Comparing The Efficacy of Acceptance and Commitment Therapy (ACT) and Dialectical Behavior Therapy Skills Training (DBT-ST) on Cognitive Emotion Regulation in Patients with Type II Diabetes

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Abstract

Objectives: Diabetes is a chronic, multifaceted and threatening disease which has significant psychological complications. The purpose of this study was comparing the efficacy of Acceptance and Commitment Therapy (ACT) and Dialectical Behavioral Therapy Skills Training (DBT-ST) on cognitive emotion regulation in patients with type II diabetes.

Method: The design of this quasi-experimental research was a pretest-posttest with a control group. The statistical population of the study included all patients with type II diabetes referred to Baghban (Touba) Medical Clinic in Sari in 2019, among whom 45 patients were selected through the convenience sampling method and then randomly assigned into three groups. The first group received ACT, the second group received DBT-ST, and the third group was considered as a control group. Data were collected using a 36-item Cognitive Emotion Regulation Questionnaire (Garnefsky et al., 2001) in three stages of pre-test, post-test, and follow-up, and were analyzed by repeated measurement variance analysis.

Results: The results showed that ACT and DBT-ST were significantly more effective on cognitive emotion regulation for the experimental groups compared to the control group (effect sizes 0.911 & 0.967, respectively). The effectiveness of DBT-ST compared to ACT was more significant on cognitive emotion regulation scores (effect sizes 0.967) at (P>0.01).

Conclusion: Based on the results of this study, it can be concluded that ACT improved psychological indexes and mental health of patients with type II diabetes due to acceptance of unfavorable emotions and thoughts, commitment, and DBT-ST for emotion regulation and mindfulness components.

Keywords: Acceptance and Commitment Therapy, Dialectical Behavioral Therapy, Cognitive Emotion Regulation, Diabetes Type II.

Introduction

Today we encounter with this unpleasant fact that the enemies of the revolution, by the use of narcotics and psychotropic weapons as a software weapon, are seeking for the destroying the people's identity and undermining their will and determination, collapsing the beliefs and values of the society, and weakening the old traditions such as religion and social cohesion (Ahqar, 2015).

Diabetes mellitus is a multifactorial metabolic disease characterized by high blood glucose and metabolic disorder of carbohydrate, fat, and protein (Poretski, 2017). High blood glucose is as a result of impaired insulin secretion and hepatic gluconeogenesis (Yamagishi, 2018). The major

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types of diabetes include type I diabetes (insulin-dependent) and type II diabetes (non-insulin-dependent). The global prevalence of diabetes is increasing. While about 422 million people worldwide were diagnosed with diabetes in 2014, 645 million are projected to develop diabetes by 2040 (Da Rocha et al., 2016). According to the US Centers for Disease Control and Prevention (CDC) (2017), 34.2 million people of all ages or 10.5% of the total US population have diabetes. A national study conducted in Iran estimated that the prevalence of diabetes in 2013 was 13.8 (Peykari, 2015), and it is predicted that if the current trend continues, it will reach about 5.2 million cases in 2025 (Amini & Parvaresh, 2009). It is the most common cause of amputation, blindness, chronic renal failure, and a risk factor for heart disease (Chang, 2010).

Diabetes is often associated with mental health problems and disorders, which reduce the patient's ability to cope with the disease. For example, longitudinal studies have shown that depression is 15 to 24 percent higher in people with diabetes than in people without diabetes. On the other hand, the prevalence of type II diabetes is between 15 and 37 percent among people with depression, which implies the mutual relationship between these conditions (Bonora & De Fronzo, 2018). According to Sturt, Dennick, Due-Christensen, and McCarthy (2015), symptoms of diabetes-related distress such as worry about the future and the possibility of serious complications, guilt or anxiety while dealing with diabetes, a feeling of discouragement from the diabetes diet, 60% of people with type I diabetes or type II diabetes are treated with insulin. On the other hand, reducing patients' ability to control diabetes aggravates their psychological problems and causes patients to fall into a defective cycle (White, 2001).

The role of psychological factors affecting diabetes has been investigated in many studies (Snock, Nicols, Ven, & Lubach, 1999). Patients with diabetes are sensitive to negative emotions such as anxiety, fear, anger, and the like, and have difficulty in emotion regulation (Yazdi, Saffarnia, & Zare, 2020), and experiencing negative emotions such as anger, frustration, fear, disappointment, and depression are very common among them (Richman, Kubzansky & Maselko, 2005). In recent years, the role of cognitive emotion regulation and the improvement of emotional regulation strategies in mental disorders have been investigated (Fajkowska, 2013).

Emotional regulation includes any coping strategies that people use when faced with intense emotions (Gross & John, 2003). Grass (2013) defined the emotional regulation as "which emotions, where and when to have, and how to experience and express them" (Bahrebar, Ahadi, Aghayousefi, 2019). One of the most important aspects of the emotional regulation process is the regulation of emotional experiences through the use of cognitive elements. The way of evaluating individual cognitive apparatus when dealing with negative events is very important. In other words, the individual's mental health stems from a mutual interaction between the use of certain types of cognitive emotion regulation strategies and the correct assessment of situations (Thampson, 1991; Ochsner & Gross, 2005). This concept is called cognitive emotion regulation in psychological texts. In fact, cognitive emotion regulation strategies refer to how people think after a negative experience or traumatic event happens (Garnefski et al., 2002). The cognitive emotion regulation strategies are dichotomized into maladaptive strategies (self-blame, rumination, catastrophizing, other blame) and adaptive strategies (acceptance, positive refocusing, refocus planning, positive reappraisal, putting into perspective). Many psychiatric disorders are because of choosing and implementing maladaptive emotional regulation strategies for emotion regulation (Gross & Jazaieri, 2014). A meta-analysis showed that maladaptive cognitive regulation strategies are far more relevant to psychological trauma than adaptive strategies, and mood-related disorders are more associated with cognitive emotion regulation strategies than other

disorders (Aldao et al., 2010). In addition, some studies show that social-psychosocial problems and disorders, such as fatigue, irritability, anger, depression, and anxiety are more common in people with diabetes, and the prevalence of depression in people with diabetes type II is three times higher than in diabetes type I (Kruse, 2003), and cognitive elements are important parts of anxiety and various types of depression (Fajkowska, 2013). Because patients with diabetes type II have a lot of problems, effective treatments to improve the psychological characteristics of these patients is of most importance (George & Joseph, 2014). In the last two decades, psychologists have used a variety of psychological interventions for a wide variety of psychological problems in people with diabetes. However, not all treatments have been effective. Among new and structured approaches, we can refer to Acceptance and Commitment Therapy and Dialectical Behavior Therapy. Acceptance and Commitment Therapy (ACT) is a psychological intervention based on modern behavioral and evolutionary principles, including the Relational Frame Theory (RFT), which applies the processes of mindfulness, acceptance, and commitment to developing psychological flexibility (Loma, Hayes, and Walser, 2017). Acceptance and commitment therapy is different from cognitive-behavioral therapy. Its underlying principles include 1) acceptance or inclination to experience pain or other disturbing events without attempting to control them, and 2) action based on value or commitment with a desire to act as an individual's meaningful goals before eliminating unknown experiences. It is linguistic methods and cognitive processes that, in interaction with other verbal dependencies, lead to healthy functioning (Valiz et al., 2003). The ultimate goal of this model is to increase the value of living. Acceptance, contact and connection with the present moment, defusion, the observing self, values clarification, and commitment are six major processes in this therapy (Kevin, Sowden & Ashworth, 2014). The main assumption of acceptance and commitment therapy is that a significant portion of psychological distress is a normal part of the human experience (Hayes, Strosahland Wilson, 2012). Acceptance and commitment therapy helps people experience problematic thoughts and emotions differently, rather than having a systematic attempt to change or reduce their occurrence (Timothy & Jessica, 2017). Dialectical Behavioral Therapy, on the other hand, is a cognitive-behavioral approach that Linehan has identified as a treatment for those who engage in destructive behaviors. This approach combines interventions related to cognitive-behavioral therapy, which are based on the principle of change, with oriental teachings and techniques, which are based on the principle of acceptance, and accordingly, suggests four intervening components: 1) Core Mindfulness, 2) Distress Tolerance (as the components of acceptance), 3) Emotion Regulation, and 4) Interpersonal Effectiveness (as the components of change). Dialectical behavioral therapy is a combination of supportive, cognitive, and behavioral therapies (Wagner, Rizvi &Harned, 2007). Miller, Ratos, and Linehan (2006) state that the goal of dialectical behavior therapy is to increase self-esteem, achieve individual goals, and resolve feelings of inadequacy. According to Sheets (2009), dialectical behavioral therapy teaches skills for managing stress and difficult emotional states, and focuses on current problems and concerns here and now that lead to troublesome behaviors and emotions.

Among the studies conducted in Iran, we can mention the research of Tamannaeifar, Gharraee, Birashk, Habibi and Mojtaba (2014). In their study, they found that both acceptance and commitment therapy and Group Cognitive Therapy led to a reduction in depressive symptoms and rumination; however, there was no difference between the effectiveness of the two groups.

Kazemi Rezaei, Kakabarai, and Hosseini (2015) in a study to evaluate the effectiveness of emotion

regulation skill training based on dialectical behavioral therapy on cognitive emotion regulation and quality of life of patients with cardiovascular diseases found that after emotion regulation skill training based on dialectical behavioral therapy, the scores of positive cognitive emotion regulation strategies and quality of life of cardiovascular patients in the experimental group increased and their negative strategies scores decreased significantly compared to control group.

Baygan, KhoshKonesh, HabibiAskar Abad, and Fallahzadeh (2016) found that group-based dialectical behavior therapy was effective in reducing the symptoms of alexithymia, stress, and symptoms of diabetes in people with diabetes type II. Baygan, KhoshKonesh, HabibiAskar Abad, and Fallahzadeh (2016) found that group-based dialectical behavior therapy was effective in reducing the symptoms of alexithymia, stress, and symptoms of diabetes in people with diabetes type II.

Ahovan, Balali, AbediShargh, and Doostian (2016) in a study showed that dialectical behavior therapy skills training (DBT-ST) during eight 90-minute sessions improved cognitive emotion regulation in female patients with Obsessive–compulsive disorder (OCD).

In Mirani, Moradi, Nouri, and Borhani's (2017) studies, it was found that acceptance and commitment therapy has significantly reduced maladaptive cognitive emotion regulation strategies and increased adaptive cognitive emotion regulation strategies among patients under methadone maintenance treatment.

Darvish Baseri and Dasht Bozorgi (2017) demonstrated that Group therapy based on acceptance and commitment was effective in cognitive emotion regulation and alexithymia of patients with diabetes type II.

The results of the research by Hamidipour and Ghotbian (2017) showed that acceptance and commitment therapy is effective in cognitive emotion regulation. Psychotherapy was shown to be effective in examining subtests of cognitive emotion regulation, resulting in subscales of acceptance, positive focus, re-focus, reappraisal, and others-blame, and has led to greater regulation and increased ability of subjects in these areas, yet it was not effective in subscales of self-blame, rumination, observing others, and catastrophizing in women with glass abuse.

Yaraghchi, Jomehri, Seyrafi, Kraskian Mujembari, and Mohammadi Farsani (2019) in a study showed that acceptance and commitment therapy reduced body mass index and negative strategies and increased positive cognitive emotion regulation strategies in obese people.

So far, no research has been conducted to compare the two methods in people with diabetes, and there is no scientific evidence available, while both methods have their own advantages and disadvantages.

Thus, taking into account the necessity of the study, this study was conducted to compare the effectiveness of acceptance and commitment therapy (ACT) and dialectical behavioral therapy (DBT) on cognitive emotion regulation in patients with diabetes type II.

Method

Population and participants

The present study is a part of applied research and was conducted based on a quasi-experimental design with two experimental groups and one control group. The statistical population of the study included all patients with diabetes type II who referred to Baghban Medical Clinic (Touba) in Sari in 2019. A group of 45 (14 males and 31 females) was selected based on research criteria (diabetes type II diagnosed by an endocrinologist, ages 25 to 45, having at least fifth-grade elementary education, and being lack of severe mental illness or incurable disease, and so on, who were not treated with other psychological interventions during the study). Then they were randomly assigned into two experimental groups and one control group. Exclusion criteria

included the absence of more than two sessions of treatment. The first experimental group received acceptance and commitment therapy for eight 2-hour sessions, two sessions per week for four weeks. For the second experimental group, dialectical behavior therapy skills training was performed based on the components of mindfulness, distress tolerance, and emotional regulation, and interpersonal efficiency during twelve two-hour sessions and six weeks based on treatment guidelines. At the beginning of the study, there were 15 subjects in each group, and later from each experimental group, one person was excluded from the study due to the absence of more than two sessions. Therefore, one person was randomly removed from the control group to equalize the groups. As a result, the final sample was 42 participants. All patients responded to the Cognitive Emotion Regulation Questionnaire (Garnefski, et al., 2001) in the pre-test phase. For the first experimental group, acceptance and commitment therapy was held in ten 2-hour sessions and two sessions per week for five weeks. In the second experimental group, group dialectical behavior therapy skills training was performed in 12 two-hour sessions over six weeks of treatment based on the components of mindfulness, distress tolerance, and emotional regulation and interpersonal efficiency. The control group was placed on the waiting list without receiving any intervention. At the end of the sessions, individuals from all three groups were invited individually for post-test. After two months, everyone responded to the Cognitive Emotion Regulation Questionnaire for the third time (follow-up phase). The collected data by the use of questionnaires, medical records, and interviews were analyzed through descriptive statistics (mean and standard deviation) and inferential statistics (repeated measurement variance analysis) by SPSS V22 statistical analysis software.

Ethical statement

In this research, the participants were informed that they had full authority to participate in the research and if they wished, the test results would be provided to them. Also, after explaining the purpose of the research, obtaining informed consent, the right to leave the study, ensuring harmless treatment based on the quality of life and treatment based on emotion regulation, answering questions and observing fidelity and validity while collecting data, were other principles of ethics. Also, the participants were informed that material and non-material rights will be taken into account in reporting the results of the study. The participants were not charged with any expenses for the research. This study with the ethics code of IR.IAU.SARI.REC.1399.060 was approved by the ethics committee of Islamic Azad University, Sari branch.

Tools

1. Cognitive Emotion Regulation Questionnaire (CERQ):

This questionnaire was developed by Garnefski, Kraaij, and Spinhoven (2001) in the Netherlands and has two English and Dutch versions. The Cognitive Emotion Regulation Questionnaire is a multidimensional questionnaire used to identify cognitive coping strategies after experiencing bad events or situations. The questionnaire, which can be used on people over the age of 12, is a self-report tool with 36 articles. The subscales include nine cognitive strategies, including self-blame, acceptance, rumination, positive refocusing, refocus planning, positive reappraisal, putting into perspective, catastrophizing, and other blame. Questions are answered from never to always on a 5-point Likert scale. The subscale consists of four items. The total score of each subscale is obtained by adding the score of the questions. Therefore, the range score for each subscale is 4 to 20. High scores on each subscale indicate the greater use of the strategy in coping and dealing with stressful and unpleasant events (Garnefski et al., 2001). The The Persian version of the Cognitive Emotion

Regulation Questionnaire in Iran was validated by Besharat and Bazzazian (2014). In their research, the psychometric characteristics of this form were reported, including internal consistency, retest reliability, content validity, convergent validity, and optimal diagnostic (differential) validity. In an introductory review of the questionnaire in a sample of the general population (n = 368, 197 females and 171 males), Besharat reported the Cronbach's alpha coefficient for subscales from 0.67 to 0.89. The correlation coefficient of the participants in the study (43 women and 36 men) was calculated twice in two to four weeks' intervals of the subscales of the questionnaire = 0.57 to r = 0.76. In this study, eight psychological specialists evaluated the content validity of the Cognitive Emotional Regulation Questionnaire, and the coefficients of the Kendall agreement for subscales ranged from 0.81 to 0.92. The results of Hassani's study (2010) also showed that nine subscales of the Persian version of the Cognitive Regulation Questionnaire had good internal emotional excitement (Cronbach's alpha range was 0.76 to 0.92). The article scores were significantly correlated with the overall score of adaptive and maladaptive subscales (r = 0.466 to r = 0.75), and the value of retest correlation coefficients (0.05 to 0.77) indicates the consistency of the scale. The results of the analysis of the main component supported the model of the nine main factors of the Emotional Cognitive Regulation Questionnaire, which explained 74% of the variance. The degree of internal relations of subscales was relatively high (0.32 to 0.67). Finally, considering the criterion validity, the subscales of the Persian version of the cognitive regulation questionnaire were specifically correlated with depressive symptoms.

To determine the reliability of the cognitive emotion regulation questionnaire for the present study, a cronbach's alpha was performed and the reliability of the subscales were 0.84 for self-blame, 0.79 for rumination, 0.81 for catastrophizing, 0.83 for others-blame, 0.86 for total score of maladaptive strategies, 0.82 for acceptance, 0.78 for positive refocusing, 0.80 for focus on planning, 0.76 for positive reappraisal, 0.81 for putting into perspective, and 0.84 for total score of adaptive strategies.

2. Demographic questionnaire

The questionnaire is a researcher-made tool that collects demographic information such as patient's age, gender, marital status, education, occupation, type of diabetes, and type of treatment (insulin and non-insulin). Diabetes history included the duration of the disease and the type of diabetes treatment. The duration of the disease was measured by asking the patient about the number of years of diabetes.

3. Acceptance and commitment therapy (ACT) protocol:

The protocol was developed by Hayes, Felt, and Linehan (2004) and has been studied in various studies. The results of these studies indicate the effectiveness of this treatment for chronic pain (Scott & McCracken, 2015), cancer (Han & McCracken, 2014), and MS (Nordin & My Day, 2012). Acceptance and commitment therapy steps are summarized in Table 1. It is a new behavioral therapy that uses acceptance and mindfulness interventions along with change and commitment strategies to help clients build meaningful, purposeful, and satisfying lives. Contrary to more traditional approaches to cognitive-behavioral therapy, acceptance and commitment therapy does not intend to change the form or frequency of unwanted emotions and thoughts, but the main goal is to promote psychological flexibility, that is the ability to connect the present moment and adapt to the change or persistence of behaviors according to the situation and one's values. In other words, acceptance and commitment therapy focuses on helping people live satisfactorily, even in the presence of unpleasant thoughts, emotions, and feelings (Flexman, Blackledge, & Bond, 2011).

Table 1. A brief description of Acceptance and Commitment Therapy (ACT)

Sessions	Brief description
Introduction	Getting acquainted with the patients and establishing a good relationship with them to build trust for getting the questionnaires filled out properly, administering the demographic questionnaire and the pretest
Session 1	Introducing the teaching expert, the group getting acquainted with each other and establishing a therapeutic relationship among themselves, introducing the Acceptance and Commitment Therapy intervention and its main objectives and pillars, setting ground rules for the entire sessions, providing information about heart failure and its complications, reviewing ways to control and prevent disease complications and their costs and benefits, providing psychological education, break and snacks, assigning the homework
Session 2	Reviewing experiences of the previous session and receiving feedback from the patients, discussing the experiences and assessing them, evaluating the patients' tendency to change, understanding the patients' expectations about the ACT intervention, fostering creative distress, break and snacks, summarizing the presented material and assigning the homework
Session 3	Reviewing experiences of the previous session and receiving feedback from the patients, identifying inefficient strategies and learning to control them and perceive their futility, explaining the concept of acceptance and its differences with concepts of failure, despair, denial and resistance, teaching that acceptance is a constant rather than logical process, discussing the problems and challenges of a heart attack, explaining how to avoid painful experiences and being mindful of the consequences of avoidance, discovering situations that have been avoided and contacting them through acceptance, defining coping and introducing effective and ineffective coping strategies, break and snacks, summarizing the presented material and an overview of the next session's work, assigning the homework
Session 4	Reviewing experiences of the previous session and receiving feedback from the patients, break and snacks, behavioral commitment and obligation, introducing and explaining confused self-concept and its diffusion, the application of cognitive diffusion therapeutic approach, intervention in the performance of problematic chains of language and metaphors, discouraging the patients from wasting their time with thoughts and emotions, summarizing
Session 5	Reviewing experiences of the previous session and receiving feedback from the patients, showing the distinctions between the self, therapeutic experiences and behavior, self as context, weakening the self-concept and self-expression. Through these practices, the participants learn to focus on their activities (such as breathing, walking, etc.) and be mindful of their state at all moments and learn to perceive their emotions, feelings and cognitions and to process them without judgment; that is, they learn to pay attention to their thoughts and emotions but not get attached to their content, break and snacks, summarizing the presented material and an overview of the next session's work, assigning the homework
Session 6	Reviewing experiences of the previous session and receiving feedback from the patients, identifying the patients' values in life and focusing on these values, their elaboration and their power of choice, assigning the homework
Session 7	Using mindfulness techniques with an emphasis on the present, break and snacks, summarizing the presented material and an overview of the next session's work, assigning the homework
Session 8	Reviewing experiences of the previous session and receiving feedback from the patients, Mindfulness practice, review of homework from session 7, psycho-education and teaching specific defusion techniques, and setting homework

Session 9	Reviewing experiences of the previous session and receiving feedback from the patients, examining each patient's values and giving further depth to the concepts previously taught, explaining the difference between values, goals and routine mistakes in the selection of values, assigning the homework.
Session 10	Discussing the potential internal and external barriers to the pursuit of values, the group members listing and sharing their most important values and the potential barriers to their pursuit, discussing the goals related to values and the characteristics of goals among the group, the group members identifying three of their most important values and determining the goals they wish to pursue in keeping with those values, determining the next steps for achieving those goals, break and snacks, summarizing the presented material and an overview of the next session's work, assigning the homework.
Session 11	Understanding the nature of tendencies and commitment (teaching commitment to action), identifying behavioral models compatible with values and developing commitment to act on them, briefly discussing the concept of relapse and preparing to cope with it.
Session 12	Reviewing the homework and summarizing the sessions with the patients, the group members sharing their experiences and discussing their gains and unmet expectations, the researcher expressing his gratitude to the patients for attending the sessions, administering the post-test.

4. Dialectical behavior therapy skills training (DBT-ST) protocol:

The treatment plan applied in the present study was provided in 12 two-hour sessions. Each session included introducing the goals and topics of the session, discussing and practicing, and reviewing outside class. Dialectical Behavioral Therapy book (McKay, Wood, & Brent Lee, 2007; Linhan, 1993) was used to develop the program and package therapy. The steps of dialectical behavioral therapy

Table 2. A brief description of dialectical behavior therapy (DBT) intervention sessions based on Marsha Linehan instructions

Sessions	Brief description
Session 1 (mindfulness1)	Familiarity with the concept of mindfulness and three mental states (reasonable mind, emotional mind, and wise mind)
Session 2 (mindfulness2)	Teaching two types of skills to attain mindfulness; "What" skills (including viewing, description, and participation) and "How" skills (including non-judgmental stance, inclusive self-consciousness)
Session 3 (distress tolerance 1)	Learning distraction strategies with ACCEPTS skills (activities, contributing, comparisons, emotions, pushing away, thoughts, and sensation)
Session 4 (distress tolerance 2)	Learning self-soothing with five senses
Session 5 (emotion regulation 1)	Teaching a pattern of identifying emotions and tagging them, which leads to increased emotional control
Session 6 (emotion regulation 2)	Teaching positive emotional experiences by creating short-term positive emotional experiences
Session 7 (interpersonal effectiveness 1)	Opportunities for interpersonal effectiveness (the proportionality between your demands and the demands of others; the proportion of demands and musts)
Session 8 (interpersonal effectiveness 1	The goals of interpersonal effectiveness (obtaining goals in a situation and confronting with resistance and conflict)

training are summarized in Table 2.

Results

Demographic data of the patients based on age and diabetes variables are presented in Table 3.

Table 4 demonstrates mean and standard deviation of pre-test and post-test scores of cognitive emotion regulation subscales in the experimental and control groups.

Table 3: Frequency distribution of the experimental and control group in terms of age and duration of diabetes

variable	group	(Experiment (ACT frequency	percent	(Experiment (DBT frequency	Percent	control frequency	percent
age	30-40	5	35.7	4	28.6	6	42.9
	41-45	9	64.3	10	71.4	8	57.1
diabetes	1-5	5	35.7	4	28.6	3	21.4
duration	6-10	8	57.1	7	50	10	71.4
	Above 10	1	7.1	3	21.4	1	7.1
	Total	14	100	14	100	14	100

Table 4: Mean and standard deviation of pre- and post-test scores of cognitive emotion regulation subscales in the experimental and control groups

Dependent variable	group	Pre-test Mean	SD	Post-test Mean	SD	Follow up Mean	SD
Self-blame	Experiment (ACT)	11.29	0.914	10.07	1.328	9.86	1.512
	Experiment (DBT)	11.36	1.216	9	0.901	9	1.177
	Control	11.21	0.893	10.93	1.072	10.79	1.122
rumination	Experiment (ACT)	13.14	1.292	11.07	1.685	10.93	1.730
	Experiment (DBT)	13.07	1.385	10.29	1.590	10.07	1.639
	Control	13.07	1.439	12.57	1.158	12.21	1.311
catastrophizing	Experiment (ACT)	12.64	1.277	11.21	1.311	10.79	1.188
	Experiment (DBT)	12.93	1.141	11.07	1.269	11.07	1.207
	Control	12	1.486	11.64	1.336	11.43	1.399
Other-blame	Experiment (ACT)	11.57	1.869	10.14	2.349	9.93	2.200
	Experiment (DBT)	12.21	1.805	9.36	1.737	9.29	1.773
	Control	11	1.840	11.07	1.817	10.93	1.730
Total score of maladaptive strategies	Experiment (ACT)	48.64	3.153	42.79	4.980	41.79	5.026
	Experiment (DBT)	49.64	3.249	39.86	4.294	39.43	4.450
	Control	47.29	3.625	46.21	3.827	45.43	3.956

acceptance	Experiment (ACT)	6.64	1.550	9.57	2.593	9.43	2.593
	Experiment (DBT)	6.57	1.505	11.79	2.966	11.93	3.496
	Control	6.50	1.787	6.86	2.070	6.71	1.939
Positive refocusing	Experiment (ACT)	9.21	1.718	10.21	1.626	9.93	1.269
	Experiment (DBT)	9.36	1.447	10.50	1.454	10.50	1.454
	Control	9.14	1.834	9.36	1.946	9.43	2.102
Focuse on planning	Experiment (ACT)	11	1.617	11.64	1.336	11.50	1.401
	Experiment (DBT)	10.57	1.910	11.57	1.330	11.29	1.26
	Control	10.36	1.26	10.29	1.326	10.21	1.311
positive reappraisal	Experiment (ACT)	10.86	2.107	11	2.075	10.57	1.785
	Experiment (DBT)	10.81	2.092	11.21	1.968	11.07	1.859
	Control	10.29	1.729	10.43	1.55	10.50	1.557
Putting into Perspective	Experiment (ACT)	7.57	1.342	8.14	1.748	7.93	1.900
	Experiment (DBT)	7.50	1.345	8.36	1.781	8.43	1.828
	Control	7.44	1.160	8.07	1.385	8.07	1.385
Total score of adaptive strategies	Experiment (ACT)	44.50	3.917	50.57	4.108	49.36	3.875
	Experiment (DBT)	44.79	3.867	53.21	4.509	52.93	4.393
	Control	42.86	4.833	43.71	4.762	43.57	5.049

As can be seen in Table 4, the mean scores before the cognitive emotion regulation test in the two experimental groups (DBT and ACT) and control group were almost equal, but, in the post-cognitive emotion regulation test, the mean scores of the experimental groups (DBT and ACT) were significantly higher than the mean scores of control group. Also, the follow-up value can be seen in two experimental groups (DBT and ACT) and control group. Using the Kolmogorov-Smirnov test, the normality, and by examining the Levine test and the Crochet Mochley test, the variance homogeneity was confirmed, respectively.

The results of Table 5 show that the value of F calculated for the effect of stages (pre-test, post-test, and follow-up) at the level of 0.01 is significant in the between-group factor. As a result, it demonstrates the effectiveness of acceptance and commitment therapy and dialectical behavioral therapy skill training on cognitive emotion regulation in patients with diabetes type II. Also, there is a significant difference between the mean of pre-test, post-test, and follow-up of cognitive emotion regulation scores. However, there was no significant difference between the subscales of focus on planning, positive reappraisal, and putting others into perspective.

The Toki test was used to examine the differences   between the means of treatment processes.

Table 5: Results of analysis of variance of repeated measurements with between and within group factors in subscales

Factors	Variables Sources	Subgroup	df	Mean squares	F	Sig.	Effect size
Within-Group Factors	Therapy Stages of Subscales	Self-Blame	1	13599.056	4591.889	0.000	0.992
		Rumination	1	17619.841	3742.338	0.000	0.990
		Catastrophizing	1	17080.071	3941.000	0.000	0.990
		Other-blame	1	14187.056	1491.457	0.000	0.975
		Total Score of maladaptive strategies	1	250224.008	6006.344	0.000	0.994
		Acceptance	1	8984.889	623.877	0.000	0.941
		Positive refocusing	1	11948.643	1611.783	0.000	0.976
		Focus on planning	1	15092.389	2789.903	0.000	0.976
		Positive reappraisal	1	14571.627	1438.111	0.000	0.974
		Putting into perspective	1	7968.286	1215.049	0.000	0.969
		Total score of adaptive strategies	1	28633.722	6030.511	0.000	0.994
Between-Group Factor	Group	Self-blame	1	14.889	5.027	0.000	0.805
		Rumination	1	23.270	4.942	0.000	0.902
		Catastrophizing	1	0.286	4.066	0.000	0.924
		Other-blame	1	5.484	3.577	0.000	0.875
		Total score of maladaptive strategies	1	117.460	4.820	0.000	0.834
		Acceptance	1	122.056	8.475	0.000	0.911
		Positive refocus	1	6.952	5.938	0.000	0.877
		Refocus on planning	1	14.151	2.616	0.086	0.118
		Positive reappraisal	1	4.437	0.438	0.649	0.022
		Putting into perspective	1	0.643	0.098	0.907	0.095
		Total score of adaptive strategies	1	527.627	11.298	0.000	0.967

Table 6: Summary of the results of the Toki follow-up test for three groups

variable	Steps	Mean differences	Standard deviation	Sig.
	DBT- ACT	0.987	0.125	0.000
Self-blame	Control - ACT	0.635	0.125	0.000
	DBT - Control	0.785	0.125	0.000
rumination	DBT- ACT	1.542	0.107	0.000
	Control - ACT	1.436	0.107	0.000
	DBT - Control	1.698	0.107	0.000
catastrophizing	DBT- ACT	0.874	0.154	0.000
	Control - ACT	0.968	0.154	0.000
	DBT - Control	1.142	0.154	0.000
Other-blame	DBT- ACT	1.117	0.236	0.000
	Control - ACT	1.134	0.236	0.000
	DBT - Control	1.598	0.236	0.000
Total scores of maladaptive strategies	DBT- ACT	2.867	0.574	0.000
	Control - ACT	4.457	0.574	0.000
	DBT - Control	5.764	0.574	0.000
acceptance	DBT- ACT	0.956	0.244	0.000
	Control - ACT	1.754	0.244	0.000
	DBT - Control	1.968	0.244	0.000
Positive refocusing	DBT- ACT	0.345	0.65	0.000
	Control - ACT	0.468	0.165	0.000
	DBT - Control	0.677	0.165	0.000
Total scores of adaptive strategies	DBT- ACT	3.387	0.224	0.000
	Control - ACT	4.754	0.224	0.000
	DBT - Control	5.968	0.224	0.000

different (P= 0.02), and this, with regard to the difference between the mean of coping and control groups, showed a positive effect of coping-therapy on quality of life. Also, there is no significant difference between the efficacy of emotional regulation training and coping therapy training on the quality of life of adolescent boys in the risk of drug abuse (P= 0.10). After removing the effect of pre-test scores, the mean of life quality (follow-up) variables was not significantly different between the two experimental groups (emotion regulation and coping therapy) and control (P <0.05), which

Table 7: Summary of results of variance analysis with repeated within group measurement

Comparison	Variable sources	Df	Mean squares	F	Sig.	Effect size
ACT and Control groups	Group	2	289.178	11.419	0.000	0.911
	Error	38	24.826			
DBT-ST and Control groups	Group	2	437.143	16.388	0.000	0.967
	Error	39	22.608			
DBT-ST and ACT	Group	2	492.200	24.871	0.000	0.998
	Error	40	16.526			

suggests no effect for the emotion regulation program and coping-therapy training on the quality of life variable up to the follow-up stage.

The results of Table 7 show that both (DBT) and (ACT) methods were significantly effective and the effect size of DBT-ST treatment was slightly higher than the effect size of acceptance and commitment therapy (effect size= 0.968) compared to the control group (effect size= 0.911). Regarding Cohen's view that the Eta coefficient equal to 0.01 indicates the small effect size, 0.66 indicates the moderate effect size, and 0.14 indicates the large effect size, so both DBT-ST and ACT methods are effective on cognitive emotion regulation. Emotional cognition has been effective, but the effect of DBT-ST is greater than ACT in the cognitive emotion regulation scores, with higher effect size of DBT-ST compared to ACT. Also there is different between Effect size of DBT-ST and ACT based on F and sig. The effect size of DBT-ST compared to ACT was found to be 0.967. Therefore, it means that DBT-ST was more effective than ACT on cognitive emotion regulation.

Discussion and conclusion

The aim of the present study was to compare the effectiveness of acceptance and commitment therapy and dialectical behavioral therapy skills training on cognitive emotion regulation in patients with diabetes type II. For this purpose, in this study, acceptance and commitment therapy in the form of eight group therapy sessions, and dialectical behavioral therapy skills training in the form of twelve sessions were provided to 14 patients with diabetes type II. Members of the control group did not receive any treatment. The results of data analysis proved the effectiveness of acceptance and commitment therapy and dialectical behavioral therapy skill training on cognitive emotion regulation in patients with diabetes type II. These two types of treatment significantly reduced scores of maladaptive cognitive emotional regulation and increased adaptive cognitive emotion regulation scores in patients with diabetes type II; however, there was no

significant difference between the subscales of focus on planning, positive reappraisal, and putting others into perspective. The results of this study are consistent with the research of Eri et al. (2018), Yaraghpi et al. (2018), Jalodari et al. (2019), and Tamnaei Far, Gharayi, Birshak, and Habibi (2014).

Acceptance and commitment therapy and dialectical behavioral therapy skill training increase disease acceptance, tolerance, and adaptive cognitive emotion regulation. The basic skills that patients with diabetes type II learned in these two types of treatment allowed them to add these skills to their behavioral resources and use more constructive strategies in difficult situations. In the process of acceptance and commitment therapy, psychological flexibility is recognized as the basis of psychological health (Hayes et al., 2014). The individual with psychological flexibility does not avoid unwanted events and does not attempt to control and change them, rather spends his energy on values and meaning of life instead of avoiding unwanted events (Hayes et al., 2013).

The acceptance and commitment therapy process helps patients accept responsibility for behavioral changes and change whenever necessary, and in fact, this treatment seeks to balance appropriate strategies for the situation. ACT through factors such as non-judgmental acceptance, being in the moment, coping with internal experiences without avoidance, and suppressing or trying to change them improves how people think after a negative experience or traumatic event (i.e., cognitive emotion regulation) (PetrosVinert, 2011), and help patients with diabetes type II accept their feelings, emotions, and thoughts despite being uncomfortable and reduce their hypersensitivity to the disease, thereby increasing their mental health and quality of life. On the other hand, the transparency of values and the internalization of the committed action that takes place during acceptance and commitment therapy give individuals sufficient motivation to continue and complete the treatment (Harris, 2019).

This model of treatment uses the processes of acceptance, mindfulness, commitment, and behavior

change processes to create psychological flexibility. Increasing cognitive flexibility helps people accept stress or stress-related thoughts (tolerate unpleasant events without a struggle to control them) and increase valuable activities.

One of the most important parts of ACT is understanding the adaptive nature of emotions and increasing emotional awareness by using a variety of interventions, including mindfulness. Mindfulness skill is one of the techniques that predict self-regulatory behavior and positive emotional states in individuals. Because this skill, on the one hand, leads to a cognitive evaluation of emotions, reduces negative emotions, increases positive emotions and adaptive behaviors, and ultimately leads to an increase in emotion regulation. On the other hand, dialectical behavioral therapy, by emphasizing validation, leads to the acceptance of emotional problems, and this acceptance ultimately facilitates change and emotional regulation. A significant percentage of diabetic patients suffer from depression, and the characteristic of depressed patients is that they do not do well in distancing themselves from their negative emotions and moods. During the DBT learning process, depressed patients observe their depressed mood and its physiological, mental, behavioral, and emotional consequences through behavioral and self-observation exercises in a non-judgmental state, and by practicing learn the mechanism of transition from this situation. According to Robbins (2004) and Lynch (2006), comprehensive alertness and distress tolerance skills are the most effective DBT-ST strategies in treating emotional distress.

The results showed that ACT and DBT-ST were significantly more effective than the control group on cognitive emotion regulation. The effect of DBT-ST compared to ACT was greater on cognitive emotion regulation scores. Based on the results of this study, it can be concluded that ACT, due to acceptance of unfavorable emotions and thoughts, commitment, and DBT-ST for emotion regulation and mindfulness factors, improved psychological indexes, and mental health of patients with diabetes type II.

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