

Comparison of the Effectiveness of Autogenic Training with Affect Regulation Training on Psychological Adjustment of Women with type 2 Diabetes

Mahboube Hormozi Sheikhtabaghi¹, Mojgan Agahheris^{*2}, Fariborz Bagheri³

Abstract

Objective: Diabetes is a chronic disease that has negative physical and psychological consequences and effective interventions are necessary to reduce these consequences. Therefore, this study aimed to compare the Autogenic training (AT) and Affect regulation training (ART) on the psychological adjustment of women with type 2 diabetes.

Method: Among female patients with type 2 diabetes referred to the Iranian Endocrine Institute, 33 patients were selected by convenience sampling and randomly divided into three groups (AT, ART, and control). Participants answered the Psychosocial Adjustment to Illness Scale (PAIS-SR) before and at the end of the intervention. The subjects of ART and AT groups underwent 10 90-minute training sessions and the control group did not receive any intervention.

Results: Data analysis with MANOVA and ANOVA showed that psychosocial adjustment to disease in both ART and AT groups was significantly improved compared to the control group ($P < 0.05$). The two groups of AT and ART were not significantly different in improving psychosocial adjustment to disease ($P > 0.05$).

Conclusion: It seems that both interventions, AT and ART, have been effective in improving the psychological adjustment of women with type 2 diabetes by affecting the mechanisms of mind-body communication.

Keywords: Diabetes, affect regulation, autogenic training, psychological adjustment, women.

Introduction

Diabetes has affected the lives of more than 4.2 million people worldwide (Gredig, & Bartelsen-Raemy, 2017). It is a metabolic disorder characterized by high blood sugar due to impaired insulin secretion, defective insulin function, or both (Thapa, Pyakurel, Baral, & Jha, 2019). Diabetes has become one of the main causes of cardiovascular disease,

blindness, kidney failure, and death throughout the world. Type 2 diabetes is also the most common metabolic disease in which environmental factors such as obesity, sedentary lifestyle, poor nutrition, and genetic factors play a role in its occurrence and exacerbation (Wegeberg, et al, 2019). By 2035, it will affect approximately 600 million people worldwide (Nanayakkara et al., 2018). Patients with type 2 diabetes suffer from psychological and social health problems (Lee, 2019) and this requires adaptation to the disease. The goal is to adapt, manage, or prevent anxiety from a potentially threatening situation (Gåfvels, & Wändell, 2006). Mastering diabetes and its adverse consequences, accepting oneself as a

1. Ph.D. Student of Department of psychology, Islamic Azad University, Science and Research Branch, Tehran, Iran

2. Corresponding author: Associate Professor, PhD in Health Psychology, Payame Noor University, Tehran, Iran .

3. Associate Professor, Department of Psychology, Islamic Azad University, Science and Research Branch, Tehran, Iran.

*Corresponding Author: Mojgan Agahheris Email: agah.mojgan@yahoo.com

person with a chronic illness, and having a positive attitude toward the future can facilitate coping with the disease (Gois, Ferro, Santos, Sousa, Ouakinin, Do Carmo, & Barbosa, 2012). People with diabetes are constantly challenged with the stressful demands associated with the disease and must use a variety of methods to cope with the disease (Owens-Gary, Zhang, Jawanda, Bullard, Allweiss, & Smith, 2019). Studies show that people with chronic illnesses are more likely than others to use relaxation techniques and other mental-physical techniques to cope with the illness (Asuzu, Walker, Williams, & Egede, 2017).

Autogenic training (AT) training is one of these methods, a standard relaxation technique developed by Schultz in 1930 to manage stress (Stetter, & Kupper, 2002). Autogenic training from the mental repetition of six regular exercises (heaviness, warmth, regular and calm heart function, breathing regulation, warmth in the upper abdomen, and acceptable forehead cooling) is designed to make general communication of the organism (Stanton, & Meston, 2015). Doing these exercises frequently helps to increase a person's endurance capacity to experience deeper relaxation and response therapy (Seo, Hong, Choi, Kim, Brandt, & Im, 2018). In contrast to the stress response, the mechanism of action of this relaxation technique lies in the relaxation response, which involves a complex interaction of the endocrine, immune, neural, and psychological systems (Kiba et al., 2017). Ramirez-Garcia, & et al. (2020) in a study systematically reviewed studies on the effectiveness of AT on the mental health of patients with chronic diseases and showed that AT is effective in improving the psychological well-being and quality of life of these patients. Also, Cavallaro (2020) in his study aimed at the effectiveness of AT in dialysis patients found that psychological symptoms such as anxiety, depression, and distress were reduced by using this intervention. Meditation exercises reduce stress in people with type 2 diabetes, and therefore stress-based mental exercises

can increase psychological and social adjustment (Sakai, S., Inoue-Sato, Amemiya, Murakami, Inagaki, & Sakairi, 2020). Wijayanti, Setiawan, & Wardani (2020) compared the effectiveness of AT and sandalwood aromatherapy on hypertension in hypertensive elderly and found no difference between the two interventions and considered both treatments effective. Takaishi (2000) found in his study that AT was significantly more effective than progressive relaxation in reducing arousal in anxiety disorders.

Although AT can be used as a technique in psychotherapy (Labbé, & Williamson, 1984), there is ample evidence that AT is essentially a relaxation technique (Abuín, 2016), and some believe that it is not as effective as other psychiatric interventions. People who struggle with chronic physical problems suffer from psychological disorders and negative emotions (Rezaei et al., 2019; Dickens, Cherrington, & McGowan, 2012; Watts, Leydon, Birch, Prescott, Lai, Eardley, & Lewith, 2014). Therefore, it seems that the ability to perceive, recognize, accept, and regulate negative emotions can play an important role in health and well-being. However, many people do not have these skills (Berking, & Whitley, 2014). Affect regulation training (ART) is designed to develop emotion regulation skills in people who suffer from mental disorders or want to learn how to cope with their challenging emotions in everyday life (Berking, & Whitley, 2014). This approach includes seven skills: muscle relaxation, respiratory relaxation, non-judgmental awareness, acceptance and tolerance, compassionate self-support, emotion analysis, and emotion modulation (Berking, & Whitley, 2014). Empirical evidence suggests that defects in affect regulation contribute to the onset and persistence of a wide range of mental disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Trinidad, & Johnson, 2002; Jazaieri, Urry, & Gross, 2013). Based on these findings, it can be assumed that many mental disorders and adjustment problems are successfully cured using emotion-

based interventions (Berking, Orth, Wupperman, Meier, & Caspar, 2008). For example, Berking et al. (2019) found that emotion regulation training was associated with a reduction in depressive symptoms. Wing, Epstein, Nowalk, & Lamparski (1986) also found that affect regulation training is effective in improving affect regulation and blood sugar control strategies in diabetic patients. Compared with muscle relaxation methods, Mohammadi & Ahmadi (2018) found that progressive relaxation intervention is more effective than affect regulation. Berking, & Whitley (2014) also showed that enriching cognitive-behavioral therapy with affect regulation training has more effect on mental health and improving depression than traditional cognitive-behavioral therapy. However, the evidence from previous studies to reduce the severity of mental and physical disorders in this area is still preliminary (Berking et al., 2019).

Therefore, considering the role of diabetes in quality of life and its destructive effects on psychological adjustment, emotions, and feelings, it seems necessary to find optimal and practical therapeutic intervention. The need to evaluate the therapeutic effect of AT and ART is doubled due to the lack of research or conflicting findings. Therefore, this study aimed to compare the effectiveness of AT and ART on the psychological adjustment of type 2 diabetic women.

Method

The present study was a quasi-experimental with pretest-posttest and control group. For this purpose, among all female patients with type 2 diabetes who were referred to the Iranian Endocrine Institute, 33 patients were selected by convenience sampling method and randomly divided into three groups of intervention (AT and ART) and control were assigned (11 people in each group). All participants answered the Psychosocial Adjustment Questionnaire (PAIS) before and after the intervention. ART and AT group participants participated in 10 90-minute training

sessions. The interventions were performed by a trained psychologist under a supervisor. The data obtained with SPSS-24 software were statistically analyzed at both descriptive and inferential levels.

Ethical statement

All subjects provided written informed consent prior to their inclusion in the study. The participants were briefly explained about the study process and its goals and also assured of the confidentiality of their personal information. It should be noted that the present article is taken from Islamic Azad University, Research Sciences Branch, which was approved by the research ethics committees with code IR.IAU.SRB.REC.1398.144.

Research instruments

Psychosocial Adjustment to Illness Scale (PAIS-SR; Drogatis, 1986): PAIS-SR evaluates the psychosocial adjustment process of a person with a health condition and/or its consequences and has versions for patients and carers. The scale has 46 items with Likert-type answers grouped under a total of seven domains (Health Care Orientation, Vocational Environment, Domestic Environment, Sexual Relationships, Extended Family Relationships, Social Environment, and Psychological Distress). The sum of the total scores is divided by the number of questions and the total average is considered as the overall consistency score. In the study of Drogatis (1986), the reliability obtained from Cronbach's alpha in the subscales of this questionnaire was obtained from 0.47 to 0.85. The construct validity of this questionnaire using exploratory factor analysis showed that these seven subscales explained a total of 0.63 of the total variance of the scale. In a study in Iran, confirmed the face validity of the questionnaire by 10 professors and its reliability in a sample of 20 people with diabetes was obtained 0.94 (Aflakseir, Raoofi, Mollazadeh, Khormaei, & Farmani, 2015).

Affect regulation training (ART): ART (Berking, & Whitley, 2014) is a 90-minute, 10-week program

translated by Agah Harris and Mirza Mohammad Alaini that its contents are presented in Table 1.

2 Associate's degrees, 8 bachelor's degrees, and 6 master's degrees. There were also 15 employees, 2

Table1: Affect regulation training Protocol (ART)

Sessions	Outline of session
First session	Introducing the mind-body relationship and the pattern of chronic physical diseases
Second session	Psychological training: The nature of the functions of affect or emotion
Third session	First and second skills: muscle relaxation training with breathing regulation
Fourth session	Psychological education: the importance of practicing emotional regulation
Fifth session	Third skill: training awareness without judgment
Sixth session	Fourth skill: training to accept and tolerate emotions
Seventh session	Fifth skill: training compassionate self-support (with compassion)
Eighth session	Sixth skill: emotion analysis training
Ninth session	Seventh skill: training to adjust and correct emotions
Tenth session	More coping exercises on emotional states

Autogenic training (AT): AT (Sadigh, 2001) is a 90-minute, 10-week program translated by Agah Harris and Mirza Mohammad Alaini based on the book "Autogenic Training: A Mind-Body Approach". The outline of each session is presented in Table 2.

teachers, 7 hairdressers, and 9 housewives.

Table 3 describes the descriptive characteristics of psychosocial adjustment scores with the disease and its subscales in two stages of pre-test and post-test and three groups of ART, AT, and control. As can be seen, the mean scores of psychosocial adjustment to

Table2: Autogenic training protocol (AT)

Sessions	Content of session
First session	Stress and chronic diseases, Autogenic training, Relaxation postures, Passive focus, Mental connection with a specific function or part of the body, Repetition of specific phrases, Daily exercise
Second session	First Preliminary Exercise
Third session	The second introductory exercise
fourth Session	The first standard exercise: weight
fifth meeting	The second standard exercise: heat
Sixth Session	The third standard exercise: the heart
Seventh session	The fourth standard exercise: breathing
Eighth Session	Fifth Standard Exercise: Abdominal Heat
Ninth session	Sixth standard exercise: forehead coolness
Tenth session	Advanced autogenic training

Results

The results showed that the average age of the subjects was 48 years with an age range of 46 to 53 years. The mean duration of diabetes was 33 months with a standard deviation of 18 months and ranged from 10 to 96 months. Out of 33 subjects, the subjects' education was as follows: 17 diplomas,

illness in the post-test compared to the pre-test in the groups of AT and ART improved, but in the group control of these values has not changed significantly. MANOVA was used to analyze the data. Before analysis, some of the most important assumptions of this test, including the normality of data distribution related to dependent variables using

the Kolmogorov-Smirnov test, the homogeneity of variance-covariance matrices using the M-box test, and the homogeneity of variance errors using the Levene’s test were examined. To determine the significance of the effect of the independent variable (group) on dependent variables, Pillai’s trace was used (Table 4).

in the effect of subscales of psychosocial adjustment with illness scores in two stages of pre-test, post-test according to the ART, AT, and control groups ($P < 0.05$), with the effect size of 64.7% (Table4).

Table 5 shows the ANOVA results for examining the difference between the mean scores of the

Table3: Descriptive characteristics of psychosocial adjustment to illness scores in groups

Variables	groups	Pre-test		Post-test	
		M	SD	M	SD
Health care	ART	12.18	4.30	5.63	2.97
	AT	10.27	3.84	4.45	2.38
	Control	9.18	4.16	10.09	0.54
Vocational Environment	ART	58.66	7.36	65.25	4.39
	AT	53.00	4.95	64.41	4.12
	Control	56.08	13.39	53.33	12.94
Domestic Environment	ART	9.72	4.17	5.09	2.98
	AT	8.54	2.87	3.81	2.04
	Control	7.18	3.12	8.54	3.29
Sexual Relationships	ART	6.18	2.96	2.45	3.38
	AT	6.18	1.88	2.54	2.62
	Control	7.27	2.37	7.72	2.37
Extended Family Relationships	ART	3.72	1.27	0.36	0.50
	AT	4.09	2.77	0.63	0.80
	Control	2.90	2.30	3.27	2.32
Social Environment	ART	6.18	2.44	1.18	1.66
	AT	4.90	2.46	1.09	2.07
	Control	4.81	3.18	4.45	3.55
Psychological distress	ART	8.27	3.52	3.18	1.99
	AT	5.90	2.73	2.45	1.50
	Control	6.36	3.32	7.72	3.84
psychosocial adjustment to illness	ART	51.18	13.22	18.72	8.59
	AT	45.90	8.81	16.00	6.75
	Control	41.18	11.71	46.72	13.84

Table4: Results of MANOVA comparing groups in the stages of measuring psychosocial adjustment

Impact	Variable	Value	F	Df1	Df2	P	Effect size
Group	Subscales of psychosocial adjustment	1.29	6.53	14.000	50.000	0.001	0.647
Group	Total scores of psychosocial adjustment	0.82	11.44	4.00	66.00	0.0001	0.41

The results of Pillai's trace show significant changes

psychosocial adjustment to the disease based on

intergroup and intragroup effects. The results of the ANOVA test showed significant changes in the subscale of the psychosocial adjustment in two stages of pre-test and post-test and ART, AT, and control groups ($P < 0.05$). The effect of these changes is 74.2%, 74.1%, 62.7%, 80.7%, 56.7%, 78.8%, and 68.1% for health care, vocational environment, domestic environment sexual relationships, extended family relationships, social environment, and psychological distress, respectively.

on muscle relaxation, including AT (Cavallaro, 2020; Ramirez-Garcia et al., 2020; Wijayanti et al., 2020) and ART (Berking et al., 2014; Wing et al., 1986; Berking et al., 2019) on quality of life, mental health, and adjustment to chronic diseases.

In explaining this conclusion, it can be said that patients with diabetes are constantly challenged by the stressful demands specific to this disease (Wegeberg et al., 2019), which can result in dysfunction in physical and psychological dimensions (Nanayakkara et

Table 5. Results of ANOVA comparing the scores of d psychosocial adjustment

Variable	SS	df	MS	F	P	η^2
Health care	371.63	2	185.81	43.12	0.0001	0.742
Vocational environment	161.15	2	80.57	43.02	0.0001	0.741
Domestic environment	268.06	2	134.03	25.24	0.0001	0.627
Sexual relationships	147.15	2	73.57	62.90	0.0001	0.807
Extended Family Relationships	104.42	2	52.21	19.62	0.0001	0.567
Social Environment	194.36	2	97.18	55.87	0.0001	0.788
Psychological distress	247.69	2	123.84	31.98	0.0001	0.681
Total scores of psychosocial adjustment	9927.51	2	4963.75	136.32	0.0001	0.901

The results of Scheffe' and Tukey tests for pairwise comparison of the difference between the mean scores of the subscales of psychosocial adjustment to the disease in the pre-test and post-test separately in the three ART, AT and control groups indicate a significant difference in the mean subscale scores. Psychosocial adaptation to the disease in the two intervention groups compared to the control group ($P < 0.05$). The difference in scores in the comparison between AT and ART was not significant ($P < 0.05$). In other words, psychosocial adjustment to the disease improved in the ART and AT groups.

Discussion and conclusion

The results showed that the difference in scores of psychosocial adjustment to disease in the ART group was significant compared to the control group. But these changes were not significant in comparison with the AT group and ART group. Therefore, it can be concluded that psychosocial adjustment to disease has improved in the intervention groups compared to the control group. Almost all previous studies have shown the effectiveness of both interventions based

al., 2018). Therefore, high levels of stress in these patients reduce adjustment to the disease. Relaxation training seems to be an optimal strategy for stress management (Mohammadi, & Ahmadi, 2018). AT is a standard relaxation technique performed using the mental repetition of six regular exercises (weight, warmth, slow and regular heart function, breathing regulation, warmth in the upper abdomen, and forehead cooling) (Stanton, & Meston, 2017). The mechanism of action of relaxation involves a complex interaction of the endocrine, immune, neurological and psychological systems (Seo et al., 2018), which increase the individual's capacity to experience deep relaxation and therapeutic benefits (Stanton, & Meston, 2017). The proposed formula in AT emphasizes psychological relaxation at each stage. During practice, clients are encouraged to passively focus and simply follow the therapist's recommendations without trying to change them (Takaishi, 2020). Therefore, AT can be a promising treatment for improving psychological well-being and quality of life in people with chronic physical

problems. People with one or more chronic health problems, the use of relaxation techniques such as AT can facilitate their improvement (Kiba et al, 2017).

Another advantage of AT over other methods is that in this method, the focal points for reducing the level of arousal are not limited to the muscular system, but also emphasize the relaxation of the mental state and the autonomic nervous system, such as heat in the limbs. (Takaishi, 2020). While AT exercises are performed, most people experience passive concentration, which allows them to overcome the vicious cycle of stress (Ramirez-Garcia et al, 2020). AT also direct the sympathetic system arousal to parasympathetic activation by relaxation (Lim, & Kim, 2014). AT also reduces the patient's anxiety level by creating mental energy for positive self-image and a sense of self-efficacy (Lim and Kim, 2014).

In general, it can be said that muscle relaxation through a regular set of physiological changes leads to a decrease in oxygen consumption, heart rate, respiration, and blood lactate, which together indicate a reduction in anxiety symptoms in a person. Besides, muscle relaxation helps to increase the efficiency of inner potential, including the power of reason and creativity, by strengthening mental strength and increasing self-confidence. At the physiological level, this method creates a balance between the activity of the posterior and anterior hypothalamus, and as a result, prevents the complications of anxiety and leads to increased adaptation (Stanton, & Meston, 2017).

On the other hand, one of the important components that play a role in self-care behaviors is affecting regulation (Trinidad, & Johnson, 2002). Exercises used to affect regulation training include accepting emotion tolerance, analyzing emotions, and modifying and modifying them (Berking, & Whitley, 2014). Thus, emotion regulation training can help psychological adjustment by modifying what emotion a person experiences, when, and how.

In explaining this issue, it can be said that emotions play an important role in adapting to stressful events (Gross, & Jazaieri, 2014). The main goal of emotion regulation is to achieve mental well-being by increasing positive emotions and reducing negative emotions (Gross, & Jazaieri, 2014). Deficiency in these skills can lead to psychological problems in at least two ways. First, excessive, prolonged, and unfavorable emotional states are the main criteria for various mental disorders (Diagnostic and Statistical Manual of Mental Disorders, 2013), and second, many cognitive and behavioral symptoms of psychological disorders can be Defined as inconsistent attempts to regulate unpleasant emotions (Berking et al., 2019).

Emotion regulation training leads to the prevention and treatment of physical and psychological effects of negative emotions by improving emotion regulation skills (Berking et al., 2019). The individual's ability to identify emotions facilitates the process of increasing the power to assess environmental stimuli, establish emotional relationships, and express empathy, thereby enabling a person to interact constructively with the environment (Mohammadi, & Ahmadi, 2018). Regulation of emotion increases resilience by increasing the perceptual power of the environment. Also, one of the effects of emotion regulation training is the ability to identify and distinguish positive and negative emotions, which causes people to reduce their negative emotions and improve their positive emotions by becoming proficient in managing emotions (Aldao et al, 2010), this, in turn, leads to increased adaptation. Therefore, it can be concluded that both of these interventions, by reducing stress and increasing self-regulation, facilitate the adjustment process of patients with diabetes.

On the other hand, adaptation is considered as continuous cognitive and behavioral changes to manage external and internal demands that go beyond one's possibilities (Aldao et al, 2010); At the same time, emotion regulation also refers to efforts

that help the person to experience what emotion, when and how (Jazayeri et al., 2013). Deficiency in these skills can lead to psychological problems in at least two ways. First, excessive, prolonged, and unfavorable emotional states are the main criteria for various mental disorders (Diagnostic and Statistical Manual of Mental Disorders, 2013), and second, many cognitive and behavioral symptoms of psychological disorders can be Defined as inconsistent attempts to regulate unpleasant emotions (Berking et al., 2019). Emotion regulation training to improve emotion self-regulation skills leads to the prevention and treatment of problems related to emotion regulation (Berking et al., 2014). Although both of these therapies lead to an increased psychological adjustment to the disease, emotion regulation intervention, in contrast to AT therapy, it enhances the ability to assess environmental stimuli by empowering individuals to identify inner emotions. Establish emotional relationships and express empathy, thereby enabling a person to interact constructively with the environment (Labbé, & Williamson, 1984). On the other hand, according to 35 randomized controlled trials evaluating medical and psychiatric interventions, AT has been found to have the fewest side effects compared to other psychological methods (Goldbeck, & Schmid, 2003); People who practice spontaneous stress relief for 15 to 20 minutes a day regularly report more balanced emotional states, adjustment skills, better sleep quality, and reduced anxiety levels (Gois et al, 2012). Thus, deep muscle relaxation - the main skill taught in the treatment of spontaneous stress relief - reverses the “attack or flight” response, which leads to a maximum reduction in heart rate and blood pressure. In such conditions, the dominance of the parasympathetic system is complete (Gross, & Jazaieri, 2014). Therefore, both of these therapies, by including their mechanisms, contribute to psychological adaptation to the disease. The present study has limitations. For example, sampling was selected in a non-random and accessible

manner and as a result, there is a possibility of some annoying variables. Also, the long-term effects of AT and ART interventions were not studied. The statistical population also included only women with type 2 diabetes and therefore caution should be exercised in extending these results to other diabetic patients as well as other chronic diseases. Therefore, future researchers are suggested to repeat the results of the present study in other societies with more controlled conditions in future studies, and also therapists and the medical system to use these interventions to help diabetic patients.

References

- Abuin, M. R. (2016). Terapia autógena: técnicas, fundamentos, aplicaciones en la salud y clínica y apoyo empírico. *Clínica y Salud*, 27(3), 133-145.
- Aflakseir, A., Raoofi, S., Mollazadeh, J., Khormaei, F., & Farmani, A. (2015). Prediction of psychosocial adjustment to illness based on health locus of control dimensions in type 2 diabetic patients. *Iranian Journal of Diabetes and Metabolism*, 14(5), 337-344.
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical psychology review*, 30(2), 217-237.
- Asuzu, C. C., Walker, R. J., Williams, J. S., & Egede, L. E. (2017). Pathways for the relationship between diabetes distress, depression, fatalism and glycemic control in adults with type 2 diabetes. *Journal of Diabetes and its Complications*, 31(1), 169-174.
- Berking, M., & Whitley, B. (2014). Emotion regulation: Definition and relevance for mental health. In *Affect Regulation Training* (pp. 5-17). Springer, New York, NY.
- Berking, M., Eichler, E., Luhmann, M., Diedrich, A., Hiller, W., & Rief, W. (2019). Affect regulation training reduces symptom severity in depression—A randomized controlled trial. *PloS one*, 14(8), e0220436.
- Berking, M., Orth, U., Wupperman, P., Meier, L. L., & Caspar, F. (2008). Prospective effects of emotion-regulation skills on emotional adjustment. *Journal*

- of Counseling Psychology*, 55(4), 485.
- Cavallaro, M. F. (2020). The autogenic training on dialysis as a mental place of serenity and well being. *Journal of Clinical & Developmental Psychology*, 2(2).
- Derogatis, L. R. (1986). The psychosocial adjustment to illness scale (PAIS). *Journal of psychosomatic research*, 30(1), 77-91.
- Dickens, C., Cherrington, A., & McGowan, L. (2012). Depression and health-related quality of life in people with coronary heart disease: a systematic review. *European Journal of Cardiovascular Nursing*, 11(3), 265-275.
- Edition, F. (2013). Diagnostic and statistical manual of mental disorders. *Am Psychiatric Assoc.*
- Gåfväls, C., & Wändell, P. E. (2006). Coping strategies in men and women with type 2 diabetes in Swedish primary care. *Diabetes research and clinical practice*, 71(3), 280-289.
- Gois, C. J., Ferro, A. C., Santos, A. L., Sousa, F. P., Ouakinin, S. R., Do Carmo, I., & Barbosa, A. F. (2012). Psychological adjustment to diabetes mellitus: highlighting self-integration and self-regulation. *Acta diabetologica*, 49(1), 33-40.
- Goldbeck, L., & Schmid, K. (2003). Effectiveness of autogenic relaxation training on children and adolescents with behavioral and emotional problems. *Journal of the American Academy of Child & Adolescent Psychiatry*, 42(9), 1046-1054.
- Gredig, D., & Bartelsen-Raemy, A. (2017). Diabetes-related stigma affects the quality of life of people living with diabetes mellitus in Switzerland: implications for healthcare providers. *Health & social care in the community*, 25(5), 1620-1633.
- Gross, J. J., & Jazaieri, H. (2014). Emotion, emotion regulation, and psychopathology: An affective science perspective. *Clinical Psychological Science*, 2(4), 387-401.
- Jazaieri, H., Urry, H. L., & Gross, J. J. (2013). Affective disturbance and psychopathology: an emotion regulation perspective. *Journal of Experimental Psychopathology*, 4, 584-599.
- Kiba, T., Abe, T., Kanbara, K., Kato, F., Kawashima, S., Saka, Y., ... & Fukunaga, M. (2017). The relationship between salivary amylase and the physical and psychological changes elicited by continuation of autogenic training in patients with functional somatic syndrome. *BioPsychoSocial medicine*, 11(1), 1-11.
- Labbé, É. L., & Williamson, D. A. (1984). Treatment of childhood migraine using autogenic feedback training. *Journal of consulting and clinical psychology*, 52(6), 968.
- Lee, K. W. (2019). Distinguishing user's different fingers on touch screen: method, application and user acceptance assessment. *Journal of Industrial and Production Engineering*, 36(1), 1-12.
- Lim, S. J., & Kim, C. (2014). Effects of autogenic training on stress response and heart rate variability in nursing students. *Asian nursing research*, 8(4), 286-292.
- Mohammadi, S. Y., & Ahmadi, S. (2018). Effectiveness of progressive relaxation and emotional regulation on quality of life of heart patients. *The Journal of Qazvin University of Medical Sciences*, 22(5), 59-69.
- Nanayakkara, N., Pease, A., Ranasinha, S., Wischer, N., Andrikopoulos, S., Speight, J., ... & Zoungas, S. (2018). Depression and diabetes distress in adults with type 2 diabetes: results from the Australian National Diabetes Audit (ANDA) 2016. *Scientific reports*, 8(1), 1-10.
- Owens-Gary, M. D., Zhang, X., Jawanda, S., Bullard, K. M., Allweiss, P., & Smith, B. D. (2019). The importance of addressing depression and diabetes distress in adults with type 2 diabetes. *Journal of general internal medicine*, 34(2), 320-324.
- Ramirez-Garcia, M. P., Leclerc-Loiselle, J., Genest, C., Lussier, R., & Dehghan, G. (2020). Effectiveness of autogenic training on psychological well-being and quality of life in adults living with chronic physical health problems: a protocol for a systematic review of RCT. *Systematic reviews*, 9, 1-8.
- Rezaei, S., Ahmadi, S., Rahmati, J., Hosseini-fard, H., Dehnad, A., Aryankhesal, A., ... & Raoofi, S. (2019). Global prevalence of depression in HIV/AIDS: a systematic review and meta-analysis. *BMJ supportive & palliative care*, 9(4), 404-412.
- Sadigh, M. R., & Montero, R. P. (2001). Autogenic training: a mind-body approach to the treatment of fibromyalgia and chronic pain syndrome. CRC Press.
- Sakai, S., Inoue-Sato, M., Amemiya, R., Murakami, M.,

- Inagaki, K., & Sakairi, Y. (2020). The influence of autogenic training on the physical properties of skin and cardiac autonomic activity in postmenopausal women: an exploratory study. *International Journal of Dermatology*, 59(1), 103-109.
- Seo, E., Hong, E., Choi, J., Kim, Y., Brandt, C., & Im, S. (2018). Effectiveness of autogenic training on headache: A systematic review. *Complementary therapies in medicine*, 39, 62-67.
- Stetter, F., & Kupper, S. (2002). Autogenic training: a meta-analysis of clinical outcome studies. *Applied psychophysiology and biofeedback*, 27(1), 45-98.
- Stanton, A., & Meston, C. (2017). A single session of autogenic training increases acute subjective and physiological sexual arousal in sexually functional women. *Journal of sex & marital therapy*, 43(7), 601-617.
- Takaishi, N. (2000). A comparative study of autogenic training and progressive relaxation as methods for teaching clients to relax. *Sleep and Hypnosis*, 2(3), 132-136.
- Thapa, S., Pyakurel, P., Baral, D. D., & Jha, N. (2019). Health-related quality of life among people living with type 2 diabetes: a community based cross-sectional study in rural Nepal. *BMC public health*, 19(1), 1171-1180.
- Trinidad, D. R., & Johnson, C. A. (2002). The association between emotional intelligence and early adolescent tobacco and alcohol use. *Personality and individual differences*, 32(1), 95-105.
- Watts, S., Leydon, G., Birch, B., Prescott, P., Lai, L., Eardley, S., & Lewith, G. (2014). Depression and anxiety in prostate cancer: a systematic review and meta-analysis of prevalence rates. *BMJ open*, 4(3).
- Wegeberg, A. M. L., Meldgaard, T., Hyldahl, S., Jakobsen, P. E., Drewes, A. M., Brock, B., & Brock, C. (2019). Quantities of comorbidities affects physical, but not mental health related quality of life in type 1 diabetes with confirmed polyneuropathy. *World Journal of Diabetes*, 10(2), 87.
- Wijayanti, L., Setiawan, A. H., & Wardani, E. M. (2020). The Effect Of Autogenic Relaxation and Aroma Therapy of Sandalwood on Blood Pressure in Elderly Hipertension. *Jurnal Keperawatan*, 12(3), 413-420.
- Wing, R. R., Epstein, L. H., Nowalk, M. P., & Lamparski, D. M. (1986). Behavioral self-regulation in the treatment of patients with diabetes mellitus. *Psychological Bulletin*, 99(1), 78.