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Original Article

# A Component-Based Analysis of Acceptance and Commitment Therapy for Affective Regulation in Individuals With Diabetes

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**Abstract**

**Background and aims:** Diabetes is a chronic condition often linked to emotional distress, negatively affecting disease management and quality of life. This study examined the effectiveness of acceptance and commitment therapy (ACT) in improving affective control among individuals with diabetes.

**Methods:** A quasi-experimental design with pre-test, post-test, and follow-up was employed, involving women aged 30–50 with type 2 diabetes mellitus (T2DM) registered with the Ahvaz Diabetes Association in 2023. Thirty participants were recruited and assigned to either an intervention group (n = 15) receiving eight weekly 90-minute ACT sessions or a control group (n = 15) with no intervention. Outcomes were measured using the Affective Control Scale and analyzed with repeated-measures ANOVA.

**Results:** ACT significantly reduced negative affect (anger, depression, anxiety) and enhanced positive affect in women with T2DM ($P < 0.001$). The control group showed no significant changes in negative (pre: 110.33 ± 13.56; post: 113.53 ± 12.90; follow-up: 115.21 ± 13.25; $P = 0.167$) or positive affect (pre: 28.46 ± 8.06; post: 27.20 ± 7.71; follow-up: 25.73 ± 7.36; $P = 0.143$). In contrast, the ACT group displayed significant reductions in negative affect (pre: 109.26 ± 9.22; post: 86.40 ± 8.60; follow-up: 91.33 ± 13.56; $P = 0.001$) and increases in positive affect (pre: 26.60 ± 3.94; post: 34.60 ± 3.99; follow-up: 33.60 ± 3.86; $P = 0.001$), with significant between-group differences post-intervention and at follow-up ($P = 0.001$).

**Conclusion:** ACT effectively enhances emotional well-being in individuals with diabetes by reducing negative emotions and increasing positive ones, supporting its use in managing emotional challenges associated with chronic health conditions.

**Keywords:** Acceptance and commitment therapy, Emotions, Anxiety, Depression, Diabetes mellitus

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## Introduction

Diabetes mellitus (DM), a chronic metabolic disorder characterized by hyperglycemia due to impaired insulin production or action (1), is classified into type 1 (autoimmune beta-cell destruction), type 2 (insulin resistance and beta-cell dysfunction), gestational, and other specific forms (2, 3). The global prevalence of this disease is rising, posing a significant public health challenge. According to the estimates of the International Diabetes Federation, 537 million adults were living with DM in 2021, with the number projected to rise to 643 and 783 million by 2030 and 2045, respectively. Such a dramatic increase in prevalence has profound implications for individual health and healthcare systems. Beyond physiological complications (e.g., retinopathy, nephropathy, neuropathy, and cardiovascular disease), the burden of DM extends to psychological and social dimensions that further challenge disease management and quality of life (QoL) (4). Individuals with DM often experience psychological distress, including impaired affective regulation, negatively impacting treatment adherence and well-being (5).

Affective control, also called emotion regulation, encompasses a range of processes involved in modulating emotional experiences, including identifying, evaluating, and modifying emotional responses (6). The regulation of affect, thus, entails both conscious and unconscious strategies aimed at influencing which emotions are experienced, when they are experienced, and how they are expressed (7). In the context of chronic illnesses (e.g., DM), effective control is particularly crucial. Individuals managing DM often face a multitude of

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emotional challenges, including anxiety related to disease management, frustration with dietary restrictions, and feelings of sadness or depression associated with the long-term nature of the condition (8). These negative emotions can significantly impair self-care behaviors, such as adherence to medication regimens, blood glucose monitoring, and healthy lifestyle choices (9). Consequently, deficits in affective control in individuals with DM can contribute to poorer glycemic control, increased risk of complications, and reduced QoL (10). Therefore, interventions targeting affective control represent a crucial area of focus in DM care.

In contemporary healthcare, psychological therapies play a significant role in managing the physical symptoms and manifestations of T2DM through mindfulness-based clinical interventions. By addressing the illness's psychological dimensions, these interventions enhance the QoL and disease management (11). Acceptance and commitment therapy (ACT) is one of the novel and effective approaches in treating various psychological problems and disorders associated with DM (12, 13). ACT, emphasizing the acceptance of unpleasant experiences and commitment to valued actions, empowers individuals to cope more effectively with the challenges posed by the disease (14). The core principles of this type of therapy consist of two primary components: (1) acceptance, or a willingness to experience pain and other distressing events without attempting to control or suppress them, and (2) values-based action, or commitment, which involves a willingness to act in accordance with personally meaningful goals, even in the presence of unwanted experiences (15, 16). This approach prioritizes the development of psychological flexibility and a focus on living a meaningful life rather than concentrating on eliminating negative emotions and thoughts (17).

Research has consistently demonstrated the link between psychological factors, such as stress, anxiety, and depression, and poorer glycemic control, adherence to treatment, and overall well-being in individuals with DM (5). ACT distinguishes itself from traditional cognitive behavioral therapies by shifting the focus from changing the content of thoughts to changing the individual's relationship with those thoughts (13). Rather than directly challenging negative thoughts, ACT promotes their acceptance as transient mental events, reducing their influence on behavior and emotional state (17). The emphasis on acceptance is consistent with a growing body of research, underscoring the value of acceptance-based approaches in managing chronic health conditions (18). Some studies have shown that ACT interventions can lead to improvements in various psychological outcomes in individuals with chronic illnesses, including reduced anxiety and depression, increased psychological flexibility, and improved QoL (19, 20).

Beyond its well-documented physiological complications, such as retinopathy, nephropathy, and cardiovascular disease (4), DM profoundly impacts psychological well-being, contributing to emotional distress, including anxiety, depression, and impaired affective control (5, 8). These psychological challenges are critical, as they can significantly undermine essential self-management behaviors (e.g., adherence to medication, dietary regimens, and consistent blood glucose monitoring), thereby exacerbating glycemic control issues and diminishing overall QoL (9, 10). Despite the predominance of interventions focusing on physiological management in DM care, these approaches often overlook the critical psychological dimensions of the condition. Although extensive prior research has demonstrated the efficacy of ACT in enhancing psychological outcomes in chronic illnesses, including reductions in anxiety and depression and improvements in psychological flexibility (17–20), its specific application to improving affective control among individuals with T2DM warrants further, targeted investigation. Such an inquiry is vital in diverse cultural contexts, such as Iran, where empirical evidence remains scarce. Addressing this identified research gap, the present study evaluates the effectiveness of ACT in specifically enhancing affective control—encompassing reductions in anger, depressed mood, and anxiety, alongside an increase in positive affect—among women with T2DM. Utilizing a quasi-experimental design and focusing on a culturally specific population registered with the Ahvaz DM Association, this research aims to provide novel insights into the practical applicability of ACT for improving emotion regulation within DM management, thus offering a targeted, acceptance-based therapeutic approach to mitigate the psychological burden associated with this chronic condition.

## Materials and Methods

The present research employed a quasi-experimental pre-test, post-test, and follow-up design with a control group. The study population comprised all women aged 30–50 years who had been diagnosed with T2DM and had registered with the Ahvaz Diabetes Association in 2023. These patients had been diagnosed with T2DM by specialists for at least three years prior to the study. The sample size was calculated using G*Power software, aiming for a power of 0.80, an alpha of 0.05, and a medium effect size (0.25) for a repeated-measures analysis of variance (ANOVA) involving two groups and three time points, yielding a minimum requirement of 28 participants. To mitigate potential dropout, 30 participants were enrolled in this study. Before participation, all individuals provided written informed consent after receiving a detailed explanation of the study's purpose, procedures, potential risks, and benefits, per the ethical guidelines approved by the Ethics Committee of Islamic Azad University of Ahvaz. Participants were informed of their right to withdraw from the study without consequence. Thirty individuals with DM were selected using convenience sampling and then randomly divided into intervention (n = 15) and control (n = 15) groups using a computer-

generated random number sequence produced by the RAND function in Microsoft Excel, ensuring unbiased allocation and balanced group composition. The inclusion criteria were the age range of 30–50 years, a DM diagnosis for at least three years, a minimum of a high school education, the absence of any diagnosed psychological disorders, non-participation in other concurrent therapy sessions, and the absence of significant social problems (e.g., substance abuse). On the other hand, the exclusion criteria included absence from more than two therapy sessions and withdrawal from participation in the educational-therapeutic sessions. Several measures were implemented to address potential confounding variables. DM-related complications (e.g., retinopathy, nephropathy, and neuropathy) were assessed through medical records, and only participants without severe complications were included to minimize their impact on affective control. Moreover, medication use (oral hypoglycemic agents or insulin) was documented at baseline. In addition, participants were required to maintain stable medication regimens throughout the study, verified through self-reports and consultation with their healthcare providers. Personal character traits (e.g., trait resilience or neuroticism) were not directly measured due to resource constraints; however, the absence of diagnosed psychological disorders and the random allocation process helped mitigate their influence. Baseline fasting blood sugar (FBS) and glycated hemoglobin (HbA1c) levels were measured to ensure group equivalence (FBS: 152.4 ± 18.7 mg/dL and 149.8 ± 20.1 mg/dL in the intervention and control groups, respectively, $P = 0.673$; HbA1c: 7.2 ± 0.9% and 7.4 ± 1.0% in the intervention and control groups, respectively, $P = 0.541$). Further, participants with extreme values (HbA1c > 9.0%) were excluded to control for severe glycemic variability.

Following the formation of the intervention and control groups, the intervention group received an 8-week, 90-minute weekly ACT-based educational-therapeutic program, while the control group received no intervention. The first author, a qualified clinical psychologist with extensive training and practical experience in ACT, meticulously delivered the intervention. The teaching and learning methods employed throughout the 8-week program were multifaceted, incorporating didactic presentations, interactive group discussions, experiential exercises, and guided mindfulness practices. These pedagogical approaches were strategically designed to facilitate participants' understanding of core ACT principles and promote the practical development of psychological flexibility in managing emotional distress related to DM. A summary of the ACT intervention sessions is presented in Table 1. The data collection procedure involved administering the Affective Control Scale (ACS) to both the intervention and control groups before the intervention (pre-intervention), immediately after the intervention (post-intervention), and after a two-month follow-up period (follow-up).

### *Measurement Tools*

The ACS, developed by Williams et al (21), is a 42-item instrument designed to evaluate the capacity for emotion regulation. The ACS comprises four subscales: anger (8 items), depressed mood (8 items), anxiety (13 items), and positive affect (13 items). Responses are recorded on a 7-point Likert-type scale ranging from 1 ("Strongly Agree") to 7 ("Strongly Disagree"). In addition, subscale scores are derived by summing the responses for the respective items, with the total ACS score calculated as the sum of all item scores. For interpretation, the possible score range for the Anger and Depressed Mood subscales (each with eight items) is 8–56. Further, the possible score range for the Anxiety and Positive Affect subscales (each with 13 items) is 13–91. Furthermore, the total ACS score, encompassing all 42 items, ranges from 42 to 294. Consistent with improving emotional regulation, lower scores on the anger, depressed mood, and anxiety subscales indicate better affective control (i.e., reduced negative emotional experiences).

In contrast, higher scores on the positive affect subscale represent greater positive emotional regulation. The data collection procedure involved administering the ACS through a structured interview. Trained research assistants verbally presented each item to the participants, who then selected their responses on the 7-point Likert-type scale. This interview format clarified any potential ambiguities in the questions and ensured a standardized administration protocol across all participants, thereby enhancing the consistency and reliability of the collected data. The ACS demonstrates strong psychometric properties, with high internal consistency and reliability, as evidenced by Cronbach's alpha coefficient of 0.88 for the total scale (22). The Persian version of the ACS, utilized in this study, exhibited a content validity index of 0.96 and a content validity ratio of 0.93, confirming its suitability and validity for the study population (22).

### *Data Analysis*

The obtained data were analyzed using SPSS, version 26. Descriptive statistics, including means and standard deviations, were calculated to summarize the data. Moreover, the normality of each variable's distribution within groups was assessed using the Shapiro-Wilk test. Additionally, homogeneity of variance and sphericity of the variance-covariance matrix were evaluated using Levene's test and Mauchly's test, respectively. Similarly, the intervention's effectiveness across three time points (pre-intervention, post-intervention, and follow-up) was analyzed via repeated-measures ANOVA. When sphericity was violated, the Greenhouse-Geisser correction was applied. Additionally, independent samples t-tests and chi-square tests were utilized to compare baseline characteristics between groups, ensuring equivalence in age, marital status, education level, and ACS subscale scores.

**Table 1.** A Summary of the ACT Intervention Sessions

| Session | Objectives | Content |
|---|---|---|
| 1 | Group member introductions and pre-test administration | • Explaining the rules, principles, and agreements governing the counseling sessions<br>• Obtaining informed consent from group members for participation in the therapeutic process<br>• Outlining the goals of therapy and emphasizing the possibility of change<br>• Explaining the intervention's philosophical basis<br>• Introducing creative hopelessness<br>• Explaining concepts related to diabetes management<br>• Examining individuals' eating patterns (normal vs. emotional eating and mindfulness eating training)<br>• Introducing ineffective past coping strategies and low self-efficacy (exploring individuals' past attempts to achieve goals) |
| 2 | Establishing a contract between the patient and the therapist for diabetes management Introducing therapeutic concepts | • Teaching patients that any attempt to avoid or control unwanted mental experiences is ineffective or counterproductive, often exacerbating these experiences. They learn to fully accept these experiences without any internal or external reactions aimed at eliminating them. The individual's psychological awareness in the present moment is enhanced; in other words, the individual becomes aware of all their psychological states, thoughts, and behaviors in the present moment. |
| 3 | Reviewing and discussing the previous assignment | • Reviewing individuals' responses regarding self-control strategies<br>• Controlling the problem (control as a problem) rather than the solution<br>• Reinforcing the concept that any attempt to avoid or control unwanted mental experiences is ineffective |
| 4 | Reviewing individual experiences since the previous session | • Evaluating performance |
| 5 | Distinguishing between the conceptualized self and the observing self | • Assessing performance |
| 6 | Demonstrating the importance of values and explaining how to understand them | • Teaching mindfulness and meditation (emotional awareness and wise mind awareness)<br>• Teaching clients how skills are observed and described, how skills are not judged, how to maintain focus, and how these skills function |
| 7 | Recognizing that self-efficacy is not aligned with individual values | • Helping individuals consistently understand their values as the source of commitment and use them in implementing the concept of "willingness" and in the service of behavioral activation and personal goals<br>• Reviewing choices versus judgments/decisions and identifying values-based behaviors within a week |
| 8 | Exploring the connection between goals and activities | • Achieving behavioral goals: (1) continuing the assignment, considering behavioral activation by committing to specific activities the client defines based on larger goals and values, and (2) being prepared to cope with potential setbacks after the end of therapy by identifying possible strategies, obstacles, fear algorithms, and committed action based on the ACT algorithm |

*Note*. ACT: Acceptance and commitment therapy.

## Results

Participants in this study consisted of 30 women diagnosed with T2DM. The baseline characteristics of the intervention and control groups are provided in Table 2. The intervention and control groups had a mean age of 39.66 ± 3.47 years and 40.21 ± 6.61 years, respectively, with no significant difference between groups ($P = 0.763$, independent samples t-test). Regarding marital status, the intervention group included 6 single (40.0%) and 9 married (60.0%) participants, while the control group included 5 single (33.33%) and 10 married (66.67%) participants, showing no significant difference ($P = 0.723$, chi-square test). All participants had at least a high school education, with no significant between-group differences in educational attainment ($P = 0.847$, chi-square test). In addition, baseline scores on the ACS subscales (anger, depressed mood, anxiety, negative affect total, and positive affect) were comparable between groups, with no significant differences (all $P > 0.05$, independent samples t-tests), confirming group equivalence at baseline (Table 2).

**Table 2.** Baseline Characteristics of Intervention and Control Groups

| Characteristic | Intervention Group (n = 15) | Control Group (n = 15) | *P* Value |
|---|---|---|---|
| Age (years, mean ± SD) | 39.66 ± 3.47 | 40.21 ± 6.61 | 0.763 |
| Marital status | | | |
| Single | 6 (40.0%) | 5 (33.33%) | 0.723 |
| Married | 9 (60.0%) | 10 (66.67%) | |
| Education level | | | |
| High school | 10 (66.67%) | 9 (60.0%) | 0.847 |
| College or higher | 5 (33.33%) | 6 (40.0%) | |
| ACS subscales (mean ± SD) | | | |
| Anger | 34.13 ± 4.83 | 33.46 ± 5.82 | 0.629 |
| Depressed mood | 32.93 ± 2.76 | 32.26 ± 3.39 | 0.380 |
| Anxiety | 42.20 ± 5.34 | 44.60 ± 7.59 | 0.164 |
| Negative affect (total) | 109.26 ± 9.22 | 110.33 ± 13.56 | 0.719 |
| Positive affect | 26.60 ± 3.94 | 28.46 ± 8.06 | 0.271 |

*Note*. SD: Standard deviation; ACS: The Affective Control Scale.

Table 3 lists the means and standard deviations for affective control components (anger, depressed mood, anxiety, total negative affect, and positive affect) across three time points (pre-intervention, post-intervention, and two-month follow-up) for the control and intervention (ACT) groups. At baseline, both groups showed comparable mean scores for all variables. Post-intervention, the ACT group demonstrated significant reductions in negative affect components (anger: from 34.13 ± 4.83 to 25.00 ± 4.73; depressed mood: from 32.93 ± 2.76 to 25.13 ± 3.13; anxiety: from 42.20 ± 5.34 to 36.26 ± 5.62) but a notable increase in positive affect (from 26.60 ± 3.94 to 34.60 ± 3.99).

Before conducting the repeated-measures ANOVA, the

**Table 3.** Means and Standard Deviations of Research Variables

| Variables | Groups | Pre-Intervention | Post-Intervention | Follow-up | *P* value (Within-Group) |
|---|---|---|---|---|---|
| | | Mean ± SD | Mean ± SD | Mean ± SD | |
| Anger | Control group | 33.46 ± 5.82 | 34.53 ± 8.82 | 34.33 ± 5.60 | 0.457 |
| | ACT group | 34.13 ± 4.83 | 25.00 ± 4.73 | 28.73 ± 4.86 | 0.001 |
| | *P*-value (between-group) | 0.629 | 0.001 | 0.006 | - |
| Depressed mood | Control group | 32.26 ± 3.39 | 33.53 ± 3.15 | 32.20 ± 8.74 | 0.246 |
| | ACT group | 32.93 ± 2.76 | 25.13 ± 3.13 | 26.70 ± 3.32 | 0.001 |
| | *P*-value (between-group) | 0.380 | 0.001 | 0.001 | - |
| Anxiety | Control group | 44.60 ± 7.59 | 45.36 ± 7.88 | 44.66 ± 7.83 | 0.582 |
| | ACT group | 42.20 ± 5.34 | 36.26 ± 5.62 | 35.70 ± 7.85 | 0.001 |
| | *P*-value (between-group) | 0.164 | 0.001 | 0.001 | - |
| Negative affect (total) | Control group | 110.33 ± 13.56 | 113.53 ± 12.90 | 115.21 ± 13.25 | 0.167 |
| | ACT group | 109.26 ± 9.22 | 86.40 ± 8.60 | 91.33 ± 13.56 | 0.001 |
| | *P*-value (between-group) | 0.719 | 0.001 | 0.001 | - |
| Positive affect | Control group | 28.46 ± 8.06 | 27.20 ± 7.71 | 25.73 ± 7.36 | 0.143 |
| | ACT group | 26.60 ± 3.94 | 34.60 ± 3.99 | 33.60 ± 3.86 | 0.001 |
| | *P*-value (between-group) | 0.271 | 0.001 | 0.001 | - |

*Note*. ACT: Acceptance and commitment therapy; SD: Standard deviation.

normality of the distribution of each research variable within each group was assessed using the Shapiro-Wilk test. Scores on all the subscales of the ACS were found to be normally distributed pre-intervention, post-intervention, and at follow-up. Furthermore, Levene's test indicated that the assumption of homogeneity of variance was met. However, Mauchly's test revealed a violation of the sphericity assumption of the variance-covariance matrix. Consequently, the Greenhouse-Geisser correction was applied to all analyses.

According to the results from the repeated-measures ANOVAs, significant main effects of time were observed for both negative and positive affect ($P < 0.001$), indicating substantial changes in scores across the three assessment points. Furthermore, significant main effects of group were observed for both negative ($P < 0.001$) and positive affect ($P = 0.013$), demonstrating differences in overall mean scores between the intervention and control groups. Critically, significant group × time interactions emerged for both negative and positive affect ($P < 0.001$), revealing that the patterns of change over time significantly differed between the two groups. These findings confirm the differential impact of the ACT intervention on emotional outcomes compared to the control condition.

## Discussion

This study evaluated the efficacy of ACT for enhancing affective control in women with T2DM, representing significant reductions in negative affect (anger, depressed mood, and anxiety) but a considerable increase in positive affect. These findings align with those of previous research by Maghsoudi et al (23), Ataie Moghanloo et al (24), and Somaini et al (25), reporting improvements in emotional distress and psychological well-being following ACT interventions in diabetic populations. Emotions are a fundamental aspect of human experience, shaping personality development, social relationships, and self-concept (8). While experiencing a range of emotions is natural, intense negative emotions can be destructive, impairing decision-making and overall well-being (8). ACT addresses this issue by fostering psychological flexibility, enabling individuals to accept distressing thoughts and feelings as transient experiences and focus on value-driven actions (19, 26).

This study offers novel contributions to the literature by examining the impact of ACT on affective control among women with T2DM in a culturally distinct context—Ahvaz, Iran. Unlike prior studies that often investigated broader psychological outcomes, such as general distress or QoL, in mixed-gender or Western populations (14, 23, 24), this research employed a component-based analysis of affective control, dissecting its subcomponents (anger, depressed mood, anxiety, and positive affect) using the ACS. This targeted approach provides granular insights into how ACT influences specific emotional domains critical for DM self-management, where emotional regulation directly impacts adherence to medication, dietary regimens, and glucose monitoring (9). The focus on Iranian women addresses a significant research gap, as few studies have explored the efficacy of ACT in non-Western cultural settings, where gender roles, societal expectations, and limited access to psychological support may uniquely shape emotional responses and intervention outcomes. Similarities with previous studies, such as reductions in negative emotions (23, 24), likely reflect the universal applicability of the core processes of ACT (i.e., acceptance and values-based action) across diverse populations. However, the pronounced increase in positive affect observed in this study may be attributed to the culturally tailored intervention design, which

incorporated group-based discussions and mindfulness practices that resonated with the participants' social and emotional experiences, potentially enhancing engagement and therapeutic impact.

The findings of this study are consistent with those of research on the efficacy of ACT in other chronic health conditions. For example, Feliu-Soler et al (19) found that ACT reduced emotional distress while improving QoL in patients with chronic pain, mirroring the reductions in negative affect observed in this study. Similarly, Sauer et al (20) reported that ACT decreased anxiety and depression while enhancing psychological well-being in cancer patients, conforming to the findings of the current study. These similarities underscore the robust ability of ACT to foster psychological flexibility across chronic conditions characterized by significant emotional burdens. However, differences are also evident; for instance, Kemani et al (27) observed smaller effect sizes for physical symptom reduction (e.g., pain intensity) in chronic pain patients compared to the substantial reductions in negative affect found in our study. This discrepancy may arise from the distinct nature of DM, where emotional distress is closely tied to daily self-management tasks (e.g., dietary restrictions and glucose monitoring), which ACT effectively targets through acceptance and commitment to health-focused goals. In contrast, chronic pain often involves persistent physical sensations that may be less amenable to psychological interventions alone. Additionally, the structured 8-week ACT protocol of this study, specifically tailored to DM-related emotional challenges, likely contributed to stronger effects than more generalized ACT interventions in other chronic disease studies.

The observed reductions in anger, depressed mood, and anxiety following the ACT intervention suggest that this approach effectively targets core processes underlying emotional distress, such as experiential avoidance and cognitive fusion (15). By promoting the acceptance of difficult emotions, ACT enables individuals to disengage from maladaptive coping strategies, fostering actions aligned with personal values (28). This emphasis on acceptance is particularly pertinent for individuals with DM, who encounter persistent emotional challenges associated with disease management (26). The increase in positive affect further indicates that ACT mitigates negative emotions and enhances emotional well-being, potentially improving adherence to self-care behaviors (9). These findings corroborate the broader literature on the effectiveness of ACT in chronic conditions (18, 27) and highlight its potential as a scalable intervention for DM care, particularly in settings like Iran, where psychological support for chronic diseases is underutilized.

This study had several limitations. First, convenience sampling limits generalizability to broader populations beyond women aged 30–50 with T2DM in Ahvaz. Second, the small sample size may have constrained statistical power. Third, the two-month follow-up period may not capture the long-term durability of ACT's effects. Finally, reliance on self-report measures (e.g., the ACS) may introduce response biases. Accordingly, future research should explore ACT's efficacy in larger, more diverse samples, with longer follow-up periods and objective measures of emotional regulation.

## Conclusion

The present study provides compelling evidence for the beneficial effects of ACT on affective functioning in women with T2DM. The observed pattern of results, characterized by significant reductions in anger, depressed mood, and anxiety, alongside a significant increase in positive affect, suggests that ACT effectively targets core emotional processes relevant to this population. These findings contribute to the growing body of literature supporting the application of ACT in the context of chronic health conditions. Nonetheless, further research is needed to elucidate the mechanisms underlying the effects of ACT on affective regulation in DM (e.g., the role of psychological flexibility in mediating emotional outcomes). Additionally, studies should incorporate longitudinal assessments of physiological markers (e.g., FBS and HbA1c) to evaluate whether improvements in affective control translate into enhanced glycemic control, thereby providing a more comprehensive understanding of the impact of ACT on DM management. Expanding the investigation to include larger, more diverse samples (including men and different age groups) and exploring the intervention's effectiveness across varied cultural and clinical settings will further strengthen the evidence base for the applicability of ACT in chronic disease care.

### Authors' Contribution

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### Competing Interests

The authors declare that there is no conflict of interests to disclose.

### Ethical Approval

This study was approved by the Ethics Committee of Islamic Azad University of Ahvaz (IR.IAU.AHVAZ.REC.1403.166).

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