Effectiveness of Acceptance and Commitment Therapy on Intolerance of Uncertainty, Experiential Avoidance, and Symptoms of Generalized Anxiety Disorder in Individuals with Type II Diabetes

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Abstract

Aims: The aim of the present study was to investigate the effectiveness of acceptance and commitment therapy (ACT) on intolerance of uncertainty (IU), experiential avoidance (EA), and symptoms of generalized anxiety disorder (GAD) in individuals with type II diabetes. **Materials and Methods:** This study was quasi-experimental study with pretest/posttest design. In this study, 24 individuals with type II diabetes were selected by convenience sampling method and then randomly designed into two experimental and control groups. The experimental group participated in eight sessions of ACT, while the control group was not in any treatment. The participants completed GAD 7-item scale, Penn State Worry Questionnaire, IU scale, and Acceptance and Action Questionnaire-II. Data were analyzed by multivariate analysis of covariance. The significance level was 0.05. **Results:** The findings showed that ACT decreased the IU, EA, and symptoms of GAD in an individual with type II diabetes ($P < 0.05$). **Conclusions:** The results showed that ACT might be an efficient way to decrease the IU, EA, and symptoms of GAD in an individual with type II diabetes. Furthermore, therapists can use this therapeutic approach for decreasing IU, EA, and symptoms of GAD in the individual with type II diabetes.

Keywords: Acceptance and commitment therapy, anxiety disorders, diabetes, uncertainty

INTRODUCTION

Diabetes mellitus type 2, also known as type II diabetes, is a progressive and chronic metabolic disorder[1] characterized most often by relative insulin deficiency.[2] Its prevalence is also increasing, and the prevalence of its at-risk cases has been even reported above average.[3] In this respect, several factors including obesity, high-energy diets, sedentary lifestyle, and aging can contribute to the occurrence of this disorder.[2,4] Besides, type 2 diabetes can have several complications and consequences such as cardiovascular diseases, neuropathy, retinopathy, nephropathy, as well as mortality.[2,5,6] Another side effect of diabetes is anxiety disorders. Reviewing the related literature, Smith *et al.*[7] found that diabetes could be accompanied by an increased risk of anxiety disorders as well as high levels of anxiety. In addition, comorbid anxiety disorders and high levels of anxiety symptoms can be correlated with stronger complications of diabetes, pain, depression, increased body mass index, low blood glucose levels, low quality of life, and much more disabilities. In this respect, generalized anxiety disorder (GAD) and panic disorders are considered as the most common chronic and debilitating disorders associated with medical conditions

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such as diabetes.[7,8] Moreover, excessive anxiety and worry, difficult to control the worry, and different psychological and physical complaints including muscle tension, restlessness or feeling of being edgy, fatigue, difficulty concentration, irritability, and sleep problems are among major features of GAD.[9] It has been also reported that 14% of individuals with diabetes can experience GAD.[10] The results of a longitudinal study similarly showed that patients who have type II diabetes had a high rate of anxiety disorders such as GAD (12%).[11] Sajjadi et al.[12] reported the prevalence rate 6.25% for GAD in individuals suffering from this disorder. As well, Zardoshtian Moghadam and Mansouri[13] found that people with type 2 diabetes could experience more severe symptoms of GAD compared to healthy individuals.

Different models have been presented for worry and GAD, each one underscoring the specific factors in development and maintenance of this disorder.[9] The intolerance of uncertainty (IU) model and people's beliefs about uncertainty can also play an important role in the development and maintenance of GAD. The IU is considered as a kind of cognitive bias that can affect how an individual perceives, interprets, and responds to ambiguous situations at cognitive, emotional, and behavioral levels.[14,15] According to the acceptance-based model, experiential avoidance (EA) is recognized as one of the most important factors influencing development and maintenance of GAD. The EA refers to avoiding threatening and negative internal experiences.[16,17] In this regard, Zardoshtian Moghadam and Mansouri[13] found that individuals with type 2 diabetes experience higher levels of IU than normal people. However, no difference was observed between them in terms of EA. In addition, Rasmussen et al.[18] found that no differences in IU among type 2 diabetes mellitus adults with sustained high HbA1c (HH) and sustained acceptable HbA1c in a nondiabetic group. However, pairwise comparisons showed that there is a significant difference between type 2 diabetes mellitus adults with sustained HH and nondiabetic group in IU. Hadlandsmyth et al.[19] suggested that cognitive fusion and EA negatively influence diabetes management behaviors in adolescents.

Thus far, a wide variety of pharmaceutical[20] and psychological treatments including cognitive-behavioral therapy, applied relaxation, psychoanalytic approaches, meta-cognitive therapy, and behavior therapy based on acceptance-based and well-being therapy[21] have been used for the treatment of GAD. Acceptance and commitment therapy (ACT) has also been highlighted as one of the other treatments used for this disorder.[22-24] In this therapeutic approach, acceptance and mindfulness processes as well as commitment and behavior change processes can be employed to create psychological flexibility.[25] ACT is explicitly contextualistic and based on relational frame theory. This theory explains why cognitive fusion and EA are harmful.[26] The ACT is comprised of six basic principles of cognitive fusion, contact with the present moment, acceptance, self as context, values, and committed action.[25] In this respect, Wetherell et al.[22] and

Hasheminasab[23] reported that ACT is an effective way to reduce the symptoms of GAD. Likewise, Avdagic et al.[24] found that this therapeutic approach can be effective way for reducing anxiety, EA, and IU in individuals with GAD. Few research studies conducted on patients with type II diabetes have also shown that ACT could lessen stress, improve coping strategies,[27] and enhance mental health.[28]

Given the high prevalence of type 2 diabetes[3] as well as its physical and psychological consequences,[2,5,6] prevalence and incidence rates of GAD,[11-13] and its related factors, the aim of the present study was to investigate the effectiveness of ACT on IU, EA, and symptoms of GAD in individuals with type 2 diabetes.

MATERIALS AND METHODS

This study was quasi-experimental research with pretest/posttest design and control group. The statistical population of this study included all individuals with type 2 diabetes living in the city of Neyshabur, Iran, in 2017. In this study, after making coordination with the Iranian Diabetes Society in Neyshabur city, 24 people with type 2 diabetes referring to the diabetes society were selected by convenience sampling method and then randomly designed into two experimental and control groups. The inclusion criteria were patients with type 2 diabetes, informed consent to participate in the research, and no physical disabilities including blindness. The exclusion criteria in this study were absent in more than one therapy session, receiving other pharmacological and nonpharmacological treatments, as well as no informed consent to participate in research. The ethical considerations included respect for participants, informed consent, confidentiality of data, and avoiding any harm to them. Using the research instruments and coordinating with the study samples, both groups received pretests. Then, the ACT was administered on the experimental group for eight 90-min sessions, while the control group was not in any treatment. After completing the therapy sessions, both groups received posttests. Finally, the results of the pretests and posttests were compared. The participants completed GAD 7-item scale (2006), Penn State Worry Questionnaire (PSWQ) (1990), IU scale (1994), and Acceptance and Action Questionnaire-II (2011). Data were analyzed by SPSS version 24 software (IBM company, Armonk, NY, United States of America), using multivariate analysis of covariance (MANCOVA). The significance level was 0.05.

Generalized Anxiety Disorder Scale-7
It is a 7-item self-report measure scored on a 4-point scale ranging from 0 (not at all) to 3 (nearly every day). The GAD-7 is used for diagnosis of GAD and assessment of the severity of clinical symptoms. The scale demonstrated good internal consistency ($\alpha = 0.92$) and good test–retest reliability ($r = 0.83$). In addition, it has good construct, criterion, factorial, and procedural validity.[29] Internal consistency for the Persian version was reported 0.89. The

first-half alpha coefficient, the second-half alpha coefficient, and split-half reliability were 0.86, 0.76, and 0.76, respectively. Moreover, the results of confirmatory factor analysis showed good and satisfactory indices (comparative fit index [CFI] = 0.99, normed fit index [NFI] = 0.99, nonnormed fit index [NNFI] = 0.99, incremental fit index [IFI] = 0.99, relative fit index [RFI] = 0.98, goodness-of-fit index [GFI] = 0.98, and root mean square error of approximation [RMSEA] = 0.062).[30]

Penn State Worry Questionnaire

It is a 16-item self-report measure that assesses worry. Each item is scored on a 5-point scale ranging from 1 (not at all typical) to 5 (very typical). Internal consistency for this questionnaire was reported 0.91.[31] Mansouri et al.[30] reported good internal consistency for the PSWQ (α =0.87). The first-half alpha coefficient, the second-half alpha coefficient, and the split-half reliability were 0.76, 0.78, and 0.76, respectively. Moreover, the results of confirmatory factor analysis showed good and satisfactory indices (CFI = 0.98, NFI = 0.97, NNFI = 0.97, IFI = 0.98, RFI = 0.97, GFI = 0.95, and RMSEA = 0.065).[30]
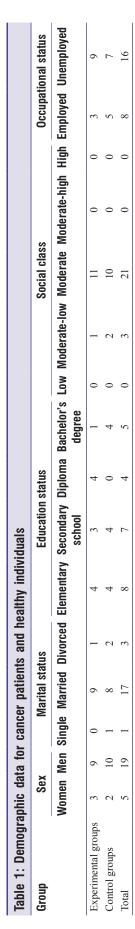
Intolerance of uncertainty scale

It is a 27-item self-report measure scored on a 5-point scale ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). Internal consistency for IUS was reported 0.91. In addition, it is significantly correlated with PSWQ ($r = 0.63$) and the Worry Domain Questionnaire ($r = 0.57$).[32] Internal consistency for the Persian version was reported 0.93. The first-half alpha coefficient, the second-half alpha coefficient, and the split-half reliability were 0.90, 0.84, and 0.81, respectively. Moreover, the results of confirmatory factor analysis showed good and satisfactory indices (CFI = 0.98, NFI = 0.97, NNFI = 0.97, IFI = 0.98, RFI = 0.96, GFI = 0.88, and RMSEA = 0.067).[30]

Acceptance and Action Questionnaire-II

It is a 7-item self-report measure scored on a 7-point scale ranging from 1 (never true) to 7 (always true). The mean Cronbach's alpha coefficients were reported equal to 0.84 (0.78–0.88). The 3- and 12-month test-retest reliability was reported 0.81 and 0.79, respectively.[33] Mansouri et al.[30] report good internal consistency for the Acceptance and Action Questionnaire-II (α =0.85). The first-half alpha coefficient, the second-half alpha coefficient, and the split-half reliability were 0.82, 0.71, and 0.60, respectively. Moreover, the results of confirmatory factor analysis showed good and satisfactory indices (CFI = 0.98, NFI = 0.98, NNFI = 0.97, IFI = 0.98, RFI = 0.96, GFI = 0.98, and RMSEA = 0.078).[30]

RESULTS

The mean age of the individuals in the experimental and control groups was equal to 50.42 (10.31) and 42.42 (10.01), respectively. As well, the results of the t-test showed no significant difference between the mean age in both groups ($t = 0.96$, $P < 0.05$). Other demographic data are presented in Table 1.

Table 1: Demographic data for cancer patients and healthy individuals

Group	Sex		Marital status			Education status				Social class					Occupational status	
	Women	Men	Single	Married	Divorced	Elementary	Secondary school	Diploma	Bachelor's degree	Low	Moderate-low	Moderate	Moderate-high	High	Employed	Unemployed
Experimental groups	3	9	0	9	1	4	3	4	1	0	1	11	0	0	3	9
Control groups	2	10	1	8	2	4	4	0	4	0	2	10	0	0	5	7
Total	5	19	1	17	3	8	7	4	5	0	3	21	0	0	8	16

The results of the Chi-square test also revealed no significant differences between sex ($\chi^2 = 0.63$, $P > 0.05$), education ($\chi^2 = 0.11$, $P > 0.05$), social class ($\chi^2 = 0.54$, $P > 0.05$), marital ($\chi^2 = 0.63$, $P > 0.05$), and occupation status ($\chi^2 = 0.39$, $P > 0.05$) in both experimental and control groups. The descriptive statistics (mean and standard deviation) are presented in Table 2. Moreover, MANCOVA was used to determine the difference between the experimental and control groups. To test the assumptions of normal distribution of the data and the homogeneity of the variance in the variables, the Shapiro–Wilk and Levene's test were initially used. The results of the Shapiro–Wilk test were not significant for any of the study variables ($P > 0.001$), so the variables had normal distribution. Further, the results of the Levene's test showed that the variance of all the variables in both groups was equal and there was no significant difference ($P > 0.05$); accordingly, the assumption of the homogeneity of the variance was accepted. To verify the equivalence of variance-covariance matrices of the data, the Box's M-test was used. The results of this test demonstrated that the equivalence assumption endorsed (Box's male = 15.14, female = 1.21, df1 = 10, df2 = 2313.94, $P = 0.27$). The result of the homogeneity of regression slopes not significant, except for the symptoms of GAD ($P > 0.05$). The result of Wilks' lambda showed that the total effect of the group was significant ($F = 15.69$, df = 4, $P < 0.0001$). Therefore, there is a significant difference between both groups in at least one of the study variables. The results of the MANCOVA are presented in Table 2.

As noted in Table 2, significant differences between the groups on the symptoms of GAD, worry, IU, and EA were found. After controlling the pretest effect, mean scores of the experimental group for these variables were significantly lower than control group ($P < 0.05$). The effect sizes of this intervention for the symptoms of the GAD, worry, IU, and EA in individual with type 2 diabetes were 0.73, 0.67, 0.60, and 0.69, respectively.

DISCUSSION

The aim of this study was to investigate the effectiveness of ACT on IU, EA, and symptoms of GAD in individuals with type 2 diabetes. The results showed that ACT reduces EA, IU, and symptoms of GAD in this group of patients. Although in literature review did not observe the same study in this area,

the results of this investigation were in line with the findings of the previous studies in which ACT had been able to reduce EA, IU,[24] and symptoms of GAD[22-24] in people with GAD. Wetherell et al.[22] reported that ACT is an effective way to reduce the worry and depression in older adults with GAD. Hasheminasab[23] found that ACT is an effective way to decrease the anxiety, depression, and cognitive avoidance and increase the quality of life in an individual with GAD. Likewise; Avdagic et al.[24] reported that this therapeutic approach can be effective way for reducing anxiety, EA, and IU in individuals with GAD. Although previous research administrated about individual with GAD, the present study administrated about individual with type 2 diabetes.

In explaining the above results, it can be said that diabetes as an emotional stressful event, due to different physical and psychological changes as well as interfere with individual functions, causes persistent anxiety and symptoms of anxiety disorders such as GAD in people with this disorder.[13] As a stress factor, type 2 diabetes could also cause IU and EA. For example, Zardoshtian Moghadam and Mansouri[13] reported that individuals with type II diabetes had higher IU and more severe symptoms of GAD. In this respect, individuals with higher IU levels described uncertain situations as stressful and upsetting and uncertainty should be avoided. If these individuals were placed in such situations, impaired functioning due to increased biases in information processing and consequently more worry result from IU.[14]

People with type 2 diabetes may also have problematic relationship with their internal experiences. They may actively avoid their thoughts, feelings, and physical sensation. However, ACT could increase psychological flexibility using acceptance and mindfulness processes as well as commitment and behavior change processes[25] and consequently reduce IU and EA in individual with type II diabetes. Techniques, exercises, metaphors, and homework in ACT can help patients accept one's feelings and physical sensations instead of avoiding and controlling thoughts. Ways to increase contact and connection with the present moment are also taught, aiding these individuals to identify their values and act in accordance with them. This therapy can also help these patients find the factors reducing cognitive fusion, EA, and IU and consequently increase their psychological flexibility.[25,26,34] In summary, all the principles and processes involved in this

Table 2: Comparison of mean and standard deviation of dependent variables in the experimental and control groups

Variables	Pretest				Posttest				Sum of squares	df	Sum of squares (errors)	df (errors)	F	P	η²	Observed power
	Experimental group		Control group		Experimental group		Control group									
	Mean	SD	Mean	SD	Mean	SD	Mean	SD								
GAD	15	3.64	12.50	3.82	10	3.04	12	3.35	74.75	1	27.04	18	49.74	<0.001	0.73	1
Worry	58.92	5.82	53.62	6.24	48.91	4.69	52.08	6.68	289.42	1	141.06	18	36.93	<0.001	0.67	1
Intolerance	73.91	13.17	59.83	13.76	53.16	6.75	60.25	13.84	156.63	1	477.06	18	27.77	<0.001	0.60	1
Avoidance	37.08	7.32	29.50	7.51	28.66	4.96	29.25	6.79	1107.15	1	101.50	18	41.77	<0.001	0.69	0.999

GAD: Generalized anxiety disorder, SD: Standard deviation

treatment will reduce avoiding anxiety-provoking thoughts and situations, decrease problematic attention patterns for decreasing cognitive errors including IU, rumination, worry, catastrophizing, increased acceptance of internal experiences, and increased commitment, and act for achieving goals in harmony with selected values. Furthermore, these changes eventually decrease EA, IU, and anxiety as well as change how to deal with problematic behaviors. Therefore, the severity of the symptoms of GAD is also reduced.

There are some notable limitations of the present study. First, this study was conducted on a group of individuals with type 2 diabetes. Therefore, these results cannot be generalized to other groups. Second, variables were measured only through self-report instruments, which in turn could affect the results of the research for various reasons such as bias. The third limitation of this study was the lack of enough time to conduct a follow-up test to examine the maintenance of the effectiveness of the ACT. Fourth, the present study was conducted on a group of individuals with type 2 diabetes. Therefore, the study needs to be replicated with diabetic patients with GAD.

CONCLUSIONS

The results showed that ACT might be an efficient way to decrease the IU, EA, and symptoms of GAD in an individual with type II diabetes. ACT can lead to significant improvement in outcomes among individual with type II diabetes. Further, therapists can use this therapeutic approach for decreasing IU, EA, and symptoms of GAD in the individual with type II diabetes.

Conflicts of interest

There are no conflicts of interest.

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