

ORIGINAL RESEARCH**Effectiveness of autogenic training and affect regulation training on anxiety sensitivity in women with type-2 Diabetes**

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Abstract

Aims: Diabetes and intermittent periods of fluctuations in blood sugar levels are associated with stress and negative emotions. Due to the fact that these patients are prone to emotional problems, the aim of this study was to evaluate the effectiveness of autogenic training and affect regulation training on anxiety sensitivity in women with type-2 diabetes.

Materials and Methods: This was a quasi-experimental study with pre-test and post-test design and control group. The statistical population included all women with type-2 diabetes in Tehran who referred to diabetes control centers in 2020. Among them, 45 people were selected by available sampling and replaced in two experimental and one control groups. All three groups completed anxiety sensitivity questionnaire. Autogenic training and affect regulation training were performed on the experimental groups. Data were analyzed using SPSS software version 24 and multivariate analysis of variance.

Results: The analysis of the results showed that both autogenic training and affect regulation training reduced anxiety sensitivity in women with type 1 diabetes ($p < 0.00$), but the effectiveness of autogenic training was not significantly different from affect regulation training ($p > 0.001$).

Conclusion: Therefore, it can be said that affect regulation training by accepting and expressing the negative emotions, reduced anxiety sensitivity in women with type-2 diabetes. Also, people with high anxiety sensitivity are incapable of moment-to-moment awareness without judgment. Thus, through autogenic training, the skill of processing thoughts and observing emotion as objective events in the mind is strengthened.

Keywords: Affect regulation, Autogenic, Anxiety sensitivity, Type-2 diabetes

Introduction

Diabetes is a major public health problem that is approaching epidemic proportions globally (1). Worldwide, the prevalence of chronic, non-communicable diseases is increasing at an alarming rate. It is considered one of the largest emerging threats to health in the 21 century (2). It is estimated that there will be 380 million persons with DM in 2025 (3). People with diabetes are at high risk for acute complications such as foot infections, malignant external otitis, rhino-cerebral mucormycosis, and gangrenous cholecystitis (4).

Diabetes has adverse psychological and social consequences such as stress, depression, anxiety, and mental fatigue that impair quality of life (5). On the other hand, factors such as stress, socio-economic problems, smoking and alcohol consumption, unhealthy nutrition, and inactivity, obesity can reduce the quality of life in diabetics (4). In addition to financial costs, the disease imposes a psychosocial burden on the patient and his families, such as pain, anxiety about the future of the disease, amputation, marital and family problems, job incapacity, dietary restrictions, and inability to make decisions (5).

There is evidence that the prevalence of depression and anxiety is moderately increased in diabetic patients, which in turn is associated with complications such as an increased risk of other debilitating diseases such as cardiovascular disease, decreased optimal self-care, and increased health care costs (6). Diabetic patients suffering from anxiety have poor control of blood sugar, diet, and exercise (7). On the other hand, mental disorders such as depression and stress lead to isolation by disrupting social communication (8). One of the vulnerabilities associated with anxiety is anxiety sensitivity. Anxiety sensitivity refers to the fear of behaviors or sensations associated with the experience of anxiety, and a misinterpretation of such sensations as dangerous (9). Bodily sensations related to anxiety, such as nausea and palpitations, are mistaken as harmful experiences, causing anxiety or fear to intensify (10). Anxiety sensitivity is one of the meta-diagnostic factors of vulnerability that may play a role in the development, exacerbation, and persistence of psychological and physical illnesses (11). High levels of anxiety

sensitivity increase anxiety reactions and may trigger fear-related responses, which in turn leads to higher levels of anxiety (9). Therefore, anxiety sensitivity plays an important role in maintaining the symptoms of anxiety and depression (10). People with high anxiety sensitivity are unable to control their anxiety and become more involved in avoidant behaviors as their anxiety levels increase (11). On the other hand, anxiety and stress caused by diabetes reduce the acceptance of the disease in diabetic patients. While accepting the disease is associated with blood sugar control and optimal management of diabetes, which can lead to a feeling of self-sufficiency (10). Low acceptance of diabetes can be described by dysfunctional attitudes and behaviors such as avoidance and repression of disease management tasks, which may reflect self-protection strategies to prevent devaluation (12).

Therefore, any method that can reduce anxiety sensitivity, stress, and depressive symptoms in diabetic patients can indirectly help them to better manage the disease and its physical and psychological complications. At least three factors justify the addition of psychological interventions to the treatment plans of diabetics: increasing patient acceptance, modifying behaviors to improve self-care, and removing psychological barriers to disease management (13). Different types of psychological interventions can help improve diabetes management. According to research evidence, stress management interventions, including autogenic training, have been used extensively as a supplementary method in the treatment of various physical and mental illnesses (14). Autogenic training is a relaxation technique that uses systematic exercises to induce a general disconnection of the organism. The technique can help alleviate symptoms of stress (15). It is used in conjunction with conventional medical care as part of disease management to relieve symptoms associated with chronic health problems and to improve well-being. It is a method for influencing one's autonomic nervous system (16). Autogenic Training restores the balance between the activity of the sympathetic and the parasympathetic branches of the autonomic nervous system (17). This has important health benefits, as the parasympathetic activity lowers the blood

pressure, slows the heart rate, and promotes the functions of the immune system (15).

On the other hand, because patients with diabetes are exposed to stress and negative emotions such as fear and anger, and often have difficulty managing their stress and emotions (7), it seems that affect regulation training can empower them in improving anxiety and regulating emotions (15). Emotion regulation can be defined as one's attempts to monitor and modulate their emotional experience (18). Regulating one's emotions is necessary to appropriately respond to environmental demands. The inability to adapt emotionally is associated with greater negative affect, lower life satisfaction, felt inauthenticity in social relationships, greater negative social communication with others, and with a higher risk in the development and maintenance of depression and anxiety (19).

Therefore, according to the above, this study aimed to compare the effectiveness of affect regulation training and autogenic Training on anxiety sensitivity in women with type-2 diabetes.

Materials and Methods

This research is a quasi-experimental study with a pretest-posttest and control group. The statistical population of the present study included women with type-2 diabetes in Tehran who referred to diabetes control centers in 1399. Using a purposive sampling method, 45 people were randomly selected and randomly assigned to experimental and control groups (15 people in each group). Inclusion criteria included: 1) female gender, 2) having type-2 diabetes, 3) having a minimum level of diploma literacy, 4) not participating in other medical interventions at the same time. Exclusion criteria also included: 1) Absence from more than three sessions and 2) non-compliance with group therapy rules.

Anxiety Sensitivity Index-3: This is a self-report measure containing 18 questions developed by Reiss & McNally (1985) to assess the degree of people's fears of the negative consequences of symptoms and anxiety-related feelings. (e.g., "It scares me when my heart beats rapidly") (20). The ASI-3 consists of a general factor and three sub-scales (physical, cognitive, and social concerns). Sentences are scored from 0 (very

low) to 4 (very high). Sub-scales range from 0 to 24 and the total score is in the range of 0 to 72. The ASI-3 has good internal consistency (ranging from 0.76 to 0.86 for physical concerns, from 0.79 to 0.91 for cognitive concerns, and from 0.73 to 0.86 for social concerns), convergent validity, and divergent validity. In a study in Iran, its validity was obtained based on three methods of internal consistency, retesting and halving, respectively 0.93, 0.95, and 0.97. Simultaneous validity was performed by its simultaneous implementation with a 90-SCL questionnaire with a correlation coefficient of 0.56 (21).

Autogenic training (AT): AT is a 90-minute, 10-week program translated by Agah Harris and Najimi based on the book "Autogenic" (22). The outline of each session is presented in Table 1.

Table1: Autogenic Training Protocol (ART)

Sessions	Title	Content of session
First session	Introducing the mind-body relationship and the logic of voluntary stress relief, and its relationship to chronic diseases such as diabetes	Explain the role of the mind in physiological and biochemical changes in the body, defining stress and its role in causing endocrine changes, the role of autogenic in physiological and biochemical changes in the body. Introduce the topics of each session.
Second session	Basic exercises and general instructions	Teaching the necessary instructions for performing the exercises, including turning off the cell phone, closing the door of the room, loosening the clothes, etc.
Third session	First exercise: "Heavy" standard	Performing the first exercise (Heavy) according to the instructions, training the extended exercise according to the instructions. Examining the common problems and solving them.
Fourth Session	Exercise 2: "Heat" standard	Perform the second exercise (heat) according to the instructions. Focus training to generate heat in the limbs, arms, and legs. Examining the common problems and solving them.
Fifth meeting	Exercise 3: "Heart" Standard	Perform the third exercise (heart) according to the instructions. Provide heart exercise instructions. Examining the common problems and solving them.
Sixth Session	Exercise 4: "Breathing" Standard	Perform the fourth exercise (breathing) according to the instructions, training breathing exercises. Examining the common problems and solving them.
Seventh session	Exercise 5: "Abdominal Heat" Standard	Perform the fifth exercise (abdominal heat) according to the instructions, training abdominal heat training. Examining the common problems and solving them.
Eighth Session	Exercise 6: "Cooling the forehead" standard	Perform the sixth exercise (Cooling the forehead) according to the instructions, training Cooling the forehead exercises. Examining the common problems and solving them.
Ninth session	Advanced autogenic training	Introduce the sitting position of the doll model, provide execution instructions. Training in the use of forms specific to each organ. Training and use of targeted formulas. Examining the common problems and solving them.
Tenth session	Teaching autogenic meditation technique	Teaching autogenic meditation exercises according to instructions. Practical visualization exercise of colors (types of colors). Visualization of specific colors, visualization of objective objects (definable). Visualization of specific concepts. Experience the feeling state. Visualizing people. Insightful meditation in which certain questions are answered exploratory.

Affect regulation Training ART): The affect regulation training program was designed by Berking, & Whitley (23). This program consists of 10 90-minute sessions. Agah Harris and Najimi have translated this program.

Table 2: Affect regulation Training Protocol (ART)

Sessions	Title	Content of session
First session	Introducing the mind-body relationship and the pattern of chronic physical diseases	Explain the role of the amygdala and the physiological and biochemical changes it causes in the body. Definition of stress and its role in endocrine changes. The relationship between the amygdala and stress.
Second session	Psychological education: The nature of the functions of emotion or affect	Psychological education: The nature of the functions of emotion or excitement Reasons to use emotional regulation. Defining chronic stress, painful emotions, and negative moods that are reported as negative affect, and by reducing the pleasure of life, physical and mental health and energy levels cause a vicious cycle of negative emotions – stress.
Third session	First and second skills: muscle relaxation training with breathing regulation	Introduction of Defective Cycles 1 and 2: Amygdala Activation - Rapid Breathing. Muscle tension is the cause of long-lasting stress and emotional responses. Break the vicious cycle with ART. Breathing training focuses on exhalation. Training contraction and relaxation.
Fourth Session	Psychological education: The importance of practicing affect regulation	Teaching the structure of the brain and its function. Teaching the role of stress on muscle tension. Teaching the role of stress relief on strengthening synaptic connections.
Fifth meeting	Third skill: Teaching awareness without judgment	Defective Cycle 3: Amygdala activation - negative thinking. Introduce this cycle and learn how to break the vicious cycle with ART skills. Introducing the types of emotion and their classification. Determine the intensity of emotion from 10-0. Identify feelings and affect.
Sixth Session	Fourth skill: Training to accept and tolerate emotions	Defective cycle 4: Amygdala activation - avoidant reactions. Introduce the role of amygdala activation and avoidance and training to break this cycle with ART.
Seventh session	Fifth skill: Self-compassion training	Defective Cycle 5: Amygdala Activation - Self-Criticism. Teach compassionate self-support instead of self-criticism.
Eighth Session	Sixth skill: Emotion Analysis Training	Defective Cycle 6: Amygdala activation - difficulties in analyzing emotion. Introduce the cycle and learn to break it by teaching emotion analysis. Learn how emotion is triggered by different events.
Ninth session	Seventh skill: Training to modify emotion	Vicious cycle 7: Activation of the amygdala - difficulties in modulating emotion. Introduce this cycle and learn how to break it with the seventh ART skill. Learning the seven steps of problem-solving. Review ART skills.
Tenth session	Coping exercises on emotional states	Recognize and understand important emotional states. Teaching the importance of negative affect for mental health. Affect analysis. Emphasis on ART program maintenance.

In this research, the 24 version of SPSS statistical software has been used for descriptive and inferential analysis.

Results

A total of 33 subjects with a mean age of 48.90 years and a standard deviation of 2.10 participated in this study. The mean duration of diabetes was 33.23 months with a standard deviation of 18.82. Table 3 presents the descriptive characteristics of anxiety sensitivity scores and its subscales in the two stages of pre-test and post-test, as well as the difference in mean scores between the three groups of ART, AT, and control. As can be seen, the mean scores of anxiety sensitivity and its subscales in the post-test compared to the pre-test decreased in AT and ART groups.

Table 3: Descriptive characteristics of anxiety sensitivity scores and its subscales by group

Indicator	Group	Pre-test		Post-test		Mean difference	
Physical concern	ART	10.44	4.7	4.5	3.2	5.9	2.8
	AT	9.5	4.5	4.5	3.1	5	4
	Control	10.8	3.5	11.9	3.3	1.1	1.2
Cognitive concern	ART	9.1	2.3	1.7	1.2	7.3	2.2
	AT	6.4	2.8	1.6	1.4	4.8	2.8
Social concern	Control	7.9	4.1	9.1	4.6	-1.2	1.1
	ART	9.1	3.1	3.7	1.9	5.4	2.6
	AT	7.3	2.6	4.1	1.3	3.2	1.8
anxiety sensitivity	Control	11.1	5.1	12.3	4.8	-1.1	1.2
	ART	28.7	6.8	10	3.6	18.7	5.8
	AT	23.3	7.5	10.2	4.5	13.1	7.3
	Control	29.9	12.1	33.3	11.8	-3.5	1.9

Table 4 shows the effects of MANOVA on the three groups of ART, AT and control in two

stages pre-test and post-test in the mean scores of the anxiety sensitivity subscales.

Table 4: MANOVA Results of difference between the mean scores of the Anxiety Sensitivity subscales

	Impact	Value	F	df1	df2	P	Effect size
Intercept	Pillai's trace	0.78	33.18	3	28	0.0001	0.78
	Wilks' Lambda	0.22	33.18	3	28	0.0001	0.78
	Hotelling's trace	3.5	33.18	3	28	0.0001	0.78
	Roy's largest root	3.5	33.18	3	28	0.0001	0.78
Group	Pillai's trace,	0.83	6.9	6	58	0.0001	0.41
	Wilks' Lambda	0.20	11.3	6	56	0.0001	0.55
	Hotelling's trace	3.7	16.8	6	54	0.0001	0.65
	Roy's largest root	3.7	35.6	3	29	0.0001	0.75

As shown in table 4, the results of the Pillai's trace show significant changes in the collective effect of the subscales of anxiety sensitivity scores in both pretest, post-test concerning ART, AT, and control groups ($p < 0.05$). The effect size of these changes is 41.8%.

Table 5 shows the results of the ANOVA test to examine the difference between the mean scores of the anxiety sensitivity subscales in pretest and post-test separately in the three groups of AT, ART, and control.

Table 5: ANOVA test results to compare the difference between the mean scores of anxiety sensitivity subscales.

Source	Variable	SS	df1	MS	F	P	Effect size
Corrected model	Physical concern	318.7	2	159.3	18.4	0.0001	0.55
	Cognitive concern	433.2	2	216.6	44.4	0.0001	0.74
	Social concern	251.6	2	125.8	31.3	0.0001	0.67
Intercept	Physical concern	353.4	1	436.3	40.1	0.0001	0.57
	Cognitive concern	436.3	1	208.7	89.4	0.0001	0.79
	Social concern	208.7	1	159.3	51.9	0.0001	0.63
Intercept	Physical concern	318.7	2	159.3	18.4	0.0001	0.55
	Cognitive concern	433.2	2	216.6	44.4	0.0001	0.74
	Social concern	251.6	2	125.8	31.3	0.0001	0.67

As shown in table 5, the results of the ANOVA test show significant changes in all three subscales of anxiety sensitivity in pre-test and post-test according to groups of ART, AT, and control ($p < 0.05$). The effect size of these changes is 55.1% for physical concern, 74.7% for cognitive concern, and 67.6% for social concern.

Discussion

This study aimed to evaluate the effectiveness of e affect regulation training and autogenic training on anxiety sensitivity in women with type-2 diabetes. The results of this study showed a significant improvement in the subjects of the experimental group in anxiety sensitivity scores, compared to the beginning of the study, which is consistent with the findings of Najimi et al. (24) and Aldao et al. (25).

In explaining these results, it can be said that affect regulation training facilitates their acceptance and optimal expression by making people aware of positive and negative emotions, and therefore has an important role in health; because the findings of previous research showed that having the skill of increasing the levels of positive emotions and reducing negative emotions helps to improve the positive perception of self and health (7). So emotion regulation is a structure that seems to have a great impact on physical and mental health and plays an important role in people's adaptation to stressful life events (24). Thus, the ability to regulate affect is associated with increased health consequences, and, conversely, the inability to regulate emotion is associated with an increased risk of mental, personality, and anxiety disorders. Thus, affect regulation training caused women with type-2 diabetes, who experience high emotional fluctuations due to diabetes, to evaluate potentially stressful events from a different perspective, experience negative emotions with less intensity, feel more competent in emotion management, and experience less discomfort and tension (23). As a result, emotion regulation training through these processes increases positive perceptions of health and reduces anxiety sensitivity.

In other words, people with anxiety sensitivity evaluate anxiety-related symptoms as a sign of impending harm (10). Thus, there is a vicious cycle between physical sensations, negative interpretations, and anxiety that constantly keeps the person in a state of alertness to the physical symptoms associated with anxiety (11). Researchers claim that ultimately monitoring and managing individuals' physical, cognitive, and behavioral symptoms of anxiety determines whether or not anxiety sensitivity tends toward a mental disorder. In other words, as long as people can tolerate negative cognitions and emotional states, the existence of high anxiety sensitivity alone cannot be a problem (23).

Therefore, if people who suffer from high anxiety sensitivity have a greater ability to accept their emotions and negative thoughts, they can better prevent the intensification of their anxiety experiences. Emotional acceptance enables a person to gain a more rational and realistic understanding of the

levels of personal threat by being aware of the anxious situation (13).

The results of this study also showed that autogenic training reduced anxiety sensitivity in women with type-2 diabetes. The results of this study showed a significant improvement in the subjects' anxiety sensitivity scores, which is in line with the findings of Najimi et al. (24), Chow et al. (26), McGinnis et al. (27). Autogenic requires attention to the early signs of anxiety, observing, and reporting responses during the imaging exercise, and therefore it is important to be aware of one's experiences (16). Unlike automatic responses to anxiety symptoms, monitoring internal symptoms leads to more attention to your symptoms. Many people report that they become worried during autogenic exercises, and so repetition of the exercise may teach people that they can be worry and not necessarily respond to it. This shows that if people are allowed to worry while focusing on something else (autogenic), their anxiety or experience of worry gradually changes.

The results show that applied autogenic plays a role in increasing acceptance and encounter of internal experiences. People with high anxiety sensitivity are incapable of moment-to-moment awareness without judgment. Thus, through autogenic training, the skill of processing thoughts and observing emotion as objective events in the mind is strengthened.

One of the limitations of this study is that the sample of this study included only women referring to diabetes centers in Tehran. Therefore, a generalization of results to other groups should be done with caution. Also, not having a follow-up period is another limitation of this research. It is suggested that researchers consider follow-up in future studies to measure the long-term effect of the intervention. It is also recommended that health professionals use this method to promote the mental health of diabetic patients.

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Conflict of interest

The authors have no conflict of interest to declare.

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