments, sensory disorders, cognitive defects, cerebellar changes, changes in the autonomic nervous system and psychological changes (4). In addition to neuro-motor disorders, symptoms such as anxiety, weakness decreased problem-solving skills occur and affect various aspects of a person's life and put a lot of pressure on the patient (5).

In addition to the biological and neurological factors involved in this disease, psychological factors are impacted in multiple sclerosis (6). Studies have shown that the type of strategy that people adopt in the face of life pressures, play an important role in the onset and course of their disease. For example, personality traits and adaptive strategies are associated with stress tolerance and adaptation to stressful situations (7). Several factors influence the choice of how to deal with this disease. Evidence suggests that differences in how different problems are dealt with are not only due to the nature or severity of the disease, but also to psychological and personality factors (8).

One of these factors is the perception of disease. Perception of illness often includes information in five dimensions of nature, namely labels and symptoms associated with the disease (such as fatigue and weakness); Cause or belief about the causal causes of the onset of the disease; Duration or a person's perception of duration in terms of acute, periodic or chronic; Outcomes or expected results of the disease in terms of economic, social, psychological and physical effects; And the effectiveness of control, treatment, and improvement (9). Researchers believe that the difference in patients' perceptions and interpretations of the causes of the disease is not only due to differences in their health, but also people's reactions and perceptions of the disease to various factors such as social, cultural, psychological and personality of People depend. In recent years, the importance of human empowerment and talent factors has been emphasized instead of abnormalities and disorders (10).

Adherence to treatment or a person's willingness to follow treatment instructions is also one of the factors that can play a special role in improving MS (11). Failure to take medication and diet may even lead to death (12). Several factors play a role in this, which can be based on the bio-psycho-social model and the model of medical and psychological integration (MI-MAP) to several psychological factors, including the doctor-patient relationship, health control center, memory error and other

psychological factors (13). Finally, the severity of the disease, the degree to which a person experiences the disease, can be related to various factors, some of which are physical, some psychological and some environmental and social (14). Among the important psychological and social factors, we can mention emotional states such as anxiety, depression, stress, anger, hostility, social support, and social relations (15).

Previous research and meta-analytic studies, have shown the beneficial effects of psychological interventions such as acceptance and commitment therapy and cognitive-behavioral therapies in improving the coping mechanisms of patients with MS. However, these two approaches therapies have not been compared in terms of their effectiveness (16). Due to the important role of cognition and beliefs in adaptation to chronic medical diseases (improving quality of life and psychological well-being, disease perception and patients' adherence to the treatment plan) (17), the third wave treatments are always of added value and importance in helping such patients. This has important implications for the provision of psychological interventions to individuals with MS, many of whom have limited mobility, are easily fatigued, and may find additional health-care visits for mental health services burdensome and difficult to sustain. In sum, given that MS has no known cure, there is a need to help individuals learn to live with their illness and its physical, psychological, and emotional sequelae, and to do so in a way that is broadly effective, minimally demanding, and time- and cost-effective (18).

Therefore, this study is innovative in that it targets the underlying issue of disease perception and adherence to treatment using emerging therapies in the field of psychology such as acceptance and commitment therapy and cognitive therapy based on awareness. The existence of these therapies can be used along with drug therapies, psychological therapies to increase people's resilience, and as a result, contribute to the psychological well-being of these patients. Thus, the aim of this study was to determine the effectiveness of acceptance and commitment therapy (ACT) on illness perception and adherence to treatment of patients with multiple sclerosis.

***Method***

The present study was a quasi-experimental with pre-test, post-test, and follow-up design with a control group. The statistical population of this study were all patients with MS under the auspices of the MS Society of Tehran, Iran in 2019. A total of 30 women with MS were purposefully selected and randomly divided into two groups: acceptance and commitment therapy (n = 15) and control group (n = 15). The required sample size was calculated 45 in total based on effect size= 0.40, $\alpha$=0.95, 1-$\beta$ (err prob) = 0.80 test power and 10% loss for each group. Inclusion criteria included diagnosis of MS, minimum diploma literacy, age ranges between20 to 45 years, relapsing of MS after at least 2 years. Exclusion criteria included simultaneous exposure to other physical problems and illnesses and severe psychiatric and neurological disorders (based on psychiatric visits). Before the experiment, all participants

participated in the pre-test and completed all the instruments. Then, the experimental groups were offered the relevant treatments while the control group was on the waiting list. Then, at the end of the treatment, all participants participated in the post-test. Also, two months after the end of treatment sessions, follow-up was performed using the mentioned scales.

Acceptance and commitment therapy has been done based on Hayes et.al (12) in 8 sessions of 90 minutes on a weekly basis..

Table 1. Acceptance and commitment therapy sessions

| Sessions | Content |
|---|---|
| First | Preliminary explanations, problem conceptualization, patient preparation and pre-test implementation, as well as preparing a list of enjoyable activities and its inclusion in the weekly program. |
| Second and third | Familiarity with ACT therapeutic concepts (psychological flexibility, psychological acceptance, psychological awareness, cognitive separation, self-visualization, personal story, clarification of values and committed action) in six stages |
| Fourth | Mindfulness training (emotional and wise awareness), teaching patients about what skills are observed and described and how skills are not judged, and how these skills work. |
| fifth | First, the focus is on increasing psychological awareness and then people are taught how to respond and deal appropriately with their mental experiences and create purpose and social lifestyle and practical commitment to them. Counting the positive and negative points of couples by each other without any judgment or emotional reaction. |
| Sixth | Distress tolerance training (permanence skills in crises, distraction, self-relief using six senses and mindfulness practice) and reviewing previous sessions |
| Seventh | Emotion regulation training (goals of emotion regulation training, knowing why emotions are important, emotional recognition, reducing vulnerability and emotional suffering, increasing positive emotions), changing emotions through action contrary to recent affect, practical practice learned, providing feedback by group and therapist. |
| Eighth | Increasing interpersonal efficiency (maintaining and maintaining the health of relationships, interests, etc.). Teaching important interpersonal skills (describing and expressing, asserting and daring, being openly confident, negotiating and self-esteem). Summing up and executing post-test. |

**The Revised Illness Perception Questionnaire (IPQ-R):** The IPQ-R is divided into three sections with the identity and causal dimensions presented separately from the remaining others. In the first section the identity scale is presented with 17 commonly known symptoms (e.g., fatigue, dizziness, etc.) and participants are asked whether they believe the symptom to be related to the illness (1 – yes; 0 – no).

The sum of the yes-rated items forms the identity subscale of this version. In the following section, consequences, timeline acute/chronic, timeline cyclical, coherence, personal control, treatment control, and emotional representation of the IPQ-R are rated on the original 5-point Likert type scale: from strongly disagree to strongly agree. Using Cronbach's alpha method for the components of emotional manifestations,

treatment control, disease outcome, acute/chronic timeline, disease coherence, personal control, and timeline were equal to 0.93, respectively. 0.85, 0.78, 0.84, 0.86, 0.78, 0.38 were calculated (19).

**The Multiple Sclerosis Treatment Adherence Questionnaire (MS-TAQ):** This tool was designed by Wicks et al. in 2011 to assess the psychometric performance. Wicks and colleagues (20) analyzed the dimensions (DMT-Barriers, DMT-Side Effects and DMT-Coping Strategies) using Cronbach's alpha. Barriers dimension are concerned with patients reporting that missing at least one dose of the previous 28 days. This dimension is about the importance of 13 barriers to adherence and rated based on 4-point scale from "not important at all" to "extremely important" in missing a dose. DMT-Side Effects dimension is about the side effects caused by treatment and 10 side effects rated on a 5-point scale from "never" to "all or nearly all of the time" were asked to report the frequency by patients. At the end, in the DMT-Coping Strategies dimension, all patients were asked on a dual yes/no format. There are questions about 7 coping mechanisms that patients use to reduce the side effects they experience within 28 days in this dimension (20). The Cronbach alpha coefficients of the DMT-Barriers and DMT-Side Effects dimensions were 0.82 and 0.86. For the dimension of DMT-Coping Strategies, Cronbach's alpha value was as low as 0.40. Wicks and colleagues think that the reason for this low value is a consequence of the dual response choices and the limited range of tool (20).

In this study, mean and standard deviation were used for descriptive analysis. Repeated measures analysis of variance, Kolmogorov-Smirnov test for checking the normality, and Tukey post hoc test were also used for the inferential analysis of results. The data were analyzed using SPSS.22 software. The significance level in this study was 0.05.

***Results***

The mean (SD) of age in the ACT, and control group were 35.06±10.48, and 35.60±10.58, respectively. There was no significant difference between the two groups in terms of age.

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Table 3- Descriptive indicators of the subjects' scores in three groups in disease perception and adherence to treatment

| Variable | | ACT | | Control Group | |
|---|---|---|---|---|---|
| | **Step** | M | SD | M | SD |
| Illness perception | Pre-test | 77.93 | 7.54 | 77.93 | 5.21 |
| | Post-test | 99.60 | 9.44 | 76.13 | 7.01 |
| | Follow-up | 106.20 | 3.96 | 77.66 | 8.01 |
| Adherence to treatment | Pre-test | 33.42 | 4.62 | 31.48 | 3.42 |
| | Post-test | 45.53 | 10.87 | 30.80 | 3.42 |
| | Follow-up | 43.46 | 7.18 | 30.13 | 4.38 |

The first assumption was that the data in the dependent variables were normal. Kolmogorov-Smirnov test was used to check the normality of the data in this study. Non-significant results in this test showed that the data were normal. The second assumption was the homogeneity of the variances of the research variables. Leven's test was used to test this assumption. Non-significant results of this test indicate compliance with this assumption. The last assumption to be examined is the mixed analysis of variance test to check the spherical of intragroup variances. That is, there must be an equal variance between each pair of intragroup conditions (pre-test-post-test-follow-up). The results of the Mauchly test are shown to check compliance with the spherical default. The results of the mixed analysis of variance are presented in Table 2.

Table 4 - Results of mixed analysis of variance with within-subject and between-subject factors

| Variable | Factors | Change sources | SS | Df | MS | F | P | Effect Size |
|---|---|---|---|---|---|---|---|---|
| Illness perception score | Within subject | Group | 21519.24 | 2 | 10759.62 | 19.38 | 0.001 | 0.82 |
| | | Interaction* Group | 11785.15 | 4 | 2946.28 | 22.53 | 0.001 | 0.71 |
| | | Error | 4649.60 | 84 | 55.35 | | | |
| | Between subject | Group | 24360.53 | 2 | 12180.26 | 27.65 | 0.001 | 0.93 |
| | | Error | 1835.86 | 42 | 43.71 | | | |
| Adherence to treatment | Within subject | Group | 6445.21 | 2 | 3222.60 | 103.37 | 0.001 | 0.71 |
| | | Interaction* Group | 3103.58 | 4 | 775.89 | 24.89 | 0.001 | 0.54 |
| | | Error | 2618.53 | 84 | 31.17 | | | |
| | Between subject | Group | 5048.63 | 2 | 2524.31 | 76.74 | 0.001 | 0.78 |
| | | Error | 1381.46 | 42 | 32.89 | | | |

As shown in Table 4, in relation to the intragroup factor, the value of F observed for the effect of intervention stages (pre-test, post-test and follow-up) at the level of 0.05 for total disease perception scores ($F= 194.38$, $p<0.001$) and the total score of adherences to treatment ($p<0.001$, $F=103.37$) is significant. As a result, between pre-test, post-test and follow-up scores of disease perception ($F=53.22$, $p<0.001$) and adherence to treatment ($F=24.89$, $p<0.001$) there is a significant difference in the three stages of treatment. The interactive effect between stages and groups is also significant. Therefore, it can be stated that the difference between the mean scores of disease perception and adherence to treatment in different stages (pre-test, post-test and follow-up) according to the variable levels of groups (acceptance and commitment therapy group and control group) is different. The results of Bonferroni post hoc test to compare the pair difference of the measurement steps to compare the

pair difference of the groups in disease perception scores and adherence to treatment are shown in Tables 5.

Table 5 - Summary of the results of Bonferroni post hoc test for disease perception scores

| Dependent variable | Steps | | Mean Difference | Std Error estimates | P |
|---|---|---|---|---|---|
| Illness perception score | Pre-test | Post-test | -23.37 | 1.48 | 0.001 |
| | Pre-test | Follow-up | -29.22 | 1.67 | 0.001 |
| | Post-test | Follow-up | -5.84 | 1.53 | 0.001 |
| Total score of treatment adherence | Pre-test | Post-test | 11.82 | 1.06 | 0.001 |
| | Pre-test | Follow-up | 16.40 | 1.21 | 0.001 |
| | Post-test | Follow-up | 4.57 | 1.23 | 0.025 |

The results of Bonferroni test in Table 5 showed that there is a significant difference in the total score of disease perception between pre-test and post-test and follow-up stages ($p<0.01$). Considering the increase in the subjects' scores in the post-test and follow-up stages compared to the pre-test stage, it can be seen that the subjects experienced a significant increase in the score compared to the pre-test in the post-test and follow-up stages. There is a significant difference in the total score of disease perception between all stages of research (pre-test, post-test and follow-up) ($p<0.001$). There is a significant difference between the pre-test and post-test and follow-up stages in the total score of adherences to treatment and the component of barriers to adherence ($p<0.01$). The results also show that there is a significant difference between the pre-test stage compared to the post-test and follow-up in the components of life effects and coping strategies ($p<0.001$). Considering the decrease in the subjects' scores in the post-test and follow-up stage compared to the pre-test stage, it can be seen that the subjects experienced a significant decrease in scores compared to the pre-test in the post-test and follow-up stage and the effects of experimental groups on the research stages were significant.

The results showed that there is a significant difference between the study groups in the total score of disease perception ($p<0.01$). This means that experimental group compared to the control group had a significant effect on the subjects' perception of the disease and considering that the average total score of the disease perception. It can be seen that acceptance and commitment-based therapy had an effect on subjects' perceptions of disease ($p<0.05$). Based on this, it can be found that acceptance and commitment-based therapy (ACT) affect the perception of patients with multiple sclerosis.

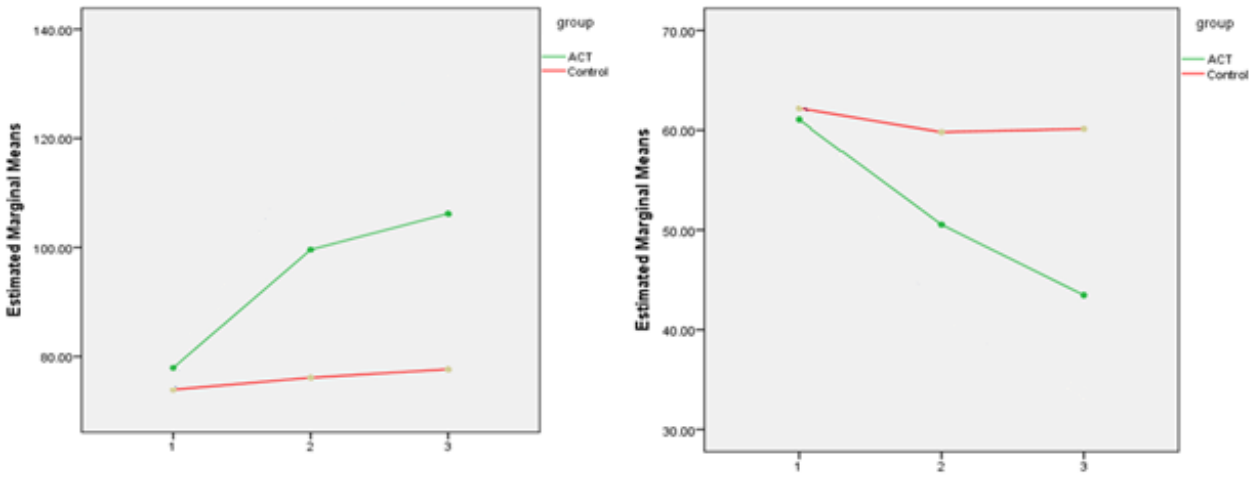


Figure 1- Modified means of disease perception and treatment scores in the experimental and control groups in the pre-test, post-test and follow-up stages

***Discussion***

The results showed that the scores of the subjects in the experimental group in the post-test and the follow-up period indicated the effectiveness of ACT on the components of illness perception. Also, considering the higher mean scores of illness perception in subjects in the acceptance and commitment therapy compared to and the control group in post-test and follow-up.

The results of the present study were consistent with the findings of Dehkhodai and Alipour (21) and Oraki and Sami (22). In their study, Saboor and Kakaberi (23) performed ACT group therapy on women with chronic pain and found that ACT therapy reduced pain, depression, stress, and increased pain perception. Additionally, Kakavand et al. (24) concluded that the implementation of acceptance and commitment-based therapy reduced negative perceptions of stress. Based on these findings, it should be noted that psychological consequences such as anger, anxiety, fear, and depression due to a chronic disease such as MS are inevitable, and these factors during the disease can cause erosion of physical and mental reserves, which in turn weakens the immune system and low body resistance. All these factors can negatively affect the treatment period of the disease and cause the person to be disappointed with the treatment and ignore the prescribed recommendations (25).

Thus, psychological therapies such as acceptance and commitment therapy that focuses on awareness of cognitive thoughts and biases, and commitment-acceptance therapy that simultaneously focuses on acceptance and striving for change, help patients become aware of their thoughts and processes. And improve their thought process and communication with thoughts by identifying dysfunctional beliefs and alternative beliefs. These types of therapies (acceptance and commitment therapy) focus more on the outcome of the thought or how

the person relates to their thoughts rather than on the content of the thought or attempt to eliminate it. On the other hand, in acceptance and commitment therapy, people are taught to recognize and accept their emotions in the first place, and to deal with their emotions and thoughts by reducing the futile effort to eliminate and control the thought from the position of acceptance (26). The person learns to allow for thoughts related to the disease and thus reduce the threatening nature of these thoughts, thus increasing the patient's perception of the disease and, of course, following the treatment recommendations by increasing the power of acceptance and commitment to treatment (27-28).

Moreover, the results showed that acceptance and commitment therapy affect adherence to treatment. In explaining these findings, it can be said that more awareness of the body can lead to following medical instructions and treatment; In other words, self-care behaviors such as following treatment are performed well when a person establishes a good relationship with their body (29). Acceptance and commitment therapy in addition to cognitive techniques such as identifying dysfunctional and alternative thoughts and beliefs with the help of exercises such as concentration breathing, body checking, sitting meditation, they learn to be aware of unpleasant events such as chronic illness.. For example, by reducing negative thoughts about the disease and improving treatment, there is a greater tendency to engage in self-care behaviors and following medical instructions (30).

On the other hand, in explaining the effectiveness of acceptance and commitment therapy on adherence to treatment in patients with MS, it can be said that acceptance and commitment therapy can be a promising method to adherence the treatment instructions. The effectiveness of acceptance and commitment therapy on basic mediators such as executive functions in following the treatment (31-32). Adherence to treatment is not yet as well-known as it should be, and because of the importance of following medical guidelines in disease care and recovery, it is essential to effectively mediate other adherents of treatment using psychotherapy interventions such as Identify acceptance and commitment therapy (33-34).

Regarding research limitations, the results were restricted to patients with multiple sclerosis, and the controlled and experimental literature review related to the acceptance and commitment therapy was limited. This study was performed only on the population of patients with multiple sclerosis in Tehran, and caution should be exercised in generalizing the results to other regions and cities. It is suggested that this research be done in another sample group, and its results be evaluated and compared with those of this research. Also, the therapies introduced in the present study be compared with other psychological interventions. Finally, the researchers in future studies should consider the present study results as new research hypotheses. If this research is conducted in other cities, and the results are evaluated, it is suggested that this research be followed up after group training in the form of individual counseling.

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