Comparison of Body Image and its Relationship with Body Mass Index (BMI) in High School Students of Ahvaz, Iran

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Abstract

Background
It is not clearly specified that which of the components of body mass index (BMI) affect body image and which of them do not. Given that having information in this regard is of special importance as a basis for future planning for adolescents, the present research aimed to compare body image in female and male adolescents and study its relationship with body mass index in high school students of Ahwaz, Khuzestan Province in the academic year 2015-2016.

Materials and Methods
In this descriptive-analytic study, 200 high school students were selected as the sample using the random cluster sampling method. The required data were collected using demographic questionnaire, anthropometric data checklist (height and weight), and the Multidimensional Body-Self Relations Questionnaire (MBSRQ). All descriptive and inferential statistics tests were performed using SPSS-17 at a confidence level of 95%.

Results: The students ranged from 15 to 18 years old. Equal distribution was employed among all four grades of high school. Body mass index (BMI) in male students showed a significant inverse relationship only with appearance orientation (P<0.05, r = -0.238) and body image (P<0.05, r = -0.200). In female high school students, BMI was scientifically related to appearance evaluation (P<0.05, r = -0.354), appearance orientation (P<0.05, r = -0.219), body areas satisfaction (P<0.05, r = -0.257), and body image (P<0.05, r = -0.286). Body Image was significantly greater in female than the male students by controlling BMI.

Conclusion: Overweight and obesity are considered important factors affecting the physical and mental health, including satisfaction with body image, among adolescent girls. Women's extreme attention to their body leaves a negative impact on their attitude toward their body and body value. Therefore, promotion of a healthy body image should be integrated across all interventions aimed to address obesity and other health-related concerns among adolescents.

Keywords: Adolescent, Body image, Body mass index, Students.

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1- INTRODUCTION

Body image is a complex concept involving a person's thoughts, feelings, and attitudes about his/her body (1, 2). Body image is a multi-dimensional structure. The first dimension, cognitive or perceptual dimension, refers to one's perception of his/her body including the evaluation of body weight, shape, and size. The second dimension, emotional dimension, deals with one's feelings such as satisfaction and concern about his/her appearance. The third dimension, ideal dimension, emphasizes what one wants to achieve (1).

In other words, body image consists of three concepts of actual body, one's body as it is, ideal body, the body shape one desires to have, and body shot, the body one presents. This includes two categories of personal reaction moderator (adjustment styles) and social support network (3). This image form since the birth evolves with one's growth and changes during different stages of life (4).

Body dissatisfaction is one of the fundamental problems of adolescence which is associated with complications such as eating disorders (emaciation and starvation), obsession with weight loss, malnutrition, physical deformities, sexual disorders, body dysmorphic disorders, mental disorders (depression, suicidal thoughts, stress, social phobias, obsessive-compulsive behaviors, and anxiety), loneliness, smoking and alcohol consumption, academic failure, interpersonal sensitivity, low self-esteem, feeling of being unattractive, preoccupation, and general health problems (5-7). On the other hand, positive body image makes one feels good about life (8). Improvement in body image can be effective in successful regulation of nutritional habits and obesity treatment (9). Adolescence and school ages is one of the critical periods of human life, one of the most important stages in the life of every

person, and a period of transition from childhood to adulthood. Maturity occurs at these ages which play an important and primary neurohormonal role in physiological and mental changes of adolescents in this period (10). Maturity affects all physical and mental aspects adolescents including identity and body image. Adolescence can be considered the most important period of preoccupation with body image, because, in addition to sexual appeal, some complex and varied changes occur in the body. Signs of maturity leave dramatic effects on relations with the environment, causes identity crisis, paying attention to one's appearance to draw the attention of others reaches a peak, and cognitive development creates the feeling that one is constantly exposed to others (11). In this period, physical and emotional changes occur frequently, one of the most important of which is the body image disorder (12, 13).

This age period (Adolescence) is so important that researchers argue that school is a very appropriate environment for performing interventions to improve body image in adolescents (13). On the other hand, body image disorder at school ages interferes with health status, and since concepts of education and health are linked with each other, it can be stated that learning is very in the absence of health and also health is very effective in the health of individuals. Finally, it can be concluded that better understanding of body image problems at school ages can be helpful in future planning for improvement of health and education (12).

Body mass index (BMI) is one of the variables which have now attracted the attention of researchers in terms of body image study. BMI statistically measures and compare the height and weight of a person. This scale is the right tool for estimation of one's weight based on his/her height. This index was developed by a Belgian scientist named Adolph Quenelle in 1850 (14). BMI is measured in

four categories of ≤ 18.4 (slim), 18.4-24.9 (normal), 25-29.9 (overweight), and ≥ 30 (obese). Different groups of BMI can affect body image and dissatisfaction of children and adolescents with their body (15). The results of some studies show that body dissatisfaction is common even among adolescents with a normal weight (2, 16). Although the relationship between body image and body mass index has been clearly established, it is not well specified that which of the components of body mass index affect body image and which of them do not, while having information in this regard is of special importance as a basis for future planning for adolescents (17-18). Finally, it should be argued that body image is affected by many factors and it is different depending on cultural, social, nutritional, and racial differences in each region. The passage of time, through making changes to the texture of a community, can change body image.

According to what mentioned above and the point that repeated studies at different intervals and regions are needed for evaluation of body image and body mass index and also due to fewness of studies on this subject in Khuzestan province- Iran, the present research aimed to compare body image in female and male adolescents and study its relationship with body mass index in high schools of Ahvaz, Khuzestan province in the academic year 2015 to 2016. The results of this study can be used for future planning and proposing recommendations in order to prevent the consequences of unfavorable body image among adolescent students, as the future-builder of Iran.

2- MATERIALS AND METHODS

2-1. Study design and population

The present research was a descriptive-comparative study which was carried out from November 2015 to July 2016. Using the following formula, the sample sized was determined to be 200 (100 girls and 100 boys). In this formula, the level of error (α) and accuracy (ε) was 5% and 0.1, respectively. Since the items were scored on a 0 to 5 Likert scale, standard deviation (SD) was first estimated by:

$$\sigma = \frac{\max(x_i) - \min(x_i)}{6}$$

Then, the sample size was calculated using:

$$n = \left(\frac{z_{\alpha/2} \times \sigma}{\varepsilon}\right)^2 \quad \& \quad \sigma = \frac{5-1}{4} = 1$$

$$n = \left(\frac{1.96 \times 1.00}{0.2}\right)^2 = 96.04$$

The inclusion criteria were providing a written informed consent for participation in the study and being a high school student. People with acute and chronic diseases, physical injuries (scars and burns), and psychiatric diseases and also those who were professional athletes were excluded from the study.

For sampling, a combination of cluster and random methods was used. For this purpose, each of the five districts of education was considered a cluster and 2 high schools (a girls' high school and a boys' high school) were randomly selected from each cluster. Then, 20 students were randomly selected from different grades of each school. Finally, 200 students from 10 high schools in different points of Ahvaz were selected as the sample.

2-2. Measurement tools

Multidimensional Body-Self Relations Questionnaire (MBSRQ) was used for evaluation of body image. This tool was devised by Cash and Tom in 1997 (19). Weight and height of subjects were measured using a digital scale and a tape, respectively. MBSRQ is a five-option 46-item self-rating scale that is subscales include appearance evaluation (AE) (items 5, 7, 13, 19, 25, 28, and 38), appearance orientation (AO) (items 1, 2, 8, 9, 14, 15, 20, 21, 26, 27, 32, and 33), fitness

evaluation (FE) (items 16, 22, 31, and 34), fitness orientation (FO) (items 3, 4, 6, 10, 11, 12, 17, 18, 23, 24, 29, 30, and 35), overweight preoccupation (OWPREOC) (items 36 and 37), and body areas satisfaction (BAS) (items 38, 39, 40, 40, 41, 42, 43, 44, 45, and 46). Scoring was based on 5-point Likert scale in which 1 represents completely disagree and 5 denotes completely agree. Items 6, 11, 12, 15, 17, 21, 22, 23, 26, 28, 29, 31, and 32 were scored inversely. Scores obtained on this questionnaire ranges between 46 and 230 that higher scores represent better and more positive body image. The reliability and validity of this questionnaire were measured by Rahati in 2004. Cronbach's alpha of the whole questionnaire and subscales of appearance evaluation, appearance orientation, fitness evaluation, overweight preoccupation, and body areas satisfaction is equal to 0.88, 0.67, 0.79, 0.57, 0.83, 0.83, and 0.84 (20). Weight and height of subjects were measured using a digital scale and a tape, respectively. Body mass index is obtained by dividing weight in kilogram by height in meter squared. BMI is measured in four categories of $\leq$ 18.4 (slim), 18.4-24.9 (normal), 25-29.9 (overweight), and $\geq$30 (obese) (15).

2-3. Methods

At first, demographic information of students was obtained through interview. Then, their height and weight were measured by the examiner using a digital scale and a tape, with regard to correct principles (in a standing position with minimum clothes and no shoes). Emjoi digital scale (EF118, made in Japan) was used for weighing. The researchers used to go to school between 9 a.m. to 11 a.m on different days of weeks and measure weight and height. School-aged adolescents were weighed without shoes and heavy outer clothing via a daily calibrated EMJOI balanced scale. Multidimensional Body-Self Relations Questionnaire was filled out by students in a self-reporting manner in the presence of the researcher. To increase the accuracy of the digital scale, it was calibrated every day by weighting a standard 2-kg weight.

2-4. Data analysis

The obtained data and information were statistically analyzed with descriptive statistics, independent t-test, correlation coefficient test, and regression model using SPSS version 17.0 at a significance level of 95%; also t-independent test was employed to compare BMI, Appearance Evaluation, Appearance Orientation, Fitness Evaluation, Fitness Orientation, Preoccupation with Weight Gain, and Satisfaction with Different Parts of Body among male and female students. Pearson correlation was employed to study the relationship of BMI with Body Image and its subscales. Regression model was used to study the relationship of gender and BMI with body image.

2-5. Ethical considerations

This study was approved by the Ethics Committee Islamic Azad University of Khorasgan. All the subjects were briefed on the research purpose and ensured that their information will be kept confidential. A written informed consent was obtained for participation in the study.

3-RESULTS

The subjects were in the age group of 15-18 years old with the same frequency distribution of 25% at ages 15, 16, 17, and 18. In addition, the frequency distribution of students of the first, second, third, and pre-university grade was the same (25%). BMI ranged between 18.5 and 24.9 among 91% of male students and 90% of female students. As BMI increase in male students, they had a lower body image. When gender was controlled, BMI increase declined body image scores. The mean of grade point average for boys, girls, and all students was 18.29 $\pm$ 1.14, 18.36 $\pm$ 1.06, and 18.33 $\pm$ 1.10,

respectively. In relation to BMI, results showed that 91% of boys, 90% of girls and all students had normal weight (18.5-24.9). According to the results presented in **Table.1**, it was revealed that BMI has a significant inverse relationship only with appearance orientation (r= -0.238, P<0.05) and body image (r= -0.200, P<0.05) among boys. Therefore, it can be concluded that with the increase in body mass index among male students, appearance orientation reduces in them. In addition, body image was lower among male students with the increase in BMI.

The results related to girls shown in **Table.2** indicated that BMI has a significant inverse relationship with subscales of appearance evaluation (r= -0.354, P<0.05), appearance orientation (r= -0.219, P<0.05), body areas satisfaction (r= -0.257, P<0.05), and body image (r= -0.286, P<0.05). Therefore, it can be stated that with the increase in body

mass index among female students, their body image in subscales of appearance evaluation, appearance orientation, and body areas satisfaction. In addition, body image was lower among female students with the increase in their BMI. Ultimately, in order to evaluate the simultaneous effect of gender and body mass index and net effect of each on body image among students, linear regression model was used.

In this model, variables of gender and BMI were taken as predictor variables and body image score was considered the dependent variable. The results of model fit have been presented in **Tables 2-4**.

According to the results shown in **Table.3**, by controlling the amount of body mass index, body image of girls was significantly higher than the boys (t=8.246, P<0.001). In addition, with the control of gender, increased body mass index causes a decrease in body image among the subjects (t=-3.652, P<0.05).

Table 1: The relationship between BMI and body image in male students

Variable	Statistical test	Appearance evaluation	Appearance orientation	Fitness evaluation	Fitness orientation	Overweight preoccupation	Body areas satisfaction	Body image
BMI	Pearson correlation coefficient	-0.011	-0.238*	-0.107	0.003	-0.020	0.038	-0.200
	P-value	0.915	0.017	0.289	0.978	0.840	0.706	0.046

Table-2: The relationship between BMI and body image in female students

Variable	Statistical test	Appearance evaluation	Appearance orientation	Fitness evaluation	Fitness orientation	Overweight preoccupation	Body areas satisfaction	Body image
BMI	Pearson correlation coefficient	-0.354	-0.219	-0.039	0.092	-0.196	0.257	-0.28
	Significance level	0.001	0.029	0.699	0.362	0.050	0.010	0.004

Table-3: The results of repression model fit in studying the relationship of gender and BMI with body image

Variables	Beta Coefficient	Standard error	t-value	P-value
Gender	5.197	1.197	8.246	0.001
BMI	-1.123	0.308	-3.652	0.001

BMI: Body mass index

4- DISCUSSION

The results of this study showed that 91% of boys and 90% of girls in Ahvaz city had a normal weight with a BMI in the normal range of 18.5 to 24.9. The study findings indicated that BMI had a significant inverse relationship only with appearance orientation (r=-0.238, P<0.05), and body image (r=-0.200, P<0.05), among boys. In addition, body image was lower among male students with the increase in BMI. The results related to girls showed that BMI had a significant inverse relationship with subscales of appearance evaluation (r=-0.354, P<0.05), appearance orientation (r=-0.219, P<0.05), body areas satisfaction (r=-0.257, P<0.05), and body image (r=-0.286, P<0.05).

In addition, body image was lower among female students with the increase in their BMI. The results of Khor et al. (2010) showed that there was a significant relationship between BMI and body areas satisfaction, as girls with a slim or normal BMI were more satisfied with their body areas than overweight ones (2). The findings of Golian et al. (2014) showed that most female students in both normal and obese groups had a moderate body image and there was no significant difference between normal and obese girls in terms of mean body image. However, mean body image in girls with normal weight was higher than obese ones. The results of this study also showed that score of depression, anxiety, and tension significantly increases in obese adolescent female students with the decrease in body image score (22).

In a study conducted by Zeighami et al. (2012) on the correlation between body mass index, body image, and depression in women, the results demonstrated that although overweight women had a moderate body image, their BMI was significantly and negatively correlated with body image score (P=0.002), but significantly and positively correlated with depression score (P=0.002). In other words, obesity is a risk factor for depression and obese women are more susceptible to depression (23).

The findings of Dehghani et al. (2012) showed that there was a significant difference between BMI and different aspects of body image satisfaction, as students with a normal or slim BMI feel physical attraction and were more satisfied with their appearance and body areas (24). In addition, students with a lower BMI reported the least concern and anxiety about weight, obesity, dieting, and limited nutrition. Additionally, a significant relationship was found between normal and slim BMI and subscales of appearance, body areas satisfaction, and preoccupation with overweight (24); and this is consistent with the findings of the present study. The results of Karaca et al. (2011), showed that body image of female students becomes weaker with the increase in their BMI (25).

In connection with these results we can say, cultural attitudes to body in men have also undergone some changes. Before the advent of television and other mass media, how people looked in others opinion was less important. Today, the media are criticized for presenting unrealistic physics. We can now observe that handsome men are getting more muscular day by day. With the promotional offer about body shape, the media can affect the feelings of individuals. In Iran, most actors and actresses and fashion channels in the satellite and the Internet are selected as a role model and instigate the issue. In addition, watching the music videos can be a risk factor for acceptance and verification of concerns related to weight and body shape among men. Given the findings and results of studies conducted in this area and importance of adolescence, the necessity of paying attention to their problems become more evident. Therefore, early detection and prevention of this type

of disorders should be taken into consideration by all members of the health care team including school authorities. By raising the self-esteem of students through health care education in schools, body image disorders can be prevented and their mental health can be promoted.

5- CONCLUSION

In general, the results showed that body is considered a movable device with actions and reactions. Individuals always try to exhibit this entity as best as possible. Social pressure on thinness and fitness was effective in body image, which causes individuals to feel unhappy with their appearance and body.
Hence, overweight and obesity are considered important factors affecting the physical and mental health, including satisfaction with body image, among adolescent girls. Based on the results of this study, it can be argued that women take care of their body and are under its domination more than men. However, women's extreme attention to their body leaves a negative impact on their attitude toward their body and body value. Women who believe in the traditional gender-based role for women are more likely to fall into the trap of beauty. Keeping away from more serious social roles and being confined to home causes too much attention to be paid to physical beauties.

In addition, today we are faced with extensive media ads that again emphasize on other aspects of women's beauty. Hence, it can be stated that when the cultural texture of society focuses on the value of physical attraction and beauty, the ground for concerns about body image is gradually provided.

6- CONFLICT OF INTEREST: None.

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