



# Efficacy of body appreciation training on body image concerns in overweight adolescents

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## ABSTRACT

Body image concern is one of the important issues in the field of overweight and the factors of failure in losing weight which is necessary to undergo intervention to increase the efficiency of sports and nutrition programs. This study aimed to analyze the efficacy of body appreciation training on body image concerns in overweight adolescents. It was a semi-experimental method with a pre-test and post-test design with a control group). The research community consisted of overweight girl adolescents who were referred to weight control and weight loss centers in Isfahan City in 2021. From the mentioned society, 30 adolescents were selected by targeted sampling method and assigned to two groups of 15 people, experiment and control. The experimental group received 9 sessions of 90-min body appreciation training. The control group was on the waiting list during this time. The research tool was the body image concern questionnaire of Littleton et al. (2005). Data analysis was done using SPSS-24 software and the covariance analysis method. The results showed that there is a significant difference between the two groups in the variable of concerns related to body image ( $P < 0.001$ ); Also, the results showed that there is a significant difference between the two groups in the variables of dissatisfaction with appearance and interference in social functioning ( $P < 0.001$ ). In this way, based on the results of this research, body appreciation training can be used to reduce concerns related to body image in overweight adolescents.

## 1. Introduction

Adolescence is between 10 and 19 years and a transitional step for experiencing puberty and adulthood [1]. During this critical period, compliance and adaptability to the process of treating chronic problems are very low, in a way that most of the treatments applied seem discouraging [2]. Accordingly, considering the treatment solutions for chronic problems of adolescence is one of the main goals of specialists. Overweight is the most common problem in this period [3]. Being overweight is one of the global epidemics, a common and chronic disorder that is diagnosed with above 30 body mass indices. This health problem has been increasing since the first half of the 20th century and is known as the most important nutritional complication and global social problem [4]. Currently, the prevalence of overweight among children and adolescents is a public problem around the world and overweight is on the rise in low- and middle-income countries [5]. The results of the studies conducted in Iran also report the prevalence of overweight in adolescents as

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8.8 [6,7]. Also, in a study conducted in Isfahan City of Iran, the trend of overweight and obesity in children and adolescents between 1994 and 2010 showed a nearly two-fold increase [8]. Additionally, being overweight and obese during adolescence is associated with a wide range of complications and an increased risk of sudden occurrence of physical problems, mental disorders, and some cancers [9]. Such as type 2 diabetes, cardiovascular diseases, some types of cancer, and high blood pressure [10].

Childhood and adolescent obesity have reached epidemic levels in the United States, affecting the lives of millions of people. In the past 3 decades, the prevalence of childhood obesity has more than doubled in children and tripled in adolescents [11]. It is known that 30–60% of the reasons for chronic diseases in adulthood are caused by unfavourable health behaviour during adolescence [2]. Being overweight imposes direct costs, including visits, medication, and hospitalization, as well as indirect costs, such as loss of income due to overweight-related diseases, on communities' health and treatment systems [12,13]. In other words, being overweight has a two-way relationship with psychological disturbances this means that many psychological issues can cause being overweight as a primary and constant factor; on the other hand, being overweight can result in numerous unpleasant psychological consequences and life dissatisfaction [14].

The body-image concern is one of the significant issues regarding overweight and one of the factors for being unsuccessful in weight loss programs [15]. Body image is a multidimensional perception such as positive and/or negative perceptions, feelings, cognitions, and behaviors related to body appearance and performance which is under the effect of the content of thought, a set of positive and negative emotions, and the attitude of other people. Accordingly, to start or continue providing weight management services, it is necessary to check that being overweight is not a misinterpretation of the person's real body shape [16]. Misperception and negative body image are very common in overweight people [17]. Therefore, trying to correctly understand body image in overweight people has an impact on successful weight control [18]. Thompson & Bardone-Cone through their study have found that in comparison with their peers, adolescent girls are more concerned about their body image and often they compare themselves with their younger age socially [19]. These concerns are associated with family and academic performance weakness, negative self-concept, low physical activity, and more depression [20].

Reviewing the aforementioned theoretical bases shows that trying to reduce concerns related to body image can guarantee the efficiency of nutritional and sports programs for weight loss in adolescents. Because achieving positive aspects of oneself and favorable self-perception as well as reducing the perception of negative emotions in the context of weight loss is helpful, especially during adolescence, it seems that interventions aimed at adapting and empowering oneself to deal with stressful situations can help overweight adolescence Achieve more effective weight loss nutrition and exercise programs by reducing body image concerns. In this context, body appreciation is a helpful concept. Body appreciation is a dimension of positive body image which traditionally used to describe and predict greater body satisfaction, focusing less on identifying, predicting, and promoting maladaptive body attitudes [21]. Body appreciation was first explored and analyzed in Avalos and Tylka's 2006 body acceptance model of visual eating (eating following physiological hunger and Satiety signs). According to this model, body acceptance by others can stimulate individuals to appreciate their body and pay less attention to their appearance which facilitates visual eating. Recent studies have shown that focusing on self-strength and body appreciation helps individuals in the favorable evaluation of appearance, body-related self-esteem, and various indicators of psychological well-being such as self-esteem, optimism, active coping, positive affect, life satisfaction, and self-compassion [22]. Body appreciation is effectively associated with visual eating and physical activity behaviorally (especially when the motivation to exercise is not appearance-based) [23,24].

Body appreciation is not simply putting up with a negative body image or experiencing a sense of self-attractiveness, rather, it includes having a favorable opinion of the body (despite actual weight body size and perceived deficiencies), awareness and attention to body needs, engaging in healthy body care behaviors, and protecting the body by rejecting unrealistic media ideals about the body [25]. Therefore, body appreciation training was first formulated by researchers of this study based on the positive psychology approach emphasizing positive cognitive aspects, changing attitudes, and recognizing strengths and positive points instead of emphasizing weaknesses. This approach was presented to create positive opinions about one's body, accepting the body despite its flaws, respecting the body, especially its needs, and ultimately protecting the body, including rejecting unrealistic ideals [26]. This training course looks for a way to reevaluate the self-received messages and find a way to reject the negative ones [27].

Training body appreciation resulted in reducing self-negative body image and moving toward focusing on appreciation which represents an important change in the way of observing and evaluating body image [26]. Body appreciation training does not only deal with issues that cause the negative image of the body to disappear but also teaches people to change their knowledge and behavior towards their body and to use positive strategies to face criticism from others. In this era, Baceviciene and Jankauskiene have reported that body appreciation is associated with low levels of body mass index, body satisfaction, and having control over eating habits which increases self-esteem, body performance, and More sports participation [28]. Cox, Ullrich-French, Tylka, and McMahon have shown that changing body appreciation is related to a positive change in intrinsic motivation, and targeting body appreciation can help people's intrinsic motivation to increase physical activity [29]. Homan & Tylka also reported that body appreciation through a lower investigation in self-worth based on appearance and approval from others and through less involvement in eating and body comparison can be associated with mindful eating [30]. Andrew, Tiggemann & Clark in their research have found that increased body appreciation leads to greater acceptance of the body by others and less consumption of media appearance, reduced social comparison, and internalization of correct thinness criteria, which is related to greater body perception [31].

Therefore, by taking the prevalence of overweight among adolescents and the vulnerability of this group in confrontation with physical and psychological problems as well as the role of body image concerns as an obstacle in reaching the goals of nutritional and sports programs in adolescents into consideration, presenting a training program aimed at self-empowerment, changing the way people look at themselves, and modifying the styles of dealing with stressful issues is of great importance. Thus, based on particular attention to training body appreciation toward creating favorable attitudes about the body, unquestioning body acceptance, body

respect, and finally, body protection, this question arises Does body appreciation training affect body image concerns in overweight adolescents? The findings of this research help counsellors and medical and psychological specialists in the field of adolescents and nutrition and diet therapy counsellors to reduce the body image concerns of adolescents by providing a training course to reduce Concerns related to the body image of adolescents by presenting a training course.

## 2. Material and method

### 2.1. Design

This research was of a semi-experimental method with a pretest, posttest, and control group.

### 2.2. Participants

The research population includes adolescent girls with overweight referred to weight control and weight loss centers in Isfahan (The name of a city in Iran) in 2021. From the mentioned population, 30 participants were selected based on non-random of the available method; to minimize bias, they were categorized into two-15 people of experimental and control groups randomly. This number was selected based on the opinion of researchers (Gall, Gall, and Borg, 2003) who found 15 participants suitable for each group in experimental research.

### 2.3. Inclusion and exclusion criteria

Entry criteria include the followings.

1. Personal desire to participate in research;
2. Overweight adolescents (body mass index greater than 25);
3. The gender of the girl
4. Age range from 10 to 19 years;
5. Not suffering from acute or chronic mental disorders (by conducting an initial interview);
6. Not using simultaneous psychological treatments (by conducting an initial interview);
7. Not taking psychiatric drugs for the past 3 months (by conducting an initial interview);
8. It was not suffering from physical diseases (by conducting an initial interview).

The exclusion criteria also include the followings.

1. Consumption of all kinds of drugs and alcohol;
2. Lack of cooperation or unwillingness to continue the research;
3. Failure to complete the assignments presented in the meetings, and
4. Absence was more than 2 meetings.

### 2.4. Implementation procedure

After taking the pretest, the experimental group received fourteen 90-min sessions of body appreciation training every week. It is worth mentioning body appreciation training by researchers and using relevant articles in this area Daniels, Gillen, and Markey's [32] book Positive Body was set for the first time. To achieve its validity, the training package was signed and approved by 5 professors of the psychology department, whose internal agreement coefficient was 0.74 which shows the appropriate validity of the training package. The summary of these sessions is represented in Table 1. During this time, the control group was on the waiting list. After completing the interventions, the post-test was performed. The ethical principles of this research were secrecy, confidentiality, freedom, and full authority of the participants to withdraw from further participation in the research, and the detailed notification of the results, if requested by the participants, was accompanied by the training of the control group after the completion of the treatment

**Table 1**  
Results of descriptive statistics of research variables.

Components	Control group				Experimental group			
	Pretest		Posttest		Pretest		Posttest	
Components	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Body image concern	48.60	15.78	57.30	16.89	46.05	12.41	26	5.40
Dissatisfaction and embarrassment with the appearance	26.65	9.10	31.90	11.16	25.40	7.37	14.30	4.27
Interfering with social functioning	21.95	7.13	25.40	6.41	20.65	5.90	11.70	2.55

of the experimental groups which was approved by the Najafabad Azad University-branch with the code of ethics IR.IAU.NAJAFABAD.REC.2021.112. Also, in the beginning, all the goals, the research process, and the way of conducting the meetings were explained to the teenagers participating in the research, and informed consent was obtained from them and their parents.

### 2.5. Intervention (body appreciation training)

The summary of the body appreciation training sessions for each session is as follows.

First session: Introducing and getting to know the members of the group with each other, talking about the rules and the time and day of the meetings, and expressing the need to appreciate the body and have a positive image of the body.

Second session: replace body judgment with body celebration, noticing how your mood changes based on your mindset on a given day. On days when you struggle with your body image, find positive or even just neutral words to describe your body. Remove the words that have a self-deprecating theme from your vocabulary and replace them. Talk to your body the way you would talk to a friend. If your nose is big, celebrate it by saying: I have an impressive, memorable, and commanding nose.

Third session: the components of positive body image appreciation include respecting, honouring, loving, and showing appreciation for the body's features, functions, and health. It includes praising the body for what it can do, what it represents, and its unique qualities. An inclusive love and respect for the body allow people to appreciate the unique beauty of their body and the functions it performs for them; Therefore, it is necessary to know the needs of the body, including hygiene and health related to the body.

Fourth session: Dedicate your social media posts to displaying messages and images that promote self-confidence and healthy body communication. Remember, don't obsessively check your social media for likes and views and if it's not productive, limit your time on social media; For example, I appreciate the different and unique features of my body, I love my body, "I feel beautiful even if I am different from attractive media images. Or "Beauty and slimming models and actors do not affect my attitude toward my body."

Fifth session: Live based on your style. One way to create a healthy relationship with your body is to change your appearance and style. Cut your hair, and buy yourself some new clothes. Check your closet and get different clothes than you usually wear. Use bright colors and patterns and try all colors.

Sixth session: Get inspiration from public figures or people in your life who are confident in their bodies. Just be careful not to fall into the comparison trap while doing this. The point is to try something new for yourself, not to depend on someone else. Read books about overcoming body shame. A great way to learn new body appreciation tactics is to read the stories of others who have transformed their relationship with their bodies. Avoid diet books or anything that suggests it will change your appearance in any way.

Seventh session: Avoid taking advice from people who seem to think too much about body happiness. Pictures on the cover of health magazines do not promote healthy self-esteem, most of them are only about happiness. Don't let these narrow views limit you. Instead of focusing on what you no longer want, focus on what you do want, and then write your body a love letter by creating a positive body image. You can use phrases like "I feel confident and worthy of love and respect." Or write the exact opposite of every negative thought about yourself to counter it.

Eighth session: Positivity is internal which affects external behavior. Start your day by praising yourself. And instead of letting the negative self-talk start, direct your thoughts. For example, start your day by thinking, "You are kind. You are smart. You are important."

Ninth session: Notice that when you are being unkind to your body, immediately replace the positive self-talk by mentioning three personal strengths: kindness, passion, and creativity.

Tenth session: Use affirmations. using affirmations can be helpful when practicing body positivity. You can use affirmations in a variety of ways, such as saying them out loud to yourself in the mirror with complete conviction. Or by writing and placing them in the areas where you spend your time during the day such as the room, or bathroom. Using affirmations is very effective in retraining the subconscious mind to create a better relationship with the body. You could write something like, "My value is in my honesty and kindness," or "I love my body and respect it".

Eleventh session: Body appreciation is an important variable in targeting activities related to eating behavior, physical activity, using drugs and smoking, and doing tattoos.

Twelfth session: Self-care practices and yoga Enhancing body image and cultivating positive self-image Self-compassion which means being mindful, kind, and cultivating self-management Motivating exercise.

Thirteenth session: The psychological well-being of a positive body image is related to many indicators of positive psychological well-being, such as optimism, self-esteem, active coping, life satisfaction, mental happiness, emotional intelligence, and a sense of connection with nature.

Fourteenth session: Administrating the post-test, getting feedback from the participants, and summarizing the contents of the meetings with everyone's participation.

### 2.6. Instrument

The dependent variable in this study is concern about body image, which was measured by Littleton's Body Image Fear Questionnaire (BICI). Research instruments were including:

**Table 2**

The results of default tests of covariance analysis.

Variables	Control group				Experimental group				Levene's test	
	Pretest		Posttest		Pretest		Posttest		Statistics	Level of significance
	Statistics	Level of significance	Statistics	Level of significance	Statistics	Level of significance	Statistics	Level of significance		
Body image concern	0.49	0.96	0.65	0.78	0.63	0.82	0.99	0.27	10.97	0.16
Dissatisfaction with appearance	0.79	0.54	0.71	0.68	0.79	0.55	0.83	0.49	1.72	0.086
Interfering with social functioning	0.46	0.98	0.68	0.73	0.46	0.98	0.93	0.35	2.73	0.092

Littleton Body Image Concern inventory-this inventory was designed in 2005 by Littleton, Axson & Pury. This test consisted of 19 items in which every question has 5 choices and scored from 1 (never) to 5 (always). In this questionnaire, the minimum possible score will be 19 and the maximum will be 95. A score between 19 and 38 shows that the fear level of appearance and the self-body image is low. A score between 35 and 50 showed moderate concern about the image of one's appearance and body. A score higher than 57 means that the concern about the image of one's appearance and body is high. This questionnaire does not have reverse scoring. The subscale of appearance dissatisfaction (first factor) includes questions 1, 3, 5, 8, 9, 14, 15, 16, 17, 18, 19, and interference in social functioning (second factor) includes questions 2, 4, 6, 7, 10, 11, 12, 13. Littleton et al. (2005) The reliability of this questionnaire was checked by the internal consistency method and the Cronbach alpha coefficient was 0.93 [33].

## 2.7. Analysis

After collecting the data at the descriptive level of mean and standard deviation and the inferential level, Analysis of covariance (ANCOVA) was used to investigate the research hypotheses. The data were analyzed through SPSS software version 24. The acceptable level of significance used in this research was considered to be at least 0.001 and most 0.05.

## 3. Results

### 3.1. Demographic characteristics

The results of the demographic characteristics showed that the majority of adolescents participating in the experimental group had an average age of 17.15 years and in the control group 16.9 years and the comparison results of the two groups showed the homogeneity of these two groups.

### 3.2. Descriptive results

Descriptive results of concerns related to body image and its dimensions according to group membership in the pre-test and post-test are presented in [Table 1](#).

Results showed that the average concerns related to body image in the pre-test and post-test of the control group were 48.60 and 57.30, respectively, and in the experimental group, 46.05 and 26.05, respectively. Totally, in comparison with the control group, the average post-test scores of the experimental group in concerns related to body image and its dimensions (dissatisfaction and embarrassment with appearance and interference in social functioning) in the experimental group have decreased more.

### 3.3. Inferential results

To perform the analysis of the covariance test, it was necessary to comply with a series of assumptions, the results of which are presented in [Table 2](#).

Results of [Table 2](#) showed that the data of the groups in body image concern and its dimensions have a normal distribution. Also, the variance of the two groups in the variable of concern about body image is similar ( $P < 0.05$ ). Therefore, to check the efficacy of body appreciation training on concerns related to body image from Analysis of covariance (ANCOVA) and to check the Efficacy of body appreciation training on dimensions of body image concerns (dissatisfaction and embarrassment with appearance and interference in social functioning) from multivariate covariance analysis has been used, the results of which are given in [Tables 3 and 4](#).

As can be seen in [Table 3](#), the difference between the two experimental and control groups in body image concern is statistically significant ( $P < 0.001$ ), therefore, body appreciation training reduces body image concern in overweight adolescent girls. Also, according to the eta coefficient, about 65% of the variance of body image concern's variable is related to the effect of training-related concerns.

As the results of the analysis of covariance (ANCOVA) in [Table 4](#) have shown body appreciation training has been effective on the subscales of body image concern (shame and dissatisfaction with appearance and interference with social functioning). Also, considering the eta coefficient, about 57% of the difference in embarrassment and dissatisfaction with appearance and 71% of the difference in interference in social functioning are related to the effect of body appreciation training.

## 4. Discussion

This research aimed to investigate the efficacy of body appreciation training on body image concerns in overweight adolescents.

**Table 3**

Covariance analysis of the effect of body appreciation training on body image concerns.

Source of variation	sum of squares	Degree of freedom	mean square	F	statistical significance	Eta Square	Statistical power
Pre-test	1220.68	1	1220.68	12.56	0.004	0.20	1
Group	9090.72	1	9090.72	70.67	0.001	0.65	0.85
Error	4759.51	27	128.63				

**Table 4**

Covariance analysis of the effect of body appreciation training on dimensions of body image-related concerns.

Variables	Source of variation	Sum of square	Degree of freedom	mean square	F	Significance level	Eta squared	Statistical power
Embarrassment and dissatisfaction with appearance	Pretest	100.23	1	100.23	1.68	0.203	0.045	0.24
Embarrassment and dissatisfaction with appearance	Group	2876.79	1	2876.79	48.28	0.001	0.57	1
Embarrassment and dissatisfaction with appearance	Error	2144.93	26	59.55				
Interfering with social performance	Pretest	59.99	1	59.99	3.18	0.083	0.081	0.81
Interfering with social functioning	Group	1729.49	1	1729.49	91.78	0.001	0.71	1
Interfering with social functioning	Error	678.34	26	18.84				

The results showed that body appreciation training can reduce body image concerns in overweight adolescents. Also, the results indicate the effect of this training course on both body image concerns related dimensions including Embarrassment and dissatisfaction with appearance and interference in social functioning. Because the body appreciation training was developed and validated by the researcher for the first time, it is clear that no research can directly compare the results of this study. However, this section of results can be in line with the research findings discussed regarding the positive role of body appreciation in body image. In this area, Baceviciene and Jankauskiene in 2020 reported that Appreciation of the body brings about satisfaction with the body [28]. Swami et al., 2019 also believed that because body appreciation reduces focus on negative body image, it can be expected that body appreciation training has positive effects on improving body image [26]. In this context, Homan and Tylka 2018 also reported that increasing body appreciation by investing less in personal worth based on appearance and the approval of others can reduce body image concerns [30]. The research results of Andrew et al., in 2016 the increase in body appreciation resulted in more body acceptance by others and less consumption of media appearances reducing social comparison and internalizing the right weight loss criteria will help you understand your body [31].

Regarding the mechanism of the effect of body appreciation training on concerns related to body image and its dimensions, including embarrassment and dissatisfaction with appearance and interference in social functioning in overweight adolescents, it can be stated that during the body appreciation training sessions, the participants were taught that Love themselves as they are and focus on their abilities and capabilities. Considering the content of sessions, including (favorable opinions about the body, the body is positive, awareness and attention to the needs of the body, self-esteem of the body, acceptance of the body, and love and appreciation of the body's performance) as well as the mentioned issues girls find a positive view of themselves and their appearance. They understood that it is the adolescents themselves who are highly sensitive to this issue and wrongly focus all their thoughts and minds on this matter.

Additionally, this training course tried to teach adolescents to reevaluate received messages about themselves and empower them to reject negative messages [26]. Body appreciation training through conversation techniques with the body, body praise, change in media idealization, body positive practice, enhancing body image, fostering positive self-image, and fostering self-management taut women to change their behavior toward their body [27] and change their attitude towards themselves by reducing the focus on body image and moving towards body appreciation, through changing the way they view and address body image [28]. Body appreciation training has taught adolescents to accept their bodies Even if there exist some aspects that they want to change them. In this way, people establish a different relationship with their body and adapt to themselves and the world around them, and as a result, they are empowered with emotional and cognitive changes and feel less interference in their social functioning due to concern about their body image.

Furthermore, this training course works by focusing on positive cognitive aspects, changing the attitude, and recognizing the strengths and positive points instead of emphasizing the weaknesses, by increasing the favorable opinion about the body, and more acceptance of the body despite the existing defects, internalization of the correct weight loss criteria and finally protecting the body by rejecting unrealistic ideals [26] Create positive feelings and emotions towards the body in adolescents. This process was done through the techniques of body celebration, body talk, body praise, change in media idealization, writing a lovely letter to the body, positive body practice, strengthening body image, cultivating positive self-image, and cultivating self-management, all of which included self-acceptance. followed According to the body acceptance model, body acceptance encourages people to appreciate their bodies and pay less attention to their appearance, which causes a person to experience 1'fewer negative emotions towards their body, which results in a reduction in body image concerns.

## 5. Concluding remarks

After discussing the limitations of our study (5.1), we provide conclusions (5.2) and some reflections on lines of research that should be investigated considering our results (7.3).

### 5.1. Limitations

This study has several limitations that should be noted. First, we found no evidence of a mediating effect of confounding variables such as adolescent identity crisis, which could interfere with training effectiveness. Secondly, the sample size enrolled in the present study was relatively small, larger studies are needed to confirm this evidence of a mediating effect of body image concerns. Thirdly, our research has not any follow-up stage. Therefore, the long-term effects of body appreciation training on body image concerns need to be further investigated.

### 5.2. Conclusion

The adolescence stage is associated with physiological changes in all parts of the body, which may lead to dissatisfaction and body image concerns. Since satisfaction with body shape and size in teenagers is considered a determining factor in their self-confidence and mental health; Therefore, educational programs can play an important role in promoting a healthy mental image and body appreciation in adolescents. Teenagers will be the adult population of the future; thus, a healthy adolescent population today implies a healthy population in the future with a healthy lifestyle and proper body image. It is in a way that in recent years, teenagers particularly female adolescents surrounded using mass communication (satellite, Instagram, Facebook, etc.) and are faced with content that is related to appearance and body which made them mentally engaged regarding their body and appearance. For this reason, many problems related to their body can be prevented or reduced in severity through body appreciation training and timely guidance.

### 5.3. Suggestions for further research

Finally, it is suggested to experts in the field of weight loss based on the findings of the research.

1. To make weight loss programs efficient, both nutritional and sports, by using body appreciation training with controlling emotions related to being overweight in adolescents, effective steps in reducing weight-related concerns in adolescents picked up.
2. Brochures or booklets can be prepared in schools based on the results of the current research and given to overweight adolescents and their parents.
3. Considering the efficacy of body appreciation training on body image concerns, it is suggested that counselors, fitness centers, and diet therapy clinics use the training package prepared as a useful model to solve attitude problems regarding body image for people, especially adolescent girls.
1. It is suggested that in future studies the effectiveness of this treatment should be implemented in other communities, such as candidates for female cosmetic surgery, social anxiety and body dysmorphic disorder also in other cities.
2. Because the cultural context is influential on being overweight and the attitude about it is recommended that future researchers replicate the same issue in other statistical communities.
3. While there has been an effort in recent years to conduct more research on body image in populations other than normal-weight young women, there is still a dearth of studies on this topic in men or in people from different groups who get overweight. Therefore, it is suggested that this research could be conducted on other classes of society (women, men, and boys) and its results can be compared with the current research findings.
4. Considering that the educational package of body appreciation was compiled for the first time in the current research according to books and articles, therefore, it is suggested to be used in future studies to check its efficacy on other variables to reveal its strengths and weaknesses.

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### Ethical approval

The Ethics Committee of Najafabad Azad University approved the study. Therefore, this research received the following code: IR.IAU.NAJAFABAD.REC.1401.112 (<https://ethics.research.ac.ir/IR.IAU.NAJAFABAD.REC.1401.112>).

### Author contribution statement

Zahra Fathi: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.  
Yousef Gorji: Conceived and designed the experiments; Analyzed and interpreted the data.

### Data availability statement

The data that has been used is confidential.



## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

- [1] L. Jena Samanta, J. Parida, J. Badamali, A. Pradhan, P.K. Singh, B.K. Mishra, et al., The incidence, prevalence, and contributing factors of overweight and obesity among the adolescent population of India: a scoping review protocol, *PLoS One* 17 (9) (2022), e0275172, <https://doi.org/10.1371/journal.pone.0275172>.
- [2] A. Nicolucci, C. Maffei, The adolescent with obesity: what perspectives for treatment, *Ital. J. Pediatr.* 48 (9) (2022), <https://doi.org/10.1186/s13052-022-01205-0>.
- [3] R. Ahirwar, P.R. Mondal, Prevalence of obesity in India: a systematic review, *Diabetes Metabol. Syndr.: Clin. Res. Rev.* 13 (1) (2019) 318–321, <https://doi.org/10.1016/j.dsx.2018.08.032>.
- [4] G.M. Al Kibria, Prevalence and factors affecting underweight, overweight, and obesity using asian and world health organization cutoffs among adults in Nepal: analysis of the demographic and health survey 2016, *Obes. Res. Clin. Pract.* 13 (2) (2019) 129–136, <https://doi.org/10.1016/j.orcp.2019.01.006>, 10.
- [5] Q. Sserwanja, L.M. Mutisya, E. Olal, M.W. Musaba, D. Mukunya, Factors associated with childhood overweight and obesity in Uganda: a national survey, *BMC Publ. Health* 21 (1) (2021 Aug 3) 1494, <https://doi.org/10.1186/s12889-021-11567-1>. PMID: 34344336; PMCID: PMC8330108.
- [6] H. Rashidi, A. Erfanifar, S.M. Latifi, S.P. Payami, A.M. Aleali, Incidence of obesity, overweight and hypertension in children and adolescents in Ahvaz southwest of Iran: five-year study, *Diabetes Metab Syndr* 13 (1) (2019) 201–205.
- [7] A. Ahmadi, M.R. Sabri, Z.S. Navabi, M. Eghbali-Babadi, A. Khosravi, N. Mohammadifard, Facilitating and impeding factors in successful weight loss among the adolescents with overweight and obesity: a qualitative study, *Journal of Isfahan Medical School* 40 (680) (2022) 539–549, <https://doi.org/10.48305/jims.v40.i680.0539>.
- [8] M. Amidi Mazaheri, M. Hosseini, Prevalence of underweight, overweight and obesity among high school girls in Isfahan, *HSR* 6 (1) (2011). URL: <http://hsr.mui.ac.ir/article-1-120-fa.html>.
- [9] A. Arabmomeni, S.A.H. Dana, The effects of 10 weeks of spinning training on body composition, Vo2max and Ghrelin Hormone Levels in adolescents with overweight, *Journal of Sport Biosciences* (2023), <https://doi.org/10.22059/jsb.2023.360590.1592>.
- [10] B.A. Swinburn, G. Sacks, K.D. Hall, K. McPherson, D.T. Finegood, M.L. Moodie, et al., The global obesity pandemic: shaped by global drivers and local environments, *Lancet* (2011) 378 (9793) (2011) 804–814, [https://doi.org/10.1016/S0140-6736\(11\)60813-1](https://doi.org/10.1016/S0140-6736(11)60813-1).
- [11] N. Yazdani, S.V. Hosseini, M. Amini, Z. Sobhani, F. Sharif, H. Khazraei, Relationship between body image and psychological well-being in patients with morbid obesity, *IJCBNM* 6 (2) (2018) 175–184, <https://doi.org/10.1177/2333794X189891305>.
- [12] M. Tremmel, U.G. Gerdtam, P.M. Nilsson, S. Saha, Economic burden of obesity: a systematic literature review, *Int. J. Environ. Res. Publ. Health* 14 (2017) 435–450, <https://doi.org/10.3390/ijerph14040435>.
- [13] M. Safaei, E. Sundararajan, M. Driss, W. Boulila, A. Shapi'I, A systematic literature review on obesity: understanding the causes & consequences of obesity and reviewing various machine learning approaches used to predict obesity, *Comput. Biol. Med.* 136 (2021), 104754, <https://doi.org/10.1016/j.cmpbiomed.2021.104754>.
- [14] M.T. Flores-Dorantes, Y.E. Díaz-López, R. Gutiérrez-Aguilar, Environment and gene association with obesity and their impact on neurodegenerative and neurodevelopmental diseases, *Front. Neurosci.* 14 (2020) (2020) 863, <https://doi.org/10.3389/fnins.2020.00863>.
- [15] C. Bouzas, M.d.M. Bibiloni, J.A. Tur, Relationship between body image and body weight control in overweight  $\geq 55$ -Year-Old adults: a systematic review, *Int. J. Environ. Res. Public Health* 16 (2015) 16–22, <https://doi.org/10.3390/ijerph16091622>.
- [16] K.M. Lucibello, E. Pila, E.M. Pritchard, C.M. Sabiston, Validation of the body-related envy scale (BREV) in adolescent girl athletes. *Sport, exercise, and Performance Psychology* 11 (4) (2022) 477–493, <https://doi.org/10.1037/spy0000304>.
- [17] E. Robinson, Overweight but unseen: a review of the underestimation of weight status and a visual normalization theory, *Obes. Rev.* 18 (10) (2017) 1200–1209, <https://doi.org/10.1111/obr.12570>.
- [18] A. Haynes, I. Kersbergen, A. Sutin, M. Daly, E. Robinson, A systematic review of the relationship between weight status perceptions and weight loss attempts, strategies, behaviors, and outcomes, *Obes. Rev.* 19 (3) (2018) 347–363, <https://doi.org/10.1111/obr.12634>.
- [19] K. Thompson, A.M. Bardone-Cone, Sources of body comparison and their relation to body image concerns among middle-aged women, *Eat. Behav.* 40 (2021) 10–14, <https://doi.org/10.1016/j.eatbeh.2020.101468>.
- [20] C. Lombardo, Studies on body image in children and adolescents with overweight/obesity, in: *Body Image, Eating, and Weight*, Springer, Cham, 2018, pp. 193–205. [https://link.springer.com/chapter/10.1007/978-3-319-90817-5\\_14](https://link.springer.com/chapter/10.1007/978-3-319-90817-5_14).
- [21] T.L. Tylka, N.L. Wood-Barcalow, What is and what is not a positive body image? Conceptual foundations and construct definition, *Body Image* 14 (2015) 118–129, <https://doi.org/10.1016/j.bodyim.2015.04.001>.
- [22] L.C. Avalos, T.L. Tylka, Exploring a model of intuitive eating with college women, *J. Counsel. Psychol.* 53 (2006) 486–497, <https://doi.org/10.1037/0022-0167.53.4.486>.
- [23] T.L. Tylka, A.C. Iannantuono, Perceiving beauty in all women: psychometric evaluation of the broad conceptualization of beauty scale, *Body Image* 17 (2016) 67–81, <https://doi.org/10.1016/j.bodyim.2016.02.005>.
- [24] J. He, S. Sun, H.F. Zickgraf, Z. Lin, X. Fan, Meta-analysis of gender differences in body appreciation, *Body Image* 33 (2020) 90–100, <https://doi.org/10.1016/j.bodyim.2020.02.011>.
- [25] A.C. Iannantuono, T.L. Tylka, Interpersonal and intrapersonal links to body appreciation in college women: an exploratory model, *Body Image* 9 (2) (2012) 227–235, <https://doi.org/10.1016/j.bodyim.2012.01.004>.
- [26] V. Swami, D. Barron, R. Hari, S. Grover, L. Smith, A. Furnham, The nature of positive body image: examining associations between nature exposure, self-compassion, functionality appreciation, and body appreciation, *Ecopsychology* 11 (4) (2019) 243–253, <https://doi.org/10.1016/j.bodyim.2020.06.004>.
- [27] K.A. Bailey, K.L. Gammage, C. van Ingen, How do you define body image? Exploring conceptual gaps in understanding body image at an exercise facility, *Body Image* 23 (2017) 69–79, <https://doi.org/10.1016/j.bodyim.2017.08.003>.
- [28] M. Baceviciene, R. Jankauskiene, Associations between body appreciation and disordered eating in a large sample of adolescents, *Nutrients* 12 (3) (2020) 752, <https://doi.org/10.3390/nu12030752>.
- [29] A.E. Cox, S. Ullrich-French, T.L. Tylka, A.K. McMahon, The roles of self-compassion, body surveillance, and body appreciation in predicting intrinsic motivation for physical activity: cross-sectional associations, and prospective changes within a yoga context, *Body Image* 29 (2019) 110–117, <https://doi.org/10.1016/j.bodyim.2019.03.002>.
- [30] K.J. Homan, T.L. Tylka, Appearance-based exercise motivation moderates the relationship between exercise frequency and positive body image, *Body Image* 11 (2) (2014) 101–108, <https://doi.org/10.1016/j.bodyim.2014.01.003>.
- [31] R. Andrew, M. Tiggemann, L. Clark, Predictors and health-related outcomes of positive body image in adolescent girls: a prospective study, *Dev. Psychol.* 52 (3) (2016) 463–475, <https://doi.org/10.1037/dev0000095>.
- [32] E. Gillen Daniels, M. Markey, C.H. Body Positive: Understanding and Improving Body Image in Science and Practice, first ed., Publisher: Cambridge University Press, 2018.
- [33] H.L. Littleton, D. Axsom, C.L. Pury, Development of the body image concern inventory, *Behavior Research and Therapy* 3 (2) (2005) 229–241, <https://doi.org/10.1016/j.brat.2003.12.006>.