The Effectiveness of Positive Psychotherapy on the Well-Being and Glycemic Control of Patients with Type 2 Diabetes: A Randomized Controlled Trial

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Abstract

Background: Diabetes is one of the most widespread diseases that disturb the mental and physical health of patients. Objectives: The aim of study was searching a therapeutic method to enhance the diabetic’s health by supposing the effectiveness of positive psychotherapy on the well-being and glycemic of patients with type 2 diabetes in Iran. Methods: In a randomized, single-blinded clinical-trial study, from January 2016 to February 2017, a total of 30 type 2 diabetic patients of Yazd Diabetes Research Center, with purposeful sampling method, were selected randomly and put in two groups (Experimental and Control groups). While participants of both groups continued their drug therapy, the experimental group received 10 sessions of 90 minutes (a session per week) group positive psychotherapy while the control group remained on the waiting list. Data were gathered before the intervention and two weeks after intervention. At the end of the treatment sessions three of the experimental group (n = 12) and two of the control group (n = 13) were excluded from the study for their absence in post-test. Data were gathered by demographic form, general well-being questionnaire (GWB), and Glycemic test (HbA1c). SPSS software, version 16 with P = 0.05 level, Kolmogorov-Smirnov (K-S), chi-square, and analysis of covariance (ANCOVA) were used for analyzing data. Results: The results showed that positive psychotherapy significantly increases mental well-being, and its subscales in comparison with the control group (P < 0.01). Also, other results showed that glycemic in the experimental group in comparison with the control group significantly decreased (P < 0.05). Conclusions: It can be deduced that positive therapy intervention can be effective in mental well-being and to some extent, blood glucose of diabetics. So, this therapy can be used when diabetic patient’s psychological factors should be carefully considered.

Keywords: Positive Psychotherapy, Well-Being, Glycemic, Diabetes

1. Background

Diabetes is one of the diseases that endangers most people’s health. Diabetes appears with disturbances in the metabolism of glucose, fat, and protein, which especially includes disruptions in producing and using insulin hormone that is necessary in glucose metabolism (1). Iran is one of the countries that is at increased risk of diabetes, thus, 14% - 23% of Iranians 30-year-olds and above have diabetes or impaired glucose tolerance (IGT). Nearly 25% of IGT would get diabetes in the future (2). The main causes are obesity and immobility, which are related with increased risk of type 2 diabetes (3, 4). Stress has a negative effect on their body, psychological, and also endangers their mental health (5). In addition to stress, depression (6) and anxiety (7) are respectively the most mental disorders in patients with diabetes. Considering the last studies in Yazd, the rate of depression in type 2 diabetic patients is 46%, where 70.4% are female and 48% male (8). These psychological factors might have a significant impact on the mental well-being of patients with diabetes. Well-being is a psychological component that is considered as freshness and life satisfaction (9). Mental well-being is a multidimensional structure, which is marked with social, mental, and physical freshness (10, 11). Today tendency to study psychological well-being as one of the therapeutic process in former decades was increased (12). Positive psychotherapy is one of the approaches that engage scientists to consider well-being and mental health (13). Therefore, positive psychotherapy movement emphasizes on positive features and potentials growth in a per-
son. Hence, a group of psychologists used mental health instead of psychological well-being because they believed that this word brings more positive aspects to someone's mind (14, 15). Seligman believes that positive psychology is a new method in psychotherapy that pays attention to potentials, talent, and positive emotions (16). Indeed, positive approach suggests therapists not only try to eliminate symptoms of an illness but also try to enhance patient's quality of life. Hence most of psychologists use some interventions in their positive therapeutic method, which was based on patient’s thought, feeling, behavior, and positive cognition (17). Positive psychotherapy focuses on increasing the level of well-being, happiness, and quality of life. It believes that increasing positive emotions can decrease mental pressures and shortages as well as have a positive effect on mental health (18 - 20). The effectiveness of positive psychotherapy has been checked on different illnesses. For example, Seligman et al. (15) reported that positive psychology tasks decreased depression symptoms for at least 6 months. Senf and Liau (21) and Asgharipoor et al. (22), showed that positive therapy is effective in treating mental features and can also increase happiness and decrease depression symptoms. The mechanism of blood sugar reduction in participants can be explained such that positive psychotherapy training with positive motivational techniques on hypothalamic-pituitary-adrenal axis reduces Cortisol in response to stress. On the other hand, improvement of anxiety can decrease catecholamine release and lead to better glycemic control in diabetic patients (23). It seems that these trainings can lead to better control of diabetes by suppressing or reducing the levels of Cortisol secretion. Therefore, participating in positive training courses leads to the reconstruction of individual belief and cognition about diabetes. Up to now, there wasn’t any research that has been done in regards to the effectiveness of group positive psychotherapy on improving psychological health of patients with type 2 diabetes.

2. Objectives

Considering the special cultural condition, it seems necessary to do proper, affordable, and effective researches to increase diabetics’ health in Iran. Hence, present research aims to study the effectiveness of group positive psychotherapy on increasing general well-being and decreasing blood sugar of type 2 diabetic patients.

3. Methods

3.1. Study Type and Participants

This study was a randomized, single-blinded clinical trial from January 2016 to February 2017 where the inter-viewer did not know about the control or testing of the patients. The research community consisted of all diabetic patients who referred to Yazd Diabetes Research Center. Therefore, the sample size was calculated with the mean and standard deviations of previous studies (24, 25). The sample required for this study was 24 people (12 in each group); however, 15 were considered for each group because of the probability of dropping out of the subjects.

\[
n = \left( \frac{Z_{1-\alpha/2} + Z_{1-\beta}}{\mu_1 - \mu_2} \right)^2 \left( \frac{S_1^2 + S_2^2}{2} \right)
\]

\[
= \left( \frac{1.96 + 1.28}{(1.7)^2 + (7.4)^2} \right)^2 \left( \frac{S_1^2 + S_2^2}{2} \right)
\]

\[
= \left( \frac{10.49}{7.1} \right)^2 \left( \frac{S_1^2 + S_2^2}{2} \right)
\]

\[
= \frac{604.96}{50.41}
\]

\[
= 12.00
\]

After visiting the diabetes center, each of the diabetes patients took necessary explanation of the research methods and goals. Those who wanted to participate (after confirming the consent form) were being interviewed. The sampling method was purposeful. The inclusion criteria for selecting participants included having at least six months of history of type 2 diabetes, being 30 - 55 years old, getting poor to moderate mental well-being scores on the GWB scale, having at least a diploma and over, and HbA1c was between 5.7 to 10. In addition, the exclusion criteria included getting very good mental well-being scores on the GWB scale, not completing of informed consent form, having physical problems, which interfere psychotherapy process, and using other psychiatric or psychotherapy treatments simultaneously.

Out of 110 questionnaires collected from the participants, 35 of them had the entry criteria. Of these, five individuals were excluded from the study due to the exclusion criteria. Finally, the participants were 30; randomly two groups of 15, one experimental and one control group were established. While participants of both groups continued their drug therapy, the intervention group received 10 sessions of 90 minutes (a session per week) positive psychotherapy and the control group remained on the waiting list. CONSORT flowchart is indicated in Figure 1.

Questionnaire and glycemic test were used for gathering data. Therefore, each examinee of both groups completed the mental health questionnaire before the first intervention session and after the last one. Also, glycemic tests were taken before the first session and two weeks after the last session (within two months) of psychotherapy intervention. The tools for gathering data were as below.

1) Demographic Form: This questionnaire was made by the examiner and used for gathering patients’ characteris-
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Answered towell-being questionnaire (N = 110)

- Excluded questionnaires due to were incompleted (N = 10)
- Of the 100 people, 35 had entry criteria

Randomized (N = 30)

- Excluded due to exclusion criteria (N = 5)

Experimental group

- Analyzed (N = 15)
  - Excluded from analysis (N = 3)

Control group

- Analyzed (N = 15)
  - Excluded from analysis (N = 2)

**Figure 1. CONSORT flowchart of patients enrolled in this study**

Material and Methods

3.2. Interventions

Indeed, the group positive psychotherapy composed of 10 sessions of 90 minutes (a session per week) that was performed in 10 weeks. The participants learned the positive attitude skills toward themselves and others by the help of a therapist and one instructed cooperator. Also, it should be noticed that positive psychotherapy refers to two types. The first one is the general meaning of positive psychotherapy, which predicates to all positive psychotherapies. The second type is the therapeutic method, which was introduced for the first time by Seligman et al., in 2006, and that method was used in this research (15). During the intervention, examinees completed the written specified practices in a work form of each session. **Table 1 shows a brief review of each session’s content.**

3.3. Statistical Methods

The primary outcomes of our analysis were the rate of well-being and HbA1c in patients with type 2 diabetes. Also, the secondary outcome from the analysis was the effect of positive psychotherapy on well-being and HbA1c in the patients. SPSS software, version 16, with P = 0.05 level was used for analyzing data. Kolmogorov-Smirnov (K-S) test was used for evaluating the normality of numerical data and the results showed that all variables had normal distribution. In addition, chi-square and analysis of covariance (ANCOVA) were used in this research.

4. Results

4.1. Demographic Characteristics

In the beginning of the study, the data of 30 patients were collected, however, the results of three of the intervention group and two of the control group were excluded from the study for not participating in the post-test. From these 25 patients, 52% were female and 48% male. Chi-square showed that there was no significant difference between the two groups in terms of gender, economic status, occupation and type of drug. It can be concluded that both groups are similar in terms of demographic characteristics (Table 2).

4.2. Analyzing Data Using ANCOVA

Results showed that the mean scores of general well-being and its subscales in the posttest phase of experimental group was more than the pretest phase while the mean scores of general well-being and its subscales in the posttest phase of clinical control group was nearly the same as the pretest phase. In addition, the mean score of HbA1c (28).
Table 1. Method of Group Positive Psychotherapy

| Time                          | Task                                                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| First week                    | Establishing pre-group in order to take written testimonial of patients and become familiar with each other. Also, initial speaking about mental pressures. |
| The second and third week     | Teaching how to use abilities and VIA performance. Task: evaluating 5 dominant abilities and find some ways to use them in their routine life. |
| Third week                    | Teaching three good things. Task: write down three good things that happen every day and why they happened.                              |
| The fourth and fifth week     | Teaching life summary. Task: imagine that you were died after a very satisfying life. What are you going to write in your obituary? Write whatever you like to be remembered about you in 1 or 2 pages. |
| The sixth and seventh week    | Teaching gratitude visit. Task: find someone whom you are very gratitude but you never thank him/her well. Write a letter that describe your gratitude and read it for him/her on the telephone or face to face. |
| Eighth week                   | Teaching active response. Task: one response: answer someone whom you know very actively at least once a day.                             |
| The ninth and tenth week      | Teaching relish feeling. Task: each day devote some time enjoying those activities you like such as eat meat, take a shower, and take a walk. At that time you do them, write down what did you do. How did you do it and what was your feeling. |

Table 2. Demographic Comparison in Test and Control Group by Means of Chi-Square (N = 25)*

| Variable, Classification  | Test Group | Control Group | Total | P Value |
|---------------------------|------------|---------------|-------|---------|
| Gender                    |            |               |       | > 0.543 |
| Males                     | 6 (50)     | 6 (42.6)      | 12 (48)|         |
| Females                   | 6 (50)     | 7 (53.8)      | 13 (52)|         |
| Economic status           |            |               |       | > 0.703 |
| Good                      | 2 (16.7)   | 4 (30.8)      | 6 (24) |         |
| Average                   | 7 (58.3)   | 6 (46.2)      | 13 (52)|         |
| Weak                      | 3 (25)     | 3 (23)        | 6 (24) |         |
| Job                       |            |               |       | > 0.845 |
| Jobless                   | 6 (50)     | 5 (38.4)      | 11 (44)|         |
| Worker                    | 3 (25)     | 4 (30.8)      | 7 (28) |         |
| Housekeeper               | 3 (25)     | 4 (30.8)      | 7 (28) |         |
| Drug type                 |            |               |       | > 0.571 |
| Tablet                    | 7 (58.3)   | 9 (69.2)      | 16 (64)|         |
| Tablet - insulin          | 5 (41.7)   | 4 (30.8)      | 9 (36) |         |

*Values are expressed as No. (%).

HbA₁c in the posttest phase of the experimental group was less than the pretest phase while the pre-post test scores of the clinical control group were nearly the same. The contents of Wilks’ lambda showed that there was a significant difference between both groups in terms of dependent variables in P < 0.01 level (F = 8.741, Value = 0.314, df = 16). Accordingly, it can be stated that there was significant difference between the experimental and control groups at least in terms of the dependent variables (well-being and HbA₁c) in patients with type 2 diabetes.

Analysis of covariance (ANCOVA) on dependent variables was used to examine the differences between experimental and control group post-test results. Table 3 showed the ANCOVA results for comparing post-tests of two dependent variables (general well-being and HbA₁c) with controlling pretests in both groups. The results listed in Table 3 showed that analysis of covariance ANCOVA was significant in variables as HbA₁c (F = 16.5 and P = 0.035), general well-being (F = 21.09 and P = 0.001) anxiety subscales (F = 25.94 and P = 0.001), depression (F = 18.34 and P = 0.001), positive well-being (F = 18.37 and P = 0.001), self-control (F = 4.59 and P = 0.038), and vitality (F = 21.56 and P = 0.001). Therefore, the hypothesis on the impact of group positive psychotherapy on increasing general well-being and its factors in patients with type 2 diabetes was being confirmed (P < 0.01). Also, the other hypothesis based on the impact of group positive psychotherapy on decreasing blood sugar was being approved (P < 0.05).
5. Discussion

The results showed that group positive psychotherapy significantly increased the general well-being in patients with type 2 diabetes and that increase was significant in comparison with the control group. These findings are in line with the results of Sorbi et al. (25), Tanaka et al. (9), Senf and Liau (21), and Dowlatabadi and et al. (24). Also Wing et al. (29) and Parks-Sheiner (30) had obtained similar results about the effectiveness of positive interventions on mental well-being and life satisfaction.

It should be mentioned that positive psychotherapy focuses mainly on the abilities and positive emotions of the people. This intervention is positive individual characteristics and institutions that facilitate their growth. Accordingly, this view of the matter and awareness of the positive abilities can help patients cope with depression and prevent its relapse. Positive psychotherapy tasks are designed in such a way that can increase well-being. For example, “three good things” task absorbs depressed person intrusive thoughts toward negative events. In addition, “gratitude visit” task can change the memory of past negative aspects into enjoying the good things that friends and family have done for him/her (15).

Layous et al. (18) presented a new model for the effectiveness of positive interventions. They believe that positive interventions not only directly increase the well-being and reduce symptoms of depression, however, they also indirectly increase the positive thoughts, positive behavior, and positive emotions. Therefore, during therapy sessions these two goals are pursued simultaneously, which increases the effectiveness of this treatment and thus, enhances the well-being of patients.

Other results showed that group positive psychotherapy significantly decreased the blood sugar in type 2 diabetic patients. The obtained results are in line with the researches of Yi-Frazier et al. (31), Celano et al. (32), Robertson et al. (33), and Snoek and Skinner (34). Furthermore, the obtained results are in line with other known therapies in psychology such as stress management with cognitive-behavioral method (35); mindfulness (36) and relaxation (21), which can almost control blood sugar in type 2 diabetic patients.

As a result, it will bring strengthening positive beliefs and promising and reducing stress in patients. In this regard, Joyce et al. (31), had done a review research about the effectiveness of positive psychology on diabetes outcomes. The results showed that positive personal characteristics such as self-confidence, self-efficacy, and also positive environmental factors, such as monitoring and others supporting, are important predictors for controlling blood sugar and managing diabetes over the life.

5.1. Conclusions

This research addressed the effectiveness of positive psychology interventions on physical and mental health of patients with type 2 diabetes for the first time by considering the advantages and disadvantages of previous researches. Overall, the findings indicate that this method of treatment has beneficial effects on the health and well-being of patients with type 2 diabetes. Hence this affordable therapy, in terms of time and cost, can be used widely used in Diabetes Treatment Centers to improve the health of patients. As the researchers in this study have found the strengths and weaknesses of their study, they also propose that in future studies the group positive psychotherapy in comparison with other treatments on well-being and happiness determine better effective treatments. Also, this therapy examines the stability of treatment effects on mental and physical characteristics with long-term follow up (1 year) and if it becomes effective it would use it for treating...
patients. On the other hand, the present study has some limitations and shortcomings. The main reasons for the limitations of this study are lack of control of confounding variables such as personality, physical, and also sociocultural variables, the lack of cooperation from many participants, no placebo control group in order to control the nonspecific effects of treatment, lack of time, low cost of finance, lack of facilities, and lack of treatment space to follow-up study for the stability of treatment effects.

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Footnotes

**Authors’ Contribution:** Drafting the manuscript: Mohammad Hossein Sorbi, Reyhane Azizi, and Masoud Rahmanian; statistical analysis: Mohammad Hossein Sorbi and Masoud Rahmanian; study design and coordination: Masoud Rahmanian. All authors contributed to this project and article equally. All authors read and approved the final manuscript.

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