

The Effectiveness of Acceptance and Commitment Therapy on the Self-Care and Adherence to Treatment in Patients with Type 2 Diabetes

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Abstract

Aim: This study aimed to investigate the effectiveness of acceptance and commitment therapy on self-care and adherence to treatment in patients with type 2 diabetes. **Materials and Methods:** This study was a quasi-experimental research with pretest–posttest–follow-up and control group design. The sample of the present study consisted of 30 patients with type 2 diabetes referred to the health network of Asaluyeh city in the first half of the year 2019. The perceived self-efficacy scale for self-care and adherence to treatment questionnaire were used for data collection. **Results:** The results of the data analysis showed that acceptance and commitment therapy is effective in the self-care and adherence to treatment of patients with type 2 diabetes. **Conclusion:** Based on obtained results, it can conclude that acceptance and commitment therapy as a short term therapy has effective influences on self-care and adherence to treatment of patients with type 2 diabetes.

Keywords: Acceptance and commitment therapy, adherence to treatment, diabetes, self-care

INTRODUCTION

Type 2 diabetes is a metabolic, chronic, and progressive disease diagnosed by the relative lack of insulin.^[1] Similarly, it is a polygenic heterogeneous disorder triggered by the interaction between predisposing genes and factors that are related to lifestyle and environment.^[2]

More than 425 million individuals suffered from diabetes in 2017 and it is predicted that this number will amount to 693 million individuals in 2045.^[3] The prevalence of diabetes in Iranian adults has been reported 11% (4.5 million individuals) and it is predicted that this rate will amount to 9.2 million in the year 2030.^[4]

Blood vessel stenosis, cardiovascular diseases, neuropathy, nephropathy, retinopathy, and death are the side effects and

consequences of diabetes.^[1,5,6] Diverse pharmacological treatments (including metformin, sulfonyl, meglitinide, and insulin) and nonpharmacological treatments (including modifying lifestyle) have been proposed. However, it seems necessary to have a combination of pharmacological treatment and change in lifestyle for a well and long-term metabolic control of type 2 diabetes.^[7] The investigation of the research literature reveals that diabetes management has a crucial role in decreasing the side effects and consequences of this disease. Although self-care is the main component in the management of this disease, the daily engagement of individuals with self-care activities, related to metabolic control,

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is difficult.^[3] Self-care involves any deliberate effort in caring for physical, mental, and emotional health.^[8] Self-care activities related to diabetes also refer to the active and effective strategies of diabetes, as well as the organization of personal life. They include adhering to pharmacological treatment, supervising blood pressure, physical activities, controlling regimen, and foot care; however, it is not limited to these cases.^[3]

On the other hand, adherence to treatment has an integral role in managing type 2 diabetes, as well as its consequences; however, this issue is often neglected.^[9] Numerous studies display that an increase in adherence to treatment has a relationship with an increase in glycemic control.^[10] In their review study, Bailey and Kodack^[9] found that a noticeable ratio of these patients has a poor adherence to treatment toward a desirable control. Besides, many factors such as complex dosing regimens, clinical inactivity, economic status, ethnicity, patients' education and beliefs, social support, and multidrug treatment have effects on it.^[9] Polonsky and Henry^[11] reported that, at least, 45% of patients with type 2 diabetes fail in their glycemic control. They found that one of the main related factors is poor adherence to pharmacological treatment. Likewise, poor adherence to treatment has relationships with various consequences such as improper glycemic control, heightened mortality, the high expenses of ambulatory care, hospitalization, and management of diabetes' side effects.^[11]

Diverse interventions and treatments have been employed so that the self-care and adherence to treatment of patients with type 2 diabetes are increased.^[7,11] Polonsky and Henry^[11] believe that new pharmacological and nonpharmacological treatments are necessary since they can deal with the burden of disease and problematic beliefs of patients about their medicines and have a noticeable and long-term effect on adherence to treatment. Accordingly, new interventions and treatments are necessary for improving the self-care of these patients. Another treatment, increasing self-care and adherence to treatment of patients suffering from type 2 diabetes, is acceptance and commitment therapy.^[9] Acceptance and commitment therapy is a synthesis of acceptance and mindfulness methods with commitment and behavior change methods. This approach pursues increasing psychological flexibility.^[12] To this end, this treatment uses six basic processes including acceptance, commitment, diffusion, self-as-context, values, and contacting the present moment.^[12,13] Acceptance and commitment therapy targets cognitive diffusion and experiential avoidance.^[14] It is employed in the treatment of diverse psychological and physical disorders.^[15] The investigation of the research literature reveals that this treatment improves the quality of life,^[16] life satisfaction,^[17] and mental health^[18] of patients with type 2 diabetes. Likewise, it decreases their psychological distress,^[19] psychological symptoms,^[16,17] generalized anxiety,^[1] and depression.^[20]

The investigation of the literature shows that this treatment can have a significant role in diabetes management. In their study, Gregg *et al.*^[21] found that patients suffering from

diabetes in low classes, who had received a combination of diabetes management training and acceptance and commitment therapy for a day, more probably employed coping strategies after 3 months and reported better self-care compared to those who had received mere training. Besides, their rates of glycosylated hemoglobin were in the target range. Shayeghian *et al.*^[22] reported the same results concerning a group of people suffering from type 2 diabetes, who had referred to Tehran Shahid Labafinezhad Hospital. Azadi *et al.*^[23] compared the effectiveness of mindfulness intervention based on mobile social networks with acceptance and commitment therapy and mindfulness in patients with type 2 diabetes. They found that acceptance and commitment therapy improved their self-management and glycosylated hemoglobin level. In a study entitled "designing an acceptance and commitment therapy intervention to promote diabetes management in adolescents," Hadlandsmayth *et al.*^[24] explained that experiential avoidance and cognitive diffusion give rise to some problems in the diabetes management of adolescents suffering from diabetes. Besides, acceptance and commitment therapy can influence the diabetes management of adolescents.

With concern to the prevalence of type 2 diabetes,^[3-6] consequences and side effects of this disease,^[1,5,6] the roles of self-care and adherence to treatment in diabetes management,^[3,9] and also the necessity of attention to new interventions and treatments,^[11] the present study aimed to investigate the effectiveness of acceptance and commitment therapy on the self-care and adherence to treatment of patients with type 2 diabetes.

MATERIALS AND METHODS

The present study is methodologically experimental with pretest–posttest–follow-up and control group design. The statistical population consisted of all patients suffering from type 2 diabetes who referred to the health network of Asaluyeh city in the first half of the year 2019. The examined sample comprised 30 patients with type 2 diabetes who were selected by purposeful sampling and assigned in two experimental and control groups. The experimental group received acceptance and commitment therapy for 8 and 60-min sessions held once a week. However, the control group received no intervention. Thereafter, the posttest was administered in both the groups, and the follow-up was conducted on the experimental group after a 6-month interval. The inclusion criteria to the study were patients suffering from type 2 diabetes for at least 1 year, the age range between 35 and 45 years, having diploma as the minimum educational level, having no serious psychological disease leading to drug interaction and psychotherapy (via inquiring the physician in attendance), no interaction with treatments relevant to this disease (via inquiring the physician in attendance), and not receiving simultaneously psychotherapy or other therapeutic programs. The exclusion criteria included patients suffering from different advanced diseases, having side effects resultant from diabetes such as renal insufficiency, diabetic foot ulcers and amputation,

retinopathy accompanied by an intense decreased vision more probably accompanying psychological disorders, and receiving psychotropic or affecting medicines during the intervention. Observing secrecy principals, avoiding any hurt to participants, and the informed consent for participating in the study were of the ethical considerations of the study. The data of the present research were analyzed by the SPSS software (IBM, New York, US) through the methods of univariate analysis of covariance (ANCOVA) and repeated-measure analysis of variance (ANOVA).

The perceived self-efficacy scale for self-care

This questionnaire was developed and employed by Naderimagham *et al.*^[25] Its design is based on Bandura's theory on the self-efficacy construct, as well as the self-care questionnaire of Tobert and Glasgow (1994). This questionnaire possesses 17 items and five subscales of nutrition, physical activity, self-monitoring blood sugar, foot care, and smoking. The items of this questionnaire are based on a 5-point Likert scale ranging from 1 (not at all) to 5 (very much). The face, content, and construct validities (exploratory factor analysis and analytic) of this scale have been reported desirable. The reliabilities of this scale, obtained by the internal consistency and test-retest methods (with 2 weeks interval), were 0.85 and 0.81. The Cronbach alpha coefficients related to the subscales were 0.68–0.85. Likewise, their retest coefficients were reported 0.77–0.95.^[25]

Adherence to treatment questionnaire

The adherence to treatment questionnaire was designed by Modanloo^[2] concerning chronic diseases. It contains 40 items in the domains of making effort for treatment, intention to take the treatment, adaptability, integrating illness into life, stick to the treatment, commitment to treatment, and indecisiveness for applying the treatment. The items of this questionnaire are based on a six-point Likert scale scored from 0 (not at all) to 5 (completely). The reliabilities of this scale, obtained by the internal consistency and test-retest methods (with 2 weeks interval), were 0.92 and 0.845, respectively.^[2]

Acceptance and commitment therapy

In this study, the acceptance and commitment therapy was executed in 8 and 45–60-min sessions collaboratively and with exact accordance with the standard protocol.^[13] Table 1 summarizes the content of intervention sessions.

RESULTS

Table 2 illustrates the descriptive results of the studied variables.

To investigate the effectiveness of acceptance and commitment therapy on patients with type 2 diabetes, we employed a univariate analysis of covariance. To test this hypothesis, we, first, investigated its assumptions. The results related to the Levene's test ($F = 0.496$, $df_1 = 1$, $df_2 = 28$) showed that the assumption of homogeneity of variances was observed ($P > 0.05$). The results of the F -test ($F = 5.6$,

Table 1: The contents of the collaborative ACT sessions

Sessions	Content
1 st session	Establishing therapeutic relationships, familiarizing patients with the research topic, answering the questionnaires, and therapeutic contracting
2 nd session	Using representations to discover and examine the therapeutic methods of patients, as well as evaluating the rate of their effects, discussing on the therapies temporality and low-effectiveness via representations, receiving feedback, and presenting tasks
3 rd session	Using representations to help clients diagnose those beliefs that are related to their health, discover the effect of adherence to treatment and self-care, and accept the personal painful events without confliction, receiving feedback, and presenting tasks
4 th session	Using representations to explain experience avoidance and awareness of its consequences, training acceptance steps, changing language concept, training relaxation, receiving feedback, and presenting tasks
5 th session	Introducing the three-dimensional behavioral model for explaining the common relationships among behavior/emotions, psychocognitive functions, and observable behaviors; discussing on efforts to increase self-care behavior according to the adherence to treatment, receiving feedback, and presenting tasks
6 th session	Using representations to explain the concepts of role and background, observing self as a platform, and establishing contact with self to control caring behaviors, awareness of different felt perceptions, and separation from those feelings that are parts of mental content, receiving feedback, and presenting tasks
7 th session	Explaining the concept of values, recognizing beliefs related to health, motivating them to adhere to treatment, empowering clients for self-care and a better life, focus practice, receiving feedback, and presenting tasks
8 th session	Training commitment to action, identifying behavioral designs according to values and developing commitment to apply them, adding up the sessions, and administering the posttest

ACT: Acceptance and commitment therapy

$MS = 241.41$, $df = 1$, $SS = 241.41$) showed that the assumption of the homogeneity of regression slopes was also observed ($P > 0.05$). Besides, the results showed that the assumption of the linear relationship between the pretest and posttest ($F = 21.20$, $MS = 913.32$, $df = 1$, $SS = 913.32$) has been established ($P < 0.01$). The results of the one-way ANCOVA are reported in Table 3.

The results of Table 3 display that the mean scores of self-care in the experimental group and the control group are significantly different ($P < 0.05$). The repeated-measure ANOVA was conducted concerning self-care of the experimental group in three times of pretest, posttest, and follow-up. We examined the assumption of multivariate normal distribution using Mauchly's test ($W = 0.154$, χ^2 , $df = 2$, $P = 0.06$). The results showed that this assumption was established. Accordingly, we could perform the repeated-measure ANOVA. The multivariate results of Wilk's Lambda test showed that there were significant differences among the self-care scores in pretest, posttest, and follow-up ($V = 0.511$, $F = 6.03$, df assumption = 2,

Table 2: Statistical indices for studied variables

Variable	Experimental group						Control group					
	Pretest		Posttest		Follow-up		Pretest		Posttest		Follow-up	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Self-care	39.2	9.6	47.4	6.92	46.87	7.99	41.53	7.17	35.6	10.4	-	-
Adherence to treatment	90.67	9.85	98.8	8.51	97.73	9.77	99.67	6.97	99.87	6.45	-	-

SD: Standard deviation

df error = 13, $P = 0.01$). Thus, we can conclude that time has a statistically significant effect. In other words, this statistic demonstrated that the self-care scores changed in three different temporal periods. We used Bonferroni's *post hoc* test to more precisely investigate the differences among the three groups.

The results of Table 4 reveal that there was a significant difference between the mean scores of the test in two execution times (pretest with posttest, pretest with followup, and posttest with followup). Thus, we can conclude that the increase in self-care is stable over time. We also employed univariate ANCOVA to investigate the effectiveness of acceptance and commitment therapy on the adherence to treatment in patients with type 2 diabetes. To test this hypothesis, we, first, examined its assumptions. The results of the Levene's test ($F = 0.388$, $df_2 = 28$, $df_1 = 1$) showed that the assumption of homogeneity of variances was observed ($P > 0.05$). The results of the F -test ($F = 5.76$, $MS = 301.02$, $df = 1$, $SS = 301.02$) showed that the assumption of homogeneity of the regression slopes was also observed ($P > 0.05$). Besides, the results revealed that the assumption of the linear relationship between the pretest and posttest ($F = 21.20$, $MS = 899.11$, $df = 1$, $SS = 899.11$) was established ($P < 0.01$). The results of one-way ANCOVA are reported in Table 5.

The results of Table 5 illustrate that there is a statistically significant difference between the mean scores of adherence to treatment in the experimental and control groups ($P < 0.05$). The repeated-measure ANOVA was conducted on the self-care of the experimental group in three times of pretest, posttest, and follow-up. The assumption of multivariate normality distribution was checked by Mauchly's test, and the results showed that this assumption was established by Mauchly's test ($W = 0.601$, $\chi^2 = 5.12$, $df = 2$, $P = 0.06$). Accordingly, the execution of repeated-measure ANOVA was permissible. The results of the multivariate test of Wilk's Lambda showed that there were statistically significant differences among the adherence to treatment scores in three execution times of the pretest, posttest, and follow-up ($V = 0.499$, $F = 7.43$, df assumption = 2, df error = 13, $P = 0.01$). Thus, we can conclude that time has a statistically significant effect. In other words, this statistic shows that the scores of adherence to treatment changed in three temporal periods. We used Bonferroni's *post hoc* test to more precisely investigate the differences between the three groups [Table 6].

The results of Table 6 demonstrate that the test mean scores were significantly different in the two execution times

Table 3: The results of analysis of covariance for effect of ACT on self-care

Source	SS	DF	MS	F	Effect size
Pretest	721.89	1	721.89	14.31	0.35
Group	1279.47	1	1279.47	25.37**	0.48
Error	1361.3	27	50.41		
Modified total	3127.5	29			

** $P < 0.01$, * $P < 0.05$. SS: Sum of squares, DF: Degrees of freedom, MS: Mean square, ACT: Acceptance and commitment therapy

Table 4: Bonferroni's pairwise comparisons for pretest, posttest, and follow-up of self-care

Assessments	Mean differences	SE
Pretest Posttest	8.20**	2.27
Pretest Follow-up	7.66**	2.16
Posttest Follow-up	0.533	0.533

** $P < .001$. SE: Standard error

Table 5: The results of analysis of covariance for the effect of ACT on adherence to treatment

Source	SS	DF	MS	F	Effect size
Pretest	831.17	1	831.17	15.03	0.38
Group	1389.42	1	1389.42	26.11**	0.50
Error	1467.25	27	51.13		
Modified total	3229.81	29			

** $P < 0.01$, $P < 0.05$. ACT: Acceptance and commitment therapy, SS: Sum of squares, DF: Degrees of freedom, MS: Mean square

Table 6: Bonferroni's pairwise comparisons for pretest, posttest, and follow-up of adherence to treatment

Assessments	Mean differences	SE
Pretest Posttest	9.31**	2.97
Pretest Follow-up	8.52**	2.76
Posttest Follow-up	0.72	0.72

** $P < .001$. SE: Standard error

(posttest, pretest, pretest, and follow-up). Hence, we can conclude that adherence to treatment is stable over time.

DISCUSSION

The present study investigated the effectiveness of acceptance and commitment therapy on the self-care and adherence to treatment of patients suffering from type 2 diabetes. The

results of the present study showed that acceptance and commitment therapy influenced the self-care and adherence to treatment of these patients. Besides, this effect is stable over time (3 months). The results of the present study are in line with the results of the study conducted by Greg *et al.*^[21] They found that low-class patients suffering from type 2 diabetes, who had received a combination of diabetes management training and acceptance and commitment therapy for a day, employed more coping strategies and reported better results compared to those who had received mere training. Besides, the rate of their glycosylated hemoglobin was in the target range. In this study, only some certain aspects of self-care including regimen, exercising, and supervising glucose are considered; however, the present study has addressed foot care and smoking, as well. Furthermore, this study highlighted some certain aspects of acceptance and commitment therapy. Shayeghian *et al.*^[22] investigated a group of patients with type 2 diabetes and reported that a combination of diabetes management training and acceptance and commitment therapy affects their coping strategies, self-care, and glycosylated hemoglobin level even 3 months after the intervention. Azadi *et al.*^[23] argued that acceptance and commitment therapy improves self-management and glycosylated hemoglobin levels.

The investigation of the research literature reveals that patients suffering from type 2 diabetes face some problems in their management and adherence to treatment owing to experiential avoidance and cognitive diffusion. In other words, they have problems with their unpleasant internal experiences and engage with avoidance behaviors. Thus, they are unable to properly manage their diseases.^[26] This approach pursues increasing psychocognitive flexibility.^[12] This target is fulfilled via six fundamental processes such as acceptance, commitment, diffusion, self-as-context, values, and contacting the present moment.^[12,27] In their study, Hadlandsmayth *et al.*^[24] aimed to design a therapeutic intervention of acceptance and commitment to enhance the diabetes management of adolescents. They reported that acceptance and commitment therapy pursues psychocognitive flexibility and targets experiential avoidance and cognitive diffusion via acceptance, diffusion, mindfulness, values, and self-as-context. With respect to what was mentioned, we can elucidate the results of this study by explaining that acceptance and commitment therapy increases psychocognitive flexibility through increasing the acceptance of distressing experience content, employing diffusion recognition techniques to reduce the harmful effects of recognitions, increasing clients' capabilities to contact the present moment, increasing self-as-context, identifying significant values in clients, and supporting effective steps toward achieving worthy objectives.^[12,14,27] Consequently, it increases the self-care and adherence to treatment of patients suffering from type 2 diabetes.

The active acceptance of undesired thoughts and emotions, perhaps uncontrollable, in addition to commitment and action toward those objectives that are in harmony with the selected values of an individual is the two main purposes of this

approach.^[28] With respect to what was mentioned, patients suffering from type 2 diabetes learn to accept their momentarily experience actively and voluntarily.^[12] Indeed, clients are aware of their distressing internal experiences (thoughts, emotions, memories, and physical symptoms) or situations, events or their triggering factors. Hence, they accept them actively and without any step toward reducing them (for example, experiential avoidance). The clients learn the difference between acceptance and tolerance via metaphors and various exercises and practice acceptance skills respecting diverse internal and difficult events.^[14,27] On the other hand, individuals with type 2 diabetes learn to specify the values, goals, barriers impeding goal achievements, and requisite actions for fulfilling the goals. Then, they are committed to behave or act in accordance with their selected values (Hayes *et al.*, 2011). These techniques along with other techniques increase psychocognitive flexibility, self-care, and adherence to treatment of patients with type 2 diabetes.

CONCLUSION

The findings showed that the acceptance and commitment therapy increased self-care and adherence to treatment in patients with type 2 diabetes. Convenience sampling and using self-report questionnaires were limitations of the study. It is suggested that future researchers employ other diagnostic instruments to enhance the precision and value of their diagnosis and use random sampling method.

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Conflicts of interest

There are no conflicts of interest.

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