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**Title: The Effectiveness of Training Based on Positive-Psychology on Quality of Life of Patients with
Type 2 Diabetes**

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Abstract

Introduction: Diabetes is one of the most common chronic diseases, which has a negative effect on the quality of life. The purpose of this study was to investigate the effectiveness of training based on positive-psychology on Quality of life of patients with type 2 diabetes.

Methods: This Quasi-Experimental study was a pretest-posttest with control and follow-up group. The sample was selected through convenient sampling from patients in Hazrat Ali Health center in Isfahan with type 2 diabetes in 2017 and randomly divided into two groups of 15. The experimental group was trained positive psychology and The control group did not receive any treatment. Both groups were evaluated before and after the intervention and at the follow up stage using the World Health Organization Quality of Life questionnaire. The data were analyzed by using analysis of variance with repeated measurements.

Results: results Showed that positive-psychological education had significant influence on the quality of life and mental health area, social relations and environmental health in patients with type 2 diabetes and There is a significant difference between the experimental and control groups but in physical health area There was no significant difference between test and control group ($P < 0.001$).

conclusion: Positive psychological education effectively improves the quality of life of patients with type 2 diabetes. Therefore, it is recommended that this treatment approach be used to help improve the quality of life of these patients.

Keywords: training based on Positive Psychological, Quality of life, Type 2 diabetes

Introduction

Diabetes is one of the chronic diseases that has been a problem for human for years and it has been happened in different ages and has an alarming prevalence [1] and it is described as a chronic disease caused by an abnormality in the metabolism of carbohydrates, proteins and fat [2]. Diabetes is defined as a disorder in homeostasis, which includes disorder in fasting glucose and disorder in glucose tolerance. Plasma glucose, which in this definition increases the risk of diabetes, is the level of fasting blood glucose 126 mg / dl, or blood glucose two hours after eating, 200 mg / dl [3]. Epidemiological data show that the number of people with diabetes will be double, this increase is particularly about type 2 diabetes [4]. Type II diabetes is a chronic multifactorial disorder that is associated with hyperglycemia and damage to organs in long term [5]. Type 2 diabetes is non-insulin-dependent diabetes or adult diabetes. About 90% to 95% of people get type 2 diabetes. The cause is unknown and is due to the destruction of stem cells. Overweight or obesity is one of the causes of type 2 diabetes. Overweight causes insulin resistance [6]. The prevalence of diabetes has increased in recent years, and its risk has increased by 40% over the past 26 years [7]. According to recent World Health Organization studies, the prevalence of diabetes and its related risk factors in Iran was reported 9.6% in men and 11.1% in women and 10.3% in the overall population [8]. According to studies by the International Federation of Diabetes, the number of people with diabetes worldwide has reached 425 million in 2017 and predicted to reach 629 million by 2045 [9].

Life condition of Patients with type 2 diabetes is somehow that are often reported as having lower quality of life [10]. quality of life of patients with type 2 diabetes is affected by disease and its complications, such as retinopathy, neuropathy and cardiovascular disease because of chronic condition of illness, disability, and lifetime need for care and it endangers their mental health [11, 12]. In fact, the chronic nature of the disease affects the body, mental, and individual and social function of the patient. Therefore, studying different dimensions of quality of life in diabetic patients is important [13]. Diabetes is a major challenge for healthcare professionals because it affects the patient's psychosocial function and thus threatens the quality of life associated with health [14]. Between illness and quality of life, especially for those with chronic illness, who are involved in many issues throughout life,

there is an interaction, and physical signs and disorders have a direct effect on all aspects of quality of life [15].

Several studies have shown that quality of life in diabetic patients is reduced in comparison to those without diabetes. Moreover, the presence of complications of diabetes has more negative effect on the quality of life of the person [16]. In a study conducted by Eid Bagi and his colleagues in 2014, it was concluded that there is a significant difference between the life quality of diabetics and non-diabetics [17]. Also, Shokouhi Far and Fallahzadeh in 2014 concluded that diabetes is a chronic disease that affects the quality of life [18]. Considering the connection between quality of life and mental health and high prevalence of psychological problems in diabetic patients, effective interventions to improve mental health status and improve the quality of life of patients are necessary [19]. In fact, improving the life quality of people with type 2 diabetes is highly emphasized in the clinical guidelines of diabetes control, and in fact, one of the primary goals of diabetes control is improving quality of life [20]. Over the past two decades, the results of studies have shown that the main goal of treatment is not only to eliminate the signs and symptoms of the disease, but to improve overall quality of life for patients. In order to achieve this, attention must be paid to the psychological and social consequences of the illness. The issue of quality of life is important because if it be neglected, it can lead to disappointment, lack of motivation, and reduced social, economic, cultural and health activities [21].

Therefore, due to the importance of psychological constructs in patients with type 2 diabetes, several psychological interventions have been suggested by specialists [24,23,22]. Positive psychological interventions are a potential new approach to increasing the positive psychological structures in psychology, which seems to have positive psychological structures (such as optimism, effect of positive affection) with different health outcomes [25]. In fact, positivist interventions can reduce depression, increase happiness and psychological well-being in individuals through increasing positive emotional excitement, positive thoughts, positive behaviors, and satisfaction of basic needs of individuals such as autonomy, love and communication [26]. And emphasizes the enhancement of human abilities and virtues, enabling individuals and societies to succeed [27]. Several studies have been done to examine the effectiveness of positive psychology, for example, the study results of Masi and his colleagues (2019) [28] and Hoffman and his colleagues (2015) [29] showed that positive

psychological interventions is effective in improving the health outcomes of patients with diabetes and the results of the research by De Bois (2016), showed that the positive psychological program would improve mental health, performance and health in patients with type 2 diabetes [30]. Therefore, the use of group counseling programs and in particular psychotherapy, improve physical, emotional and social performance, decrease fatigue and reduce the negative effects of this disease [31]. Positive Thinking Skills includes the teaching of thinking differently both about positive thoughts and events, and negatives thoughts and events and consider value for having this skill. In positive thinking, individuals are encouraged to recognize their positive experiences and their strengths points and recognize the role of these two in enhancing self-esteem and improving their lives [32].

Finally, the prevalence of type II diabetes and the negative effects of this chronic disease on the quality of life of patients with type 2 diabetes, considering its future effects and the need to select appropriate interventions to correct it and lack of researching about effectiveness of education based on Positive-psychological psychology on quality of life and its dimensions in patients with type 2 diabetes, in particular, shows the necessity of this research.

Therefore, the purpose of this study was to investigate the effectiveness of positive-psychological education on quality of life and its dimensions in patients with type 2 diabetes.

Method

In terms of purpose this study was applied research and from the data collection point, it was pre-test and post-test kind with control group and follow-up periods. The statistical population of the present study was all the patients with type II diabetes from the health centers of Isfahan in 1396. In order to sampling patients with type 2 diabetes who went to Hazrat Ali (AS) comprehensive health center, 30 patients were selected according to being accessible and entry criteria then randomly divided into two groups of 15. It should be noted that 2 of the experimental group and 2 of the control group were eliminated due to lack of cooperation from the research project. The enter criteria for this study includes diagnosis of type 2 diabetes with blood tests and doctor's diagnosis, ages 30 to 65 years, having reading and writing skills, satisfaction with participation in research, and exit criteria includes Unwillingness to continue cooperation and failure to perform provided assignments at the

meetings, absences for more than 2 sessions and having acute or chronic psychiatric disorders were recognized by the psychiatrist.

The world health organization Quality of Life Questionnaire was used to collect data:

The World Health Organization's Quality of Life Questionnaire contains 26 questions and measures four areas of physical health, mental health, social relationships, and environmental health with 24 items, each with 3,6,7 and 8 questions, respectively. The two questions do not belong to any of the areas and generally assess the general health and quality of life. A score of 4-20 will be obtained for each area, in which 4 are the worst signs and 20 are best condition of that field. These scores can be converted into amplitude of scores from at least zero and 100 maximum. In the results reported by the World Health Organization's Quality of Life Scale in the 15 international centers of the organization, the Cronbach's alpha coefficient is between 0.73 and 0.89 for the four subscales and the whole scale. In Iran, Nassiri also used three kind of retests with three weeks gap and Cronbach's alpha test for reliability of the scale, which was 0.70, 87.87 / 0, respectively.

The method of this study was that 30 people were chosen based on entry criteria and available sampling method and They were randomly divided into two experimental and control groups. Before applying the intervention, the World health organization Quality of Life Questionnaire was delivered to both groups for pre-test. There was no intervention for the control group. Then, for the experimental group, eight 90-minute sessions of positive-psychological education were performed, then the test was repeated again for both groups. In order to maintain the effect of education, one month after both groups were followed up. To observe the ethical considerations of the study, before distributing the questionnaires, informed consent was obtained from the samples. Explaining the method of implementing the intervention and the optionalness of the company in the research, in order to ensure better cooperation and the freedom of participants to act on the confidentiality of the information, they were assured The data from the research questionnaire were analyzed and used only in relation to the goals and hypotheses of the research. Positive psychological training sessions were conducted based on the Rashid and Seligman treatment protocol (2011), described in Table 1 [34].

In order to analyze the research data, SPSS 22 software and the mean and standard deviation of scores were used at descriptive level and inferential level, repeated measures analysis of variance was used.

Table 1: Pandects of formation of Positive Psychological Sessions

The first meeting	members become familiar with each other, the initial communication, directing the patient to the atmosphere of positive psychology and the patients define themselves in positive way.
The second session	presents the summary of the previous session and its review, the expression of the main concepts in positive thinking, the identification of signs and symptoms of positive thinking, the assessment of abilities and helping the patient to develop positive abilities.
The third session	presents the summary of the previous session, helping the patient to understand the role of good and bad memories, providing a appreciation notebook, and writing three good memories, also writing three bad memories and express the negative emotions, providing assignments about that.
The fourth session	presents the summary of the previous session, turns negative-to-positive emotions, focusing on appreciation, forgiveness, and providing assignments about that.
Fifth Session	Presentations from the previous session focused on the topic of hope and optimism, reviewing the contents
Sixth Session	Presentation of a summary of the previous session, love and attachment, positive relationship with others, review of response styles (active-constructive response), presentation of assignments in the same direction
seventh session	presents the summary of the previous session, the art of having and feeling the pleasure, the presentation of assignments about that.
Eighth session	Integration the lessons, creating a positive environment, maintaining health and its impact on positive psychology, feedback

Findings

The demographic information and descriptive indexes, the frequency and percentage of the age of the members in the experimental and control group are as follows; the mean age in the

experimental group was 44.54 years with a standard deviation of 7.52 and in the control group mean age was 46.85 and with a standard deviation of 7.87. Also, the sex of the sample members in the experimental group was 46.2% male and 53.8% female, and in the control group 61.5% male and 38.5% female, and 53.8% female and 46.2% male overall.

Descriptive findings were used to examine the mean and standard deviations of the variables in the research. The mean and standard deviation of the variables studied are divided into two groups of experiment and control in Table 2.

Table 2: Descriptive Findings of the studied variables divided into two groups of experiment and control

control		experiment		stage	Variables
Standard deviation	mean	Standard deviation	mean		
4/57	51/69	4/43	53/23	Pretest-	Quality of Life
4/44	50/53	2/08	68/76	posttest	
5/41	43/46	3/30	64/61	follow-up	
1/73	13/00	1/98	15/53	Pretest-	Physical health field
1/53	13/23	2/16	14/00	posttest	
2/25	12/53	1/25	14/30	follow-up	
1/66	13/61	1/97	13/92	Pretest-	Mental health field
1/14	11/84	1/64	16/76	posttest	
13/97	10/30	1/73	17/0	follow-up	
1/06	5/15	1/26	5/38	Pretest-	Social relation field
1/14	6/16	0/898	8/84	posttest	
1/24	6/84	1/01	8/76	follow-up	
2/23	15/84	1/66	16/53	Pretest-	Environment health field
2/36	16/92	2/21	20/30	posttest	
2/03	14/15	1/18	21/92	follow-up	

According to Table 2 in the pre-test stage, there is no significant difference between the experimental and control groups; however, in the post-test phase, compared to the pre-test stage, in the experiment group the scores of quality of life, the field of physical health, the field of mental health, the field of social relations and field of The health of the environment has increased. In order to implement a repeated measure of variance analysis, we first need to examine the assumptions of performing variance analysis.

Table 3. Kolmogorov Smirnov test and Levine test

Significant level	value	Test type	variables		
0/130	0/151	Pretest	Quality of life		
0/401	0/212	Pretest	Physical health field		
0/196	0/141	Pretest	Mental health field	Kolmogorov Smirnov test	
0/527	0/208	Pretest	Social relation field		
0/119	0/153	Pretest	Environment health field		
Significant level	df 2	df 1	F		Homogeneity of the covariance and scaling adjoins
0/975	24	1	0/001		Quality of life
0/683	24	1	0/171	Physical health field	
0/742	24	1	0/111	Mental health field	
0/742	24	1	0/627	Social relation field	
0//400	24	1	0/735	Environment health field	

Levine test

Based on the results of Table 3, the results of the Kolmogorov-Smirnov and Levin tests show that the data are consistent with the normal distribution and the homogeneous assumption of variance analysis. The results of the Kolmogorov-Smirnov test have been shown to evaluate the normal distribution of quality of life scores, which condition Normal distribution of the scores of dependent variables is observed. Also, the results of Levine test for assessing the equality of variance of groups in the quality of life variables showed that the significance level obtained for both groups in the dependent variables was greater than 0.05, so with 0.95 it can be assured that the experimental and control groups in terms of score scattering of the dependent variables are the same.

Table 4: Analysis of variance among subjects and inside subjects with three measurements: pre-test, post-test and follow-up for quality of life, physical health, mental health, social relationships, health environment of patients with type 2 diabetes

Statistical power	Eta	Significance level	F	Mean of squares	Freedom degree	sum of squares	source
1/00	0/445	0/00	19/219	389/577	2	779/154	error
1/00	0/734	0/00	66/251	1342/936	2	2685/872	Interactive
				20/270	48	972/974	factor
1/00	0/950	0/00	453/229	5400/013	1	5400/013	Error
				11/915	24	285/949	group
1/00	0/938	0/00	360/641	959/782	2	1919/564	error
1/00	0/419	0/00	17/289	46/013	2	92/026	Interactive
				2/661	48	127/744	factor
0/231	0/064	0/404	77/752	160/821	1	160/821	Error
				2/068	24	49/641	group
0/856	0/537	0/002	19/928	3/167	2	6/333	error
1/00	0/463	0/00	20/704	70/628	2	141/256	Interactive
				3/411	48	163/744	factor
1/00	0/868	0/00	157/197	308/013	1	308/013	Error
				1/959	24	47/026	group

1/00	0/578	0/00	32/880	25/397	2	50/792	error
1/00	0/578	0/00	32/880	25/397	2	50/795	Interactive
				0/772	48	37/07	factor
1/00	0/723	0/00	62/771	123/128	1	123/128	error
				1/962	24	47/077	group
0/976	0/288	0/00	9/688	39/321	2	78/641	error
1/00	0/592	0/00	34/806	141/269	2	282/538	Interactive
				4/059	48	194/821	factor
1/00	0/821	0/001	110/267	415/385	1	415/385	Error
				3/767	24	90/460	group

According to Table 4 and the significance of factors within the groups, there was a significant difference between the three measurements of pre-test, post-test and follow-up for the quality of life variable and areas of patient's physical health, mental health, social relationships, health of the environment Type 2 diabetes was confirmed at $P < 0.001$. Also, with the meaningfulness of the source of the group among the groups, it can be said that there is a significant difference between the experimental group and the control group for the variable of quality of life, mental health, social relations and health of the environment of patients with type 2 diabetes at the level of $P < 0.001$, Meaning that positive-psychological education was effective on the quality of life, mental health, social relations, and the health of the environment in patients with type 2 diabetes, but this intervention had no effect on the physical health of this group.

In order to investigate the difference between the mean of the studied scale among three pre-tests, post-test and follow-up measurements, Bonferroni post hoc test were used as paired test. The results of this test are presented in Table 5.

Table 5: Bonferroni post hoc test for comparing quality of life, mental health, social relations and environmental health as a pair in the time series

Significance level	Standard error	Mean difference	Stage B	Stage A	Scale
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(A-B)					
0/00	0/850	-7/019	Follow-up	pretest	Quality of life
0/00	1/443	6/077	posttest		
0/915	1/379	1/115	Follow-up	posttest	
0/00	0/460	-0/538	Follow-up	pretest	Mental health area
0/00	0/625	0/115	posttest		
0/425	0/430	-0/154	Follow-up	posttest	
0/00	0/193	-1/731	Follow-up	pretest	Social relation area
0/00	0/297	-1/962	posttest		
0/918	0/230	0/038	Follow-up	posttest	
0/00	0/441	-2/423	Follow-up	pretest	Health of environment area
0/00	0/566	-0/846	posttest		
0/069	0/650	1/577	Follow-up	posttest	

According to Table 5, the pre-test scores with post-test and follow-up of the quality of life scales, the variable of mental health field, the field of social relations, and the health of the environment field have significant difference and the post-test scores in the follow-up scales are relatively constant and the effect of the training Positive psychology for quality of life on mental health, the field of social relations, and the field of health of the environment is also persistent. These results indicate that positive-psychological education was effective on the quality of life, mental health, social relations and the field of health of the environment. Moreover, in reducing the effectiveness of this treatment, the time was not effective through post-test to followed up. According to the results, the research on the effectiveness of positivist psychological education on quality of life and its dimensions was confirmed in patients with type 2 diabetes and education based on Positive psychological is effective on quality of life, mental health, the field of social relationships, health of the environment of patients with type 2 diabetes and remains stable for one month.

Discuss

The purpose of this study was to provide a positive psychological education on quality of life in patients with type 2 diabetes. Based on the results, positive-psychological education

had an impact on quality of life and led to improvements in quality of life and the effect of this treatment was stable after a month and the results of this study were agree with the results of many research studies based on The effect of treatment and education on positive psychology. In a study by Jalali and his colleagues (1394) evaluated the effectiveness of positive-psychotherapy on the quality of life of spouses of neurology and psychiatry veterans, it was concluded that positive psychotherapy education increased the psychological well-being and quality of life in the experimental group in comparison The control group in post-test stage [35]. The discoveries of Shahid Golami's research (1394) indicate the effectiveness of positive-psychological therapy (PPT) on improving the quality of life of MS patients. [36]. Soheilzadeh and his colleagues (1395) found that improving self-esteem and resilience and providing appropriate strategies could improve the quality of life for patients with type 2 diabetes [37]. The results of research by Diner Wechon (2011) [38] and Sin, Delauporth and Liubomirsky (2011) [39] showed that positive thinking is effective in improving the quality of life. In the theoretical explanation of these findings it can be said that positive-thinking psychological education in order to strengthen and improve positive relationship with oneself, positive relationship with others and life and increase self-esteem can help to improve the quality of life. Also, the training of optimism and positive thinking skills encourages diabetes patients to notice positive and good experiences and their role in increasing having respect for themselves and other rather than reminding negative thoughts about their illnesses and their constraints [40]. Generally, positive-thinking psychosocial education by creating such things as positive thinking leads to a happy life, a better way of looking at life than focusing on illness and its symptoms and limitations, leading attention to positive emotions Positive sources of energy, positive energy transfer to others, reduction of psychological stress and self-confidence may have contributed to this outcome to the improvement of quality of life in patients with type 2 diabetes [41]. Also, Tabataba'i and Manafi (1395), like this part of the study, said that the treatment affects the emotions of quality of life. [42]. Also, according to Shoshani and his colleagues (2016) research results, this intervention has a positive effect on cognitive interactions and social relationships [43]. Yazdi Ravandi and his colleagues, 2016, also concluded that social support and self-efficacy play an important role in predicting the level of diabetic patients' compatibility. [44]. Fraser and his colleagues (2012) reported that positive-psychological education is effective on the environmental characteristics of diabetes

control and management [45]. In explaining this part of the findings, positive-psychological education teaches patients to take an active position in the world and shape their lives personally and to express a clear picture of good life, and See the best in every situation and reconstructing themselves; thus, a patient with type 2 diabetes accepts the constraints of his illness and, will act by knowing more about their abilities in every situation.[46] And by considering the success that have been achieved, they feel more fluent in their own environment.

In explaining the disapproval of the effectiveness of positive-psychological education on physical dimension, it can be stated that the symptoms of diabetes include frequent urination, excessive thirst, excessive hunger, and weight loss, tingling, itching, peripheral neuropathy, acute vagina infections and fatigue are affected by the individual's compliance with the treatment. It can also be argued that patients with chronic disease, long-term disease, long-term persistent and debilitating treatment, and physical and emotional consequences are among the factors [47], corresponsive with that The results of Yazdi Ravandi's research (1395), which concluded that the severity of pain and the duration of pain play an important role in predicting the quality of life of patients for chronic pain, especially in the physical domain can be said. [48]. Patients with type 2 diabetes appear to have a no difference in physical health and general health, even after treatment, due to their daily feelings of their symptoms, need to using drugs on time, the duration and severity of the disease.

The present study was confronted with generalization of the results due to the self-reporting of the counseling tool and the lack of neutral counseling sessions for control group in order to eliminate the effect of group therapy expectation. Other constraints such as the impossibility of random selection of the sample group in the present study were suggested and it would be advisable to conduct random sampling in future researches with a larger sample size, as well as to conduct longer studies with long-term follow-up and multi-stage, is suggested to investigate the continuity of the effectiveness and sustainability of the course of psychological-positive education.

Conclusion

The results of this study showed that the implementation of health plan and positive psychological education effectively improve the quality of life of diabetic patients. Also, the

use of positive thinking techniques and skills to strengthen and improve positive self-affiliation, positive relationship with others and life, and increased self-esteem can help improve quality of life. Therefore, it can be expected that providing appropriate strategies such as conducting educational programs with positive thinking, looking at life from its good aspects, rather than focusing on disease and increasing adaptability in diabetic patients, would improve the quality of life of these patients to reduce the complications, problems and costs of treatment and treatment of this disease.

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Conflict of interest

This study did not have any conflict of interest for the authors.

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