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Obesity and Perceived Body Shape among Adults Attending Primary Health Care Centers in Jeddah

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Authors' contributions

This work was carried out in collaboration among all authors. All authors contributed equally to this work, read and approved the final manuscript.

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ABSTRACT

Background: Body image can be defined as how an individual believes, realizes and gets along with their physical appearance. The relationship between obesity and body image is complex as studies argue that the image of the body might be influenced by obesity over psychological problems, which affects the quality of an adult's life.
Aim: To identify the association between perceived body image and obesity.
Study Design: An analytical cross-sectional.
Place and Duration: the study was conducted in two primary health care centers in Jeddah City, Saudi Arabia during 2020.

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Methodology: Target sample was 425 cases of Saudi adults of 20 years of age and above. Data was collected using questionnaire includes demographic characteristics, body image questionnaire. Anthropometric measurements include waist, Hip and neck circumference, and waist, height and weight were measured.
Results: men constitute 250 (58.8%) and 175 women (41.1%). Regarding marital status majority of participants were married (71.8%). The prevalence of obesity according to Body mass index was 37.6% among men and 42.9% among women, by high Waist circumference it was 68.8% among men and 84.6% women, using waist hip ratio, the prevalence among men was 64.8% and 53.7% among women. Neck circumference 57.2% among men and 53% for women. The prevalence of high Waist Hight Ratio was 89.2% among men and 86.9% for women.
Women showed higher Waist circumference underestimation compared to men. Using Body mass index men exhibited higher underestimation for obesity and women for overweight.
However, the significant associations between Perceived body image, waist height ratio and neck circumference were showed only among men. In general, obese participants are more likely to underestimate their actual body image by all obesity measurements.
Conclusion: A discrepancy was found in the PBI compared to different anthropometric measurements. Obese women are more likely to underestimate their obesity than men.

Keywords: Obesity; body shape; health care; waist circumference; overweight.

1. INTRODUCTION

Perceived Body Image (PBI) can be defined as how an individual believes, realizes and gets along with their physical appearance. The relationship between obesity and PBI is complex as studies argue that the image of the body might be influenced by obesity over psychological problems, which affects the quality of an adult's life [1]. The attention of researchers in the body image has expanded in recent years and studies have concentrated on the relationship between body image and anthropometric measurements. Majority of these studies clarified that high Body Mass Index (BMI) is associated with underestimation of obesity [2-4]. Depending on its level of intensity this dissatisfaction may shut down some sides of life-related eating habits, self-esteem as well as psychosocial, physical and cognitive functioning [5-7].

Anthropometric measurements have been used as representative measurements of obesity and more actual importance in both health care and for extensive observational and experimental studies. A study with a total of 6355 participants compared BMI, Waist Circumference (WC), Waist to Height Ratio (WtHR), Waist Hip Ratio (WHR) showed that WHtR was the best predictor of cardiovascular risk and mortality followed by WC and WHR [8]. Moreover, high BMI was associated with cardiovascular diseases and all-cause mortality [9].

Intra-abdominal fat appears to play an important role in metabolic complications of obesity, cardiovascular diseases, and depressive symptoms [10,11]. Studies have shown that belly fat generates a larger amount of cytokines in comparison to subcutaneous fat [12]. Additionally, elevated levels of inflammatory markers were found in abdominal obesity and depression [13]. A study among university students in Abha, Saudi Arabia, similarly that obese students are at risk of having anxiety symptoms [14].

This context reflects the passive impact of perceived body image on adult's life, this issue should be addressed by health care services planners, where these aspects can be investigated and diminished.

Limited studies addressed WC, WHtR, WHR and neck circumference (NC) with PBI samples of Saudi adults.

The result of this study will reflect thoughts of adult in Jeddah city about their body image compared to other measures of obesity which could help in preventing some future health issues arising from body shape misconception and could contribute to rising awareness on healthy measurements. The objective of this research is to identify the association between obesity using several measures and perceived body image among Saudi adults.

2. MATERIALS AND METHODS

An analytical cross-sectional study was conducted to assess the association between anthropometric measurements and its relationship with PBI.

Data was collected from 425 participants using a pre-designed structured questionnaire through an interview-based approach demonstrated questions on socio-demographic information, brief medical history and anthropometric measurements with a visual assessment representation of various body shapes.

Data was collected from two primary health care centers (PHCCs) in Jeddah City, Saudi Arabia, during 2020. Attendees to the selected centers were recruited randomly. Physically disabled adults, pregnant women, and athletes were excluded.

The questionnaire included sociodemographic questions as: Age, gender, nationality, marital status. education level, and income.

2.1 Anthropometric Measurement

Anthropometric measurements were carried out using weight scale in Kilograms, a metered tape for measuring neck circumference in midway of the neck, waist circumference as the highest point of the iliac crest for reference point and hip circumference and a stadiometer for height [15]. To minimize the effects of interobserver variation all data collectors underwent identical training.

2.2 Perceived Body Shape

Visual assessment scale figures of each gender men and women were used to assess the respondent's perceived body shape which consists of Silhouette Figures ranging from 1 to 9 with monotonic increments in the overweight percentage where 1 is the smallest Silhouette and 9 is the largest [16]. From the Figure, participants were asked to determine 'Which silhouette looks most like your body shape?'

2.3 Statistical Analysis

Data entry and analysis were performed using SPSS version 23. For each variable of socioeconomic information, frequencies and percentages were summarized. BMI was computed as weight in kilograms divided by the square of height in meters and classified according to World Health Organization guidelines [17].

Chi-Square test was used to assess the relation between each anthropometric measurements and the perceived body image according to the men and women participants. The statistical significance between data was determined by obtaining the *P*-value for each of the characteristic variables with a confidence interval (CI) of 95%.

Kappa coefficient was used to measure the agreement of PBI and obesity using several measurements including WC, WHR, NC, WtHR and BMI.

3. RESULTS

The demographic characteristics of the study population were presented in (Table 1). The men accounted for 250 (58.8%). The majority of the participants were Saudi (85.8%). Most of the participants were married (71.8%). In the education and income perspective, 55.8% had a bachelor's degree or more and 66.6% had income less than ten thousand Saudi Riyal.

3.1 Prevalence of Obesity

Table 2 shows the prevalence of obesity by various anthropometric measurements for a total of 425 participants. Regarding high WC it was 68.8% among men and 84.6% women.

Using WHR, the prevalence among men was 64.8%, compared to 53.7% among women.

Regarding neck circumference the prevalence of overweight among men was 31.6% and obesity 57.2%. Women with a prevalence of overweight 21.7% and obese 53.7%. The prevalence of high WtHR 89.2% among men and 86.9% for women.

The prevalence of obesity according to BMI was 37.6% among men and 42,9% among women.

3.2 Perceived Body Image Compared to the Anthropometric Measurements

Table 3 represents obesity measurements and the percentage of PBI for each cut-off point according to gender. In both men and women, a statistically significant association found between perceived body and WC, WtHR and BMI.

Regarding WC women showed higher underestimation, 29.1% compared to 16.3% among men. High WtHR constitutes 30.3% among womenand22.9% among men .The comparison of obesity by BMI with PBI, men showed higher underestimation for obesity and women for overweight.

However, the significant associations between PBI, WHR and NC were showed only among men.

In general, obese participants are more likely to underestimate their actual body image by all obesity measurements.

The agreement between the classification of Attendees according to perceived body image and other anthropometric measurements is presented in Table 4.

Among men, moderate agreement observed between BMI and PBI, kappa = 0.5, other anthropometric measurements showed fair agreement. However, among women WC and WtHR showed fair agreement but other measurements showed slight or no agreement.

4. DISCUSSION

This study identified the association between obesity and the PBI among adults.

False body perception has been reported to cause body image dissatisfaction, unhealthy diet and abnormal losing weight. Generally, in this study a considerable percentage of obese participants perceived their body image lower than the actual measure as reported by the study on Indian adolescent girls [18]. A study conducted in Pakistan among university students reported high prevalence of weight misperception [19].

In contrast to the study of PBI among the adolescents of Chennai this reported that although 57% of participants had normal BMI, only 38% perceived their body image as normal [20].

In agreement with the result of the current study, a study undertaken in Kansas reported that 60% of the studied sample chose a figure smaller than their perceived current size, indicating that they wanted to be thinner [21]. Albeeybe et al. [21] reported that overweight and obese participants more body image dissatisfaction, more shape, and weight worries than under-weight and normal participants did [22]. Zhang et al. [22] studied the association between weight status and weight perception reported that girls who were overweight were less likely to misclassify themselves as not being overweight in china than girls in US cities. Overweight girls from Hong Kong, Macau and Taipei perceived themselves as overweight whereas approximately 70% of girls from New York and Los Angeles did [23]. Another previous cross-sectional study reported results disagreeing with other studies that BID was observed to be lower in overweight and obesity which might be explained by the idea that BID reflects the subjective component of one's body image and the degree of satisfaction with one's own body size or specific body parts [24].

Table 1. Frequency table of the total population

Demographic Characteristics		Frequency	Percentage
Age (years) (N = 425)	20-29	106	24.9
	30-39	136	32
	40-49	74	17.4
	50 and above	109	25.6
Gender (N = 425)	Women	175	41.1
	Men	250	58.8
Nationality (N = 425)	Non-Saudi	60	14.1
	Saudi	365	85.8
Marital status (N = 425)	Married	305	71.8
	Unmarried	120	28.2
Education level (N = 425)	Bachelor's degree/ higher education	237	55.8
	High school / lower degree	188	44.2
Income (SR) (N = 418)	< 10000	283	66.6
	≥ 10000	135	31.8

Table 2. Prevalence of obesity

Anthropometric Measurements	Gender	Cut-off points	N (%)
Waist circumference (cm)	Men	≤94	78(31.2)
		>94	172(68.8)
	Women	≤80	27(15.4)
		>80	148(84.6)
Waist to Hip Ratio	Men	<0.90	88(35.2)
		≥0.90	162(64.8)
	Women	<0.85	81(46.3)
		≥0.85	94(53.7)
Neck circumference (cm)	Men	Normal <37	28(11.2)
		Overweight ≥37	79(31.6)
		Obese ≥39.5	143(57.2)
	Women	Normal <34	43(24.6)
		Overweight ≥34	38(21.7)
		Obese ≥36.5	94(53.7)
Waist to height ratio	Men	< 0.5	27(10.8)
		≥ 0.5	223(89.2)
	Women	< 0.5	23(13.1)
		≥ 0.5	152(86.9)
BMI (kg/m^2)	Men	Normal	51(20.4)
		Overweight	105(42)
		Obese	94(37.6)
	Women	Normal	43(24.6)
		Overweight	57(32.6)
		Obese	75(42.9)

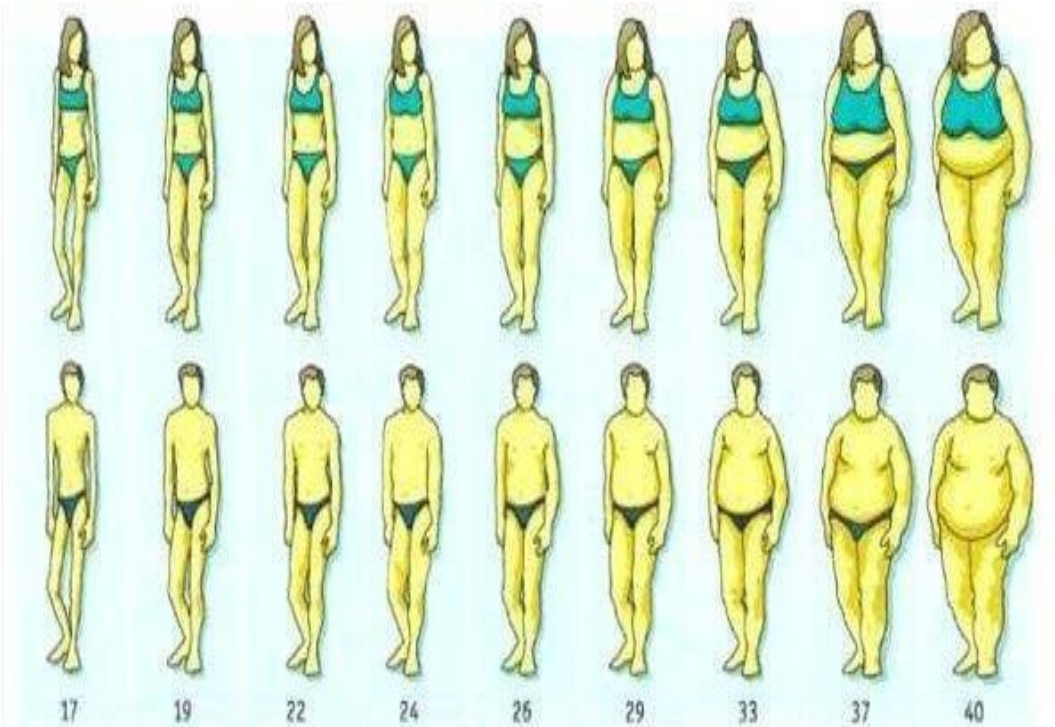

Fig. 1. Perceived body shape

Table 3. Anthropometric measurements according to perceived body image

Anthropometric Measurements	Gender	Cut-off points	Perceived Body Image			*P*-value
			Normal	Overweight	Obese	
Waist circumference (cm)	Men	≤94	43(55.1%)	33(42.3%)	2(2.6%)	<0.001
		>94	28(16.3%)	96(55.8%)	48(27.9%)	
	Women	≤80	21(77.8%)	6(22.2%)	0(0.0%)	<0.001
		>80	43(29.1%)	56(37.8%)	49(33.1%)	
Waist to Hip Ratio	Men	<0.90	36(40.9%)	40(45.5%)	12(13.6%)	0.004
		≥0.90	35(21.6%)	89(54.9%)	38(23.5%)	
	Women	<0.85	32(39.5%)	25(30.9%)	24(29.6%)	0.5
		≥0.85	32(34.0%)	37(39.4%)	25(26.6%)	
Neck circumference (cm)	Men	Normal <37	20(71.4%)	8(28.6%)	0(0.0%)	<0.001
		Overweight ≥37	28(35.4%)	44(55.7%)	7(8.9%)	
		Obese ≥39.5	23(16.1%)	77(53.8%)	43(30.1%)	
	Women	Normal <34	19(44.2%)	13(30.2%)	11(25.6%)	0.19
		Overweight ≥34	8(21.1%)	15(39.5%)	15(39.5%)	
		Obese ≥36.5	37(39.4%)	34(36.2%)	23(24.5%)	
Waist to Height Ratio	Men	< 0.5	20(74.1%)	5(18.5%)	2(7.4%)	<0.001
		≥ 0.5	51(22.9%)	124(55.6%)	48(21.5%)	
	Women	< 0.5	18(78.3%)	5(21.7%)	0(0.0%)	<0.001
		≥ 0.5	46(30.3%)	57(37.5%)	49(32.2%)	
BMI (Kg/m^2)	Men	Normal	38(74.5%)	11(21.6%)	2(3.9%)	<0.001
		Overweight	28(26.7%)	68(64.8%)	9(8.6%)	
		Obese	5(5.3%)	50(53.2)	39(41.5%)	
	Women	Normal	34(79.1%)	9(20.9%)	0(0.0%)	<0.001
		Overweight	25(43.9%)	20(35.1%)	12(21.1%)	
		Obese	5(6.7%)	33(44.0%)	37(49.3%)	
Chi-square						

Table 4. The agreement between the classification of participant according to perceived body image and anthropometric measurements

Anthropometric Measurements	Male		Female	
	Kappa	95%CI	Kappa	95%CI
Waist circumference (cm)	0.3	0.2-0.5	0.3	0.2-0.4
Waist to Hip Ratio	0.2	0.1- 0.3	0.06	-0.1- 0.2
Neck circumference (cm)	0.3	0.3 - 0.4	0.09	-0.1- 0.2
Waist to height ratio	0.3	0.2- 0.4	0.3	0.2- 0.4
BMI (kg/m2)	0.5	0.4- 0.6	0.1	0.002 - 0.2

According to our results most of the women with overweight were perceived their body image as normal, compared to the men who perceived their body image according to their actual BMI. We also found that Body shape dissatisfaction was more in girls, boys preferred a larger figure while girls choose a smaller figure than their current body shape as ideal. Golian et al. [24] showed that most of women students in both normal and obese groups had a moderate body image concern and there was no significant difference between normal and obese women in term of mean body image [25]. In this study women are more likely to underestimate their body image in contrast to similar studies on PBI which has shown that women are more likely to see themselves as overweight and to express dissatisfaction with body shape than men [26]. Aljadani HM. correlated BMI positively with body image perception among Saudi women, but this correlation was small [27]. Many other studies found that women are more possibly to overestimate their weight and consider themselves overweight than men, even if they are normal weight [28].

5. CONCLUSION

A discrepancy was found in the PBI compared to different anthropometric measurements. Obese women are more likely to underestimate their obesity than men.

We recommend that health care workers should address the body shape misperception. Moreover, a program to increase the awareness about the obesity indices and its important in assessing and monitoring weight management should be implemented through PHCCs.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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