

Development and Validation of the Iranian Body Image Scale (IBIS)

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Research Article

Keywords: Body image, adolescents, validity, reliability, body weight status

Posted Date: December 15th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-1151201/v1>

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Abstract

Background: Body dissatisfaction has been known as an important public health concern which can influence physical and psycho-social health of adolescents. Hence, health professionals need a valid and reliable tool to assess this problem and its related factors in youth. This study aims to develop and assess psychometric properties of an indigenous scale for evaluation of body image and to investigate its association with body weight status among Iranian adolescents.

Methods: This study conducted on 857 adolescents who completed the Iranian body image scale (IBIS) and self-reported their body weight and height. Face, content and construct validity methods were used to assess validity of the IBIS. Exploratory factor analysis (EFA) was used to assess construct validity. Moreover, internal consistency of the scale was assessed by calculating Cronbach's alpha coefficient (α), and test-retest reliability was examined using intra-class correlation coefficient (ICC). To compare the IBIS scores across sex and body weight status groups, the Mann–Whitney and Kruskal-Wallis tests were used, respectively.

Results: Mean age and body mass index (BMI) of participants were 16.5 ± 1.1 years and 22.4 ± 4.5 kg/m², respectively. The EFA showed a 10-factor construct which explained 57% of the variance. The Cronbach's alpha coefficient for overall items of the scale was 0.896 and ranged from 0.42 to 0.92 for subscales. The test retest reliability result was acceptable for the IBIS (ICC= 0.805). The ICC values ranged from 0.753 to 0.990 for IBIS subscales. The IBIS total score was significantly higher in girls compared to boys (median (Q1-Q3): 32.2 (25.5-43.3) vs. 30.3(24.0-38.0); $p < 0.001$). In girls, the IBIS total score was significantly lower in normal weight girls compared to their overweight ($p = 0.001$), and obese ($p = 0.001$) counterparts. This difference was not observed in boys.

Conclusion: These findings support reliability and validity of the IBIS for assessment of body image in Iranian adolescents; this scale can be applied as an appropriate tool for assessment of body image in adolescents in related future studies. Current findings highlight considering body image as an important aspect of intervention programs targeting overweight and obesity in adolescents, specifically girls.

Plain English Summary

Negative body image has been known as an important public health concern that can adversely influence different aspects of adolescents' health. Hence, a valid and reliable tool is necessary to identify adolescents at risk of developing negative body image and its related disorders. There is a lack of an indigenous scale that can comprehensively assess body image and its related factors in Iranian adolescents; hence, the current study aimed to develop and assess psychometric properties of an indigenous scale for evaluation of body image and further investigate the association between body image and body weight status among Iranian adolescents. The current findings support the reliability and validity of the IBIS. In addition, more negative body images were observed in girls compared to boys and in overweight/obese girls compared to their normal weight counterparts. Therefore, promoting a healthy body

image should be incorporated as an important component of future health promotion programs to address obesity, eating disorders, and other health-related concerns among adolescents, specifically girls.

Introduction

Body image is an important issue during adolescence; pubertal and identity development during this stage make it a critical period for formation of negative body image [1]. A negative body image may adversely influence physical, psychological and social aspects of adolescents' health; as findings of previous studies have frequently demonstrated its association with risk of obesity, eating disorders, suicide ideation, low self-esteem, and depressed mood in youth [2-6]. Moreover, negative body image found to adversely influence adolescents' social interactions with their parents and peers [7-9]. Therefore, it is important to identify those adolescents who are at risk of developing body image disturbances.

To assess different aspects of body image, various scales including the Body Shape Questionnaire (BSQ), the Drive for The Muscularity Scale (DMS), the Adolescent Body Image Satisfaction Scale (ABISS), the Body Image Coping Strategies Inventory (BICSI), the Body image scale (BIS), the Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS), and the Eating Attitudes Test (EAT-26) have been developed [10-16]. Most of these instruments have emphasized on evaluation of a unique dimension of this concept including concerns, attitude and behaviors, satisfaction, or coping strategies related to an individual's body image. Past studies conducted on Iranian adolescents with a focus on body image topic, have also been confined to measurement of certain components of body image such as body dissatisfaction, body image coping strategies, and eating disorders [17-19]. Since, body image is a multi-dimensional constructs and there is consensus about the multi-dimensional properties of this concept by body image scholars [20-22]; developing a comprehensive tool covering various dimensions of body image can help experts to better understand and assess this concept in related research.

Previous studies endorsed a significant association between individuals' perceptions regarding their bodies and the cultural context of society [23-25]. Since, most of the existing scales are developed in other countries, mainly Western ones [10-13, 15, 16], they cannot be favorably be applied in our indigenous population. Therefore, considering lack of a comprehensive and indigenous tool for assessment of body image in Iranian adolescents; developing such scale seems essential. Hence, the current study aimed to first, develop and assess psychometric properties of an indigenous scale for evaluation of body image in adolescents. Then, its second aim was to investigate the association between body image and body weight status among a sample of Iranian adolescents.

Methods

Participants

A total of 903 adolescents (aged 15-18 years) residing in Tehran participated in the current study. A total of 46 adolescents were excluded from the analysis due to having chronic mental or physical diseases (such

as depression, social anxiety, anxiety and stress, convulsion, cancer, diabetes, heart diseases, kidney diseases and thyroid disorders); hence, data of 857 adolescents were analyzed.

Prior to data collection, ethic approval was obtained from the Ethics Committee of the Research Institute for Endocrine Sciences (RIES) affiliated to Shahid Beheshti University of Medical Sciences, Tehran, Iran. Furthermore, the approvals were obtained from the Ministry of Education in Tehran and selected high schools. All participants provide a written informed consent.

Measurements

Participants were asked to answer a set of questions regarding socio-demographic variables such as their age, sex, and history of diseases as well as their parents' marital status, level of education, and job status and self-report their weight, and height. Body mass index (BMI) was calculated as weight (kg) divided by the square of height (m²). The BMI-for-age national percentiles were used to determine the body weight status of adolescents. Underweight, normal weight, overweight and obesity were defined as BMI values of <5th percentile, ≥5th to <85th percentile, ≥85th percentile to <95th percentile, and ≥ 95th percentile, respectively [26]. In addition, participants were also asked to fill out the Iranian body image scale (IBIS).

Development and scoring of the IBIS

The initial item pool consisted of 95 items that were developed by the authors based on the findings of a qualitative study and review of existing literature on body image topic. For all subscales except for "emotions and behaviors", a five-point Likert scale from one to five was used for scoring answers for each item, where the choice of an answer for "completely agree" was given a five point and "completely disagree" was given one points for items belonged to "social models", "appearance importance in social interactions", and "perceived cultural values" subscales. Remaining items belonged to other subscales are scored reversely. For "emotions and behaviors" subscale, the choices ranged from "always" to "never" with values of five and one for always and never, respectively. Then for better interpretation, the 1-5 point scale items are transformed to 0-100 as follows: 1=0, 2=25, 3=50, 4=75, and 5=100. To calculate subscale and total scores of the IBIS, the mean is computed as the sum of the items over the number of items. Hence, the scores ranged from 0 to 100. A higher total score indicates a more negative body image.

Validity assessment

Validity of the scale was assessed using face, content and construct validity methods as described below.

1) Face validity

Face validity was assessed using qualitative and quantitative methods. In qualitative method, a total of ten adolescents were asked to assess difficulty, relevancy and ambiguity the preliminary scale. In quantitative face validity method, the same participants were asked to rate each item of the scale by the 5-point Likert scale from completely important (score 5) to not at all important (score 1). Then, the item impact score was calculated using the below formula:

Item impact score=frequency (%)×importance

Frequency (%) indicates the number of participant who gave the item a score of 4 or 5. Items with an impact score of more than 1.5 were considered appropriate and maintained for next stage.

2) Content validity

Content validity of the scale was assessed by a panel of experts in different disciplines including health education, community nutrition, sociology, psychology and medical sciences. For qualitative content analysis, experts were asked to comment on style, wording and scoring of the items. In addition, for quantitative content analysis, content validity ratio (CVR) and content validity index (CVI) were calculated. To calculate CVR, firstly, each item was scored using a 3-point Likert scale (essential, useful but not essential, not essential) by each expert. Then, using the below formula the CVR was calculated:

$$CVR = \frac{ne - N/2}{N/2}$$

In this formula, N is the total number of expert panel and ne is the number of individuals who considered the relevant item “essential”. Using the Lawshe’s table, the CVR higher than 0.62 for 10 individuals (based on number of experts in the current study) indicates the necessity of the item [27].

For calculating CVI, experts were asked to comment independently on degree of the relevance, clarity, and simplicity of each item using a 4-point Likert scale (“not at all” to “completely”). Then, using the below formula CVI was calculated.

$$CVI = \frac{\text{Number of raters chose point 3 and 4}}{\text{total number of raters}}$$

Scale’s content validity index (S-CVI) was calculated by taking the sum of all item CVIs divided by the total number of items.

3) Construct validity

Construct validity of the scale was evaluated using exploratory factor analysis (EFA). For this purpose, the Principal component analysis with Varimax rotation was used. The Kaiser-Meyer-Olkin (KMO) and Bartlett Sphericity Test were used to show the sampling adequacy. The KMO value of ≥ 0.8 and the p value for the Bartlett Sphericity test of < 0.05 indicate the sampling adequacy for EFA [28]. Scree plot, eigenvalues greater than 1, and number of factors that explain $> 50\%$ of variance were used to predict the number of factors retained. In this analysis, items with factor loadings over cutoff values of 0.4 were considered important and remained in the model.

Reliability assessment

Reliability of the scale was assessed using Cronbach's alpha coefficient (α) and intra-class correlation coefficients (ICCs).

1) Internal consistency

The Cronbach's alpha coefficient (α) was used to assess the internal consistency of the scale. The Cronbach's alpha coefficients were calculated for total and subscale scores of the BIS and α values greater than 0.7 were considered acceptable [29].

2) Test-retest reliability

Test-retest reliability was determined using the intra-class correlation coefficients (ICCs). For this purpose, the scales were completed by 30 adolescents within a 10-14 days interval and intra-class correlation coefficients of total and subscale scores of the two tests were calculated and values greater than 0.5 were considered acceptable [30].

Data analysis

To analyze data, the SPSS software (version 21.0) was used. Descriptive statistics including mean \pm sd for continuous variables, and frequency (%) for categorical variables were reported. The Chi square test was used to investigate the association between qualitative variables. To compare total and subscale scores of the IBIS between boys and girls, the Mann–Whitney test was used. In addition, the Kruskal-Wallis test was applied to compare total and subscale scores of the IBIS among body weight status groups. For post hoc test, each two groups were compared using the Mann–Whitney test considering corrected p values (the Bonferroni correction method). P values <0.05 were considered statistically significant.

Results

Descriptive statistics

Mean age and BMI of participants were 16.5 \pm 1.1 years and 22.4 \pm 4.5 kg/m², respectively. Descriptive statistics for socio-demographic variables and body weight status of study participants are presented in table 1. There were no significant differences between boys and girls in terms of parental marital status, level of education and working status. About half of both mothers and fathers had academic degrees. Most mothers were housewife and about one third of fathers were employee and about half of them were self-employed. In terms of distribution of body weight status, there was a significant difference between boys and girls.

Validity assessment

In the quantitative face validity assessment, the importance of each item was assessed and items with impact score of <1.5 were eliminated. In this stage, one item was eliminated. In qualitative content validity assessment, a total of 29 items were deleted due to having overlaps with other items or assessing lots of

unnecessary details. Another five items were deleted because they did not obtain acceptable CVI and CVR levels in quantitative assessment of content analysis.

Then, a total of 60 items entered the construct validity assessment. In EFA, another 8 items were removed due to having low values of communality or factor loading or both. For 52 items (Supplementary table 1) remained in EFA, the KMO value of 0.901, and the Bartlett's sphericity test ($p < 0.001$) confirmed sampling adequacy for EFA. The extracted ten factors were based on scree plot and eigenvalues > 1.00 . A 10-factor structure explained about 57% of total variance. Factor loadings based on rotated factor matrix and explained variance of each factor were reported in table 2. The factor loading of all items ranged from 0.464 to 0.807 on their corresponding factor.

Reliability assessment

The number of items, intra-class correlation coefficients (ICCs), and Cronbach's alpha (α) for each subscale were reported in table 3. The ICC and Cronbach's alpha values for overall scale were 0.805 and 0.896, respectively. The ICC values for subscales of IBIS ranged from 0.753 to 0.990. Moreover, range of Cronbach's alpha values for IBIS subscales was between 0.42 and 0.92.

Body image in boys and girls

Table 4 shows the median and interquartile range (Q1-Q3) for subscale and total scores of the Iranian body image scale (IBIS). Girls had higher IBIS total score compared to boys. Moreover, except for social models, perceived social support, empowerment, and body evaluation subscales, other subscale scores of the IBIS were significantly different in boys and girls; except for appearance importance in social interactions subscale, girls had significantly higher scores, compared to boys.

Body image in body weight status groups

In boys, there were no significant differences in IBIS total score among different body weight status groups. However, there were significant differences in IBIS total score among underweight, normal weight, overweight and obese girls. Based on findings of post hoc tests, the IBIS total score was significantly lower in normal weight compared to overweight ($p = 0.001$), and obese ($p = 0.001$) girls. In terms of subscales, there were significant differences in empowerment and body evaluation subscale scores among different body weight status groups in boys. Further post hoc tests indicated that underweight boys had better scores in empowerment subscale compared to their normal weight ($p = 0.005$) and obese ($p = 0.006$) counterparts; and normal weight had significantly better scores in body evaluation subscale compared to obese boys ($p = 0.002$). In girls, there were significant differences in body evaluation and emotion and behaviors subscale scores among different body weight status groups. Further post hoc tests indicated that normal weight had significantly better scores in body evaluation subscale compared to obese girls ($p = 0.004$); furthermore, normal weight girls had better scores in emotions and behaviors subscale compared to both overweight ($p < 0.001$) and obese ($p < 0.001$) girls.

Discussion

The current study reported development and psychometric properties of the IBIS, a 52-item scale that can be applied for assessment of body image and its related factors in adolescent boys and girls. The current findings support validity and reliability of the IBIS. Moreover, current findings indicated sex and body weight status were significantly associated with body image in adolescents. Girls had a more negative body image compared to boys, and overweight and obese girls had significantly more negative body image compared to their normal weight counterparts.

Although several tools exist for evaluation of body image; most of them were designed to assess certain dimension of body image. For example, Body Shape Questionnaire (BSQ) is a 34-item scale that measures body shape concerns which can associate with development, maintenance and treatment of eating disorders [10]. The Drive for The Muscularity Scale (DMS) is another scale which focused on attitudes and behaviors related to muscularity. This scale expresses the extent an individual is preoccupied with increasing muscularity and a higher score show more drive for muscularity [11]. The 16-item Adolescent Body Image Satisfaction Scale (ABISS) has been developed to assess body image satisfaction in male adolescents and encompasses three subscales of body competence, body inadequacy and internal conflict [12]. The Body Image Coping Strategies Inventory (BICSI) is a 29-item instrument that developed for assessment of three main coping strategies including avoidance, appearance fixing, and positive rational acceptance which are used for management of threats or challenges related to an individual's body image experiences [13]. The Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS) is a 34-item instrument which covers several dimensions of body image, and includes five subscales: appearance evaluation, appearance orientation, overweight preoccupation, self-classified weight, and body areas satisfaction scale. It is one the most comprehensive instrument that is widely used across different countries [16]. The Body image scale (BIS) is a 35-item instrument that has been developed for assessment of body dissatisfaction in young adult female in Pakistan. This scale encompasses three main subscales including physical component, psychological component, and strategies used to maintain one's body image [14]. However, the IBIS has been developed using the findings of a qualitative study focused on exploring different aspects of body image from the perspective of Iranian adolescents which makes it a valuable tool for assessment of adolescents' body image with a more comprehensive view. The IBIS provides a deeper and greater insight to perception of body image and its underlying factors in adolescents which can be used in designing intervention programs targeting adolescents to modify their perceptions, emotions and behaviors towards their bodies.

The IBIS can be applied as a valid and reliable instrument for assessment of different aspects related to body image in adolescents. This 52-item 10 factor solution which has been emerged in EFA can explain an acceptable amount of variance of body image (more than 50%) in participants. The factor entitled as "Emotions and behaviors" with 15 items explained the highest variance followed by "Body evaluation" and "Personal characteristics and strategies" as the second and third factors. Results of assessing internal consistency and test-retest reliability for the whole scale (IBIS), indicate high reliability of the scale for assessment of body image in youth. For IBIS subscales, the ICC values exceeded the acceptable value of 0.5 [30]. In terms of internal consistency of subscales, Cronbach's alpha coefficients for all subscales exceeded the acceptable value of 0.7 [29], except for "priority of health and spiritually", "perceived cultural

values”, and “empowerment” subscales. The Cronbach’s alpha coefficients of 0.68 and 0.67 for the first two mentioned subscales, were approximately near the acceptable threshold of 0.7. However, the value of 0.42 for “empowerment” subscale showed poor internal consistency for this subscale. In such cases, it is more common to delete the relevant item in the subscale in order to increase the Cronbach’s alpha. As there are only two items in this subscale, this approach cannot be applied. We could either remove the subscale or consider another grouping for items. We preferred to retain the related items; hence, considering the existing subscales, we arranged another grouping and merged these two items with existing items in “perceived social support” subscale and then assess the validity and reliability of the new subscale. The performed confirmatory factor analysis (CFA) for the 6-item proposed latent construct and internal consistency assessment showed satisfactory results as follows. The CFA results indicated acceptable fit for proposed construct ($\chi^2/df= 1.25$, GFI= 0.996, CFI= 0.998, RMSEA= 0.017); in addition, the Cronbach’s alpha for the new construct increased to 0.67.

Based on findings of the current study, girls had significantly a more negative body image compared to boys. In line with the current findings, previous studies reported a more negative body image and a lower levels of body satisfaction in females compared to males [4, 31, 32]. In this regards, findings of a qualitative study conducted among 12-20 years Iranian adolescents reported that most of the adolescent girls did not have positive feelings about their bodily changes during puberty which led them to feel nervous or ashamed [31]. Hence, in the current study, having a more negative body image in adolescent girls compared to boys, could be a result of body image dissatisfaction due to pubertal changes and its negative influence on their psychological well-being.

In the current study, overweight and obesity were associated with a more negative body image in girls, but not in boys. These findings may be due to perceptions of different ideals with respect to body shape and size by adolescent girls and boys [32-34]. In this regards, previous findings demonstrated that while girls tend to be dissatisfied with their bodies when their BMI is average or above average; boys tend to be dissatisfied with their body when they have a BMI either below or above average [33, 34]. In another study, girls with excessive weight were more likely to be dissatisfied with their bodies, compared to overweight boys [32]. In addition, previous studies in western societies have shown that, whereas most girls prefer a slim body shape and a smaller body size, most boys prefer a muscular body shape and a larger body size. In agreement with the current findings, a previous qualitative study conducted among adolescents residing in Tehran, a number of overweight/obese adolescent boys had a positive self-image rather than a negative one. This perception rooted in beliefs such as having higher resistance to illness and physical blows, and having similar ability to compete in sports and physical activities compared to their normal weight counterparts [35]. This may explain why body image did not differ among overweight and obese boys compared to their normal weight counterparts in the current study.

To the best of our knowledge, this is the first study that develop a comprehensive scale for assessment of body image in Iranian adolescents covering several aspects related to body image perceptions including social factors, personal characteristics and strategies, attitudes, evaluation, as well as emotions and behaviors. The limitations of this study should also be taken into consideration. First, we did not measure

adolescents' body weight and height, and the BMI was calculated using the self-reported data. Hence, some adolescents may misreport their weight and height which may result in misclassification of their BMI. Second, due to the cross-sectional nature of the current study, causal inferences about body image in relation to body weight status is not possible. Finally, participants of the current study were recruited from Tehran (an urban community); therefore, it is recommended to conduct similar study on adolescents residing in suburban and rural areas to replicate the current findings.

Conclusion

In conclusion, the current findings indicated that the IBIS can be used as a valid and reliable tool for assessment of body image and its related factors among Iranian adolescents by researchers and healthcare professionals. This scale can help professionals to identify those adolescents who are susceptible to develop a negative body image and its related health consequences like eating disorders. Moreover, in the current study, girls had more negative body image compared to boys. Additionally, overweight and obese girls had more negative body images compared to their normal weight counterparts. Therefore, it is recommended that body image to be incorporated as an important component of future health promotion programs with a focus on adolescent girls as target population, specifically in those interventions targeting overweight and obesity during adolescence.

Abbreviations

BMI: Body mass index; CFA: Confirmatory factor analysis; CVI: Content validity index; CVR: Content validity ratio; EFA: Exploratory factor analysis; ICC: Intra-class correlation coefficient; IBIS: Iranian body image scale

Declarations

Acknowledgements

The authors wish to express their appreciation to school staff and all adolescents who made this study possible. This study, as a part of PhD thesis of Miss Sara Jalali-Farahani, was supported by the Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences.

Authors' contribution

SJF, PA and FA contributed to the study design. SJF and FZ² performed data analysis. SJF wrote the first draft of the manuscript. All authors contributed to interpretation of data. PA, FZ¹, FZ² and FA critically revised the manuscript and approved the final version.

Funding

The authors received no specific funding for this work.

Ethics approval and consent to participate

This study was approved by the research ethics committee of the Research Institute for Endocrine Sciences (RIES), Shahid Beheshti University of Medical Sciences. Written informed consent was obtained from all participants. For participants less than 18 years of age/illiterates, informed consent was obtained from their parents/legally authorized representative.

Consent for publication

Not applicable.

Availability of data and materials

Data used in the current study would be available from corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Tables

Table 1. Descriptive statistics of adolescents by sex groups

	Boys (n=422)	Girls (n=435)	P value
Marital status of parents			
- Married	403(95.5)*	406(93.3)	0.257
1. Divorced/widowed	19(4.5)	29(6.7)	
Maternal level of education			
- Primary	59(14.0)	73(16.8)	0.267
- Secondary	168(39.8)	152(34.9)	
- Higher	195(46.2)	210(48.3)	
Maternal working status			
- Housewife	314(74.4)	333(76.6)	0.466
- Employed/student	108(25.6)	102(23.4)	
Paternal level of education			
- Primary	78(18.5)	77(17.7)	0.771
- Secondary	139(32.9)	136(31.3)	
- Higher	205(48.6)	222(51.0)	
Paternal working status			
- Employee/laborer	145(34.3)	164(37.7)	0.467
- Self-employed	236(55.9)	225(51.7)	
- Unemployed/retired	41(9.7)	46(10.2)	
Adolescents' body weight status			
- Underweight	11(2.6)	28(6.4)	<0.001
- Normal weight	246(58.3)	308(70.8)	
- Overweight	79(18.7)	63(14.5)	
- Obese	86(20.4)	36(8.3)	

*Data is shown as frequency (percentage)

Table 2. Factor loadings of the Iranian body image scale (IBIS) items based on rotated factor matrix

ns	Factors									
	1	2	3	4	5	6	7	8	9	10
otions and behaviors										
ive been humiliated or teased others (family members, nds, teachers, and others in community) because of my pearance and physical blems.	0.523									
ive been envious of seeing autiful or well-built body ividuals.	0.575									
ive felt ashamed because of my pearance.	0.728									
ive felt frustrated when others icize my appearance.	0.730									
ive felt disgust in some parts of body.	0.654									
ive felt sad because of atisfaction with some of my pearance features.	0.687									
ive been afraid and worried t others will not accept me for appearance.	0.664									
far as I can remember, I have do some activities I liked ying clothes or attending racurricular classes) because erogatory remarks or criticism others about my appearance.	0.673									
far as I can remember, atisfaction with my body has n a barrier to my physical ivities.	0.570									
far as I can remember, because o not like some of my pearance features, I have xed less in the mirror.	0.734									
far as I can remember, I have used to attend certain herings because of some of my pearance features (body, or al features).	0.771									
far as I can remember, because o not like some parts of my y, I have tried to wear clothes t make those parts less visible.	0.693									
far as I can remember, I was satisfied with my photos and I ed them.	0.573									
far as I can remember, when ers criticize or blame me for appearance, I have been angry started a fight.	0.672									

far as I can remember, to get body fitted, I have harmed my y by extreme dieting or doing nse exercise. 0.510

Body evaluation

Overall, I have a positive evaluation of my appearance. 0.493

Overall, I have a positive assessment of my physical health. 0.720

Overall, I have a positive evaluation of my physical ability. 0.707

General, I think my appearance is good from the others' point of view. 0.600

I think I have good physical health in the others' point of view. 0.804

I think I have good physical ability in the others' point of view. 0.782

Table 2 (Cont.). Factor loadings of the Iranian body image scale (IBIS) items based on rotated factor matrix

Items	Factors									
	1	2	3	4	5	6	7	8	9	10
Personal characteristics and strategies										
I blame myself, so I do not blame myself after hearing others criticize my appearance.			0.541							
Criticizing or praising of my appearance by others does not affect my self-esteem.			0.732							
I have set goals for myself, so others' criticism of my appearance does not upset me, because I have more important goals that I think about more.			0.693							
When the others criticize my appearance or give me a negative comment, I do not care their comments.			0.562							
I do not allow others to judge or comment on my appearance.			0.620							
I do not mention my appearance in front of others, so that they are not allowed to comment.			0.646							
Appearance importance in the future										
I believe that my facial features increase the chances of a proper marriage in the future.				0.792						
I believe that my body increases the chances of a proper marriage in the future.				0.782						
I believe that considering my				0.663						

appearance features, I have ough chance of getting hired in favorite jobs.	0.736
believe that my appearance tures increase chances of my eer success in future.	
<hr/>	
cial models	
ebrities in social networks set beauty standard for me.	0.661
ce to have faces or bodies like ors, singers or costume models.	0.712
ce to have a body like athletes.	0.465
cial networks such as Instagram Telegram affect my sfaction with my body.	0.703
number of likes or comments I from others on social media ects how I feel about my pearance.	0.535
<hr/>	
ceived social support	
en I'm sad about my pearance, my family members not indifferent to my sadness support me emotionally.	0.751
family helps me to modify my pearance defects (for example, ght loss) by taking the essary measures.	0.807
family understands my stration with my appearance blems.	0.778
en I'm upset about my pearance or my body, my nds support me emotionally.	0.589
<hr/>	

Table 2 (Cont.). Factor loadings of the Iranian body image scale (IBIS) items based on rotated factor matrix

Items	Factors									
	1	2	3	4	5	6	7	8	9	10
riority of health and spiritually not desire to change my God- en appearance features ause it was according to God's .							0.625			
ving a good personality and d morals is more important							0.618			

n having a beautiful appearance.										
Will not perform any cosmetic manipulations or surgeries that endanger my health.										0.709
In my opinion, healthy body parts are more important than physical beauty.										0.702
<hr/>										
Appearance importance in social interactions										
Want to shine in any group of people and look better than everyone else.										0.713
Want to improve my appearance so that others are more attracted to me and pay attention to me.										0.669
Appearance is very important to me, because in our society people pay a lot of attention to people's appearance.										0.573
<hr/>										
Perceived cultural values										
In our society, people are first judged by their appearance.										0.729
Our society culture is such that it encourages people to use cosmetics and perform cosmetic surgeries.										0.755
It is common in our society to tease and ridicule the appearance of people.										0.781
<hr/>										
Empowerment										
Have access to a counselor or psychologist when I feel dissatisfied with my appearance.										0.598
In addition to the core lessons, we were taught other skills at school, such as ways to boost self- confidence and how to deal with bullyers.										0.570
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Explained variance	14.24	6.58	5.80	5.25	5.10	4.71	4.37	3.83	3.62	3.50

Table 3. The intra-class correlation coefficients (ICCs) and Cronbach's alpha (α) for subscales of the Nigerian body image scale

subscales	Number of items	ICC	α
emotions and behaviors	15	0.983	0.92
body evaluation	6	0.990	0.86
personal characteristics and strategies	6	0.973	0.77
appearance importance in the future	4	0.916	0.80
social models	5	0.753	0.72
perceived social support	4	0.940	0.76
priority of health and spirituality	4	0.982	0.68
appearance importance in social interactions	3	0.860	0.71
perceived cultural values	3	0.919	0.67
empowerment	2	0.765	0.42

Table 4. Median and interquartile range (Q1-Q3) for subscale and total scores of the Iranian body image scale (IBIS) in boys and girls

Scores	Boys (n=422)	Girls (n=435)	P value
Personal characteristics and strategies	20.8(12.5-37.5)*	29.2(12.5-45.8)	<0.001
Priority on health and spirituality	6.3(0-25.0)	18.8(0-37.5)	<0.001
Appearance importance in the future	18.8(6.3-37.5)	31.3(18.8-50.0)	<0.001
Appearance importance in social interactions	66.7(50.0-91.7)	58.3(41.7-83.3)	<0.001
Perceived cultural values	83.3(66.7-91.7)	83.3(66.7-100)	0.019
Social models	50.0(30.0-65.0)	45.0(25.0-65.0)	0.245
Perceived social support	25.0(12.5-43.8)	31.3(12.5-50.0)	0.183
Empowerment	75.0(50.0-100)	75.0(50.0-100)	0.163
Body evaluation	12.5(4.2-25.0)	16.7(4.2-29.2)	0.061
Emotions and behaviors	13.3(3.3-26.7)	18.3(8.3-35.0)	<0.001
IBIS total score	30.3(24.0-38.0)	32.2(25.5-43.3)	<0.001

*Data is shown as Median (interquartile range).

Table 5. Total and subscale scores of The IBIS in boys and girls by body weight status

	Underweight (n=39)	Normal weight (n=554)	Overweight (n=142)	Obese (n=122)	P value
Group 1 (n=422)					
Personal characteristics and strategies	20.8(8.3-37.5)*	20.8(12.5-37.5)	25.0(12.5-37.5)	22.9(11.5-37.5)	0.947
Perception of health and spirituality	25.0(0-37.5)	12.5(0-25.0)	6.3(0-18.8)	6.3(0-18.8)	0.123
Perceived importance in the future	18.8(12.5-50.0)	18.8(6.3-31.3)	25.0(6.3-43.8)	25.0(10.9-45.3)	0.062
Perceived importance in social interactions	75.0(50.0-91.7)	75.0(50.0-91.7)	75.0(58.3-83.3)	66.7(47.9-85.4)	0.413
Perceived cultural values	75.0(66.7-100)	83.3(66.7-91.7)	83.3(66.7-91.7)	83.3(66.7-91.7)	0.978
Personal models	45.0(35.0-65.0)	50.0(30.0-65.0)	50.0(35.0-65.0)	40.0(30.0-60.0)	0.289
Perceived social support	18.8(12.5-43.8)	31.3(12.5-50.0)	25.0(6.3-43.8)	25.0(12.5-43.8)	0.315
Empowerment	50.0(37.5-50.0)	75.0(50.0-100)	62.5(37.5-87.5)	75.0(50.0-100)	0.005
Life evaluation	20.8(4.2-33.3)	10.4(0-25.0)	12.5(4.2-33.3)	20.8(4.2-37.5)	0.005
Attitudes and behaviors	11.7(5.0-21.7)	11.7(3.3-25.0)	16.7(6.7-26.7)	15.0(5.8-33.8)	0.057
total score	31.7(23.1-34.1)	29.8(24.0-36.7)	31.7(25.0-38.0)	31.0(23.4-43.3)	0.410
Group 2 (n=435)					
Personal characteristics and strategies	16.7(8.3-39.6)	29.2(12.5-45.8)	29.2(16.7-41.7)	39.6(16.7-57.3)	0.086
Perception of health and spirituality	18.8(0-43.8)	18.8(0-37.5)	18.8(6.3-37.5)	18.8(7.8-37.5)	0.744
Perceived importance in the future	31.3(18.8-59.4)	31.3(18.8-50.0)	31.3(12.5-56.3)	37.5(25.0-50.0)	0.195
Perceived importance in social interactions	66.7(35.4-83.3)	58.3(41.7-83.3)	66.7(41.7-83.3)	66.7(50.0-83.3)	0.484
Perceived cultural values	95.8(54.2-100)	83.3(66.7-100)	91.7(75.0-100)	83.3(75.0-91.7)	0.174
Personal models	40.0(20.0-50.0)	45.0(25.0-65.0)	50.0(35.0-70.0)	50.0(35.0-65.0)	0.160
Perceived social support	37.5(12.5-50.0)	31.3(12.5-50.0)	31.3(6.3-50.0)	31.3(12.5-54.7)	0.905
Empowerment	75.0(50.0-100)	75.0(50.0-100)	75.0(50.0-100)	75.0(62.5-100)	0.934
Life evaluation	12.5(1.0-29.2)	12.5(4.2-25.0)	20.8(8.3-33.3)	20.8(13.5-44.8)	0.006

tions and behaviors	17.5(5.4-33.3)	16.7(6.7-30.0)	30.0(16.7-46.7)	39.2(12.5-56.7)	<0.001
total score	32.2(20.4-47.4)	30.8(25.0-40.4)	36.1(29.8-47.1)	43.8(27.4-55.3)	<0.001

*Data is shown as Median (interquartile range).

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