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Effectiveness of Stress Management and Acceptance and Commitment Therapy in Psychological Capital among Patients with Type 2 Diabetes

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Abstract

Background and Aim: Type 2 diabetes is a chronic and complex disease requiring continuous medical care. The aim of this study was to compare the effectiveness of stress management and acceptance and commitment therapy (ACT) in psychological capital in patients with type 2 diabetes.

Materials and Methods: The present study was a quasi-experimental study with a pretest-posttest follow-up design and a control group. The statistical population of the study consisted of all patients with type 2 diabetes referring to Milad Hospital in Tehran in 2019. In order to form three groups using the purposive sampling, 90 patients were firstly selected by convenience sampling. Then, the patients were randomly assigned to the first (n=30) and second (n=30) experimental groups and control group (n=30). The follow-up phase was performed on all three groups 3 months after the posttest. The research instrument was the Persian version of Lotans Psychological Capital Questionnaire (2007) the validity and reliability of which was confirmed in previous studies. The data were analyzed using a mixed analysis of variance by SPSS software (version 22).

Results: The obtained results showed that stress management and ACT had a significant effect on psychological capital components in patients with type 2 diabetes, compared to the control group (P<0.01). In addition, the mean scores of the posttest and follow-up of hope component in the ACT group increased more than those reported for the stress management group (P<0.01).

Conclusion: It can be concluded that stress management and ACT were effective in psychological capital in patients with type 2 diabetes. However, ACT was more effective than stress management in the hope component.

Keywords: Acceptance and commitment therapy, Diabetes mellitus, Psychotherapy, Psychological capital, Stress management

1. Introduction

Type 2 diabetes is a chronic and complex disease requiring continuous medical care (1). Among numerous studies that have been conducted in recent years on the etiology, course, prognosis, and treatment of diabetes, psychological factors have received special attention (2). In other words, patients with diabetes are faced with two main problems, including 1) self-care issues, such as dieting and continuing the regimen, and 2) emotional issues. More than 20-40% of diabetic patients experience emotional problems from illness concerns (e.g., fear of symptoms) to more general symptoms of worry, anxiety, and depression (3). These emotional discomforts are not only unpleasant for the individual but also research has shown that they reduce the quality of life, cause poor self-care behaviors and negative evaluation of insulin treatment, decrease glycemic control, and in severe cases cause cardiovascular disorders and even mortality (4).

Furthermore, the progression of complications and high costs of treatment in diabetic patients are mainly due to the inappropriate control of blood sugar. According to the literature, glycemic control in these patients is affected by biological, psychological, and social factors (5). Therefore, a comprehensive study of biological, psychological, and social factors is necessary for the perception of the cause of diabetes and management and control of physical symptoms.

One of the most important concepts in individuals with type 2 diabetes is psychological capital (6-7). Psychological capital is a set of positive characteristics and abilities of individuals that can play a strong role in the growth and promotion of the individual and is viewed as

a force in the directions of individual progress, improving individual performance and increasing penetration power (8). Seligman et al. (9) believe that psychological capital is a positive aspect of human life. Therefore, psychological capital includes psychological characteristics contributing to one's productivity, self-help, self-worth, purposefulness, and resistance to problems (10). Hope, self-efficacy, optimism, and resilience are the components of psychological capital. This hybrid construct, known as the new concept of the third millennium, is one of the positive psychological indicators the components of which act in interaction with each other and each component adds a feature to the concept of psychological capital (11).

Stress is one of the important psychological factors associated with diabetes that has been considered by researchers with its negative effects on glucose control in existing backgrounds (12). Stress activates neurohormonal crossings and sympathetic system mediated by the hypothalamus-pituitary-adrenal axis and central-sympathetic adrenal system (13). The flow of catecholamines and glucocorticoids affects the structure and function of different tissues and ultimately leads to increased glucagon production and decreased glucose uptake and destruction in peripheral muscles (14). Diabetes-induced stress has negative psychological effects in addition to physically adverse effects. Since diabetes-induced stress is one of the risk factors for exacerbating diabetes, designing and applying effective and beneficial psychological interventions to eliminate or reduce this factor can be important in chronic patients, especially diabetic patients. Among these interventions is stress management training.

Stress management training refers to a set of techniques and methods that are used to reduce the stress experienced by individuals or increase their ability to cope with life stress (15). This method is known to be effective in many psychological disorders, such as anxiety and depression, psychosomatic diseases, and even diseases, such as cancer and multiple sclerosis, because behavioral and cognitive techniques are taught to the patient simultaneously (16). Behavioral techniques (e.g., muscle relaxation training) strengthening the parasympathetic system and cognitive techniques help the patient to identify his negative and irrational thoughts and replace them with positive logical thoughts and promising mental schemas (17). To date, the effectiveness of stress management training has been investigated in various studies. Many of these studies have confirmed the positive effects of stress management training; however, some studies have questioned its effectiveness (18).

Different treatment methods have been proposed to increase the mental health of patients with diabetes, including new psychological approaches affecting patients with type 2 diabetes, such as acceptance and commitment therapy (ACT) (19). Over the past 10-15 years, a number of new treatments have been developed with the extended forms of cognitive-behavioral therapy in the field of psychotherapy (20). The third wave of behavioral therapy has begun in the early 1990s with the growth of innovative therapy using the principles of mindfulness and emphasizing the awareness of the present moment and its acceptance (21). Third-wave therapy can be divided into two groups, namely 1) interventions based on mindfulness training (e.g., mindfulness-based stress reduction and mindfulness-based cognitive therapy), and 2) interventions using mindfulness as a key component (e.g., ACT and dialectical therapy behavior).

Acceptance-based therapy was based on the hypothesis that psychological damage is associated with the attempts to control or avoid negative thoughts and emotions (22). These treatments emphasize changing the relationship between clients and their internal experiences and avoidances (23). In acceptance-based behavior therapy, clinical problems are conceptual in the form of behaviors. Three main problems are the foundation of psychological disorders, including problems related to awareness, avoidance of internal experiences, and lack of important and valuable activities in individual's life. These problems are considered intervention goals (23). The results of a study carried out by Shahbeik et al. (24) demonstrated that group psychotherapy based on ACT significantly increased emotional expression and improved self-care behaviors in patients with type 2 diabetes.

As previously mentioned, despite the fact that most of the relevant studies have confirmed the positive effects of stress management training and ACT, some studies have also questioned the effectiveness of these treatments. Considering all the above-mentioned findings and reviewing the studies, it is also necessary to mention that studies with the aim of a comparative investigation of the treatment methods related to patients with type 2 diabetes, especially inside the country (Iran), have been neglected. To date, no study has compared the effectiveness of stress management methods and ACT in patients with type 2 diabetes. Therefore, it is required to carry out further studies in this regard. With this background in mind, the current study aimed to compare the effectiveness of stress management and ACT in psychological capital among patients with type 2 diabetes.

2. Materials and Methods

The present study was a quasi-experimental study with a pretest post-test follow-up design and a control group. The statistical population of the study consisted of all

patients with type 2 diabetes referring to Milad Hospital in Tehran in 2019. The sample was selected from outpatients with type 2 diabetes. The sample of this study was selected from the statistical population using purposive sampling and considering inclusion and exclusion criteria. After the identification of the patients with type 2 diabetes based on the patients' files, 90 subjects who met inclusion criteria were identified and randomly divided into two experimental and control groups. It should be noted that the number of research samples was selected to be 90 patients with 30 cases in each group based on the effect size of 0.25, alpha of 0.05, and power of 0.80 and considering the number of lost samples according to previous studies (24). In addition, there was no sample attrition in the present study.

The inclusion criteria were at least 1 year since the duration of the disease, minimum education at diploma level, minimum age of 35 years, and maximum age of 65 years, and informed consent to participate in the study. The exclusion criteria were the existence of mental disorders requiring immediate treatments (e.g., psychotic symptoms and substance dependency), eating disorders (e.g., stress and anorexia nervosa), and pregnancy or plan for pregnancy. Necessary coordination with Milad Hospital was obtained to conduct the study. The method of implementation was that after coordination with Milad hospital officials and provision of the information about the participants, the sample group was provided to the researcher and questionnaires and treatment protocols were performed in the groups. The Psychological Capital Questionnaire (PCQ) has been used before the first therapy sessions (pretest) and after ending stress management training and ACT (posttest). After 3 months of the posttest period, follow-up was performed (follow-up).

Ethical considerations were observed in the current study. After selecting the study participants, the subject, treatment courses, and their objectives were explained to the patients. Furthermore, they were told that participating in the treatment courses was voluntary and with the consent of the individual, and there was no compulsion to participate in the courses.

Psychological Capital Questionnaire: Lotans PCQ was designed in 2007. The questionnaire was developed with 24 items and four dimensions, including self-efficacy, hope, flexibility, and optimism, based on a 5-point Likert scale (5=strongly agree, 1=strongly disagree). The reliability of the questionnaire was 0.85 based on Cronbach's alpha (25). Rad et al. (25) reported the internal consistency of the Persian version of this questionnaire (24 items) in four components within the range of 0.79-0.93. In addition, in the study conducted by Rad et al., the test validity was obtained within the range of 0.67-0.84 in 15 days of the interval among the four components. Moreover, the validity and reliability of the Persian version of the PCQ were confirmed by Shokri et al., and Cronbach's alpha was reported within the range of 0.70-0.87 (26).

Stress management training was provided for the first experimental group in 12 sessions of 90 min for 2 months twice a week (27) (Table 1).

The ACT was provided for the second experimental group in 10 sessions of 90 min for 1 month twice a week. Table 2 tabulates the content of ACT group training sessions (28).

In descriptive statistics, mean and standard deviation indices were used. Repeated measures analysis of variance was employed for inferential statistics. In order to investigate the assumptions of the inferential test, the Levene's test (to investigate the homogeneity of variances), Shapiro-Wilk test (for normality of data distribution), Box's M test, and Mauchly'a sphericity test were used in this study. Statistical analysis was performed using SPSS software (version 22).

Table 1. Stress management training

Session	Content
1st	Defining and describing stress, nature of stress, physiological and psychological responses to stress, signs, and symptoms of stress
2nd	Nature of stressors and their types, direct and indirect effects of stress on various diseases, including diabetes
3rd	Explaining the necessity of coping with stress, mechanism of the effect of coping strategies on reducing stress, and different methods of coping with stress
4th and 5th	Progressive muscle relaxation training
6th and 7th	Problem-solving skill training
8th	Time management training
9th	Anger management training
10th	Explaining the role of negative and positive evaluation in stress and training methods to identify negative assessments and take measure to change them and cognitive restructuring
11th	Healthy lifestyle training
12th	Reviewing previous techniques and simple practical recommendations to deal with possible stress in the future

Table 2. Group training sessions of acceptance and commitment therapy

Session	Content
1st	Preliminary explanations, problem conceptualization, preparation of clients, pretest implementation, and preparation of a list of enjoyable activities and their inclusion in the weekly program
2nd and 3rd	Familiarity with acceptance and commitment therapy therapeutic concepts (i.e., psychological flexibility, psychological acceptance, psychological awareness, cognitive segregation, self-visualization, personal story, clarification of values, and committed action)
4th and 5th	Mindfulness training (i.e., emotional and wise awareness), teaching references about what skills are observed and described and what skills are not judged, and remaining focused on how these skills work
6th and 7th	Firstly, focusing on increasing psychological awareness and then teaching how to appropriately respond and deal with their mental experiences and create goals and social lifestyles and practical commitment to them, counting the positive and negative points of couples by each other without any judgment or emotional reaction
8th	Distress tolerance training (i.e., skills to endure in crises, distracting senses, and self-relief using six senses and mindfulness practice) and reviewing previous sessions
9th	Emotion regulation training (i.e., objectives of emotion regulation training, awareness of why emotions are important, emotion recognition, reducing vulnerability and emotional suffering, and increasing positive emotions), changing emotions through action contrary to recent affections, practicing practical learning, and providing feedback by group and therapist
10th	Increasing interpersonal efficacy (e.g., maintaining the health of relationships and interest), teaching important interpersonal skills (i.e., describing and expressing, asserting, and daring to have open trust, negotiating, and self-esteem), summing up and implementing the posttest

Table 3. Mean and standard deviation of psychological capital components based on measurement stage in groups

Variable	Group	Index	Pretest	Posttest	Follow-up
Hope	ACT	M	15.33	24.13	23.53
		SD	2.23	2.56	2.62
	Stress management	M	16.40	18.67	18.40
		SD	2.85	1.92	2.35
	Control	M	15.87	15.67	16.53
		SD	2.50	3.70	3.76
Resilience	ACT	M	16.87	18.80	18.80
		SD	2.39	2.11	2.57
	Stress management	M	15.00	16.80	17.53
		SD	2.20	1.90	2.39
	Control	M	16.00	15.27	15.47
		SD	2.24	3.52	2.83
Optimism	ACT	M	15.33	19.67	19.40
		SD	2.44	2.19	1.68
	Stress management	M	14.07	17.80	18.27
		SD	1.53	2.01	1.83
	Control	M	14.20	13.07	13.87
		SD	1.57	2.49	2.77
Self-efficacy	ACT	M	17.33	19.80	19.93
		SD	2.69	1.82	1.58
	Stress management	M	16.07	18.80	19.47
		SD	1.39	1.78	1.77
	Control	M	16.53	15.80	16.73
		SD	2.03	3.05	3.69

ACT: Acceptance and commitment therapy; M: Mean; SD: Standard deviation

3. Results

The participants in this study were within the age range of 35-65 years. In addition, 57.42% and 42.58% of the patients were male and female, respectively. The mean values of age were 48.79±13.01, 47.86±12.19, and 46.50±10.74 years for the ACT, stress management, and control groups, respectively (P>0.05). Table 3 shows the mean values of the variables of psychological capital components in the experimental and control groups.

As it can be observed, the mean values in the ACT and stress management groups in the posttest stage showed an increase, compared to those reported for the pretest in all four subscales. Based on the results shown in Table 3, it can be described that ACT and stress management

Table 4. Mixed variance analysis of scores of psychological capital components using Greenhouse Geisser criteria

Variable		SS	df	MS	F	Sig	Eta
Hope	Time	568.16	1.29	139.11	66.08	0.001	0.70
	Time*Group	203.09	1.29	156.96	23.62	0.001	0.46
	Group	227.21	1.00	227.21	24.60	0.001	0.47
Resilience	Time	86.07	1.26	68.23	12.94	0.001	0.32
	Time*Group	2.29	1.26	1.81	0.34	0.61	0.01
	Group	46.94	1.00	46.94	1.81	0.19	0.06
Optimism	Time	333.62	1.30	257.62	47.64	0.001	0.63
	Time*Group	2.29	1.30	1.77	0.33	0.63	0.01
	Group	45.51	1.00	45.51	9.77	0.001	0.26
Self-efficacy	Time	159.20	1.36	116.76	30.06	0.001	0.52
	Time*Group	2.49	1.36	1.83	0.47	0.56	0.02
	Group	18.68	1.00	18.68	3.50	0.07	0.11

treatment increased the psychological capital components of the patients with type 2 diabetes. In order to investigate the significant difference in the mean values of the psychological capital components among the three groups in the three stages of treatment, firstly, the homogeneity assumptions of variances and sphericity were investigated. The results of the Levene's test demonstrated that the homogeneity of variances was established in the control and experimental groups.

In addition, the sphericity test for the examination of the homogeneity of covariance showed that the assumption of sphericity was not established. Accordingly, in testing the hypotheses, the Greenhouse Geisser criteria were used to obtain a more accurate approximation, and the results of intra-group variance analysis were calculated according to a lack of the assumption of sphericity. A summary of the results of a mixed analysis of variance for intra-group and inter-group factors is presented in Table 4.

The results of Table 4 show that the calculated F value for the effect of stages (i.e., pretest, posttest, and follow-up) was significant for all the components ($P>0.05$). The results of the Bonferroni posttest were calculated to investigate the differences between the mean values in the treatment stages and showed that there was a significant difference in the scores of psychological capital components between the pretest and posttest as well as pretest and follow-up. Furthermore, there was no significant difference in the scores of psychological capital components in the post-test stage, compared to those reported for the follow-up stage; therefore, the scores of psychological capital components in the follow-up stage were not significantly changed in comparison to those of the posttest stage.

According to the results of Table 4 regarding the interaction of stages, factors, and groups, the amount of F was significant for the effect of the stages (i.e., pretest, posttest, and follow-up) between the two groups of treatment based on ACT and stress management for the component of hope ($P<0.01$). Consequently, there was a significant difference in the mean scores of pretest, posttest, and follow-up of the hope component between the two groups.

4. Discussion

The aim of this study was to compare the effectiveness of stress management and ACT in psychological capital in patients with type 2 diabetes. The results of data analysis showed that there was a significant difference in the mean scores of pretest, posttest, and follow-up of the hope component between the two groups of ACT and stress management. In this way, the rate of increase in the ACT group was higher in comparison to that of the other group.

The ultimate goal of ACT is the enhancement of behavioral functioning through the improvement of psychological flexibility (28). Psychological flexibility can help individuals adapt to different situations and prevent the occurrence and development of various mental disorders (29). Adolescents, especially patients with type 2 diabetes who live in harsh and unpredictable environments, experience various stressful life events, such as poor interpersonal communication (30-31). High psychological flexibility might enable these patients to focus on the present moment even when dealing with these stressful events, thereby facilitating them to act toward their value-consistent goals, improving their well-being, and living a rich and meaningful life (32-33).

Based on the evidence, it is suggested that each dimension of psychological capital has a positive role in the promotion of school engagement (e.g., resilience) (34), self-efficacy (35), optimism (36), and hope (37). The ACT can also reduce individuals' stress and improve their well-being (38); nevertheless, an individual's well-being positively correlates with psychological capital (39). Therefore, the improvement of individual psychological capital may improve school engagement.

In explaining this finding, it can be said that the ACT

approach, rather than focusing on the resolution and elimination of traumatic factors, helps clients to accept their controlled cognitions, free themselves from the control of the verbal laws that have caused their problems, and allow them to stop conflicting with them (40). The ACT is essentially process-based and clearly emphasizes promotion by accepting psychological experiences and commitment through increasing meaningful activities of flexible, incompatible, and regardless of the content of psychological experiences. The ACT is an approach using acceptance processes, mental focus, commitment, and behavioral change processes in order to provide known flexibility (29).

One of the most important techniques of ACT is to stipulate values and committed actions. In this regard, the results of a study carried out by Hadlandsmyth et al. (13) showed that encouraging individuals to identify their values and set their goals, actions, obstacles, and ultimately their commitment to accomplishing their goals and moving toward the direction of their values despite problems cause the resulting happiness leading to life satisfaction and keep individuals from being trapped in a circle of thoughts and feelings. The negative, which in turn increases the severity of the problems, is liberated.

In the present study, the ACT method, due to value-based practice training with a willingness to act based on meaningful personal goals before the elimination of unwanted experiences, caused patients to value themselves when faced with problems by expressing their thoughts and feelings and maintaining their respect for anxiety, irritability, fear, risk, agitation, and agitation caused through coping with problems. The aforementioned factors firstly reduce health and energy and Improving performance in dealing with risky problems and ultimately increased their health (34).

Furthermore, in ACT by teaching how to use practical strategies, individuals learned that instead of intellectual and practical avoidance of social thoughts and situations, by increasing their psychological acceptance of internal experiences, improving their living conditions, achieving personal values, and removing less avoidable problems, enhance health and psychological well-being. In fact, active and effective confrontation with feelings, avoidance, change in the view of oneself and challenges, revision of the values and goals of life, and commitment to a social goal can be considered the main factors of this method (30). In this regard, Moghanloo et al. (41) demonstrated that group ACT significantly increased the hardness coefficient and decreased perceived stress in patients with type 2 diabetes. In general, due to the efficiency and application of acceptance and commitment-based treatment methods owing to the use of mindfulness principles, acceptance of problems, and lack of misjudgment, it is suggested that managers and officials of health centers and clinics of psychological services provide necessary platforms for the use of acceptance and commitment-based therapy.

The limited research population to Tehran residents restricted the generalizability of the results to other cities. It is also suggested that researchers use other methods, such as interviews, to obtain accurate data. Furthermore, it is recommended to carry out similar studies in other cities in order to compare the results with the findings of the present study. It is also suggested to employ other methods, such as observation and interview, in addition to the questionnaire method in future studies.

5. Conclusion

It can be concluded that both stress management and ACT were effective in psychological capital among patients with type 2 diabetes. However, ACT was more effective than stress management on the hope component.

Conflicts of interest: The authors declare that there is no conflict of interest.

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