Check for updates

Comparison of the Effectiveness of Schema Therapy and Behavioral Model-Based Diet Therapy on Emotional Adjustment, Body Image, and Weight Loss among Obese Individuals with Nervous Overweight

Sajjad Irani[1], Bahman Akbari[1*], Abass Abolghasemi[1,2], AbassBakhshipour Roudsari[1,3]

[1] Department of Psychology, Rasht Branch, Islamic Azad University, Rasht, Iran
[2] Department of Psychology, University of Guilan, Rasht, Iran
[3] Department of psychology, University of Tabriz, Tabriz, Iran

*Corresponding author:
Bahman Akbari, Department of Psychology, Rasht Branch, Islamic Azad University, Rasht, Iran
Tel: +989111361102
Email: BAkbari44@yahoo.com

Received: 04 Apr. 2020
Accepted: 17 Jul. 2020
ePublished: 01 Feb. 2021

Abstract

Background and Objective: Overeating and anorexia are both abnormalities in people's nutrition and diet, each of which with a number of risks.
This study aimed to compare the psychological interventions of schema therapy and behavioral model-based regimen on emotional adjustment, body image, and weight loss among obese individuals with nervous overeating.

Materials and Methods: This clinical trial study was performed on 30 obese people with eating disorders referring to nutrition clinics in Rasht, Iran. The statistical population of this study (n=30) was selected using the available sampling method and randomly divided into two experimental groups and one control group. The control group received no treatment. Data were collected using Cognitive Emotion Regulation Questionnaire-Short Form, Young Early Maladaptive Schema Questionnaire-Short Form, and Body Mass Index. The data were gathered before and after the intervention and analyzed by covariance test.

Results: Although both interventions resulted in reduced emotional eating and weight loss in obese individuals, the behavioral model-based intervention was more effective in this regard. Moreover, regimens based on the behavioral model and emotion regulation method led to maintaining appropriate weight in obese people in the long run.

Conclusions: These findings were consistent with the results obtained from various studies. Behavioral model-based diet regimen, compared to the emotion regulation method, led to weight loss and reduced emotional eating by influencing the underlying psychological factors contributing to obesity.

Keywords: Body image, Diet therapy, Emotional adjustment, Nervous eating, Schema therapy, Weight loss

Background

Overeating disorder, first described by Stancard in 1950, is a different pattern of overeating associated with a sense of inability to control overeating without compensatory behaviors, such as cleansing and exercise [1]. This disorder, after being included in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) as a disorder that needs to be further studied, today is considered as a completely separate disorder in version 5 [2]. Binge eating disorder (BED) is a new diagnosis that has been added to the DSM-5[3].
Although eating disorders may be caused by several factors, such as one's self-concept, perfectionism, interpersonal problems, and emotional disorders, there is considerable evidence that emotion regulation plays an important role in this regard [4].

In recent years, more attention has been paid to the role of emotions and emotion regulation in various types of disorders [5].In this respect, emotional regulation has been targeted as a nuclear process in psychopathology treatment and research. Several studies have been conducted to determine the relationship between the application of specific strategies and such disorders as depression, anxiety disorders, traumatic stress disorder, and eating disorders [6,7].
Emotional dysregulation has been identified as a factor contributing to the development and maintenance of eating disorders [8,9]. Experiences of strong negative emotions and a strong response to such emotions are common in both groups of women with eating disorders and the disorder

syndrome [10-14].

The theory of avoidance sees eating in patients with eating disorders as an attempt to escape personal awareness [15], and from the point of view of the emotion regulation model, eating is considered to be an attempt to change painful emotional states [16]. Based on the literature review, individuals with BED, compared with non-infected ones, were reported to encounter both an increase in negative experiences and a decrease in the ability to identify and describe their emotional states [17]. In addition, there are widely cited findings of the specific relationship between emotion regulation and BED [18]. Theoretically, eating temporarily decreases the disturbances of negative emotions that threaten the ego [19].

It has been reported that 33% of those with BED relieve bad moods or negative emotions by eating too much. Mental disorder is more severe in such cases compared to 97% of those who do not use overeating to regulate their mood [20].In general, previous theoretical and experimental work has also shown that negative emotions and emotion regulation problems are quite important in the etiology and psychopathology of eating disorders [21]. The results of studies have also indicated that several abnormal emotion regulation strategies, such as rumination, avoidance, and emotional inhibition, are associated with eating disorders [22].

On the other hand, clinically disturbed body image is a broadly central aspect of eating disorders [23]. Recent research has shown that treatments targeting physical flexibility and body image can significantly reduce eating disorders in affected individuals [24,25]. Given the prominent role of various aspects of impaired body image in neuropsychiatric anorexia and BEDs, it can be hypothesized that impaired body image may be considered part of the BED disorder semiology[26].In addition, the improvement of body image may be considered a goal for the therapeutic processes[27]. Several studies have investigated the effect of impaired body image in BED. The findings of a study performed by Lever et al.[28]revealed that impaired body image in BED, especially in higher body weights, occurs beyond the normal range leading to physical dissatisfaction. Littleton et al. [29]reported that there is a significant relationship between body mass index (BMI) and dissatisfaction with body image; therefore, an increase in BMI results in a decrease in body image satisfaction [30-32].

Schema therapy is an innovative, integrative therapeutic approach developed by Yang et al.[33].Several studies have shown that people with eating disorders receive a higher score on the scale of maladaptive schemas. [34] Overeating disorder behavior has a positive relationship with release schemes, loss or illness, dependency/inadequacy, emotional inhibition, emotional deprivation, defect and shame, failure to progress, ineffective control center, mistrust/distrust social isolation.

Although the findings of various studies have indicated the beneficial effects of schema therapy in a wide range of disorders and the increase of schema therapy application, expanding the use of this therapy requires a sufficient evaluation of its effectiveness.

Objectives

This study aimed to compare the psychological interventions of schema therapy and behavioral model-based regimen on emotional adjustment, body image, and weight loss among obese individuals with nervous overeating.

Materials and Methods

This quasi-experimental study was carried out on females with eating disorders referring to nutrition clinics in Rasht, Iran,within2017-18. The statistical population of this study consisted of five cases selected by the available sampling method. Inclusion criteria included were 1)aging 25-45 years, 2) having BMI above 25, 3) having higher education, 4)lacking other severe psychiatric disorders, 5) lacking chronic physical disorder,6) lacking pregnancy, 7) lacking recent severe stressors during the last6 months (such as divorce), and8) lacking a history of such diseases as thyroid, diabetes, kidney disease, cardiovascular disease, as well as non-consumption of psychotropic drugs or drugs affecting weight.

Subsequently, each subject was evaluated by two psychologists based on DSM-5 and clinical interview, and eventually, 30individuals were selected as obese individuals with BED. The cases were then randomly assigned into three groups. Subjects in the second group received a low-calorie behavioral diet with weight control and a diet for 14days for 3months to control and manage nutrition and weight loss. In addition, the subjects were asked to adjust their physical activity plan according to the dietician's opinion and not to alter it during the study.

At the next stage, a pre-test was performed in all groups, the intervention was implemented in experimental groups (i.e., schema therapy and behavioral therapy regimen), and a post-test was performed. The follow-up procedure was completed after 2 months. For the first group, a 10-session treatment plan, based on Protocols for Eating Disorders, was provided in 1.5-hour sessions once a week.

This research was derived from the doctoral dissertation of general psychology submitted to the Islamic Azad University, Rasht Branch, registered with the ethical code of IR.IAU.RASHT.REC. 1399.013. The researchers appreciate all the patients who did not give up in the face of the disease.

Research tools
Cognitive Emotion Regulation Questionnaire-Short Form Cognitive Emotion Regulation Questionnaire
This 18-item questionnaire, developed by Garnefsky and Craig, has a multidimensional structure and is used to identify cognitive coping strategies after a traumatic experience. This instrument is applicable in normal and clinical groups of 12 years and over. The developers of this questionnaire calculated its validity using the Cronbach alpha coefficient method and obtained 0.93, 0.87, and 0.91 for the total questionnaire, negative strategies, and positive strategies, respectively. The results of research conducted by Hosni showed that the Persian version of the short form of the Cognitive Emotion Regulation Questionnaire (CERQ) is validated. In this respect, the obtained Cronbach alpha coefficients (ranging from 0.68-0.86) showed that 9 subscales of the mentioned questionnaire have good validity [35].

Body Image Concern Inventory
This questionnaire, developed by Littleton et al. [36], was evaluated in Iran [37]. The researchers confirmed the reliability of this tool using the Cronbach alpha coefficient (α=0.93) and its validity through the Obsessive Compulsive Scale (0.63)and Eating Disorders Scale (0.40). This instrument was validated in Iran using internal consistency and test-retest methods[37]rendering for0.69 and 0.76, respectively (P<0.001). Moreover, a significant relationship was found between this questionnaire and the Coopersmith Self-Esteem Inventory(0.61).

Young Schema Questionnaire-Short Form
This 75-item questionnaire, developed by Yang [38], measures early maladaptive schemas with 15 subscales. All items are related to a schema and the average score for each of the five items is calculated to obtain a schema score. This tool has been reported to have good face validity [37] and numerous studies have shown its efficacy in separating patients based on early maladaptive schemas [38].

Body Mass Index
This value is calculated by dividing the weight (in kg) by the square of the height (in meters). Each subject's weight was measured using a digital scale with a sensitivity of 100 g and his/her height was measured with a non-dilatable tape meter to 0.5 cm accuracy.

Results
Based on the results of demographic data, the mean ages of patients in the schema therapy, behavioral therapy, and control groups were calculated at31.4, 34.8, and 30.3 years, respectively. It was found that 37%,46%, and 17% of the participants were respectively employed, housewives, and unemployed. All participants in all three groups were female.

The participants in the study (n=30)were divided into three groups of 10 cases. The schema therapy group consisted of four and six subjects with less than bachelor's and bachelor's degrees, respectively. In the behavioral therapy group,1, 4, and 5cases held a bachelor's, less than a bachelor's, and higher than a bachelor's degree, respectively. Regarding the education level of participants in the control group, Table 2 presents the descriptive information of the research variables in the three groups. Since pre-test scores are controlled, only post-test scores are included in this table.(Table 1).

To investigate the assumptions of using parametric analyzes, initially, the normality of the data was examined using the Kolmogorov-Smirnov test.

Based on the results of Table 2, the normality of the research variables in both pre-test and post-test was obtained more than 0.05, indicating that the data

Table 1. Research variable descriptive information

Variable	Level	Schema therapy		Control		Behavioral therapy	
		Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Adjust the excitement	Post-test	49.900	7.593	52.100	5.384	61.800	4.315
Body image	Post-test	50.500	10.834	53.900	10.556	66.000	9.603

Table 2. Results of data Normality using the Kolmogorov-Smirnov test

Variable	Average	Standard deviation	Significance level
Emotional adjustment pre-test	62.800	5.973	0.200
Post-emotional adjustment test	54.600	7.766	0.200
Body image pre-test	72.333	10.512	0.200
Post- body image test	56.800	12.058	0.200

Table 3. Matrix equality analysis of variances using box's test

Box's test	F	Df1	Df2	Significance level
4.484	0.667	6	18168.923	0.676

were normal. Box's test was used to check the variance matrix (Table 3).
The data in Table 3showed that the significance

Table 4. Analysis of multivariate covariance analysis

Source	Dependent variable	Sum of the squares	Degrees of freedom	Mean square	F	Significance level
Pre-test	Adjust the excitement	811.623	2	405.812	19/066	0.001
	Body image	1369.339	2	698.170	7/273	0.003
Error	Adjust the excitement	532.108	25	21.284		
	Body image	2399.9622	25	95.998		

Table 5. Comparison of schema therapy and behavioral diet therapy using latest significant difference follow-up test for dependent variables

Significance level	First group	Second group	Average changes	Significance level
	Schema therapy	Behavioral therapy	-1.185	0.573
Adjust the excitement	Schema therapy	Control	-11.784	0.001
	Behavioral therapy	Control	-10.562	0.001
	Schema therapy	Behavioral therapy	-2.271	0.611
Body image	Schema therapy	Control	-15.690	0.002
	Behavioral Therapy	Control	-13.418	0.006

level in the Box's test was greater than 0.05 and the subsequent assumption of parametric analysis was followed.

According to Table 4, both schema therapy and behavioral regimen were effective on the variables of emotion regulation and body image. The latest significant difference follow-up test was used to compare the efficacy of these two treatments (Table 5).

The findings of Table 8 indicatethat during the follow-up period, both treatments were stable on the variables of adjusting to the excitement and body image. Table 9 compares the two treatments using Scheffe's post hoc test. (Table 6).

The findings of Table 7 show that there is no significant difference between the two groups in the follow-up period regarding the effectiveness of schema therapy and behavioral regimen.

Table 6. Multivariate analysis of covariance for the research scales

Source	Dependent variables	Sum of squares	Mean square	F	Sig
Pre-test	Self-blame	26408	13.204	9.773	0.002
	Reception	6.675	3.338	1.952	0.174
	Rumination	48.682	24.321	11.117	0.001
	Positive refocus	9.707	4.835	4.355	0.031
	Focus on planning	1.214	0.607	0.278	0.761
	Positive reassessment	4.303	2.152	1.980	0.171
	Viewpoints	6.840	3.420	2.057	0.160
	Catastrophe	30.261	15.108	843.12	0.001
	Blame others	64.531	32.232	345.16	0.001
	Embarrassed by one'sappearance	387.762	193.881	674.4	0.025
	Interference with performance concerns	219.231	109.615	145.5	0.019

Table 7. Analysis of variance with mean differential scores for the follow-up period

		Sum of squares	Degrees of freedom	Mean square	F	Significance level
Emotion regulation	Between groups	067.487	2	032.432	17.520	0.001
	Within groups	800.665	27	659.24		
Body image	Between groups	867.1410	2	433.705	8.767	0.001
	Within groups	500.2172	27	463.80		

Table 8. Comparison of two treatments during follow-up using Scheffe's post hoc test

Variable	First group	Second group	Average changes	Significance level
	Schema therapy	Behavioral therapy	-1.600	0.773
Emotion regulation	Schema therapy	Control	-12.100	0.001
	Behavioral therapy	Control	-10.500	0.001
	Schema therapy	Behavioral therapy	-3.900	0.628
Body image	Schema therapy	Control	-16.100	0.002
	Behavioral therapy	Control	-12.200	0.019

Discussion

The results showed that both interventions resulted in reduced emotional eating and weight loss in obese individuals, the behavioral model-based intervention was more effective in this regard. Moreover, regimens based on the behavioral model and emotion regulation method led to maintaining appropriate weight in obese individuals in the long run.

Few similar studies have been conducted in this domain, making it difficult to compare the results of the present study with those of other ones. However, the findings of the present study are indirectly consistent with those of studies that have used schema therapy to improve and cure the psychological symptoms of eating disorders. The results of this study were indicative of the effectiveness of schema therapy in emotion regulation and body image among people with an eating disorder. These findings are in line with the findings of studies conducted by George et al. [36], Calvert et al. [14], Strachen and Kash[37], Sadeghi et al.[12], Zare Bahram Abadi and Pondehnejad[39].

Follow-up studies have reported that the individuals undergoing behavioral therapy showed no significant difference with those in the control group in the subscales of self-blame and disaster treatment. Nevertheless, this difference was significant among those receiving treatment with schema therapy; that is to say, schema therapy was effective on these subscales, compared to the behavioral therapy regimen which could not affect them. In general, the mean changes in the schema therapy group were also higher than those for the behavioral therapy group.

The schema therapy was influential on emotional regulation and body image among patients with overeating disorder considering the etiology of the disorder. According to the theory of escape, eating in such patients is an attempt to escape from individual consciousness. In the emotion regulation model, eating is considered an attempt to change painful emotional situations, and the clinical nature of a disturbed body image is broadly a central aspect of eating disorders. Regarding these, schema therapy helps the patient in the treatment process by questioning the schemas, creating a healthy voice in his mind, and consequently, empowering his healthy mind. This therapeutic approach helps patients assess the correctness of their schemas, coping styles, and strategies. As a result of applying this approach, patients view schema and coping strategies as an external truth that they can use to combat objective and empirical evidence. One of the reasons for the success of schema therapy is to target these infrastructural structures using cognitive techniques. Behavioral techniques help clients replace healthier coping styles with behavioral patterns.

To conclude that schema therapy is the ultimate treatment for patients with eating disorders needs more research to be performed, although the results show that this treatment is effective. Nonetheless, what is somewhat clear is that schema therapy is effective because of the nature of the treatment on some of the key components associated with eating disorders, such as emotion regulation. What has been found in the present study is that in BED any intervention that can lead to individual awareness of his/her insight into overeating as a way of increasing the ability to identify and describe emotional states can lead to emotion regulation and reduction and behavioral eating behaviors, especially carbohydrate overeating. In the present study, although both dietary and schema therapy methods affected emotion regulation in patients with this disorder, compared to the control group, there were two differences in the two scales of emotion regulation. According to the escape theory suggesting that BED is an attempt to escape individual consciousness, interfering with emotion regulation can lead to changes in one's self-awareness and increased awareness of impulsive binge eating behavior.

Conclusions

Based on the results, it is recommended to use both schema therapy and behavioral therapy in the treatment and reduction of the symptoms of the BED. However, future research can be performed to investigate other third wave psychotherapies, such as acceptance and commitment, to reduce stress. It is also suggested that mindfulness be applied in the treatment of eating disorders, especially BED.

References

1. Khodabakhsh M, Kiani F. Body image disturbance and perfectionism as predictor's factors of disordered eating behavior among female students. International Journal of Pediatrics.2014; 2(3-4):399-406. [DOI:10.22038/ijp.2014.3564]

2. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington, VA: American Psychiatric Publishing; 2013.

3. Stice E, Gau JM, Rohde P, Shaw H. Risk factors that predict future onset of each DSM-5 eating disorder: predictive specificity in high-risk adolescent females. Journal of Abnormal Psychology. 2017;126(1):38-51. [DOI:10.1037/abn0000219][PMID][PMCID]

4. Cornelissen KK. McCarty K. Cornelissen PL, Tovee MJ. Body size estimation in women with anorexia nervosa and healthy controls using 3D avatars. Scientific Reports. 2017;7(1):15773. [DOI:10.1038/s41598-017-15339-z][PMID] [PMCID]

5. Tavolacci MP, Grigioni S, Richard L, Meyrignac G, Déchelotte P, Ladner J. Eating disorders and associated health risks among university students. Journal of Nutrition Education and Behavior. 2015; 47(5):412-20. [DOI:10.1016/j.jneb.2015.06.009] [PMID]

6. Sadibolova R, Ferrè ER, Linkenauger SA, Longo MR. Distortions of perceived volume and length of body parts. Cortex. 2019; 111:74-86. [DOI:10.1016/j.cortex.2018.10.016][PMID]

7. Gaudio S, Brooks SJ, Riva G. Nonvisual multisensory impairment of body perception in anorexia nervosa: a systematic review of neuropsychological studies. PLoS One. 2014;9(10):e110087. [DOI:10.1371/journal.pone.0110087][PMID][PMCID]

8. Yazdani N, Hosseini SV, Amini M, Sobhani Z, Sharif F, Khazraei H. Relationship between body image and psychological well-being in patients with morbid obesity. International Journal of Community Based Nursing and Midwifery. 2018;6(2):175-84.[PMID][PMCID]

9. Mitchison D, Hay P, Griffiths S, Murray SB, Bentley C, Gratwick-Sarll K, et al. Disentangling body image: the relative associations of overvaluation, dissatisfaction, and preoccupation with psychological distress and eating disorder behaviors in male and female adolescents. The International Journal of Eating Disorders. 2017;50(2):118-26. [DOI:10.1002/eat.22592][PMID][PMCID]

10. Abbott BD, Barber BL.Embodied image: gender differences in functional and aesthetic body image among Australian adolescents. Body Image. 2010;7(1):22-31. [DOI:10.1016/j.bodyim.2009.10.004][PMID]

11. Mond JM, Hay PJ. Dissatisfaction versus over-evaluation in a general population sample of women. The International Journal of Eating Disorders.2011; 44(8):721-6. [DOI:10.1002/eat.20878][PMID]

12. Atkinson MJ, Wade TD. Does mindfulness have potential in eating disorders prevention? A preliminary controlled trial with young adult women. Early Intervention in Psychiatry. 2016;10(3):234-45. [DOI: 10.1111/eip.12160][PMID]

13. Eisenberg D, Nicklett EJ, Roeder K, Kirz NE. Eating disorder symptoms among college students: prevalence, persistence, correlates, and treatment-seeking. Journal of American College Health. 2011;59(8):700-7. [DOI:10.1080/07448481.2010.546461] [PMID][PMCID]

14. Van Strien T, Frijters JE, Bergers GP, Defares PB. The Dutch eating behavior questionnaire (DEBQ)for assessment of restrained, emotional, and external eating behavior. International Journal of Eating Disorders.1986; 5(2):295-315. [DOI:10.1002/1098-108X]

15. Lydecker JA, White MA, Grilo CM. Form and formulation: examining the distinctiveness of body image constructs in treatment-seeking patients with binge-eating disorder. Journal of Consulting and Clinical Psychology. 2017;85(11):1095-103. [DOI:10.1037/ccp0000258][PMID][PMCID]

16. Nejati V, Alipour F, Saeidpour S, Bodaghi E. Psychometric properties of Persian version of Dutch eating behavior questionnaire. Journal of Fundamentals of Mental Health. 2018; 20(1):5-14.[DOI:10.1016/j.brat.2003.12.006]

17. Neff KD, McGeehee P. Self-compassion and psychological resilience among adolescents and young adults. Self and Identity. 2010; 9(3):225-40. [DOI:10.1080/15298860902979307]

18. Azami E, Hajsadeghi Z, Yazdi-Ravandi S. The comparative study of effectiveness of training communication andemotional skills on parenting stress of mothers with autism children. Zanko JMed Sci. 2017; 18(56):1-11.

19. Wei M, Liao KY, Ku TY, Shaffer PA. Attachment, self-compassion, empathy, and subjective well-being among college students and community adults. Journal of Personality. 2011; 79(1):191-221. [DOI:10.1111/j.1467-6494.2010.00677.x][PMID]

20. Wren AA, Somers TJ, Wright MA, Goetz MC, Leary MR, Fras AM, et al. Self-compassion in patients with persistent musculoskeletal pain: Relationship of self-compassion to adjustment to persistent pain. Journal of Pain and Symptom Management. 2012; 43(4):759-70. [DOI:10.1016/j.jpainsymman.2011.04.014] [PMID]

21. Hudson JI, Hiripi E, Pope HG Jr, Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication.Biological Psychiatry. 2007; 61(3):348-58. [DOI:10.1016/j.biopsych.2006.03.040] [PMID][PMCID]

22. Javanbakht M, Mashayekhi A, Baradaran HR, Haghdoost A, Afshin A. Projection of diabetes population size and associated economic burden through 2030 in Iran: Evidence from micro-simulation Markov model and Bayesian meta-analysis. PloS One. 2015; 10(7):e0132505. [DOI:10.1371/journal.pone.0132505][PMID][PMCID]

23. Hollis-Walker L, Colosimo K. Mindfulness, self-compassion, and happiness in nonmeditators: atheoretical and empirical examination. Personality and Individual Differences. 2011; 50(2):222-7. [DOI:10.1016/j.paid.2010.09.033]

24. Irvine KR, McCarty K, McKenzie KJ, Pollet TV, Cornelissen KK, Tovée MJ, et al. Distorted body image influences body schema in individuals with negative bodily attitudes. Neuropsychologia. 2019; 122:38-50. [DOI:10.1016/j.neuropsychologia.2018.11.015][PMID]

25. Sbarra DA, Smith HL, Mehl MR. When leaving your Ex, love yourself: observational ratings of self-compassion predict the course of emotional recovery following marital separation. Psychological Science. 2012; 23(3):261-9.[DOI:10.1177/0956797611429466][PMID]

26. Van Rijn B, Wild C, Fowlie H, Sills C, Van Beekum S. Impact of transactional analysis psychotherapy training on self awareness and ability for contact. International Journal of Transactional Analysis Research & Practice. 2011; 2(1):16-24. [DOI:10.29044/v2i1p16]

27. Alkasir E, Jafarian DF, Mohammadkhani P, SoleimaniSE, Atadokht A. Effectiveness of transactional analysis group training in reducing control-oriented behaviors of spouse in marital conflicts. Iranian Rehabilitation Journal. 2017; 15(1):57-64. [DOI:10.18869/nrip.irj.15.1.57]

28. Rohde P, Stice E, Marti CN. Development and predictive effects of eating disorder risk factors during adolescence: Implications for prevention efforts. The International Journal of Eating Disorders. 2015;48(2):187-98. [DOI:10.1002/eat.22270][PMID][PMCID]

29. Littleton HL, Axom DS, Pury CL. Development of the body image concern inventory. Behavior Research and Therapy. 2005;43(2):229-41. [DOI:10.1016/j.brat.2003.12.006][PMID]

30. Widdowson M. Transactional analysis psychotherapy for a case of mixed anxiety & depression: A pragmatic adjudicated case study- 'Alastair'. International Journal of Transactional Analysis Research. 2014; 5(2):66-76. [DOI:10.29044/v5i2p66]

31. Richard A, Rohrmann S, Lohse T, Eichholzer M. Is body weight dissatisfaction a predictor of depression independent of body mass index, sex and age? Results of a cross-

sectional study. BMC Public Health. 2016; 16(1):863. [DOI:10.1186/s12889-016-3497-8][PMID][PMCID]

32. Ghadakzadeh S, Ghazipour A, Khajeddin N, Karimian N, Borhani M. Body image concern inventory (BICI)for identifying patients with BDD seeking rhinoplasty: using a Persian (Farsi)version. Aesthetic Plastic Surgery. 2011; 35(6):989-94.[DOI:10.1016/j.brat.2003.12.006][PMID]

33. Widdowson M. The importance of research in transactional analysis for transactional analysts. Transactional Analysis Journal. 2018; 48(1):33-42. [DOI:10.1080/03621537.2018.1397965]

34. Tangolo AE, Massi A. A contemporary perspective on transactional analysis group therapy. Transactional Analysis Journal. 2018; 48(3):209-23. [DOI:10.1080/03621537.2018.1471288]

35. Qiao Q, Nyamdorj R. Is the association of type II diabetes with waist circumference or waist-to-hip ratio stronger than that with body mass index? European Journal of Clinical Nutrition. 2010; 64(1):30-4. [DOI:10.1038/ejcn.2009.93][PMID]

36. Cho N, Shaw J, Karuranga S, Huang Y, Da Rocha Fernandes J, Ohlrogge A, et al. IDF diabetes atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. Diabetes Research and Clinical Practice. 2018; 138:271-81. [DOI:10.1016/j.diabres.2018.02.023][PMID]

37. Cummings DE, Rubino F. Metabolic surgery for the treatment of type 2 diabetes in obese individuals. Diabetologia. 2018; 61(2):257-64. [DOI:10.1007/s00125-017-4513-y][PMID][PMCID]

38. Kelly T, Yang W, Chen CS, Reynolds K, He J. Global burden of obesity in 2005 and projections to 2030. International Journal of Obesity. 2008; 32(9):1431-7. [DOI:10.1038/ijo.2008.102][PMID]

39. Boffetta P, McLerran D, Chen Y, Inoue M, Sinha R, He J, et al. Body mass index and diabetes in Asia: across-sectional pooled analysis of 900,000 individuals in the Asia cohort consortium. PloS One. 2011; 6(6):e19930. [DOI:10.1371/journal.pone.0019930][PMID][PMCID]