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The Effectiveness of Acceptance and Commitment-Based Group Therapy (ACGT) on Metacognitive Beliefs and Adherence to Treatment in Patients with Multiple sclerosis

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Abstract: Multiple sclerosis is a central nervous system disorder that presents significant psychological challenges for patients worldwide. In such cases, psychological interventions can offer valuable assistance. Therefore, one of the objectives of this study was to assess the impact of Acceptance and Commitment-Based Group Therapy (ACGT) on metacognitive beliefs and treatment adherence in individuals with multiple sclerosis residing in Ahvaz, Iran, in 2020. A purposive sampling method was employed, with 30 participants selected and randomly assigned to an experimental group and a control group, each consisting of 15 individuals. Data collection involved the use of the Metacognitive Beliefs questionnaire developed by Wells & Cartwright-Hatton (2004) and the Adherence to Treatment questionnaire by Seyyed Fatemi et al. (2018). This quasi-experimental study followed a pre-test, post-test, and follow-up design, including a control group. The experimental group participated in an eight-session, 90-minute Acceptance and Commitment-Based Group Therapy (ACGT), while the control group received no treatment. Data analysis was performed using analysis of covariance. The results demonstrated the effectiveness of acceptance and commitment-based group therapy (ACGT) in improving metacognitive beliefs and enhancing treatment adherence in individuals with multiple sclerosis ($p < .01$). Based on these findings, it can be concluded that this treatment approach can be beneficial for enhancing metacognitive beliefs and promoting treatment adherence in patients with multiple sclerosis.

Keywords: Multiple sclerosis, Metacognitive beliefs, Adherence to Treatment, Acceptance and commitment-based group therapy

Introduction

Multiple sclerosis (MS) is characterized by the body's immune system targeting its own tissues, leading to the destruction of myelin, a protective fatty membrane covering nerve fibers in the brain and spinal cord, akin to insulation on electrical wires (Backus & Berry, 2020; Dendrou et al., 2015). This inflammatory disease damages myelin sheaths in nerve cells within the brain and spinal cord, affecting communication and causing various physical symptoms (Mitchell et al., 2005).

Symptoms of MS can manifest as recurring or intermittent inflammation (Filippi et al., 2019) and are more prevalent in women, with twice the incidence compared to men (Kenner et al., 2007; McReynolds et al., 1999). The typical onset occurs between the ages of 20 and 40, coinciding with periods of family and social responsibilities, often impacting childbearing age (Currie, 2001; Dixon & Pérez, 2020; Lundmark & Bränholm, 1996).

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Living with MS presents challenges, including potential complications from treatment and disruptions to daily life. MS patients often exhibit low metacognitive beliefs (Wells et al., 2009), making it crucial to consider these beliefs in their study. Metacognition influences emotion processing through metacognitive knowledge and strategies, encompassing positive beliefs tied to cognitive activities and negative beliefs related to uncontrollability and the significance of cognitive thoughts (Pournamdarian et al., 2013).

Enhancing metacognitive beliefs among MS patients may improve treatment adherence. Adherence to treatment is pivotal for chronic patients like those with MS, as non-compliance leads to reduced treatment effectiveness, exacerbated symptoms, increased complications, hospitalization rates, and even mortality (Canning & Hicks, 2020; Costello et al., 2008). Negative perceptions of the disease have been associated with poorer adherence, slower recovery, increased disability, and reduced quality of life (Kołtuniuk & Rosińczuk, 2018).

Despite limited effectiveness and tolerability issues with prescribed medications for MS, some individuals explore alternative therapies. Predicting long-term treatment outcomes is challenging, but better results tend to occur in women, younger individuals, those experiencing recurring episodes, and those with fewer early-stage attacks (Ofengeim et al., 2015).

Acceptance and commitment-based group therapy (ACGT) emerges as a significant psychological therapy for MS. ACGT, a third-wave cognitive-behavioral therapy, emphasizes enhancing individuals' psychological connection with their thoughts and emotions, rather than altering cognitions (McCracken & Vowles, 2014).

The primary objective of acceptance and commitment-based therapy is to enhance clients' psychological flexibility, thereby enabling them to lead more fulfilling and valuable lives. This therapeutic approach encompasses six core processes that facilitate psychological flexibility: acceptance, cognitive diffusion, present moment awareness, self-as-context, values clarification, and committed action (Flaxman & Bond, 2010).

Various studies have explored the effectiveness of acceptance and commitment-based therapy in diverse contexts. For instance, it has been found to improve self-care behaviors and treatment adherence in dialysis patients, enhance metacognitive beliefs and address cognitive-emotional processing deficits in students with social anxiety disorder (Omidi et al., 2018), improve treatment adherence, working memory, and future memory (Hokmabadi et al., 2018), emotional self-efficacy (Motamedi et al., 2019), quality of life (Sabouri et al., 2020) and alleviate psychological distress while enhancing therapy adherence in individuals with coronary heart disease (Rahnama et al., 2017).

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In the context of multiple sclerosis (MS), psychological stress can erode metacognitive beliefs and undermine treatment adherence, leading to prolonged hospital stays and disruptions in medical education. The anxieties and depressions experienced by individuals with MS often stem from their reliance on others and a perceived loss of societal or familial roles. By gaining a comprehensive understanding of their condition, patients can bolster their resilience and life expectancy.

Multiple sclerosis is influenced by numerous factors that can either exacerbate or mitigate the disease, ultimately impacting the patient's quality of life. This study seeks to enhance metacognitive beliefs and treatment adherence among individuals with multiple sclerosis. Notably, prior research has not examined all of these variables collectively, both internationally and in Iran. Given the disease's prevalence and its significant implications for families, this investigation assumes paramount importance. The outcomes of this study can be regarded as a foundational effort to ameliorate the psychological well-being of MS patients, underscoring the need for increased attention to this issue. Conducting additional research in this domain can serve as a pivotal step in addressing the psychological challenges faced by MS patients and their families across various levels of society and individual personality traits. Therefore, this study aims to evaluate the impact of acceptance and commitment-based group therapy on metacognitive beliefs and treatment adherence in patients with multiple sclerosis.

Material and Methods

The current study employed an experimental research design with a pre-test, post-test, and follow-up assessment, incorporating a control group. The research was conducted with the objective of investigating the impact of acceptance and commitment-based group therapy on metacognitive beliefs and treatment adherence among patients with multiple sclerosis (MS). The study population encompassed all patients who sought services from the MS Association of Ahvaz (Iran) in 2019, had been medically diagnosed with MS, and possessed medical records confirming their MS diagnosis (N=101). From this population, 30 patients (divided into two groups of 15) were selected through purposive sampling. The inclusion criteria required participants to provide written consent to participate in the study, exhibit scores below the mean in the metacognitive beliefs and treatment adherence questionnaires, be between the ages of 20-55, have experienced MS symptoms for at least three months, not have a history of addiction or substance abuse, not be engaged in other psychological interventions, and possess at least a middle school level of education. Exclusion criteria included drug dependence, cognitive impairment, inability to fluently communicate in Persian, hindrance in reading, writing, or

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comprehending interview questions and questionnaires, unwillingness to continue participation, or missing more than two sessions of the treatment program.

The research procedure involved conducting a post-test on both the experimental and control groups at the conclusion of the therapy sessions. Subsequently, a follow-up assessment was conducted on both groups one month after the post-test. To adhere to ethical principles, a summary of the acceptance and commitment-based group therapy sessions was provided to the control group after they completed the training sessions and follow-up phase was administered to both the experimental and control groups.

Data obtained during the pre-test, post-test, and follow-up stages were subjected to statistical analysis, including descriptive statistics such as mean and standard deviation, as well as inferential statistics employing analysis of covariance.

Instruments

Metacognitive Beliefs Questionnaire: To gauge patients' metacognitive beliefs, the short form of the MCQ-30 Metacognition Questionnaire developed by Wells and Cartwright-Hatton (2004) was employed. This self-report questionnaire comprises 30 questions distributed across five subscales: 1. Positive beliefs about worries; 2. Beliefs regarding uncontrollability and danger; 3. Beliefs concerning cognitive adequacy; 4. Negative metacognitive beliefs about the need for control; 5. Metacognitive beliefs regarding cognitive self-awareness. Responses were recorded on a four-point Likert scale, ranging from 1 (I strongly disagree) to 4 (I strongly agree). The Cronbach's alpha coefficient for this questionnaire was 0.93 for the whole scale and 0.72 for its components. The questionnaire demonstrated a reliability coefficient of 0.73 after one month. ShirinZahedDastgiri et al. (2008) reported a Cronbach's alpha coefficient of 0.91 for the entire scale, with subscale coefficients ranging from 0.71 to 0.87. The retest reliability for the overall scale was 0.73, while subscales ranged from 0.59 to 0.83. In this study, the reliability of the Metacognitive Beliefs Questionnaire was assessed using the Cronbach's alpha method, yielding a coefficient of 0.81 for the entire questionnaire.

Adherence to Treatment Questionnaire: This scale was initially developed by Seyed Fatemi et al. (2018) for use with chronic patients in Iran. This questionnaire comprises 40 items, each rated on a 5-point Likert scale. It encompasses various dimensions, including Effort in Treatment (9 questions), Willingness to Participate in Treatment (7 questions), Adaptability (7 questions), Integration of Therapy with Life (5 questions), Sticking to Treatment (4 questions), Commitment to Treatment (5 questions), and Hesitation in the Implementation of Treatment (3 questions). To calculate the score for each subscale, the scores of the relevant items are summed, while the total score for the entire questionnaire is computed by summing the scores for all the items. The potential score range varies for each dimension: Effort in Treatment (0-45), Willingness to Participate in Treatment (0-35), Adaptability (0-

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35), Integration of Therapy with Life (0-25), Sticking to Treatment (0-20), Commitment to Treatment (0-25), and Hesitation in the Implementation of Treatment (0-15). These scores are then transformed to fall within the range of 0-100, in accordance with the questionnaire's design guidelines. According to the questionnaire's criteria, a score of 75-100% indicates very good adherence to treatment, 50-74% signifies good adherence, 26-49% reflects average adherence, and 0-25% represents poor adherence. Seyed Fatemi et al. (2018) conducted a study to establish the questionnaire's validity and reliability. Their results confirmed content validity (with a content validity index of 0.91), face validity, and construct validity, which revealed seven distinct factors. Additionally, the instrument's reliability was demonstrated through Cronbach's alpha, with a coefficient of 0.92, and the intra-cluster correlation index, with a value of 0.94. In terms of the reliability of the Adherence to Treatment Questionnaire in the current study, the Cronbach's alpha coefficient was found to be 0.84 for the entire questionnaire. The Acceptance and Commitment-Based Group Therapy sessions were structured based on the content presented by Hayes et al. (2013) and comprised eight sessions, each lasting 90 minutes. Further details regarding the session structure can be found in Table 1.

Table 1. Summary of acceptance and commitment-based therapy sessions

Session	Content
First	Completion of questionnaires, introduction, familiarity with group rules, therapy review and objectives of this program, assessment, conceptualization and presentation of booklet
Second	Discussion about experiences and their assessment, efficiency as a measurement criterion and creation of and frustration
Third	Expression of control as a problem, introduction of desire as another response, and involvement with purposeful actions
Fourth	Use of cognitive failure techniques, intervention with the functioning of problematic language chains, weakening of self-alliance with thoughts and emotions
Fifth	Self-observation as a context, weakening of self-conceptual and self-expression as an observer, presentation of separation between oneself, inner experiences and behavior
Sixth	Use of mental techniques, modeling the exclusion from comfort zone, learning to see inner experiences as a process
Seventh	Introduction of value, presentation of the risks of focusing on results, discovery of the practical values of life
Eighth	Understanding the nature of desire and commitment, determining the patterns of action in accordance with values

Results

In the present study, the mean age of female patients was 4.89 ±32.65 and male samples were 34.19± 5.32 years. The mean and standard deviation of research variables in experimental and control groups in pre-test, post-test and follow-up are presented in Table 2.

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Table 2. Mean and standard deviation of research variables in experimental and control groups in pre-test, post-test and follow-up

Dependent variable	Assessment	ACGT group		Control group	
		Mean	SD	Mean	SD
Metacognitive beliefs	Pretest	44.93	5.57	45.65	8.33
	Post-test	70.06	8.31	45.06	4.23
	Follow up	66.06	4.11	41.46	5.59
Adherence to treatment	Pretest	47	7	47.66	8.84
	Post-test	75.53	8.90	46.40	3.92
	Follow up	70.60	8.06	43.73	4.90

Data in Table 2 indicate the mean and standard deviation of the research variables in the experimental and control groups in pre-test and post-test. Before analyzing the data related to the hypotheses, its hypotheses were assessed to ensure that the data of this study estimate the hypotheses related to the analysis of covariance. For this purpose, the normality of data due to the lack of significance of Z, Kolmogorov-Smirnov indicated that for the variable of metacognitive beliefs (P = 0.121; Z = 0.170) and the variable of adherence to treatment (P = 0.167; Z = 0.136) follow the normality distribution. In addition, Levene's test was used to test the hypothesis of homogeneity of variances (for the similarity of variances in the experimental and control groups). In terms of metacognitive beliefs (p = 0.169 and F = 1.704) and adherence to treatment (p=0.148 and F = 2.211), Box's M test results (Box's = 314.144, F = 1.362, and p = 0.125,) were obtained. In order to investigate the homogeneity of the regression line slope, the analysis of variance was used which. Metacognitive beliefs (p = 0.115 and F = 2.359) and adherence to treatment (p = 0.771 and F = 0.263) were obtained. Based on the results, the analysis of covariance can be used. In order to compare experimental and control groups based on post-test scores, multivariate covariance was used after controlling the effect of pre-tests to determine the effect of acceptance and commitment-based group therapy and adherence to metacognitive beliefs and treatment in patients with multiple sclerosis. The results of the post-test are presented in Table 3.

Table 3. Results of multivariate analysis in the post-test

Effect	Value	F	Hypothesis DF	Error DF	p	Effect size
Pillai's Trace	0.88	92.390	2	25	0.001	0.88
Wilks Lambda	0.12	92.390	2	25	0.001	0.88
Hotelling's Trace	7.39	92.390	2	25	0.001	0.88
Roy's Largest Root	7.39	92.390	2	25	0.001	0.88

As can be observed in Table 3, multivariate analysis of covariance statistical tests in acceptance, commitment, and control group therapy groups indicated that these groups had significant difference in at least one of the dependent variables. Table 4 indicates the results of univariate analysis of covariance for post-test scores in dependent variables.

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Table 4. Results of univariate analysis of covariance on post-test scores of metacognitive beliefs and adherence to treatment

Dependent variables	SS	DF	MS	F	p	Effect size	Power
Metacognitive beliefs	4703.13	1	4703.13	108.44	0.001	0.807	1
Adherence to treatment	6490.06	1	6490.06	190.40	0.001	0.88	1

As can be observed in Table 4, the F-ratio of univariate analysis of covariance for dependent variables indicates that there is a significant difference in the variables of metacognitive beliefs and adherence to treatment between group therapies based on acceptance, commitment and control. Here are the results of the follow-up stage.

Table 5. Results of multivariate analysis of covariance on the follow-up

Effect	Value	F	Hypothesis DF	Error DF	p	Effect size
Pillai's Trace	0.89	111.57	2	25	0.001	0.89
Wilks Lambda	0.11	111.57	2	25	0.001	0.89
Hotelling's Trace	8.92	111.57	2	25	0.001	0.89
Roy's Largest Root	8.92	111.57	2	25	0.001	0.89

As indicated in Table 5, the multivariate analysis of covariance statistical tests in group therapies based on acceptance, adherence, and control indicate that these groups were significantly difference in at least one of the dependent variables. Table 6 indicates the results of univariate analysis of covariance for follow-up scores in dependent variables.

Table 6. Results of univariate analysis of covariance on the follow up scores of metacognitive beliefs and adherence to treatment

Dependent variables	SS	DF	MS	F	p	Effect size	Power
Metacognitive beliefs	4562.77	1	4562.77	194.09	0.001	0.88	1
Adherence to treatment	5519.80	1	5519.80	172.62	0.001	0.86	1

As can be observed in Table 6, the F-ratio of univariate analysis of covariance for dependent variables indicates a significant difference in the variables of metacognitive beliefs and adherence to treatment between group therapies based on acceptance, commitment and control.

Discussion

The primary objective of this study was to assess the impact of acceptance and commitment-based group therapy on metacognitive beliefs and treatment adherence in individuals diagnosed with multiple sclerosis. The findings revealed that acceptance and commitment-based group therapy yielded positive effects on both metacognitive beliefs and treatment adherence, and these effects were sustained throughout the follow-up phase.

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The initial discovery indicated that acceptance and commitment-based group therapy significantly enhanced metacognitive beliefs in the post-test and follow-up assessments. This outcome aligns with the findings from a study conducted by Omidi et al. (2018), which demonstrated that acceptance and commitment therapy effectively improved metacognitive beliefs and addressed cognitive-emotional processing deficiencies in students with social anxiety disorder. To elucidate this result, it can be asserted that the fundamental premise of acceptance and commitment education revolves around the notion that psychological distress arises from the avoidance of experiences, cognitive entanglement, unmet behavioral needs, and a misalignment with core values. Therapists' primary objective is not to explicitly teach acceptance and commitment to reduce symptoms; instead, symptom reduction emerges as a natural byproduct of the therapeutic process (Omidi et al., 2018). Consequently, it is more fitting to evaluate the impact of acceptance and commitment therapy in patients with MS on variables such as quality of life, psychological symptoms, chronic fatigue syndrome, and pain perception, rather than focusing solely on the scales of physical MS symptoms. This is because acceptance and commitment-based therapy primarily aims to induce behavioral changes rather than symptom reduction.

Acceptance and commitment-based therapy empowers individuals to observe their inner experiences as mere thoughts and concentrate on life values and meaningful pursuits rather than reacting impulsively to these experiences. This therapeutic approach incorporates mindfulness, acceptance, and cognitive defusion techniques to enhance psychological flexibility. It fosters acceptance within individuals, allowing them to shed the mental burden of constantly seeking answers to questions like "Why me?" Instead, they learn to accept such questions and emotions without the need to eliminate, alter, or suppress them, ultimately attaining a newfound sense of inner peace (Ruiz, 2010). The boost in metacognitive beliefs can be attributed to the heightened psychological flexibility individuals develop when confronted with adverse physical and psychological circumstances. In this context, these methods posit that mindfulness and cognitive flexibility serve as key drivers of change. Consequently, mindfulness and cognitive flexibility are regarded as mediators in reducing suffering and enhancing life satisfaction (Hayes et al., 2013).

Furthermore, the results underscored the effectiveness of acceptance and commitment-based group therapy in enhancing treatment adherence among patients with multiple sclerosis in both the post-test and follow-up assessments. This outcome is consistent with the findings of Hokmabadi et al. (2018) and Rahnama et al. (2017).

Hokmabadi et al. (2018) uncovered improvements in adherence to treatment, working memory, and future memory through this therapeutic approach. To elucidate this phenomenon, it is essential to first establish a strong therapeutic rapport with the patient, identify the underlying causes and barriers to non-

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adherence, and bolster the patient's motivation for behavior change to enhance treatment adherence among individuals with multiple sclerosis (MS).

Among the strategies employed to surmount obstacles to self-care, motivational interviews, belief recognition, self-efficacy enhancement, and the cultivation of social support emerge as pivotal components. Acceptance and commitment-based therapy, through its interventions focused on cognitive defusion, aims to assist clients in disentangling from rigidly adhering to their cognitive thoughts and regulations. Instead, clients are encouraged to explore more adaptive ways of engaging with their immediate experiential reality (Ly et al., 2014). The objective of cognitive defusion training is to educate clients in perceiving emotions solely as emotions, thoughts purely as thoughts, physical sensations exclusively as physical sensations, and memories strictly as memories (Zettle, 2003). Such training equips clients to act more effectively when confronted with the challenges posed by their condition. When patients act in accordance with their personal values, regardless of the presence of distressing thoughts or emotions, they undergo transformative experiences. By acting in alignment with their values, even in the face of distress, patients can cultivate a heightened sense of self-efficacy (Ivanova et al., 2016). Consequently, functional change and committed actions can lead to increased self-efficacy, fostering a greater sense of responsibility for their treatment regimen. Acceptance and commitment therapy remodels a patient's perspective on their pain and illness, reshapes their values and emotions, and consequently bolsters their self-efficacy beliefs, facilitating a more resolute commitment to and adherence to their treatment.

Given that MS is a prevalent condition with a notable psychological component, it has profound implications for the overall well-being of affected individuals. Metacognitive beliefs and adherence to therapy guidelines are of paramount importance in managing this patient population. Based on the outcomes of this study, acceptance and commitment-based therapy emerges as a potent non-pharmacological therapeutic modality for addressing the psychological aspects of this disease. It should be considered an integral component of the therapeutic arsenal alongside pharmacological interventions. Nonetheless, it is important to acknowledge that this study has certain limitations, notably the specific sample consisting of MS patients who sought care at the MS Association of Ahvaz. Care should be exercised when extrapolating these findings to other populations. Given the effectiveness of acceptance and commitment-based group therapy, it is advisable for therapists to become proficient in its proper implementation and consider its application in individuals with chronic illnesses to enhance both metacognitive beliefs and treatment adherence.

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