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The Relationship between Body Image Dissatisfaction and New Anthropometric Indices in Women Referred to the Nutrition Clinic in Northwest of Iran, Ardabil City, 2019

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ABSTRACT

Introduction: Recent studies have shown a high prevalence of body image dissatisfaction in women. This study purposed to examine the relationship between body image dissatisfaction and new anthropometric indices in women.

Methods: A cross-sectional study was done among 384 women referred to the nutrition clinic in Ardabil city in 2019, using convenience sampling method. Data were collected through multidimensional body self-relations questionnaires and anthropometric measurements. This questionnaire is an attitudinal assessment of body image, using a 5-point disagrees–agree Likert scale to collect responses. Data was analyzed using SPSS software (version 21). The Pearson correlation coefficient was used to investigate the relation between body image dissatisfaction and anthropometric indices. The significance level was less than 0.05.

Results: The mean age and body mass index (BMI) of the women under study were 30.01±7.20 years and 30.21±5.17kg/m^2, respectively. Correlation analysis presented that a significant positive relationship was between all anthropometric indices and the subjective weight and overweight preoccupation subscales. The highest relationship of subjective weight subscale was found with BMI, waist circumference, and waist-to-height ratio (WHtR) ($r=0.85$, $p<0.001$) followed by abdominal volume index (AVI) ($r=0.82$, $p<0.001$). The highest relationship of the overweight preoccupation subscale was obtained with waist circumference ($r=0.44$, $p<0.001$) followed by AVI and weight ($r=0.42$, $p<0.001$) and WHtR ($r=0.41$, $p<0.001$).

Conclusion: Body image dissatisfaction was associated with anthropometric indices. The findings indicated the need for interventions designed to improve anthropometric indices and, consequently, body image dissatisfaction.

Keywords: Anthropometric Indices, Body Image Dissatisfaction, Women

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Introduction

Body image is a complex structure that refers to a person's perceptions, including feelings, thoughts, and behaviors associated with physical appearance (1). Body image is a subjective assessment of body satisfaction or dissatisfaction (2). Body image dissatisfaction is a risk factor for developing mental and nutritional disorders (3). Various disorders, such as anorexia nervosa, depression, low self-esteem, sexual dysfunction, and social anxiety (4), poor eating habits (5), and unhealthy weight management behaviors (6) are common among people with body dissatisfaction.

Although, body image dissatisfaction is a global issue (7, 8), it varies in different age and gender groups (9). The body image dissatisfaction is more common in women (10). In a study, 75% of women reported dissatisfaction with their bodies (11). In the reviewed articles, body dissatisfaction has been reported between 30% and 75% in Iran (12). Media (13), social pressures (14), self-steam (15), marital status (12), and physical activity level (16) were significantly related with body image dissatisfaction.

In recent years, the interest of researchers has focused on the relation between body image and anthropometric indicators (17). Most studies have investigated the correlation between the body mass index (BMI) (BMI) and body image dissatisfaction (18-20). Based on these results, body dissatisfaction is more common in overweight and obese people (1). Waist circumference (WC) (21), waist-to-hip ratio (WHR) (22), and waist-to-height ratio (WHtR) (21) were correlated with body dissatisfaction. Therefore, it seems that body dissatisfaction could be observed in other forms, such as fat distribution (23).

Lately, new anthropometric indicators, such as WHtR, abdominal volume index (AVI), body adiposity index (BAI), and conicity index (CI) have been studied to assess the risks of obesity (24). It seems that the use of different indices can add complementary knowledge for obesity risk factors. Given the consequences of body dissatisfaction, it is necessary to consider the relationships between new indicators and body image. In the present study, an attempt was made to address this issue.

Methods

The present study is a descriptive study on women referring to the nutrition clinic in Ardabil between October and December 2019. The sample size was determined by the formula ($n = z^2pq/d^2$ ($z = 1.96$, $p = q = 0.5$ and $d = 0.05$)). Thus, 384 healthy non-pregnant, and non-lactating women volunteers (age range: 18-45 years and BMI range: 18.50-40.00 kg/m^2) were selected by the convenience sampling method. During the past three months, the samples did not participate in weight loss programs and did not have weight changes of ±2 kg. This study was approved by the ethics committee of Ardabil University of Medical Science with the code number IR.ARUMS.REC.1398.549). The data collection process was done after obtaining an informed consent form and before any intervention.

Anthropometric measurements

Weight and height were measured using a Seca digital weight scale and a wall-mounted stadiometer, respectively. Waist and hip circumference were determined as reported by the world health organization. The anthropometric indicators were computed using the following formulas:

[1] BMI= Weight (kg) / squared height (m^2),

[2] WHR= WC (cm) / HC (cm),

[3] WHtR= WC (cm) / height (cm),

[4] BAI= [HC (cm)/ (height (m))$^{1.5}$]-18,

[5] AVI= [2×(WC(m)^2+ (0.7×(WC (m)-HC (m))^2],

and

[6]CI= $WC(m)/[0.109\sqrt{weight(kg) * height(m)}]$

, respectively.

The multidimensional body self-relations questionnaire (MBSRQ)

Body image dissatisfaction was measured using the Persian version of the multidimensional body self-relations questionnaire (MBSRQ). This questionnaire has had favorable validity and reliability (25). It consists of 69 items and ten

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subscales, including appearance evaluation (AE), appearance orientation (AO), fitness evaluation (FE), fitness orientation (FO), health evaluation (HE), health orientation (HO), illness orientation (IO), body area satisfaction scales (BASS), subjective weight (SW), and overweight preoccupation (OWP), evaluating self-attitudinal aspects of the body-image construct. Responses were collected based on a 5-point Likert scale ranging from strongly disagree = 1 to strongly agree = 5).

Statistical analysis

Initially, the normality of data distribution was checked using the Kolmogorov-Smirnov test. All quantitative variables had a normal distribution. Pearson correlation coefficient was calculated to evaluate the relationship between body image dissatisfaction and anthropometric indices. Quantitative data were reported as mean and standard deviation. SPSS software version 21 was used for data analysis and a two-tailed p-value of less than 0.05 was considered statistically significant.

Results

The mean age of study participants was 30.01± 7.20 years. According to BMI classification, only 14.3% (n= 55) of the studied women were normal weight (BMI: 18.50-24.99 kg/m^2), 27.9% (n=107) and 57.8% (n=222) were overweight (BMI: 25.00-29.99 kg/m^2) and obese (BMI≥30.00 kg/m^2), respectively. The characteristics of the samples are shown in Table 1. The WC, HC, WHR, WHtR, BAI, AVI, and CI range were 66.60-113.30(cm), 79.18-122.18 (cm), 0.71-1.00, 0.42-0.71, 19.36-41.87, 9.39-25.68, and 1.12-1.30, respectively. The AE, AO, FE, FO, HO, HE, IO, BASS, SW, and OWP subscales range were 2.08-4.83, 1.71- 4.57, 1.67-5.00, 2.08-4.38, 1.50-5.00, 1.50-4.83, 1.60-5.00, 1.00-5.00, 1.00-5.00, and 1.00-5.00, respectively.

Table 1. The participants' characteristics

Variable	Mean	SD
Weight (kg)	78.47	11.11
BMI (kg/m^2)	30.21	5.17
Waist Circumference(cm)	91.39	10.19
Hip Circumference (cm)	104.65	6.11
Waist to Hip Ratio	0.87	0.06
Waist to Height Ratio	0.57	0.06
Body Adiposity Index (%)	33.32	3.08
AVI (cm^2)	17.15	3.47
Conicity Index	1.20	0.03
Appearance Orientation	3.60	0.58
Appearance Evaluation	4.01	0.51
Fitness Evaluation	3.45	0.86
Fitness Orientation	3.35	0.66
Health Evaluation	3.23	0.58
Health Orientation	3.51	0.52
Illness Orientation	3.69	0.81
Body Areas Satisfaction	2.96	0.73
Subjective Weight	4.01	1.01
Weight Preoccupation	2.87	0.73

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Table 2. The Perason correlation between anthropometric indices and body image subscales

Variable	AE	AO	FE	FO	HE	HO	IO	BAS	SW	OWP	WT	BMI	WHR	WC	HC	WHtR	AVI	CI	BAI
AE	1																		
AO	0.35***																		
FE	0.17**	0.27***																	
FO	0.21**	0.34***	0.41***																
HE	0.39***	0.32***	0.16**	0.28***															
HO	0.19**	0.38***	0.31***	0.36***	0.46***														
IO	0.16*	0.30***	0.23***	0.32***	0.28***	0.36***													
BAS	0.21**	0.15*	0.08	0.11	0.25***	0.16*	0.05												
SW	-0.09	-0.06	0.11	0.13*	-0.01	0.14*	0.01	-0.17**											
OWP	-0.001	0.20**	0.21**	0.18**	0.20**	0.45***	0.18**	0.20	0.50***										
WT	-0.07	-0.07	0.06	0.11	-0.03	0.10	0.06	-0.04	0.81***	0.42***									
BMI	-0.09	-0.08	0.03	0.13*	-0.05	0.08	0.06	-0.13*	0.85***	0.40***	0.93***								
WHR	-0.07	-0.08	0.03	0.16*	-0.03	0.09	0.03	-0.13	0.79***	0.40***	0.82***	0.92***							
WC	-0.08	-0.08	0.05	0.12	-0.04	0.09	0.05	-0.09	0.85***	0.44***	0.98***	0.97***	0.90***						
HC	-0.07	-0.05	0.06	0.03	-0.05	0.06	0.05	-0.01	0.66***	0.35***	0.88***	0.72***	0.47***	0.81***					
WHtR	-0.09	-0.09	0.01	0.13*	-0.06	0.07	0.06	-0.15*	0.85***	0.41***	0.89***	0.99***	0.94***	0.96***	0.66***				
AVI	-0.08	-0.08	0.04	0.17	-0.04	0.09	0.07	-0.09	0.82***	0.42***	0.98***	0.96***	0.88***	0.99***	0.82***	0.94***			
CI	-0.06	-0.09	0.03	0.13	-0.04	0.06	0.05	0-.06	0.66***	0.35***	0.81***	0.77***	0.80***	0.87***	0.66***	0.81***	0.88***		
BAI	-0.11	-0.07	0.06	0.14	0.10	0.06	-0.04	-0.23**	0.67***	0.27***	0.63***	0.84***	0.62***	0.72***	0.61***	0.85***	0.71***	0.52***	1

Appearance Evaluation=AE, Appearance Orientation =AO, Fitness Evaluation=FE, Fitness Orientation=FO, Health Evaluation=HE, Health Orientation=HO, Illness Orientation=IO, Body Area Satisfaction Scales=BASS, Subjective Weight=SW, Overweight Preoccupation=OWP, Weight=WT, Body Mass Index=BMI, Waist-to-hip ratio=WHR, Waist circumference=WC, Hip circumference=HC, Waist-to-height ratio=WHtR, Abdominal Volume Index=AVI, Conicity Index=CI, and Body Adiposity Index=BAI.

*** p< 0.001 (2-tailed).

**p< 0.01 (2-tailed).

*p< 0.05 (2-tailed).

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The relationships between anthropometric indices and subscales of the MBSRQ are shown in Table 2. According to the findings, a significant positive relationship was observed between SW and OWP subscales and anthropometric indices. There was also a significant inverse relationship between BMI, BAI, and WHtR with BASS.

Discussion

The current study was designed to explore the correlation between body image dissatisfaction and new anthropometric indices in women referred to the nutrition clinic. The results showed that the highest mean subscale was associated with the AO and SW, and the lowest mean was related to the OWP and BASS subscales. In addition to weight and BMI, there was a significant direct relationship between WC, HC, WHR, WHtR, BAI, AVI, and CI with SW and OWP subscales. The findings indicated a high investment in the appearance, the perception of high weight and low body satisfaction in the studied women. Meanwhile, the mean BMI of the participants was 30.21± 5.17 kg/m^2.

In previous studies, the body image dissatisfaction has been reported in different classes of BMI (26) and even women with normal weight or overweight (27). A higher mean score in the appearance orientation subscale shows low body satisfaction. The low mean score in the overweight preoccupation subscale may have been influenced by the current situation (28). It has been shown that weight misunderstanding, defined as the difference between a person's perceived weight status, and actual weight status, can affect health-oriented behaviors (29). In such situations, individuals have less healthy behaviors for weight management and may adopt behaviors putting them at risk for weight gain and poorer general health (22, 30). This problem is more common in women than in men (27). Although, it has long been known to be specific to adolescence and youth, it has recently been reported that it persists throughout life and is needed to pay more attention in middle age (26).

In this study, the relation between anthropometric indices and the SW subscale was stronger than the correlation between anthropometric indices and OWP (r: 0.66-0.85) vs. r: 0.27-0.44). Women overestimate their weight in most cases (31,32). This will increase the score of the subjective weight scale and the correlations. It should be noted that social, media, and family pressures lead to an imbalance between actual weight, perceived weight and the ideal weight of the individual (33, 34), and this has consequences for general and mental health. Given these consequences, and since perceived weight predicts weight management and related behaviors (35), it is necessary to develop appropriate interventions to correct it.

The highest correlation was between SW subscale and BMI, WC, and WHtR. The lowest correlation of this subscale was with HC, CI, and BAI. The highest correlation was between the OWP subscale and WC, weight, AVI, and WHtR, and the lowest correlation of this subscale was with BAI, HC, and CI. Previous studies have also confirmed the relationship between BMI and body image dissatisfaction (23, 36, 37). The BMI is an indicator for assessing general obesity (38); while indicators, such as WC (39, 40), WHR (39,40), WHtR (41), and BAI (39,40) and the CI (40) are tools for assessing abdominal obesity. The correlation between these anthropometric indices and the subscales of subjective weight and overweight preoccupation indicates the effect of fat distribution and abdominal obesity on body image dissatisfaction. The consequence of abdominal obesity on body image dissatisfaction has been confirmed in other studies (17, 41). Considering the internal relationships of these anthropometric indices (Table 2), it seems that the BMI and waist circumference can easily predict body image dissatisfaction due to their strong correlations.

The main strength of the current study is to examine the relationship between new anthropometrics indicators, and body image. Also, this study had limitations that should be noted. This was a cross-sectional study that does not support the investigation of a causal relationship

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between variables. Completion of the self-report questionnaires and in the nutrition clinic environment is other limitations that may affect responses due to social desirability and environmental conditions. Completing the questionnaire was reported quite long and time-consuming by some participants, which could reduce the focus on the answers. Therefore, it is necessary to use objective and longitudinal observations in future studies.

Conclusion

The present study is one of the first to examine the relationships between new indicators and body image. Regarding to the results, body image dissatisfaction was associated with anthropometric indices. It seems that anthropometric indices can be a predictor of body image dissatisfaction. These findings also made health care professionals more aware of body image dissatisfaction in women and indicated the need for interventions to improve anthropometric indices and, consequently, body image dissatisfaction.

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Conflict of interest

The authors state no conflict interest.

Authors' contribution

FG and NH designed the study; NH contributed to data collection; data analysis was done by FG; results were interpreted by FG and NH; the manuscript was drafted by FG.

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