Original Article

The effectiveness of the acceptance and commitment therapy (ACT) approach on quality of life and hemoglobin A1c among patients with type 2 diabetes

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Abstract

Background and aim: Diabetes is a chronic disease which is accompanied by high risk of disability and mortality, especially when it does not comply with the individual's lifestyle. The present study was conducted by the aim of investigating the effectiveness of the acceptance and commitment therapy (ACT) approach on quality of life and hemoglobin A1c among patients with type 2 diabetes.

Methods: The current study was conducted by semi-experimental method with pretest-posttest with control group design in which 30 patients referring to specialized diabetes clinic of Dr. Gharazi subspecialty hospital were assigned into two experiment and control groups through random sampling method. First, for examining lack of Axis-I disorders in patients, a structured interview questionnaire (SCID-I), and then the diabetes quality of life questionnaire (DQL) and hemoglobin A1c test were administered for both experiment and control groups. Afterwards, the acceptance and commitment therapy was provided for the experiment group in 10 120-minute sessions. After administering the therapy, both groups completed the diabetes quality of life questionnaire and hemoglobin A1c test again.

Results: The mean of the experimental group was higher in the quality of life than the control group and decreased in the hemoglobin A1c. The effect of the interventional factor on quality of life was not statistically significant and the independent variable has not caused differences among the groups (P=0.859). The effect of intervention on Hemoglobin A1C was statistically significant and the independent variable caused differences among the groups (P=.046).

Conclusion: The acceptance and commitment therapy, in 10 sessions, can significantly decrease hemoglobin A1c which, eventually, leads to decrease in diabetes complications and patient's recovery, reduced mortality, reduced direct and indirect expenses for the patient, the patient's family and the health care system of the country.

Key word: acceptance and commitment therapy (ACT), quality of life, hemoglobin A1c, patients with type 2 diabetes.

[DOR: 20.1001.1.23222913.2019.8.2.8.0]

Introduction

Today, diabetes is referred to as silent epidemic and is considered a major public health problem in our country and in the rest of the world. There are approximately 3 to 4 million diabetic patients in Iran and its prevalence in the population over the age of 30 years is 3.7% (1). Meanwhile, type 2 diabetes is the most common type of diabetes and accounts for 90% of the cases. The prevalence of continuous diabetes is increasing and the incidence of type 2 diabetes in children has almost tripled (2). Quality of Life is defined as a multidimensional concept that includes the fields of physical and mental health, social functioning, satisfaction with treatment, anxiety about the future and a sense of pleasant. There is a relationship between disease and quality of life, and physical impairment of physical symptoms has a direct

impact on all aspects of quality of life. The life quality in diabetic patients is one of the major goals of diabetes management (3). The quality of life in diabetic patients is very important. Low quality of life leads to a reduction in self-care, a lack of control of blood glucose and an increased risk of complications (4). In many studies, diabetes has a reciprocal and significant effect on the quality of life in patients. (5). In Ghanbari's study, 60% of diabetic patients had poor quality of life, while the majority of healthy people (58.1%) had good quality of life (6). It is also stated that in this disease, drug therapy has no effect on the recovery of the disease, and more than 95% of the treatment process is performed by the patient itself, and therefore medical professionals have less control over the interval between two meetings on illness than the Patients. In this illness and other chronic diseases, the traditional physician-patient interaction will not reduce the mortality rate, but the focus should be on the person with the disease (7). glycosylated hemoglobin (HbA1c) is considered to be the most reliable metabolic index of diabetes, and has been measured in almost all studies in the field of the disease to determine the effect of a particular therapeutic approach or as a measure of compliance with the disease (8). Hemoglobin A1c is called "long-term blood glucose," because it shows the amount of glucose in a person within 2 to 3 months before sampling. If the blood glucose level has been high for a few weeks, hemoglobin A1c levels will also be high. Also, good self-management is associated with a lower level of hemoglobin A1c, which reflects a possible 37% reduction in diabetes-related complications (9).

The aim of diabetes therapy is to produce a level of hemoglobin A1c that is as close to normal as possible (4 to 6%) and at the same time does not expose the patient to lowering blood sugar (10). One of the treatments that has developed CBT is Acceptance and Commitment Therapy (ACT) (11), which has recently been at the center of attention of researchers. ACT is part of a clinical psychology doctrine committed to Presenting scientific therapeutic methods. This new psychotherapy model is part of what is now called the "third wave" of cognitive-behavioral therapy (12). Third-wave therapies of behavioral therapy include dialectical (DBT) behavioral therapy, functional analytic psychotherapy, Mind fullness- Based Cognitive therapy (Beg) and commitment and acceptance-based therapy. Psychological flexibility in ACT is created through six main processes: acceptance, Diffusion, Self as a context of diffusion, Contact with present moment, values and Committed action (13). These treatments focus on accepting beliefs versus challenges, mindfulness, cognitive diffusion, or describing thoughts and feelings without giving meaning to them, life based on values and personal spirituality. Also, the main focus of these treatments is on the acceptance of symptoms, in order to reduce them, as well as more flexible and adaptive ways of responding to an intrusive intruder (14). This treatment was raised by Steven Hayes in the 1980s at the University of Nevada, a form of Functional contextualism (FC), based on a new theory of language and cognition that is called the Relational frame theory (RFT). In treatment based on acceptance and commitment, it is assumed that humans feel annoyed by their emotions, excitements, or thoughts and continually trying to change or emancipate these inner experiences. These efforts are ineffective to control and contradictory tend to exacerbate the emotions, thoughts and excitements that individuals initially tried to avoid (15). The underlying principles of this treatment include:

[DOR: 20.1001.1.23222913.2019.8.2.8.0]

1. Acceptance, or the desire to experience pain or other turbulent events without resorting to them.

2. Value-based action or commitment with desire to act as meaningful personal goals is more than the elimination of unwanted experiences that interact with other nonverbal affiliations in a manner that results in healthy functioning.

This method includes experiential experiences and exposure-based exercises, linguistic metaphors, and methods such as mental care education (16). The main purpose is to create psychological flexibility, that is, to create the ability to make practical choices among the various choices that are more appropriate, not to act alone in order to avoid disturbing thoughts, feelings, memories, or desires in fact, it is not imposed on a person (17).

In this treatment, first, the psychological admission of a person to mental experiences and thoughts and feelings is increased, and their interactions reduce ineffective control. It is learned that any action to avoid or control these unwanted mental experiences is ineffective or reverses and exacerbates them, and must accept completely these experiences without any internal or external reaction to remove them. In the second step, the psychological awareness of the individual increases in the instant, meaning that the individual becomes conscious of all mental states, thoughts and behavior at the moment. In the third stage, one learns to separate himself from these mental experiences (cognitive separation), so that he can act independently of these experiences.

Fourth, the attempt to reduce the extreme concentration of self-visualization of a personal story (such as being a victim) that a person has for himself in his mind. Fifth, helping the individual to identify and clearly identify the values of his or her own person and transform them into specific behavioral goals (value clarification). Finally, the motivation to engage in action, that is, activity focuses on the goals and values specified, along with the acceptance of mental experiences. These mental experiences can be obsessive-compulsive thoughts, related to trauma, panic, etc. (17).

A meta-analysis shows that in most studies, to reduce 1 percent in hemoglobin A1c, number of sessions, 10 sessions or more, or an average of 24 hours of intervention is used (18) in 1% decrease in hemoglobin A1c over a 10-year period has led to a 21% reduction in diabetes-related mortality and morbidity (3). The effectiveness of strategies acceptance and commitment to improving the function and quality of life in people with chronic pain have been investigated and also, studies have shown that patients who were treated with this approach have been compared to the control functions of higher and better quality of life enjoyed. The results of studies based on acceptance-based treatment approaches, improvement of physical, psychological, social, and emotional functions as well as reduction of medical care have been reported (19). Improvement in self-management of type 2 diabetes, through acceptance treatment and commitment, and in a one-day (7 hour) workshop, indicates that changes in hemoglobin A1C have been achieved through changes in self-management (17). In addition, there are empirical support for treatment based on admission and commitment (with and without behavioral methods) in the treatment of obsessive-compulsive disorder (skin irritation and obsessive-compulsive disorder) (20). In another study, using psychological indicators for the regulation of blood glucose in type 2 diabetic patients, the use of Stress Management training was effective in reducing hemoglobin A1c and

[DOR: 20.1001.1.23222913.2019.8.2.8.0]

decreased by 1.8% and reached an average of 7.33%. If this treatment reduced the HbA1c level by 1.95%, and its mean decreased to below 7%, which indicates the control of diabetes mellitus complications, and the level of diabetes control for type 2 diabetic patients is below 7% It has been determined that this treatment can be achieved (21, 22). In another study, anger management training with cognitive-behavioral approach has been effective in reducing hemoglobin A1c and has been effective in controlling blood sugar in type 2 diabetic patients (23). The effectiveness of this treatment on self-management of diabetes and reduction of hemoglobin A1c exists only in a study in the United States in 2007 by the founder of this treatment and his colleagues Jennifer Gerhard. He reported a mean reduction in hemoglobin A1c for a 7-hour workshop session of 0.72%, and according to a cross-analytic study that showed that at least 1% in hemoglobin A1c, the number of treatment sessions was 10 sessions or more, or an average of 24 hours of intervention has been used (18).

Methods

The statistical population of this study was all out-patients with type 2 diabetes in Isfahan. Sample size of 15 people is sufficient for each group for experimental research (24)In this way, 30 patients with type 2 diabetes, who had at least one year of their diabetes history, were referred from the Diabetes Center of Ghazi Hospital to conduct research after a medical examination by Physician counselor (responsible for Diabetes Clinic of Dr. Gorazi Hospital) for not having any other illness other than diabetes and having a structured interview (SCID-I) for not having psychiatric disorders, and not receiving other psychological treatment over the past year, and examining other entry and exit criteria. A randomized trial was conducted in two groups. It should be noted that in this research, a physician and nutrition expert were assisted.

After selecting the subjects, in order to observe ethical considerations, the participants were given information about the research topic, its axes, and the purpose of the study. Then, volunteers and volunteers participated in the study. Both groups completed diabetes quality of life questionnaire (DQOL) and the results of the first tests of hemoglobin A1c were collected. Then, for the experimental group, 10 sessions of 120-minute treatment of admission and engagement were performed in one session per week. Meanwhile, during the treatment period, the control group did not receive any treatment other than medical treatment by the doctor and nurse related to diabetes during the treatment period. Three months after the treatment, the hemoglobin A1c test and the quality of life questionnaire for diabetes patients (DQOL) were resumed.

Research tools include:

Hemoglobin A1c test

The average blood glucose level in the last two to three months represents a percentage. People without diabetes generally have 4 to 6% A1c hemoglobin. (24).

Diabetic Patients Quality of Life Questionnaire (DQOL)

The DQOL questionnaire included 60 questions, first calculated by Atumas Brugg and his colleagues in 2004, and its reliability was reduced to 15 questions. A questionnaire of 15 questions is used for diabetic patients type 1 and 2. The questions of this questionnaire include two aspects of patient care behaviors and satisfaction with disease control. The results of the Burroughs study

[DOR: 20.1001.1.23222913.2019.8.2.8.0]

showed that the shortened DQOL questionnaire was more effective and in the screening program of patients, faster than the full questionnaire was 60 questions. Completion of the questionnaire takes about 10 minutes. According to the research results of Nasihatkon and colleagues (2012) to determine the reliability and validity of a clinical checklist from Quality of life of DQOL diabetic patients in Persian language can state that the shortened form of the quality of life questionnaire for diabetic patients translated into Persian has a good reliability. Cronbach's alpha coefficient, indicating the uniformity of the measurement tool in all of the questions, was 77%. In a given category, Cronbach's alpha is higher than 9 /. Expresses excellent reliability, between-9 / -7 /. Well, between 7 /. - 5 /. Medium and less than 5 /. Reliability indicator will be unacceptable (19)**.**

Treatment plan for acceptance and commitment for self-management of type 2 diabetes

The treatment plan for acceptance and commitment to self-management of type 2 diabetes patients, presented by the founder of this treatment in 2004, has five main axes focusing on the medical and psychological aspects of diabetes.

The main pillars of this treatment include:

1- Education and information about diabetes
2- Food, diabetes and your health
3- Exercise and diabetes
4- Management and coping with stress
5- Acceptance and practice

Results

First, sample demographic information is provided. **Table 1** shows that the distribution of women and men in the experimental and control groups is homogeneous. The results of **Table 2** show that the mean age in the experimental group was 53.67 years with a standard deviation of 5.48 and in the control group 53.30 with a standard deviation of 5.04, indicating a close average age in the experimental and control groups. According to **Table 3**, the mean of the experimental group was higher in the quality of life than the control group and decreased in the hemoglobin A1c. The one-way co-variance analysis was performed in order to examine the hypothesis that acceptance and commitment based treatment is effective for the quality of life of type II diabetic patients. Based on the data in **Table 4**, the effect of the interventional factor on quality of life (F (1,22) = 0. 859 p= 0.859) is not statistically significant and the independent variable has not caused differences among the groups. In order to investigate the hypothesis that acceptance and commitment therapy on hemoglobin A1C affects type 2 diabetic patients, one-way covariance analysis was performed after ensuring the main presuppositions. According to the data of **Table 5**, the effect of intervention on Hemoglobin A1C (F (1,22) = 0/859 p = 0.046) was statistically significant and the independent variable caused differences among the groups.

Discussion

The first hypothesis, "Acceptance and Commitment Group Treatment (ACT), increases the quality of life of diabetic patients." According to Table 3, the mean of the experimental group compared to the control group on the quality of life scale has increased, but according to Table 4, the effect of the interventional factor on quality of life is

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not statistically significant. The findings of this study were consistent with the study done by Dr. Taghdisi in the diabetes clinic of Minoodasht in 2009. In this study, the educational program was used based on the precede model to improve the quality of life of diabetic patients for 4 weeks. The results showed that the average total score of quality of life in the people increased after the intervention, but this difference was not statistically significant (15, 16). The results of the research by Lithacer et al. Showed that the effect of group care in diabetes, although after one year, improved blood glucose control, but the quality of life of patients did not change (28). In the study of Agha Mollaei et al. (2005), there was a significant increase in the mean of knowledge, physical and mental health, and a decrease in mean values of hemoglobin A1C, as well as a significant increase in self-control of blood glucose, weight control, exercise and diet, but there was no significant difference in the environmental and social dimensions of quality of life. The findings of this research on quality of life showed that the reasons for the lack of results in addition to individual factors may be other factors such as economic, social and cultural factors such as poverty, lack of facilities and other factors in the society under study. The second hypothesis, "Acceptance and Commitment Group Therapy (ACT), reduces the amount of hemoglobin A1c that controls diabetes".

As Table 5 shows, acceptance and commitment group therapy can significantly reduce hemoglobin A1c. In this study, this psychotherapy could reduce this indicator by more than 1.95%, which is due to the decrease in this indicator It can improve up to 37% of the disease's complications, indicating the high effectiveness of this treatment for the improvement of diabetes. It seems that diabetic patients are reluctant to admit disease and adherence to treatment, and this rate increases, and this psychotherapy increases with the acceptance of diabetes and the targeting of patient values for compliance with medical treatments and nutrition and physical activity increases the fit. The effectiveness of this treatment on diabetes self-management and the reduction of HbA1c levels was proposed in a study in the United States in 2007 by the founder of this treatment, and his colleagues Jennifer Gourd. He reported a mean reduction in hemoglobin A1c for a 7-hour workshop session of 0.72%, and according to a cross-analytic study that showed that at least 1% in hemoglobin A1c, the number of treatment sessions was 10 sessions or more, or an average of 24 hours of intervention was used (18). Therefore, with 10 sessions of 2 hours' treatment, this treatment caused an average of 2.5% decrease in hemoglobin A1c levels. Previous studies have shown that if the hemoglobin A1c levels increase by 2%, the risk of developing diabetic ulcer increases 1.6 times, and the chance for an amputation is 1.5 times. (11). A 1% reduction in HgAl1 over 10 years has led to a 21% reduction in related deaths with diabetes and its complications (20). Given that low levels of A1c, the HbA1c reflects a possible 37% reduction in diabetes-related complications (9).

Conclusion

It can be concluded that the treatment of admission and commitment in 10 sessions can significantly reduce the amount of Hemoglobin A1c, which ultimately reduces the complications of diabetes and the patient's recovery, reduces mortality and reduces direct and indirect costs for themselves. The patient, the patient's family and the health system of the country.

[DOR: 20.1001.1.23222913.2019.8.2.8.0]

References

1. Ahmadi, A, Hasanzadeh y, Rayaefard A. (2009). Meta – bolic control and care assessment patients with type Z diates, in chaharmahal&Bakhtiari province 2008. Iranian Journal of Endocrinology &metalbolic, 11(1): 33-39.
2. Mohammadi, M. Rashidi, M. Afkhami Ardakani, M. (2011). Types II risk factors. Journal of Shaheed Sadoughi University of Medical Sciences and Health Services. 19(22) :266 – 278.
3. Breivik, H.,Collett, B., Ventafridda, V., Cohen, R.,Gallacher, D. (2006) Survey of chronic pain in Europe:prevalence, impact on daily life, and treatment. Eur J Pain, 10, 287-333.
4. Grigg, A., Thommasen, H.V., Tildesley, H., Michalos, A.C., 2006. Comparingself-rated health, satisfaction and quality of life scores betweendiabetics and others living in the Bella Coola valley. Social IndicatorsResearch 76, 263–281.
5. Bagheri, H. Ebrahimi, H. Iaghari, N. S.Hassani, M.R. (2005).evaluation of quality of life in patients whit diabetes mellitus based on its complications referred to EmamHossein Hospital, shahroud. Shahrekord university of medical science, Journal , 2(7): 50-6.
6. Ghanbari A, parsa Yekta D, Atrkar R. Effective Factors on quality of life in Diabeties patients Iranian. Journal of Medical Science of Gillan University 2000; 38: 82-9.
7. Vinter-Repalust, N., Petricek, G., Katić, M.(2004). Obstacles which patients with type2 diabetes meet while adhering to the therapeutic regimen in every day life; qualitative study. Croat Med J, 45: 630-6.
8. Twohig, M. P., Hayes, S. C., & Masuda, A. (2006a). Increasing willingness to experience obsessions: Acceptance and commitment therapy as a treatment for obsessive-compulsive disorder. Behavior Therapy, 37, 3-13.
9. Gregg, J. A., Callaghan, G. M., Hayes, S. C., Glenn-Lawson, J. L. (2007). Improving diabetes self-management throughacceptance, mindfulness, and values: A randomized controlled trial.Journal of Consulting and Clinical Psychology, 75(2), 336-343.
10. Casper, D.L. (2005). The Harrison Internal Medicine Principle. "Endocrine Diseases and Metabolism and Nutrition." Translation by Bagher Larijani, Mojtaba Hosseinzadeh, Mohammad Hadizadeh, Farzin Ronianzadeh. Tehran: Timurzadeh.
11. Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). Acceptance and commitment therapy: An experiential approach to behaviochange. New York: Guilford.
12. Hayes SC (2004). Acceptance and Commitment Therapy, Relational Frame Theory, and the third wave of behavior therapy. Behavior Therapy,35, 639-665.
13. Hayes, S. C., Luoma, J., Bond, F., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes, and outcomes. Behaviour Research and Therapy, 44, 1–25.
14. Hayes, S, C., Strosahl, K, D.,Wilson, K, G., Bissett, R, T., Pistorello, J., Toarmino, D., et al. (2004). Measuring experiential avoidance: a preliminary test of a working model.Psychol Rec, 54, 553-578.
15. Hayes, S. C., &Strosahl, K. D. (Eds.).(2010). A practical guide to Acceptance and Commitment Therapy. New York: Springer Science and Business Media Inc.
16. Proof. F (1391). The effect of empowerment program on glycosylated hemoglobin in patients with type 2 diabetes. Quarterly Journal of Internal Nursing – Surgery: 1(2) : 29-2.
17. Forman, E. M. & Herbert, J. D. (2009).New directions in cognitive behavior therapy: Acceptance-based therapies (PDF). In W. O'Donohue& J. E. Fisher, (Eds.), General principles and empirically supported techniques of cognitive behavior therapy (pp. 77-101), Hoboken, NJ: Wiley.
18. Norris SL, Engelgau MM, Naranyan KMV. (2001). Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. Diabetes Care; 24: 561–587.

[DOR: 20.1001.1.23222913.2019.8.2.8.0]

19. Hayes SC (1987). A contextual approach to therapeutic change. In N Jacobson (Ed.), Psychotherapists inclinical practice: Cognitive and behavioral perspectives (pp. 327 387). New York: Guilford
20. Woods, D. W., Wetterneck, C. T., & Flessner, C. A.(2007). A controlled evaluation of Acceptance and Commitment Therapy plus habit reversal for trichotillomania. Behaviour Research and Therapy.
21. . Litaker, D. Mion, L. Planavsky, L. Kippes, C. Mehta, N. Frolkis, J. (2003). Physician - nurse practitioner teams in chronic diseasemanagement: the impact on costs, clinical effectiveness, andpatients' perception of care. J Interprof Care :17(3):223-37.
22. TODAY Study Group. (2007). Treatment options for type 2 diabetes in adolescents and youth: a study of the comparative efficacy of metformin alone or in combination with rosiglitazone or lifestyle intervention in adolescents with type 2 diabetes. *Pediatric diabetes*, *8*(2), 74-87. Zare, h .Hasanzadeh ,S. Oruki ,M. Shirazi, N. (2012). Effectiveness of Anger Management Training with Cognitive-Behavioral Approach on Adherence to Therapy and Blood Glucose Control in Patients with Type 2 Diabetes. Journal of Health: 1(4): 56-70.
23. Andréoli, B (2004). Fundamentals of Sicily Internal Medicine. "Endocrine Diseases and Metallolism." Translated by Mohammad Jafar Khani and Maryam Bastanzadeh. Tehran: Timurzadeh.

Tables

Table 1. Gender distribution of the sample by group

Gender	examination Group		control group	
	Frequency	Percentage	Frequency	Percentage
Male	5	41.7	5	38.5
Female	7	58.3	8	61.5
Total	12	100	13	100

Table 2. Information about the age of the sample studied by groups

group	minimum	maximum	Average	Standard deviation
examination Group	45	60	53.67	5.48
control group	42	60	53.30	5.04
Total	42	60	53.48	5.15

Table 3. Average and standard deviations of the variables studied in the pre-test and post-test by the group

variable	test turn	examination Group	control group

[DOR: 20.1001.1.23222913.2019.8.2.8.0]

		average	SD	average	SD
Quality of Life	pre-exam	21.50	2.81	39.77	4.53
	Post test	50.75	4.75	52.15	4.43
Hemoglobin A1C	pre-exam	8.99	1.57	9.10	1.52
	Post test	7.54	1.53	8.77	1.95

Table 4. The results of covariance analysis on the effect of acceptance and treatment commitment on quality of life

Source of the effect	Sum of squares	Degrees of freedom	Average of squares	F	Significance
pre-exam	34.97	1	34.97	1.71	0.204
group	17.54	1	17.54	0.859	0.364
Error	448.97	22	20.41	-	-

Table 5. Results of covariance analysis of the effect of acceptance and treatment commitment on hemoglobin A1C

Source of the effect	Sum of squares	Degrees of freedom	Average of squares	F	Significance
pre-exam	29.66	1	29.66	15.73	0.001
group	8.41	1	8.41	4.460	0.046
Error	41.50	22	1.89	-	-

[DOR: 20.1001.1.23222913.2019.8.2.8.0]