



Comparison of the Effectiveness of Metacognitive Therapy and Behavioral Activation on Depression in Elderly with Type 2 Diabetes

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Abstract

Background and Objective: Generalized anxiety and depression are prevalent in patients with type 2 diabetes. Type 2 diabetes is one of the most common chronic diseases leading to many complications. This study aimed to compare the effectiveness of metacognitive therapy and behavioral activation on depression in the elderly with type 2 diabetes.

Materials and Methods: This quasi-experimental study was conducted based on a pretest-posttest design using a follow-up and control group. The study population consisted of elderly with type 2 diabetes who referred to five endocrine and metabolism clinics in region 11 of Tehran, Iran, during 2017. A total of 45 males and females were selected by purposive sampling method based on the inclusion criteria. Then they were assigned randomly to one control and two case groups. The Beck Depression Inventory (Second Edition) was utilized to measure the depression scale. In total, eight 90-min group intervention sessions were held weekly. The data were analyzed in SPSS software (version 25) through analysis of covariance and repeated measures ANOVA.

Results: The results showed that metacognitive therapy ($F=15.07$, $P<0.001$) and behavioral activation ($F=7.09$, $P<0.008$) were significantly effective on depression in the elderly with type 2 diabetes, and there was a significant difference between the experimental and control groups in this regard ($P<0.001$).

Conclusion: This study was conducted to compare the effectiveness of metacognitive therapy and behavioral activation on depression in the elderly with type 2 diabetes. The results showed that metacognitive therapy and behavioral activation were significantly effective on depression in this population with type 2 diabetes. Moreover, behavioral activation was more effective than metacognitive therapy on depression reduction.

Keywords: Behavioral activation, Depression, Diabetes, Elderly, Metacognitive therapy

Background

Population aging is one of the most critical issues that has been addressed in most countries, and the trend of aging is on the rise across the world. It is estimated that by 2025, it will reach almost two billion people worldwide [1]. Furthermore, it is estimated that population growth over 60 years will be over 26% from 2011-2050 in Iran. By 2050, about 33% of Iran's population will be over 60 years. As the population ages, the risk of living with chronic diseases, such as type 2 diabetes increases [2]. Diabetes is a chronic syndrome of carbohydrate, protein, and fat metabolism disorder that is caused by inadequate insulin secretion or resistance to insulin-producing and regulating tissues. The two main types of diabetes are type 1 and type 2

diabetes with differences in etiology, pathology, genetics, age of onset, and form of treatment [3].

Depression has a profound effect on diabetes and its complications leading to a decline in quality of life and inadequate blood sugar control followed by diabetic neuropathy, cardiovascular diseases, mortality, and an increasing family financial burden [4]. Depression is a mood disorder that manifests itself with symptoms, such as low mood, 5% reduction or increase in weight, psychomotor slowness, feeling absurd and guilty, and finally, inability to concentrate. The physical symptoms of this disorder include pain or sensitivity to light and sound, early suffering, and irritability, which persist for two weeks [5]. Depression in diabetic patients

ultimately leads to poor self-care behaviors in patients, inadequate blood sugar control, and higher incidence of morbidity and mortality. Consequently, it seems necessary to investigate the prevention and control of depression in these patients [6-8]. Many studies have shown a correlation between depression and diabetes [9-11], and multiply studies demonstrated the simultaneous incidence of diabetes and depression in Iran [12-14].

As the role of psychological interventions in diabetes has increased in recent years, new approaches to the psychological control of this disease have been considered, one of which is metacognitive therapy. This approach is based on an information processing model derived from the etiology and sustainability of mental disorders. These disorders are rooted in the fundamental theory of self-regulating executive function, which was first proposed by Wells and Mathews in 1994 and was then expanded [15]. Metacognition refers to knowledge about thinking, cognition, and the factors that influence thought. Theoretical and therapeutic perspective metacognition emphasizes on negative beliefs and thoughts because of metacognitive control of cognition and states how metacognition is effective in sustaining and changing cognition.

In the last decade, the third wave of cognitive therapies has emerged as behavioral activation therapy based on cognition [16]. The main root of the therapist's application is behavioral activation in the treatment of depression. Although the basis of some aspects of behavioral activation therapists, such as cognitive-behavioral therapists, is to modify the content of thought and cognitive processes. The focus of behavioral activation therapists is mainly on skill training and assignments that ultimately lead to a change in the patient's lifestyle.

According to behavioral activation theory, symptoms of depression and anxiety through avoidance behaviors are effectively short-term emotion regulation strategies; however, over the long term, they create positive environmental consequences in personal life, such as experiencing pleasant activities or creating a sense of mastery. This approach has been tested due to the existence of objective techniques and easy implementation in mental health centers [17], inpatient centers [18], addiction treatment centers [19], outpatient centers [20], and student counseling centers [21] in groups or individually [22]. Many studies have confirmed the efficacy of this treatment for depression [23, 24]. There have been many psychological interventions associated with type 2 diabetes; however, no intervention has been performed so far to compare the third wave treatments, including metacognitive

therapy and behavioral activation on depression in these patients.

Objectives

Therefore, this study aimed to compare the effectiveness of metacognitive therapy and behavioral activation on depression in the elderly with type 2 diabetes.

Materials and Methods

This quasi-experimental study was conducted using a pretest-posttest design with a control group and a three-month follow-up. The study population consisted of elderly with type 2 diabetes who referred to five endocrine and metabolism clinics in region 11 of Tehran, Iran, during 2017. The sample group consisted of 45 males and females, out of which 30 patients were randomly assigned into two case groups (metacognitive therapy and behavioral activation) and a control group (n=15). In this study, metacognitive intervention and activation therapy are considered independent variables, and depression is regarded as a dependent variable. Moreover, the control variables were education (higher than diploma) and age (60-75 years). The participants were selected using the notices that were placed in five endocrinology and metabolism clinics in region 11 of Tehran, Iran. Subsequently, they were assessed based on the inclusion and exclusion criteria, and complete demographic characteristics of the participants and obtained informed consent were kept in their medical records considering the confidentiality of the information.

The sample group consisted of patients with type 2 diabetes referred to the clinic. The participants were selected purposefully based on the inclusion and exclusion criteria, as well as the therapeutic protocol of each intervention (10 expert psychologists confirmed this). The present study was extracted from a Ph.D. thesis in Educational Psychology submitted to the Seaman Branch, Islamic Azad University, Semnan, Iran (Code of Ethics: IR.IAU.SEMNAN.REC.1398.009).

The inclusion criteria were: 1) type 2 diabetes mellitus based on the clinical criteria (specialist and physician diagnosis, as well as consumption of metformin and glibenclamide) and para-clinical criteria (FBS > 126, HbA1C > 7.0 blood glucose test results), 2) minimum and maximum ages of 60 and 75 years, respectively, 3) education level of higher than a diploma degree, and 4) disease duration longer than one year.

The Beck Depression Inventory (BDI) has been widely used as a self-report tool for measuring depression-related cognitions. This questionnaire includes 21 items that were obtained by examining

Table 1. Metacognitive therapy session protocol

Session	Content
1	Welcoming and acquainting members with each other by introducing yourself and clarifying therapeutic goals and group rules including privacy, identifying and naming rumination, practicing attention-training techniques, completing the summary sheet of attention training technique, homework: Practicing daily attention training techniques (twice a day).
2	Homework assessment, depression scale based on the scale of rumination, introducing and practicing a broken Mindfulness, practice postponing rumination, presenting the lessons learned a daily.
3	Reviewing and executing prior session assignments, identifying motivators and applying broken Mindfulness, challenge training with metacognitions on uncontrollability, a survey of activity level, and avoidance coping.
4	Reviewing and executing prior session assignments, checking for postponement of rumination, challenging positive beliefs about rumination.
5	Reviewing and executing prior session assignments, examine the widespread and sustained use of broken Mindfulness, examine the level of activity and provide recommendations for improvement (review and prohibition of other maladaptive coping strategies such as over-sleeping or binge eating, etc.).
6	Reviewing and executing prior session assignments, Investigating and challenging negative beliefs about sadness/depression, practicing attention training techniques (increasing difficulty level).
7	Reviewing and executing prior session assignments, working on developing new programs (completing the program summary sheet, and submitting a copy to the authorities), investigating the fear of returning symptoms.
8	Reviewing and executing prior session assignments, assessment of homework and depression scale, prevent recurrence (complete treatment plan), working on residual metacognitive beliefs, forecasting future motivators and discussing how to use the new program, the conclusion, offer suggestions, and receive feedback from group members, posttest implementation.

Table 2. Protocol of behavioral activation therapy sessions

Session	Content
1	Getting to know the people in the group and communicating between group members, Knowledge of group rules (privacy and regular attendance), presentation on the textural pattern of depression, introducing behavioral activation model and treatment, and provide a rationale for treatment.
2	Providing textural patterns of depression and behavioral activation, homework: complete the daily activity registration form.
3	Reviewing previous session exercises, training of rapa and rapam style skills (functional analysis, breaking repetitive depression patterns), homework: using distinctive style, and rapa, and rapam skills.
4	Reviewing the previous session, facing unpleasant situations, and reinforcing efficient coping strategies, homework: completing the fun/achievement scale sheet.
5	Reviewing and executing prior sessions, explaining personal stressors, and how depression plays a role in them, discussing the coping avoidance strategies of individuals in coping with stress, investigating and prohibiting maladaptive coping strategies, such as over-sleeping and smoking, homework: examine stressors at different times and perform coping strategies.
6	Reviewing the previous session, training new self-care skills to deal with depression, homework: stressful record situations during the week, and how to apply self-care skills.
7	Reviewing the previous session, discussing the importance of social support in dealing with depression, assertiveness training to increase demand, or say no.
8	Reviewing previous sessions, improving communication skills (including empathy and active listening), maintaining self-esteem, preventing recurrence of unhealthy beliefs, Reviewing techniques and exercises presented during the sessions and conclusions, offering suggestions, and receiving feedback from group members, posttest implementation.

the attitudes and symptoms of some depressed patients. The items are scored based on a scale from 0 to 3 depending on the severity of the condition reported by the patient. The score within the ranges of 0-1, 10-16, 17-29, and 30-63 indicate the least amount of depression or normality, as well as mild, moderate, and severe depression, respectively. The revised version of this questionnaire (II-BDI) is more readily compatible with the Diagnostic and Statistical Manual of Mental Disorders (fourth edition), compared to the first version, and covers all depressive elements based on the cognitive theory [25].

Beck, Stirr, Ball, and Runir revealed that the second version, the same as the first version, showed the presence and severity of depressive symptoms in patients and healthy populations. Dobson administered the questionnaire on a sample of 440 individuals and reported a reliability coefficient of 3.10 within a week. Moreover, regarding the construct validity, the correlation values of this test

with the Beck Hopelessness Scale, Suicide Thought Scale, Beck Anxiety Inventory, and Hamilton Revised Psychiatric Rating Scale for Depression were obtained at 3.07, 3.07, 3.03, and 3.79 [26]. In total, eight 90-min metacognitive therapy sessions were held weekly by the researcher based on the Wells Protocol [27], which was approved by 10 psychologists (Table 1).

In this study, a behavioral activation training package was implemented based on the treatment model of Lejuez, Hopko, Lepage, Hopko, and McNeil [28], which was approved by 10 psychologists and conducted by the researcher in eight 90-min sessions once a week (Table 2).

The data were analyzed in SPSS software (version 25) through descriptive statistics (i.e., mean \pm SD) and inferential statistics (i.e., analysis of covariance and repeated measures ANOVA).

Results

The majority of the participants in the

metacognitive therapy group (n=15) and behavioral activation group (n=15) were female (n=8, 53%; and n=9, 60%, respectively). On the other hand, the control group included 8 (53%) and 7 (47%) male and female participants. The mean level of education was undergraduate (63%), and the highest age range was within 66-70 years (47%).

The Wilks' Lambda multivariate test was utilized to examine the effect of time on the mean. The significance of this test indicates that the mean scores varied significantly over time. The results showed that Wilks Lambda was significant for the two groups of metacognitive therapy and behavioral activation. In other words, there were significant differences among pretest, posttest, and follow-up regarding the mean value of depression (P<0.05). In the control group, the results of the Wilks' Lambda test were not significant, which showed no significant differences among the three stages of pretest, posttest, and follow-up in terms of the mean value of depression. Table 5 presents the results of the pairwise survey of mean interventions at different stages. Tukey's follow-up test was employed for paired comparison.

A repeated-measures ANOVA with a Greenhouse-Geisser correction determined a significant difference among the time points in terms of the mean value of depression (F=21.03, P<0.0005).

Furthermore, the results of the post hoc tests using the Bonferroni correction revealed that exercise training elicited a slight reduction in depression from pre-training to three months after training, which was statistically significant (P<0.001). However, post-training depression reduced to 36.87±7.54, which was statistically different from pre-training (P<0.0005) and three months after training (P<0.001). Therefore, it can be concluded that a long-term metacognition and behavioral activation training program (6 months) elicits a significant reduction in depression.

Additionally, follow-up test results indicated no difference between follow-up and posttest scores in the metacognitive therapy group in terms of the mean depression levels. However, the mean depression level at the posttest was significantly lower than that at the pretest (P<0.05). Moreover, according to the results of this test, no difference was observed between follow-up and posttest stages regarding the mean depression level in the behavioral activation group. Nonetheless, the mean depression score in the posttest stage was significantly lower than that in the pretest. In the follow-up stage, the mean depression scores were significantly lower than those in the pretest (P<0.05). In the control group, there were no significant differences among the different stages in this regard (P<0.05).

Table 3. Mean±SD of depression scores by group types and test stages

Group	Pretest	Posttest	Follow-up
Metacognition	36.87±7.54	31.07±5.71	31±5.49
Behavioral activation	38.56±11.15	31.73±7.62	31.93±8.05
Control	38.25±6.76	37.73±8.34	35.80±7.29

Table 4. Analysis of variance with repeated measures to examine the effect of time (mean difference of depression in three test stages by groups)

Group	Wilks Lambda	F	P-value	Effect size
Metacognition	0.301	15.07	<0.001	0.699
Behavioral activation	0.478	7.09	0.008	0.522
Control	0.766	1.87	0.193	0.224

Table 5. Paired mean comparison of depression at different stages and by groups

Group	Comparison	Mean Difference	Std. Error	P-value
Metacognition	Posttest with pretest	-5.81	1.08	<0.001
	Follow up with pretest	-5.87	1.46	0.001
	Follow up with posttest	-0.07	0.68	0.923
Behavioral activation	Posttest with pretest	-6.83	1.75	0.002
	Follow up with pretest	-6.63	1.98	0.005
	Follow up with posttest	0.20	0.97	0.840
Control	Posttest with pretest	-0.51	1.12	0.655
	Follow up with pretest	-2.45	1.23	0.066
	Follow up with posttest	-1.99	1.36	-1.99

Discussion

This study was conducted to compare the efficacy of metacognitive therapy and behavioral activation on depression in the elderly with type 2 diabetes.

Findings showed that metacognitive therapy was effective in depression among those with type 2 diabetes mellitus. The results of this study are consistent with the findings of similar studies.

Rochet et al. [17] reported that metacognitive therapy was effective in mental health, as well as depression and anxiety. Moreover, in another study performed by Wells and Colbear on 12 patients with recurrent depression [18], they found that metacognitive therapy had a significant effect and long-term stability on reducing their symptoms.

In a study performed by Fisher et al. [19], 4-8 cancer survivors received metacognitive therapy, and the findings indicated the efficacy of this therapy on depression and anxiety in these patients. The findings also confirmed the efficacy of this treatment at a 3-6 month follow-up. In a study entitled "the effectiveness of metacognitive anxiety and depression treatment" by Norman et al. [20], it was concluded that metacognitive therapy was effective in anxiety and depression. In another study entitled "the effectiveness of metacognitive therapy versus cognitive behavioral therapy on depression" by Jordan et al. [29], 48 patients with depression entered the cognitive-behavioral and metacognitive therapy protocol during 12 weeks. The results indicated that both of these treatments were effective in the treatment of depression [30]. Similarly, in a study by Strand et al. [21], they showed that metacognitive therapy improved interpersonal relationships in depressed patients.

In explaining the effectiveness of behavioral activation on depression, it can be argued that this effect is due to an increase in the probability of enhancing self-efficacy. The goal of behavioral activation is to increase behaviors that are likely to result in patient reinforcement, which is internal (i.e., pleasure or successful) or external (i.e., social considerations). These enhancements help improve the patient's mood and eventually reduce depression [27]. In the same vein, the results of the studies conducted by Reynolds et al. [28] and Ekers et al. [30] emphasize the relationship between behavioral activation and depression.

Avoidance in the short term provides immediate comfort and relief for the patient; however, it will deprive the patient of supportive resources in the long term. In other words, the patient is instructed to respond actively to the harassing and frustrating environmental conditions instead of avoiding. Behavioral activation is a structured therapeutic process that leads to increased behaviors that enhance the tendency for environmental reinforcement continuities [31].

Given the prevalence of diabetes and its complications, it is suggested that in addition to drug interventions, more psychological interventions be performed in this regard. Most of these interventions can be attributed to metacognitive and behavioral activation interventions due to exercises

and applied skills. It is suggested that these interventions be applied to other psychological complications of diabetes as well as other chronic diseases.

Conclusions

This study was conducted to compare the effectiveness of metacognitive therapy and behavioral activation on depression in the elderly with type 2 diabetes. The results showed that metacognitive therapy and behavioral activation were significantly effective on depression in the elderly with type 2 diabetes. Moreover, behavioral activation was more effective than metacognitive therapy on depression reduction. Therefore, it can be concluded that the use of metacognitive therapy and behavioral activation interventions in type 2 diabetic patients with symptoms of depression can be used as effective therapies.

Compliance with ethical guidelines

All ethical principles were considered in this study, and the participants were informed about the research purpose, objectives, and stages. It is worth mentioning that informed consent was obtained from the participants. They were also assured about the confidentiality of their information. Moreover, they were allowed to leave the study whenever they wish, and if desired, the results of the research would be available to them. This study was extracted from a Ph.D. thesis in Psychology submitted to the Semnan Branch, Islamic Azad University, Semnan, Iran. The study protocol was approved by the Ethics Committee of Semnan Branch, Islamic Azad University, Semnan, Iran (IR.IAU.SEMNAN.REC.1398.009).

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Conflicts of Interest

The authors declare that they have no conflict of interests.

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