



The Effectiveness of Mindfulness Education on Emotional Cognitive Regulation, Eating Style and Body Mass Index in Obese Adolescent Students Female

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ABSTRACT

Background and Aim: Obesity in children and adolescents has gradually become a major public health problem in many developing countries, including Iran. The aim of this study was to determine the effectiveness of group mindfulness training on the cognitive-emotional regulation, eating style, and body mass index of obese female adolescents with body mass indexes above 30. **Methods:** In order to achieve this goal, we used a statistical sample consisting of obese teenage girls in a high school in Boroujerd city in 2021. Research design consists of a pre-test, post-test experiment with a control group of 40 people (20 experimental and 20 control). Every week for 8 sessions of 90 minutes, mindfulness-based cognitive therapy was conducted, and a post-test was administered to both experimental and control groups. A Garnefski cognitive emotional regulation questionnaire and a Dutch eating style questionnaire were used for this study. The statistical analysis was based on multivariate analysis of covariance. Statisticians used multivariate analysis of covariance. **Results:** There was a significant difference in mean scores of emotional cognitive regulation between the experimental and control groups, including an enormous difference in weight loss in eating style and body mass ($P < 0.01$). **Conclusion:** The results indicated, mindfulness therapy was able to improve cognitive-emotional regulation and eating style in obese girls by 64% and 74% respectively.



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Introduction

According to the studies conducted, the prevalence of obesity in 73 countries of the world has increased by two times between 1980 and 2015, and by 55 times in Iran. The number of overweight people in Iran has increased from 5 million to 18 million during the same period and has increased more than 3.5 times (Mokdad, El Bahceraoui, & et al., 2015). The rate of obesity in children and adolescents is increasing. Obesity in children and adolescents has gradually become a major public health problem in many developing countries, including Iran (Tarabi, Amir Arslani, & et al., 2017). The prevalence of obesity in Iran is very high, and accordingly, healthcare planners and politicians should consider effective and practical policies to reduce obesity in people (Vaisy and Mohammadi, 2019). Obesity can affect the health of adolescents (Taveras, Gillman, & et al., 2010), and obesity in adolescents causes a decrease in self-esteem, sadness, loneliness, anger, and risky behaviors (Pinhas & Singer, 2006).

Eating behaviors, "restricted", "emotional eating" and "outside eating" have been studied in overweight and obese people. Deliberately restricting eating behavior is called restricted eating. Emotional eating occurs in response to negative emotional arousal states and external eating occurs in response to external signs of food. These eating behaviors predict overeating, obesity, psychological problems, etc. (Hirsch, Kluckner, & et al., 2015; Snoek, Engels, & al., 2013). Environmental and personality factors and characteristics can explain the eating style. At the individual level, the role of the reward sensitivity factor, which reflects the functional activities of the behavioral brain systems, has been investigated in people's eating behaviors. Behavioral brain systems are designed based on Gray's theory. According to this theory, behavior and emotions are influenced by 3 systems, behavioral bioactivation (BAS), behavioral inhibition (BIS) and fight/flight/interruption (FFFS) (Eneva, Murray, & et al., 2017). BAS activity is started with appetitive (pleasant) stimuli and leads to the tendency of goal-seeking

behaviors, reward response and positive feelings in the individual. BIS is responsible for controlling conflicts between objectives; which, by maintaining alertness and direct attention to contradictory stimuli, by inhibiting actions and directing them towards FFS to facilitate defensive behaviors, resolves contradictions (Davis, Patte, & et al., 2017). Nowadays, one of the most widely used approaches used by therapists to reduce the problems of clinical and normal populations is mindfulness. In this treatment method, mindfulness is an intervention that can be used in combination with cognitive behavioral therapy (Duarte, Lloyd, & et al., 2019). Mindfulness is the regular training of meditation; In order for patients to be more aware of their thoughts, feelings, and bodily sensations, they perform mindfulness exercises (such as body scanning) that automatically activate cognitive processes and deactivate functional disorders, such as Negative ruminating thoughts act authoritatively (Mackenzie & Abbott, 2018). Mindfulness means being in the moment with whatever is now, without judgment and without commenting on what will happen; It means experiencing pure reality without explanation (Segal, Williams, & et al., 2013). For this reason, the purpose of the current research is to evaluate the effectiveness of mindfulness training in regulating the emotional cognition and eating style of obese female adolescent students; Therefore, the question of the present research is whether mindfulness training is effective in regulating emotional cognition and also eating style of obese teenage girls?

Method

In this research, a quasi-experimental research method with a pre-test, and post-test design and a control group were used to influence mindfulness on the regulation of emotional cognition and eating style of obese teenage girls. The statistical population of the research included obese adolescent girls of Borujerd city in 1400. Among the female students of the first and second secondary level, 40 of them, who had a body mass index of 30 to 35, were selected

from the statistical population through available and voluntary sampling. The criteria for measuring and determining the body mass index was the use of the Kutle formula (weight (kilograms) \div height (square meters) = BMI). After the clinical interview and the pre-test, they were randomly selected into two control (20 people) and experimental (20 people) groups and then entered the research project.

Research Tools

1. Garnefski's emotional cognition adjustment questionnaire: this is a self-report questionnaire, which was compiled by Garnefski & et al. (2002) and has 36 items. that 9 scales; Emotional cognition regulation strategy that includes: self-blame, acceptance, rumination, positive refocusing, refocusing on planning, positive reappraisal, perspective-taking, catastrophizing, and blaming others. In this questionnaire, the person is asked to specify his reaction in the face of threatening experiences and stressful life events that he has just experienced by answering 5 questions that evaluate the strategy for controlling and regulating emotions. The Persian form of this scale has been validated by Samani and Jokar (2006). The alpha coefficient for the subscales of this questionnaire was reported by Garnefski & et al. (2002) in the range of 0.71 to 0.81.

2. Dutch Eating Style Questionnaire: This is a self-report questionnaire compiled by Stein & et al (1986) to determine the eating style. The answers are ranked in the form of 5 grades, the lowest grade gets the lowest score and the highest grade gets the highest score. Several studies have reported high Cronbach's alpha (α 0.93-0.83) for its scales. Regarding the validity of this questionnaire, Wardell (2005) showed that this tool differentiates clinical groups (such as people with bulimia nervosa) from the normal group in two scales emotional eating and external eating. The Persian version of this questionnaire was translated into Persian by Javad Salehi Federdi (2005).

Implementation

In this research, first, the height and weight of the students were measured, and after extracting the

body mass index above 30, obese people were screened from other female students. Then the questionnaires (Garnefski & Dutch) were given to the students of the selected classes. After explaining the topic of the questionnaire after getting their agreement to participate in the research and explaining the objectives of the research and the instructions for filling the questionnaires, the students answered the questionnaires in the presence of the researcher. Then, the completed forms were received, and appropriate statistical methods were used to describe and analyze the information. In the next step, these people were randomly divided into two experimental and control groups. Research variables were measured in two groups in the pre-test stage. The experimental group underwent eight 90-minute sessions of mindfulness-based intervention using the MBCT cognitive therapy method, and the control group did not receive any intervention. After the completion of the intervention sessions, research variables were measured in the post-test stage in two groups. The treatment protocol used for mindfulness training was obtained from the book "Mindfulness work, 8-week program to get rid of emotional problems" (Segal et al.; translated by Keshavarzi Arshadi, 2017).

Results

Data analysis was done using SPSS-26 software in two descriptive and inferential sections. Descriptive statistics indicators such as frequency, percentage, mean and standard deviation, and the results of inferential statistics tests, univariate analysis of covariance ANCOVA, and multivariate analysis of covariance MANCOVA are presented in this section. Table 1 shows changes in body mass index in two control and experimental groups. Mindfulness is shown on the stage before and after training. According to the research findings, the average BMI index in the control group was 32 in the pre-test and 33 in the post-test. Also, the average pre-test BMI in the experimental group was 32.20, and in the post-test was 30.80, which shows that this index increased in the control group but decreased in the experimental group

Table 1. Descriptive indexes of emotional cognition adjustment and eating style subscales

Variables	Control Group		Experimental Group	
	Mean	SD	Mean	SD
Refocus on planning	26.50	4.64	34.00	5.25
Positive reappraisal	15.50	3.45	21.50	3.29
Positive refocusing	42.00	6.02	56.50	6.86
Self-blame	7.50	2.83	12.00	2.23
Blaming others	6.50	3.57	6.00	1.48
Rumination	14.00	3.28	18.00	4.38
Catastrophizing	11.00	3.27	14.00	3.48
Acceptance	12.00	3.52	15.00	1.82
Putting into perspective	20.00	9.26	67.50	7.96
Emotional cognition adjustment	91.50	13.17	12.40	13.62
Emotional eating	28.00	3.63	41.00	5.90
External eating	21.50	4.09	29.50	5.26
Restraint	20.20	2.12	29.00	5.87
Eating style	71.50	7.22	95.00	13.27

To test the main hypothesis of the research that mindfulness training is effective in regulating emotional cognition and eating style of obese teenage girls. Multivariate analysis of covariance test was used, and the results of analysis of covariance showed a significant difference between the adjusted averages of emotional cognition regulation scores according to group membership in the pre-test and post-test stages ($P=0.001$); The amount of this effect was equal to 64% in the pre-test stage and 74% in the post-test stage. Statistical power equal to 0.54 and 0.55 represents the adequacy of the sample size. Also, the test results show a significant difference between the adjusted averages of light eating scores according to group membership in the pre-test and post-test stages ($P=0.001$). According to the results of ANCOVA analysis, there is a significant difference between the adjusted averages of emotional cognition adjustment scores and eating style according to group membership in the pre-test and post-test stages ($P=0.001$). The F value of the covariance variable interaction is 30.01 ($P < 0.05$), which is not significant, and it can be concluded that the

null hypothesis is not rejected. The assumption of homogeneity of the slope is met. As a result, the variance outside the groups is homogeneous, and based on Sig = 0.001; there is a significant difference between the emotions of the experimental and control groups. The F value of the covariance variable interaction is 19.98 ($P < 0.05$), which is not significant, and it can be concluded that the null hypothesis is not rejected and the assumption of homogeneity of the slope is respected and as a result, the variance outside the groups is homogeneous. Moreover, based on $P=0.049$, there is a significant difference between the eating style of the experimental and control groups. The test results show a significant difference between the adjusted averages of light eating scores according to group membership in the pre-test and post-test stages ($P=0.001$). Therefore, the research hypothesis that training mindfulness and eating style of obese girls is effective in the pre-test and post-test phases is confirmed. This effect was equal to 73% in the test phase and 82% in the post-test phase. Statistical power equal to 0.54 and 0.67 represents the adequacy of the sample size.

Conclusion

This research was conducted to determine the effectiveness of mindfulness training on the emotional cognition and eating style of obese girls. The results showed that mindfulness training effectively reduced body mass index and weight loss in obese adolescent girls. Based on the results of the ANCOVA test and analysis of variance, there is a significant difference between the mean scores of emotional cognition regulation according to group membership in the pre-test and post-test stages ($P=0.001$). Therefore, the research hypothesis that mindfulness training is effective on emotional cognition and eating style of obese girls is confirmed.

In explaining these findings, it can be said that in the states of conscious attention, the dissemination of information turns from a defective cycle to the current experience. Basically, mindfulness training teaches people how to direct the skills that have become a habit and prepare the conditions for change towards neutral goals such as breathing. Therefore, by focusing on the mind and controlling emotions, automatic processing is prevented, making defective processing less available. The chances of seeing the environment and making correct choices again are increased, cognitive flexibility is improved, and as a result, face weight is reduced. take

The results of the present study show the importance of mindfulness and emotion regulation as psychological and emotional skills in weight loss and eating styles of obese adolescent girls. People who score higher on the mindfulness scale are more likely to be present in the present, are alert and aware of internal and external phenomena, and have cultivated a non-judgmental attitude with acceptance of the phenomena. Instead of reactive and non-constructive encounters, they deal with life's events constructively and actively. As a result, they show better performance in various aspects of life, especially in education. It can also be concluded from the findings that the characteristics of mindfulness training and the

accuracy of the structure of Garnevsy's emotional cognition adjustment questionnaire as well as the Dutch eating style questionnaire, are confirmed. As a result, both of the above questionnaires can be used as a suitable tools to measure the effectiveness of weight loss by the method of the conscious mind. It is suggested that the treatment based on the method of mindfulness in psychology clinics and counseling centers be done by psychologists in order to regulate emotions and slim diets. Sports teachers at different levels should also learn mindfulness-based education in order to have a practical impact on the quality of their psychological aspects along with the sports programs of teenagers in schools.

Conflict of interest

The authors of this study have no conflict of interest in conducting and writing it.

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