➡️ **Research Article**

# The Effectiveness of Acceptance and Commitment Therapy and Mindfulness-Based Cognitive Therapy on Illness Perception and Adherence to the Treatment of Patients With Multiple Sclerosis

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## Abstract

**Background:** Multiple sclerosis (MS) is a common disease of the central nervous system. The main cause of this disease is related to the myelin damage of nerve cells. This study aimed to compare the effectiveness of acceptance and commitment therapy (ACT) and mindfulness-based cognitive therapy (MBCT) on illness perception and adherence to the treatment of patients with MS.

**Methods:** This is a quasi-experimental study with a pre-test, post-test, and follow-up design with a control group. The statistical population of this study included all patients with MS under the auspices of the MS Society of Tehran (Iran) in 2019. Forty-five women with MS were purposefully selected and randomly divided into MBCT, ACT, and control (n=15) groups. Data were obtained using the revised illness perception questionnaire (IPQ-R) and the MS treatment adherence questionnaire (MS-TAQ). The repeated measurement analysis of variance and SPSS.22 were used to analyze data.

**Results:** The results showed that the effect of MBCT was greater than that of the acceptance and commitment-based therapy group on illness perceptions ($P<0.001$) and treatment adherence ($P<0.001$).

**Conclusion:** Overall, the effectiveness of MBCT was greater than that of the ACT group on illness perceptions and adherence to treatment. MBCT and ACT can be employed as effective methods for patients with MS.

**Keywords**: Acceptance and commitment therapy, Mindfulness, Perception, Multiple sclerosis

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## Background

Multiple sclerosis (MS) is a common disease of the central nervous system. The main cause of this disease is damage to the myelin of nerve cells that transmit nerve messages. In this disease, many areas of the nervous system are damaged, and hard tissue replaces damaged myelin (1). The prevalence rate of this disease is estimated at two and a half million people in the world according to the MS Atlas, and its prevalence rate in Iran is reported to be 5.78 out of every 100 000 people (2). 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 (2). In addition to neuro-motor disorders, symptoms such as anxiety, weakness, and decreased problem-solving power occur and affect various aspects of a person's life and put a lot of pressure on the patient (3).

Psychological factors are influential in MS, along with the biological and neurological factors involved in this disease. Studies have shown that the type of strategy that people adopt in the face of life pressures, plays 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. 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 (4).

One of these factors is the perception of the disease. Perception of illness often contains information in five dimensions of nature, including labels and symptoms associated with the disease (e.g., fatigue and weakness) and cause or belief about the causal causes of the onset of the disease. The remaining dimensions are duration or a person's perception of duration in terms of acute, periodic, or chronic, the outcomes or expected results of the disease in terms of economic, social, psychological, and physical effects, and the effectiveness of control, treatment, and improvement (5). 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 (6) but also depends on people's reactions

and perceptions of the disease to social, cultural, and psychological factors and the personality of people. In recent years, the importance of human empowerment and talent factors has been emphasized instead of abnormalities and disorders.

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 (7). Failure to take medication and diet may even lead to death (8). Several factors exert a role in this regard, which can be based on the bio-psycho-social model and the model of medical and psychological integration to several psychological factors, including the doctor-patient relationship, health control center, memory error, and other psychological factors (7). Finally, the severity of the disease, the degree to which a person experiences the disease, can be related to various physical, psychological, environmental, and social factors (9). Among the important psychological and social factors, we can mention emotional states such as anxiety, depression, stress, anger, hostility, social support, and social relations (10).

## Objectives

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

## Methods

The current quasi-experimental study includes a pre-test, post-test, and follow-up design with a control group. The statistical population of this study is all patients with MS under the auspices of the MS Society of Tehran (Iran) in 2019. A total of 45 women with MS were purposefully selected and randomly assigned to MBCT (n = 15), ACT (n = 15), and control (n = 15) groups. The required sample size was calculated at 45 in total based on an effect size of 0.40, α of 0.95, 1-β (err prob) of 0.80 test power, and 10% loss for each group. The inclusion criteria included diagnosis by a physician of MS, minimum diploma literacy, the age range of 20-45 years, recurrent-relapsing MS, and at least 2 years after MS. On the other hand, the exclusion criteria were 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 two

experimental groups were offered the relevant treatments, while the control group was on the waiting list. Next, at the end of the treatment, all participants took part in the post-test. Further, two months after the end of treatment sessions, follow-up was performed using the mentioned scales. MBCT was conducted based on the study of Segal et al (11) in 8 sessions of 90 minutes and weekly. ACT was performed in 8 sessions of 90 minutes and weekly according to the study by Hayes et al (12). The treatment packages have already been performed and standardized. Ethical considerations were as follows:

Participants' consent to participate in the study was obtained, and the purpose of the study was explained in a way that did not create bias in the participants. Efforts have been made to ensure that the participant does not feel physically or mentally disturbed by participating in the research and to withdraw voluntarily.

### The Revised Illness Perception Questionnaire (IPQ-R)

The IPQ-R is divided into three sections with the identity and causal dimensions separately presented from the remaining. In the first section, the identity scale is presented with 17 commonly known symptoms (e.g., fatigue, dizziness, and the like) and participants are asked whether or not 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 ranging from strongly disagree to strongly agree. The Cronbach's alpha coefficients for the components of emotional manifestations, treatment control, disease outcome, acute/chronic timeline, disease coherence, personal control, and timeline were equal to 0.93, 0.85, 0.78, 0.84, 0.86, 0.78, and 0.38, respectively (13).

### The MS Treatment Adherence Questionnaire (MS-TAQ)

This tool was first designed by Wicks et al to assess psychometric performance; they analyzed the dimensions (DMT-barriers, DMT-side effects, and DMT-coping strategies) using Cronbach's alpha (14). The barriers dimension is concerned with patients reporting missing at least one dose of the previous 28 days. This dimension is about the importance of 13 barriers to adherence and is rated based on a 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 are rated on a 5-point scale from "never" to "all or nearly all of the time", and patients were asked to report the frequency. Finally, regarding the DMT-coping strategies dimension, all patients were asked in 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 (14).

The Cronbach's 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 et al indicated that the reason for this low value is a consequence of the dual response choices and the limited range of tools (14).

In this study, the mean and standard deviation (SD) were used for descriptive statistics, and the repeated measures analysis of variance and Kolmogorov-Smirnov test were applied for checking normality. In addition, Tukey's post hoc test was employed for the inferential analysis of the results. The data were analyzed using SPSS software, version 22, and the significance level was 0.05.

## Results
The mean (SD) of age in the MBCT, ACT, and control groups was 32.86 ± 10.83, 35.06 ± 10.48, and 35.60 ± 10.58, respectively. There was no significant difference between the three groups in terms of age. Table 1 presents the mean and SD of variables in the experimental and control groups.

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 demonstrated that the data were normal. The second assumption was the homogeneity of the variances of the research variables. Levene's test was applied to test this assumption. The non-significant results of this test indicated compliance with this assumption. The last assumption to be examined was the mixed analysis of variance test to check the spherical of intragroup variances. In other words, there must be an equal variance between each pair of intragroup conditions (pre-test-post-test-follow-up). The results of Mauchly's test are provided to check compliance with the spherical default. The results of the mixed analysis of variance are presented in Table 2.

As shown in Table 2, concerning the intragroup factor, the value of observed F is significant for the effect of intervention stages (pre-test, post-test, and follow-up) at the level of 0.05 for total illness perception scores (F = 194.38, $P < 0.001$) and the total score of adherence to treatment ($P < 0.001$, F = 103.37). As a result, between pre-test, post-test, and follow-up scores of illness perception (F = 53.22, $P < 0.001$) and treatment adherence (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. Table 3 presents the results of Tukey's post hoc test to compare the pair difference of the groups in illness perception scores and treatment adherence.

Based on the results of Tukey's test in Table 3, MBCT and ACT affected subjects' perceptions of disease ($P < 0.001$). Considering the higher mean scores of illness

**Table 1.** Mean (SD) of Illness Perception and Adherence to Treatment in Three Groups

| Variables | | Group | | | | | |
|---|---|---|---|---|---|---|---|
| | | MBCT | | ACT | | Control | |
| | Step | M | SD | M | SD | M | SD |
| Illness perception | Pre-test | 73.74 | 8.03 | 77.93 | 7.54 | 77.93 | 5.21 |
| | Post-test | 121.01 | 7.00 | 99.60 | 9.44 | 76.13 | 7.01 |
| | Follow-up | 130.40 | 6.85 | 106.20 | 3.96 | 77.66 | 8.01 |
| Adherence to treatment | Pre-test | 31.41 | 3.23 | 33.42 | 4.62 | 31.48 | 3.42 |
| | Post-test | 40.66 | 8.23 | 45.53 | 10.87 | 30.80 | 3.42 |
| | Follow-up | 33.66 | 6.88 | 43.46 | 7.18 | 30.13 | 4.38 |

*Note*. M: Mean; SD: Standard deviation.

**Table 2.** Summary of Results of Mixed Analysis of Variance With Intra-group and Inter-group Factors for Illness Perception and Adherence to Treatment

| Variables | Factors | Change Resources | SS | df | MS | F | P Value | 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 | | | |

*Note*. SS: Sums of squares; df: Degree of freedom; MS: Means squares.

**Table 3.** Summary of Tukey Post Hoc Test Results for Illness Perception and Adherence to Treatment Scores

| Dependent Variables | Steps | | Mean Differences | Standard Deviation Error | P Value |
|---|---|---|---|---|---|
| **Illness perception score** | MBCT | ACT | 14.13 | 1.39 | 0.001 |
| | MBCT | Control | 32.80 | 1.39 | 0.001 |
| | ACT | Control | 18.66 | 1.39 | 0.001 |
| **Adherence to treatment** | MBCT | ACT | -5.84 | 1.20 | 0.001 |
| | MBCT | Control | -14.86 | 1.20 | 0.001 |
| | ACT | Control | -9.02 | 1.20 | 0.001 |

perception in the subjects of the MBCT group compared to the ACT and control groups in the post-test and follow-up, the effect of MBCT, compared to the ACT group, was more common in subjects' perceptions of the disease. The modified means of illness perception and adherence to treatment scores in the experimental and control groups in the pre-test, post-test, and follow-up stages are depicted in Figure 1.

## Discussion

The scores of the subjects of the experimental group in the post-test and the follow-up period confirmed the effectiveness of both treatments on the components of illness perception. Additionally, considering the higher mean scores of illness perception in subjects of the MBCT group, compared to ACT and the control groups in the post-test and follow-up, that the effect of MBCT was more common in subjects' perceptions of disease.

The results of the present study are consistent with the findings of Barghi Irani et al(15) and Oraki and Sami (16). In their study, Sabour and Kakabraee (17) performed ACT group therapy on women with chronic pain and found that this therapy reduced pain, depression, and stress and increased pain perception. Similarly, Kakavand et al (18) concluded that the implementation of acceptance and commitment-based therapy reduced the 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 cause the erosion of physical and mental reserves, weakening 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 (19). Thus, psychological therapies such as MBCT that focus on the awareness of cognitive thoughts and biases, and commitment-acceptance therapy which simultaneously focuses on acceptance and striving for change, help patients become aware of their thoughts and processes. In addition, they improve their thought process and communication with thoughts by identifying dysfunctional and alternative beliefs. These types of therapies (ACT and MBCT) focus more on the outcome of the thought or how the person relates to their thoughts rather than the content of the thought or attempt to eliminate it. On the other hand, in ACT, 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 (20). 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 following treatment recommendations by increasing the power of acceptance and commitment to treatment (21, 22).

The results revealed that ACT and MBCT affect treatment adherence, and the research hypothesis in this regard is confirmed. Based on the analysis of the results, there was a significant difference between the effectiveness of ACT and MBCT, and this difference was in favor of MBCT. Accordingly, 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 (23). Mindfulness-based interventions such as cognitive-mindfulness 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, and sitting
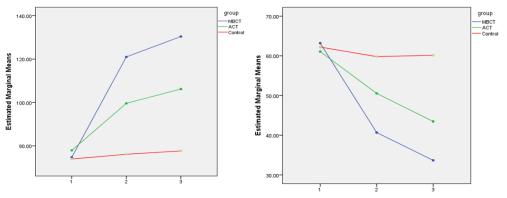


**Figure 1.** Modified Means of Illness Perception and Treatment Scores in the Experimental and Control Groups in the Pre-test, Post-test, and Follow-up Stages.

meditation, can help patients learn to be aware of bad or unpleasant events such as chronic illness and do not judge it. For example, by reducing negative thoughts about the disease and improving treatment, there is a greater tendency to engage in self-care behaviors and the likelihood of following medical instructions (24). On the other hand, ACT can be a promising method to adhere to treatment instructions(25). 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 the other adherents of treatment using psychotherapy interventions such as identifying ACT and MBCT (26).

Regarding research limitations, the results were restricted to patients with MS, and the controlled and experimental literature review related to the ACT was limited. This study was performed only on the population of patients with MS in Tehran, and caution should be exercised in generalizing the results to other regions and cities. It is suggested that this research be conducted on another sample group, and its results are evaluated and compared with those of this research. Moreover, the therapies introduced in the present study can be compared with other psychological interventions. Finally, researchers in future research 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.

## Conclusion

In general, MBCT was more effective on illness perceptions and treatment adherence compared to the ACT group. MBCT and ACT can be applied as effective methods for patients with MS.

### Conflict of Interests
The authors did not declare any conflict of interests.

### Ethical Approval
This article received the ethics code IR.IAU.INB.REC.1398.013 from Islamic Azad University, North Tehran Branch.

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