



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

Mohammad Hossein Sorbi¹, Masoud Rahmanian^{2, *} and Reyhaneh Azizi²

¹Department of Humanities, Urmia University, Urmia, Iran

²Yazd Diabetes Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

*Corresponding author: Yazd Diabetes Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Tel: +98-3537280217, Email: drmasoudrahmanian@yahoo.com

Received 2017 November 11; Revised 2019 July 03; Accepted 2019 July 14.

Abstract

Background: Diabetes is one of 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 (HbA_{1c}). 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 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 Liao (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.

$$\begin{aligned}
 n &= \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\frac{\beta}{2}} \right)^2 (S_1^2 + S_2^2)}{(\mu_1 - \mu_2)^2} \\
 &= \frac{(1.96 + 1.28)^2 ((1.7)^2 + (7.4)^2)}{(18.3 - 25.4)^2} \\
 &= \frac{(10.49) (2.89 + 54.76)}{(7.1)^2} \\
 &= \frac{604.96}{50.41} \\
 &= 12.00
 \end{aligned}$$

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 HbA_{1c} 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-

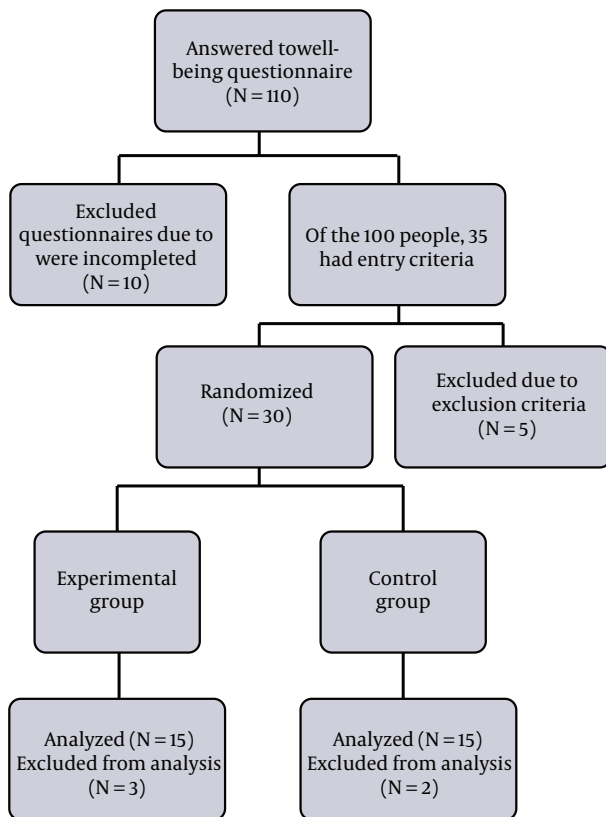


Figure 1. CONSORT flowchart of patients enrolled in this study

tics of type 2 diabetic patients such as sex, age, education level, job, disease length, and so on.

2) General Well-Being Questionnaire (GWB-18): This questionnaire was made by Harold J. Dupuy in 1977 and includes some statements about personal attitude and important aspects of patients' psych. It includes six scales of anxiety, depression, positive well-being, self-control, a sense of vitality, and general health (26). It consists of 18 items and six options that wanted examinees to declare their agreement by choosing one of the options. This questionnaire was normalized in Iran in 2015 and its correlation coefficient for test-retest was between 0.77- 0.93. Cronbach's alpha for all sub-scales were respectively 0.76 and 0.74 (27). In addition, general Cronbach's alpha of this scale in the present study was 0.79.

3) HbA_{1c} Test: Glycosylated hemoglobin (HbA_{1c}) is an indicator for being aware of how to control diabetes. Glucose binds to hemoglobin in a process called glycosylation. HbA_{1c} test shows the amount of glycosylation or average blood glucose level over the past 8 to 12 weeks. Normal range of glycosylated hemoglobin in normal people is 4 to 5.9. People with diabetes generally have high levels of

HbA_{1c} (28).

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 cooperater. 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 HbA_{1c} in patients with type 2 diabetes. Also, the secondary outcome from the analysis was the effect of positive psychotherapy on well-being and HbA_{1c} 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

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)^a

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)	

^aValues are expressed as No. (%).

HbA_{1c} 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 HbA_{1c}) 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 depen-

dent variables (general well-being and HbA_{1c}) with controlling pretests in both groups. The results listed in Table 3 showed that analysis of covariance ANCOVA was significant in variables as HbA_{1c} ($F = 16.5$ 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 were being confirmed ($P < 0.01$). Also, the other hypothesis based on the impact of group positive psychotherapy on decreasing blood sugar was being approved ($P < 0.05$).

Table 3. Mean Results of ANCOVA on the Study Variable in the Experimental and Control Groups

Variables	Experimental Group ^a		Control Group ^a		Mean Squares	F	Eta Squared	P Value
	Pretest	Posttest	Pretest	Posttest				
General well-being	55.66 ± 8.32	72 ± 8.17	62.61 ± 9.5	61.46 ± 7.41	660.78	21.09	0.526	< 0.001
Anxiety	12.70 ± 3.01	15.91 ± 1.92	14.23 ± 3.85	13.07 ± 3.04	79.63	25.94	0.577	< 0.001
Depression	8.5 ± 1.93	12.66 ± 1.74	10.76 ± 2.04	10.61 ± 1.5	61.57	18.34	0.491	< 0.001
Positive well-being	9.08 ± 2.23	12.16 ± 1.74	9.7 ± 1.84	9.9 ± 1.38	35.96	18.37	0.492	< 0.001
Self-control	11.58 ± 1.83	12.33 ± 1.54	10.23 ± 2.52	10.38 ± 1.93	7.34	4.95	0.207	< 0.038
Vitality	8.5 ± 1.73	11.66 ± 2.1	9.53 ± 1.98	9.46 ± 1.66	25.81	21.56	0.532	< 0.001
General health	5.25 ± 1.6	7.25 ± 1.35	8.15 ± 1.72	8 ± 1.22	2.491	2.57	0.120	0.125
HbA _{1c}	7.78 ± 1.6	7.20 ± 1.5	7.6 ± 1.35	7.58 ± 1.3	1.28	5.16	0.214	< 0.035

^aValues are presented as mean ± standard deviation.

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 Liao (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 re-

searches 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 socio-cultural 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.

Acknowledgments

The authors thank all the officials and personnel of the treatment center who helped them with the research.

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.

Clinical Trial Registration Code: The trial was registered at the Iranian Registry of Clinical Trial (<http://www.irct.ir>) with the identification number IRCT2015102916771N2.

Conflict of Interests: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Ethical Approval: Our study was Clinical Trail and approved by Ethics Committee of Medical Shahid Sadoughi University of Medical Sciences.

Funding/Support: The authors received financial support for the research from Shahid Sadoughi University of Medical Sciences.

References

- Nolan CJ, Ruderman NB, Kahn SE, Pedersen O, Prentki M. Response to comments on Nolan et al. Insulin resistance as a physiological defense against metabolic stress: Implications for the management of subsets of type 2 diabetes. *Diabetes*. 2015;**64**(10):e38–9. doi: [10.2337/dbi15-0002](https://doi.org/10.2337/dbi15-0002). [PubMed: [26405280](https://pubmed.ncbi.nlm.nih.gov/26405280/)].
- Larejani B, Zahedi F. [Epidemiology of diabetes mellitus in Iran]. *Iran J Diabetes Lipid Disord*. 2001;**1**(1):1–8. Persian.
- al-Asfoor DH, al-Lawati JA, Mohammed AJ. Body fat distribution and the risk of non-insulin-dependent diabetes mellitus in the Omani population. *East Mediterr Health J*. 1999;**5**(1):14–20. [PubMed: [10793776](https://pubmed.ncbi.nlm.nih.gov/10793776/)].
- Sorbi MH, Rahmanian M, Sadeghi K, Ahmadi SM, Baghaeipour L, Yazdanpoor S. Comparison of the life expectancy and general health in type 2 diabetic patients with non-patients. *Iran J Diabetes Obes*. 2014;**6**(3):114–8.
- Khalilnejad N, Sorbi MH. The relationship between general health and resiliency in mothers of primary school-age children in Yazd, Iran. *Women Health Bull*. 2016;**4**(1). doi: [10.17795/whb-31367](https://doi.org/10.17795/whb-31367).
- Grigsby AB, Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. Prevalence of anxiety in adults with diabetes: A systematic review. *J Psychosom Res*. 2002;**53**(6):1053–60. [PubMed: [12479986](https://pubmed.ncbi.nlm.nih.gov/12479986/)].
- Thomas J, Jones G, Scarinci I, Brantley P. A descriptive and comparative study of the prevalence of depressive and anxiety disorders in low-income adults with type 2 diabetes and other chronic illnesses. *Diabetes Care*. 2003;**26**(8):2311–7. doi: [10.2337/diacare.26.8.2311](https://doi.org/10.2337/diacare.26.8.2311). [PubMed: [12882854](https://pubmed.ncbi.nlm.nih.gov/12882854/)].
- Mazloomi SS, Mirzaei A, Mohammadi S. [Study of depression prevalence in the patients with type II diabetes referring to Yazd diabetes research centers in 2008]. *Toloo-E-Behdasht*. 2008;**7**(1-2):23–4. Persian.
- Tanaka T, Tsukube S, Izawa K, Okochi M, Lim TK, Watanabe S, et al. Electrochemical detection of HbA1c, a marker [correction of maker] for diabetes, using a flow immunoassay system. *Biosens Bioelectron*. 2007;**22**(9-10):2051–6. doi: [10.1016/j.bios.2006.09.008](https://doi.org/10.1016/j.bios.2006.09.008). [PubMed: [17029779](https://pubmed.ncbi.nlm.nih.gov/17029779/)].
- Ahmed N, Ahmed S, Carmichael Z, Sami AS. Measuring healthy lifestyle and mental health indicators in south asian women using the "your health: Quality of life and well-being" questionnaire. *Ann Glob Health*. 2017;**83**(3-4):463–70. doi: [10.1016/j.aogh.2017.09.007](https://doi.org/10.1016/j.aogh.2017.09.007). [PubMed: [29221518](https://pubmed.ncbi.nlm.nih.gov/29221518/)].
- Moradi N, Rashidian A. Willingness to pay for quality-adjusted life years in patients with diabete. *Value in Health*. 2015;**18**(7). A617. doi: [10.1016/j.jval.2015.09.2151](https://doi.org/10.1016/j.jval.2015.09.2151).
- Ryff CD, Singer BH, Dienberg Love G. Positive health: connecting well-being with biology. *Philos Trans R Soc Lond B Biol Sci*. 2004;**359**(1449):1383–94. doi: [10.1098/rstb.2004.1521](https://doi.org/10.1098/rstb.2004.1521). [PubMed: [15347530](https://pubmed.ncbi.nlm.nih.gov/15347530/)]. [PubMed Central: [PMC1693417](https://pubmed.ncbi.nlm.nih.gov/PMC1693417/)].
- Duckworth AL, Steen TA, Seligman ME. Positive psychology in clinical practice. *Annu Rev Clin Psychol*. 2005;**1**:629–51. doi: [10.1146/annurev.clinpsy.1.102803.144154](https://doi.org/10.1146/annurev.clinpsy.1.102803.144154). [PubMed: [17716102](https://pubmed.ncbi.nlm.nih.gov/17716102/)].
- Ryan RM, Deci EL. On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annu Rev Psychol*. 2001;**52**:141–66. doi: [10.1146/annurev.psych.52.1.141](https://doi.org/10.1146/annurev.psych.52.1.141). [PubMed: [11148302](https://pubmed.ncbi.nlm.nih.gov/11148302/)].
- Seligman MEP, Rashid T, Parks AC. Positive psychotherapy. *Am Psychol*. 2006;**61**(8):774–88. doi: [10.1037/0003-066X.61.8.774](https://doi.org/10.1037/0003-066X.61.8.774). [PubMed: [1715810](https://pubmed.ncbi.nlm.nih.gov/1715810/)].
- Wood AM, Tarrrier N. Positive Clinical Psychology: A new vision and strategy for integrated research and practice. *Clin Psychol Rev*. 2010;**30**(7):819–29. doi: [10.1016/j.cpr.2010.06.003](https://doi.org/10.1016/j.cpr.2010.06.003). [PubMed: [20655136](https://pubmed.ncbi.nlm.nih.gov/20655136/)].
- Sin NL, Lyubomirsky S. Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *J Clin Psychol*. 2009;**65**(5):467–87. doi: [10.1002/jclp.20593](https://doi.org/10.1002/jclp.20593). [PubMed: [19301241](https://pubmed.ncbi.nlm.nih.gov/19301241/)].
- Layous K, Chancellor J, Lyubomirsky S, Wang L, Doraiswamy PM. Delivering happiness: Translating positive psychology intervention research for treating major and minor depressive disorders. *J Altern Complement Med*. 2011;**17**(8):675–83. doi: [10.1089/acm.2011.0139](https://doi.org/10.1089/acm.2011.0139). [PubMed: [21721928](https://pubmed.ncbi.nlm.nih.gov/21721928/)].
- Cullen B, Pownall J, Cummings J, Baylan S, Broomfield N, Haig C, et al. Positive PsychoTherapy in ABI Rehab (PoPsTAR): A pilot randomised controlled trial. *Neuropsychol Rehabil*. 2018;**28**(1):17–33. doi: [10.1080/09602011.2015.1131722](https://doi.org/10.1080/09602011.2015.1131722). [PubMed: [26726854](https://pubmed.ncbi.nlm.nih.gov/26726854/)].
- Banos RM, Espinoza M, Garcia-Palacios A, Cervera JM, Esquedo G, Barrajón E, et al. A positive psychological intervention using virtual reality for patients with advanced cancer in a hospital setting: A pilot study to assess feasibility. *Support Care Cancer*. 2013;**21**(1):263–70. doi: [10.1007/s00520-012-1520-x](https://doi.org/10.1007/s00520-012-1520-x). [PubMed: [22688373](https://pubmed.ncbi.nlm.nih.gov/22688373/)].
- Senf K, Liau AK. The effects of positive interventions on happiness and depressive symptoms, with an examination of personality as a moderator. *J Happiness Stud*. 2012;**14**(2):591–612. doi: [10.1007/s10902-012-9344-4](https://doi.org/10.1007/s10902-012-9344-4).

22. Asgharipoor N, Asgharnejad Farid A, Arshadi H, Sahebi A. A comparative study on the effectiveness of positive psychotherapy and group cognitive-behavioral therapy for the patients suffering from major depressive disorder. *Iran J Psychiatry Behav Sci.* 2012;**6**(2):33–41. [PubMed: [24644480](#)]. [PubMed Central: [PMC3940016](#)].
23. Jablon SL, Naliboff BD, Gilmore SL, Rosenthal MJ. Effects of relaxation training on glucose tolerance and diabetic control in type II diabetes. *Appl Psychophysiol Biofeedback.* 1997;**22**(3):155–69. [PubMed: [9428966](#)].
24. Dowlatabadi MM, Ahmadi SM, Sorbi MH, Beiki O, Razavi TK, Bidaki R. The effectiveness of group positive psychotherapy on depression and happiness in breast cancer patients: A randomized controlled trial. *Electron Physician.* 2016;**8**(3):2175–80. doi: [10.19082/2175](#). [PubMed: [27123227](#)]. [PubMed Central: [PMC4844485](#)].
25. Sorbi MH, Sadeghi K, Rahmanian M, Ahmadi SM, Paydarfar HR. Positive psychotherapy effect on life expectancy and general health of type 2 diabetic patients: A randomized controlled trial. *Iran J Diabetes Obes.* 2018;**10**(1):31–6. eng.
26. Grossi E, Groth N, Mosconi P, Cerutti R, Pace F, Compare A, et al. Development and validation of the short version of the Psychological General Well-Being Index (PGWB-S). *Health Qual Life Outcomes.* 2006;**4**:88. doi: [10.1186/1477-7525-4-88](#). [PubMed: [17105655](#)]. [PubMed Central: [PMC1647268](#)].
27. Sorbi MH, Rahmanian M, Ahmadi SM, Sadeghi K, Baghaeipour L. [The relationship between general health and general well-being with life expectancy in type 2 diabetic patients]. *Trends Life Sci.* 2014;**4**:27–32. Persian.
28. Renz PB, Cavagnoli G, Weinert LS, Silveiro SP, Camargo JL. HbA1c test as a tool in the diagnosis of gestational diabetes mellitus. *PLoS One.* 2015;**10**(8). e0135989. doi: [10.1371/journal.pone.0135989](#). [PubMed: [26292213](#)]. [PubMed Central: [PMC4546239](#)].
29. Wing JF, Schutte NS, Byrne B. The effect of positive writing on emotional intelligence and life satisfaction. *J Clin Psychol.* 2006;**62**(10):1291–302. doi: [10.1002/jclp.20292](#). [PubMed: [16810662](#)].
30. Parks-Sheiner A. *Positive psychotherapy: Building a model of empirically supported self-help [Dissertation]*. University of Pennsylvania; 2009.
31. Yi-Frazier JP, Hilliard M, Cochrane K, Hood KK. The impact of positive psychology on diabetes outcomes: A review. *Psychology.* 2012;**3**(12):1116–24. doi: [10.4236/psych.2012.312A165](#).
32. Celano CM, Beale EE, Moore SV, Wexler DJ, Huffman JC. Positive psychological characteristics in diabetes: A review. *Curr Diab Rep.* 2013;**13**(6):917–29. doi: [10.1007/s11892-013-0430-8](#). [PubMed: [24048687](#)].
33. Robertson SM, Stanley MA, Cully JA, Naik AD. Positive emotional health and diabetes care: Concepts, measurement, and clinical implications. *Psychosomatics.* 2012;**53**(1):1–12. doi: [10.1016/j.psym.2011.09.008](#). [PubMed: [22221716](#)].
34. Snoek FJ, Skinner TC. Psychological counselling in problematic diabetes: Does it help? *Diabet Med.* 2002;**19**(4):265–73. [PubMed: [11942996](#)].
35. Surwit RS, van Tilburg MA, Zucker N, McCaskill CC, Parekh P, Feinglos MN, et al. Stress management improves long-term glycemic control in type 2 diabetes. *Diabetes Care.* 2002;**25**(1):30–4. doi: [10.2337/diacare.25.1.30](#). [PubMed: [11772897](#)].
36. Whitebird RR, Kreitzer MJ, O'Connor PJ. Mindfulness-based stress reduction and diabetes. *Diabetes Spectr.* 2009;**22**(4):226–30. doi: [10.2337/diaspect.22.4.226](#). [PubMed: [20657669](#)]. [PubMed Central: [PMC2909138](#)].