

Perceived body image and weight: discrepancies and gender differences among University undergraduates

*Maruf FA¹, Akinpelu AO², Nwankwo MJ¹

1. Department of Medical Rehabilitation, Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, Nnewi Campus, Nnewi, Anambra State, Nigeria.

2. Department of Physiotherapy, College of Medicine, University of Ibadan, Ibadan, Nigeria.

Abstract

Background: Body image (BI) is a multidimensional construct that includes perceptual, attitudinal, behavioural components, and feedback from other people's perception of oneself. The feedback from others and the degree to which one accepts or rejects it can determine self evaluation and perception. Body weight perception is a strong determinant of nutritional habits and weight management among adolescents. One of the barriers to reducing rise in obesity prevalence could be its cultural acceptability in some developing countries.

Objective: To explore the gender influences on perception of self- and opposite-sex body images (BI), perceived body weight and the actual body weight categories at which discrepancies occur among the perceived BIs in undergraduates.

Methods: This was a survey of perceptual dimension of BI, perceived body weight and actual body weight carried out in 121 undergraduates aged 21-29years.

Results: Discrepancies occurred between self-perceived BI and each of actual body weight ($p=0.00$ at 0.00-0.02 confidence interval (CI)), perceived body weight ($p=0.01$ at 0.000-0.02 CI) and self-ideal BI ($p=0.03$ at 0.000-0.05 CI) of normal-weight males. Self-perceived BI and perceived body weight also differed in normal-weight females ($p=0.02$ at 0.000-0.04 CI). Discrepancies ($p=0.02$ at 0.00-0.04 CI) occurred between self-perceived BI and self-ideal BI, and between self-perceived BI and desired BI ($p=0.02$ at 0.00-0.04 CI) in overweight females. Gender differences occurred for self-ideal BI ($p=0.00$ at 0.00-0.02 CI), ideal image for the opposite sex (IBIOS) ($p=0.02$ at 0.00-0.04 CI) and desired BI ($p=0.00$ at 0.00-0.02 CI).

Conclusion: Normal-weight males perceived their BI differently from their actual body weight, perceived body weight and self-ideal BI whereas normal-weight females perceived their BI differently from only their perceived body weight. Discrepancies occur between self-ideal BI and self-perceived BI, and between self-perceived BI and desired BI in overweight females. There are differential perceptions of self-ideal BI, IBIOS and desired BI between males and females.

Key words: Perceived body Image, opposite sex, perceived body weight

African Health Sciences 2012; (4): 464 - 472 <http://dx.doi.org/10.4314/ahs.v12i4.11>

Introduction

Body image (BI) is a multidimensional construct that includes perceptual, attitudinal¹, behavioural components², and feedback from other people's perception of oneself³. The feedback from others and the degree to which one accepts or rejects it can determine self evaluation and perception⁴. Thus, BI has an enormous effect on an individual's life ranging from self-esteem, through personal happiness, to health³. Body weight perception is a strong determinant of nutritional habits and weight

management among adolescents⁵. One of the barriers to reducing rise in obesity prevalence could be its cultural acceptability in some developing countries⁶. Thus ideal body weight perception can influence obesity development⁷. In western society, thinness is associated with self-control, elegance, youthfulness, and attractiveness⁸. The situation, however, seems to the contrary in some developing countries⁶.

Gender is a set of characteristics and traits that is socio-culturally considered appropriate for males and females or that makes up masculinity and femininity⁹. Previous research indicates that gender influences perceptions of healthy or unhealthy lifestyles¹⁰, and that there are gender differences in making health-related decisions¹¹. Mahalik et al¹² found that masculinity and the perceptions of other men's health predicted men's own health behaviours. Similarly, Befort and Rickard⁴ stated that women looked to others for evidence of their competence more than

*Corresponding author:

Adesina F Maruf

Department of Medical Rehabilitation
College of Health Sciences and Technology
Nnamdi Azikiwe University
Nnewi Campus, Nnewi, Anambra State
Nigeria

Telephone: (+234) 08067437607

Email: mafaad@yahoo.com

did men, and therefore more easily influenced at all types of feedback. Indeed, a previous study found that 12% of Taiwanese men and 57% of Taiwanese women overestimated their body shape¹³.

There has been high interest in BI around the world. In a cross-sectional study to identify the factors associated with adequate perception of BI in relation to body weight, majority of underweight men and women classified themselves better than other groups. Overall, more women classified themselves better than men¹⁴. Also, in a multidimensional investigations of adolescents' subjective perception of own BI in Warsaw, girls more accurately assessed their BI than boys¹⁵. Further, in a study among two migrant groups from Turkey and Morocco, overweight men (63-82%) and women (35%) perceived themselves as having normal weight¹⁶. Most of these previous studies, however, came from outside Africa^{17,18,19} except for a few^{6,20} with majority of them, reporting BI in adolescents or adults (mostly women). In Nigeria, to our knowledge, no accessible study has reported BI in any population.

Perceived BI encompasses self-perceived BI, ideal BI, ideal BI for the opposite sex (IBIOS) and desired BI. Desired BI, in this study, is conceptualized as the BI an individual wants whereas ideal BI is seen as what the society dictates as acceptable. The self-perceived BI represents internal image from a pictorial stimulus whereas perceived body weight was an abstract internal image. The actual body weight was the estimated body weight status from body mass index (BMI). The IBIOS was the perceived ideal BI for the male by the female or vice versa. We examined the possible discrepancies between the desired and ideal BIs and also the actual body weight at which they occur in male and female undergraduates. We also explored the discrepancies between self-perceived BI and each of the desired and ideal BIs among these participants. Furthermore, we compared among self-perceived BI, perceived body weight and actual body weight. Again all the perceived BIs, perceived body weight and actual body weight were compared at different actual body weight categories in male and female undergraduates.

Methods

The participants for the study were students of health sciences of Nnamdi Azikiwe University, South-Eastern Nigeria, aged 21-29 years, and recruited consecutively. Prior to data collection, written informed consent of the participants was obtained

and the procedures were carried out according to Helsinki Declaration on human subjects. Information was collected on their ages, genders, heights and weights. The perceptual dimensions of BI (perceived BIs) were assessed by presenting the participants a series of nine male and nine female silhouette pictures that depict body sizes ranging from extremely thin (assigned '1') to morbidly obese (assigned '9'). This Figure Rating Scale had previously been validated by Stunkard et al²¹ in a study of BI with persons from diverse ethnic backgrounds. The Figure Rating Scale also has good test-retest reliability².

The pictures are arranged in two rows. The top row depicts male body sizes while the one below represents the body sizes for the females. The perceptual dimension of BI was explored by asking participants to indicate their self-perceived BI, self-ideal BI, desired BI and ideal BI for the opposite sex, and whether they considered themselves as underweight, normal weight, overweight, or obese-perceived body weight. The silhouette figures were assigned body weight status based on the calculated mean BMI of the participants, in this study, who chose them. The silhouette figure 1 was, however, used to designate underweight even when none of the participants chose it. The assignment of body weight status was as follows: UW (silhouette 1), NW (silhouette 2,3 and 4), OW (silhouette 5) OB (silhouette 6,7,8, and 9).

The participants' weights were measured using a weighing scale (Seca, model 762, Germany) while their height were assessed using a height meter. The resultant weight in kilograms and height in meters were used to calculate the BMI of the participants using the relation: $BMI = W/H^2$. From the calculated BMI, the participants' actual body weights were determined as underweight, normal weight, overweight, or obese using World Health Organization criterion²².

Data Analysis

Data were summarized using frequency and proportion as well as mean and standard deviation. Wilcoxon test was used to test for statistical significance of difference between perceived body weight and actual body weight, and self-perceived BI and desired BI, self-perceived BI and actual body weight, self-ideal BI and self-perceived BI, desired BI and self-ideal BI, and self-perceived BI and perceived body weight for each of the male and the female. Body weight category (underweight, normal weight, overweight, and obese) was used when

analysing for the difference between actual body weight and self-perceived BI, actual body weight and perceived body weight, and perceived body weight, and self-perceived BI. Analysis of difference between desired BI and self-ideal BI was carried out using Wilcoxon test. Mann-Whitney-U-Test was used to test for statistical significance of difference, between male and female, for actual body weight, perceived body weight, self-perceived BI, self-ideal BI, ideal BI for opposite sex, and desired BI at different actual body weight categories. All

comparison analyses were carried out at 95% confidence interval (CI).

Results

One hundred and twenty-one undergraduates, comprising about 47% males participated in this study, and had an overall average age of 22.34 ± 1.88 years. The mean values for age and anthropometric characteristics are as shown in table 1.

Table 1: Demographic and Anthropometric Characteristics of Participants

Age, yr (n=122)	BMI, kg/m ² (n=122)	WC, cm (n=122)	W/H (n=119)
	X±S.D.	X±S.D.	X±S.D.
Male	22.90±1.88	23.45±2.69	76.32±12.02
Female	21.84±1.76	22.85±2.92	74.66±7.10

BMI= Body mass index; WC= Waist Circumference; W/H= Waist-Hip Ratio

More participants tended to perceive (7.4%) themselves as underweight than they actually were (0.8%) but fewer participants tended to perceive themselves as normal weight (80.2%), overweight (11.6%) and obese (0.8%) than they actually were (81.1%), (14.8%) and (3.3% respectively) (Not shown). Fewer participants tended to perceive their BI (72.1%) as normal weight than actually were (80.2%) but more perceived their BI (24.6%) as overweight than actually were (11.6%). The same number of participants, however, perceived themselves as obese (3.3%) as the number of actually obese individuals (Not shown). More participants desired to have normal weight (83.7%) and be obese (2.3%) than those who considered normal weight (79.5%) and obesity (1.6%) as ideal, but fewer participants desired overweight (14.0%) than those who considered overweight as ideal (18.9%) (Not shown). Majority of the participants (74%) considered normal weight as ideal for the opposite sex (Not shown)

About 85% of male and 76% of female participants perceived themselves to have normal weight (Not shown). The most frequently reported male- (64.8%) and female- perceived (77.9%) self-perceived BI was normal weight and so also was for self-ideal BI (male: 57.4%; female: 97.1%), desired BI (male: 61.1%; female: 100%) and ideal BI for the opposite sex (male: 90.7%; female: 61.2%) (Not shown).

The only UW female participant perceived her actual body weight. The normal-weight males (93%) and the normal-weight females (85.5%) perceived themselves to have their actual body weight. The overweight males perceived themselves to have normal weight (60%) while the overweight females perceived themselves to be normal weight (50%) and overweight (50%). The obese female perceived themselves to be overweight (66.7%) (table 2).

Table 2 shows that the only UW participants who was a female tended to perceive herself to be of normal weight. The normal-weight males (75.6%) and females (87.7%), however, generally tended to perceive their actual BI and so also were the overweight males (70%) and females (71.4%). Furthermore, the obese males and females all tended to correctly perceive themselves to be obese BI (table 2).

The only underweight females tended to consider normal weight status as the ideal for her. The normal weight males perceived normal weight (57.8%) as ideal BI for him (table 2). The normal-weight females, however, tended to perceive normal weight (98.1%) as ideal BI. The perception of ideal BI by the overweight males was similar to that of the normal weight males in that as 60% perceived normal weight as ideal another 40% perceived overweight as such. The overweight females however, perceived normal weight as ideal BI. Also, the obese males perceived overweight as ideal while

the obese females (66.7%) tended to perceived normal weight as ideal (table 2)

The normal weight males tended to desire normal weight status (57.1%). This perception pattern is similar to that among the overweight males. The only obese male, however, desired overweight status. Interestingly, the normal weight (100%), overweight (100%), and obese (100%) females desired normal weight status (table 2).

The normal weight males considered their actual status (84.4%) as ideal for females whereas

the normal weight females were almost equally divided between normal weight status (56.6%) and overweight status (43.4%) as ideal BI for males (table 2). The overweight males (90%) and females (85.7%) considered normal weight status as their ideal BI for the opposite sex (table 2). The two obese males chose normal weight (50%) and overweight (50%) status, and the three obese females chose normal weight (33.3%), overweight (33.3%) and obese (33.3%) status as their ideal BI for the opposite sex (table 2).

Table 2: Perceived body weight and perceived body images of participants by their actual body weight status

	Male [n (%)]				Female [n (%)]			
	UW	NW	OW	OB	UW	NW	OW	OB
Perceived body weight:								
UW	-	2(4.7)	-	-	1(100.0)	6(10.9)	-	-
NW	-	40(93.0)	6(60.0)	-	-	47(85.5)	4(50)	-
OW	-	1(2.3)	4(40.0)	-	-	2(3.6)	4(50)	2(66.7)
OB	-	-	-	-	-	-	-	1(33.3)
Self-perceived BI:								
UW	-	-	-	-	-	-	-	-
NW	-	34(75.6)	3(30)	-	1(100.0)	47(87.7)	2(28.6)	-
OW	-	11(24.4)	7(70.0)	-	6(11.3)	5(71.4)	-	-
OB	-	-	-	2(100.0)	-	-	-	3(100)
Self-Ideal BI:								
UW	-	-	-	-	-	-	-	-
NW	-	26(57.8)	6(60.0)	-	1(100.0)	52(98.1)	7(100.0)	2(66.7)
OW	-	17(37.8)	4(40.0)	2(100.0)	-	1(1.9)	-	1(33.3)
OB	-	2(4.4)	-	-	-	-	-	-
Desired BI:								
UW	-	-	-	-	-	-	-	-
NW	-	8(57.1)	2(66.7)	-	-	15(100.0)	6(100.0)	1(100.0)
OW	-	4(28.6)	3(33.3)	1(100.0)	-	-	-	-
OB	-	2(14.3)	-	-	-	-	-	-
Ideal BI for opposite sex:								
UW	-	-	-	-	-	-	-	-
NW	-	38(84.4)	9(90.0)	1(50)	-	30(56.6)	6(85.7)	1(33.3)
OW	-	3(6.7)	1(10.0)	1(50%)	-	23(43.4)	1(14.3)	1(33.3)
OB	-	4(8.9)	-	-	-	-	-	1(33.3)

Table 3 shows that the normal-weight males perceived their BI greater than their actual body weight ($p=0.00$ at 0.00-0.02 confidence interval (CI)), their self-perceived BI greater than their perceived body weight ($p=0.01$ at 0.000-0.02 CI) and their ideal BI greater than their self-perceived BI ($p=0.03$ at 0.000-0.05 CI). The normal-weight females

perceived their BI to be greater than their perceived body weight ($p=0.02$ at 0.000-0.04 CI). The overweight females desired BI was less than their perceived BI ($p=0.02$ at 0.00-0.04 CI), and their ideal BI less than their perceived BI ($p=0.02$ at 0.00-0.04 CI) (table 3).

Table 3: The Actual body weight category at which discrepancy occurred among perceived body images, PBW, and ABW of participants

	Male P-value (95% CI)	Female p-value (95% CI)
Self-Perceived Body Image Vs Actual Body Weight:		
Normal Weight (n=99)	0.00(0.00-0.02)*	0.07(0.03-0.12)
Overweight (n=18)	0.26(0.19-0.34)	0.63(0.54-0.72)
Obese (n=4)	-	-
Actual Body Weight Vs Self-Perceived Body Weight:		
Normal Weight (n=98)	1.00(0.98-1.00)	0.35(0.26-0.43)
Overweight (n=18)	0.07(0.03-0.12)	0.17(0.09-0.23)
Obese (n=4)	-	0.63(0.54-0.71)
Self-Perceived Body Weight Vs Self-Perceived Body Image:		
Normal Weight (n=98)	0.01(0.000-0.02)*	0.02(0.000-0.04)*
Overweight (n=18)	0.32(0.24-0.41)	0.73(0.65-0.80)
Obese (n=4)	-	0.63(0.54-0.72)
Self-Perceived Body Image Vs Desired Body Image:		
Normal Weight (n=31)	0.56 (0.49-0.67)	0.70 (0.62-0.78)
Overweight (n=10)	1.00 (0.98-1.00)	0.02 (0.00-0.04)*
Obese (n=4)	-	-
Self-Perceived Body Image Vs Self-Ideal Body Image:		
Normal Weight (n=99)	0.03 (0.000-0.05)*	0.46 (0.37-0.54)
Overweight (n=18)	0.43 (0.34-0.52)	0.02(0.00-0.04)*
Obese (n=4)	-	0.28 (0.19-0.33)
Desired Body Image Vs Self-Ideal Body Image:		
Normal Weight (n=31)	1.000(1.000-0.976)	0.09(0.04-0.14)
Overweight (n=10)	-	1.00(0.98-1.00)
Obese (n=2)	-	-

Table 4 shows that the males perceived larger ideal BI for themselves ($p=0.00$ at 0.00-0.02 CI) than the females did, but perceived smaller ideal BI for the

opposite sex ($p=0.02$ at 0.00-0.04 CI) than the females did. The males also desired larger BI ($p=0.00$ at 0.00-0.02 CI) than the females did (table 4).

Table 4: Comparison of perceived BIs, perceived and actual body weights between male and female participants

Variable	p-value(95% CI)
Actual body weight (n=122)	0.39(0.30-0.48)
Overall perceived body Image (n=122)	0.11(0.05-0.16)
Self ideal body image (n=122)	0.00(0.00-0.02)*
Ideal body image for opposite Sex (n=121)	0.02(0.00-0.04)*
Desired body image (n=43)	0.00(0.00-0.02)*
Perceived body weight (n=121)	0.68(0.50-0.76)

*= significant

Discussion

This report presents the perceived BIs of self (self-perceived BI, ideal BI, and desired BI) and the opposite sex as well as perceived body weight in relation to actual body weight of a sample of university undergraduates. This study had shown that male and female participants generally tended to perceive normal weight as the current BI, self-ideal BI, desired BI and ideal BI for the opposite sex. Moreover, males and females generally tended to perceive their actual body weight as their current BI contrary to the findings by McArthur et al¹⁹ that very few of the heavier males and females perceived themselves as heavy, based on their selections of the lighter and middle weight BI. The normal-weight males and females, and the overweight males and females, tended to perceive normal weight as their self-ideal BI, desired BI and ideal BI for the opposite sex. The obese males and females, however, tended to perceive normal weight and overweight as their ideal and desired BIs. The difference in the findings may be that whereas the findings in the current study are general, those of McArthur's et al¹⁹ are specific to heavy-weight category individuals. The obese males also perceived normal weight and overweight as their ideal BI for the opposite sex while the obese females perceived, to the same degree, normal weight, overweight and obesity as their ideal BI for the opposite sex. These findings indicate that there are discrepancies in the perceptions of each of self-ideal BI and desired BI in relation to self BI, in males and females, only in overweight and obese status.

The normal-weight males overestimated their actual body weight in terms of their current BI. Considering this overestimation in normal-weight males, there could be unhealthy tendencies to embark on weight reduction practices when it is unnecessary. This may make those who are already in the lower end of the normal-weight range to become underweight. The finding for the normal-weight males in this study conforms to those of other authors who found that overestimation of BI is a common finding in the general population^{22, 23, 24}. Indeed, a large percentage of men idealise a heavily muscular, yet lean physique^{26, 27}. Gruber et al²⁸ found that adult men typically select an ideal body that is more muscular, but not fatter, than their own. The finding that the normal-weight males' and females' current BIs were greater than their perceived body weight in this study may mean that our conceptualization for current BI and perceived body weight only holds true for normal-weight males and

females. In addition, the findings that the normal-weight males estimated their self-ideal BI higher than their current BI and that the overweight females estimated their ideal and desired BIs lower than their self-perceived BI may mean that the normal-weight males' ideal BI is higher than they perceived for themselves whereas the overweight females' ideal and desired BIs are lower than they perceived for themselves. A previous study had indicated that girls with higher BMI probably worry more about body shape and desire to be thinner²⁹.

It could be speculated that these girls, in comparison with peers, receive remarks from relatives or friends since childhood about being large and they form an image of themselves of being even larger³⁰. The finding for the normal-weight males conforms to the report that a discrepancy between current and ideal BI is not necessarily comparable with perception of overweight³¹. Perception of overweight may occur before or after there is a discrepancy between the current and ideal BI³¹. However, a discrepancy between an individual's current and ideal BIs may reflect body dissatisfaction and may be a factor that predisposes one to weight-loss activities³¹. The findings, in this study, of no discrepancy between the desired BI and self-ideal BI, of males and females, at all categories of actual body weight, have disproved our conceptualization that these two 'variables' may have differential notions among these participants.

The findings for the perceived BIs has implications in the sense that they represent a particular body weight in this individuals and the higher the self-perceived BI the larger the body weight category it represents and vice versa. This means that the normal-weight males who considered, as ideal, a BI higher than he perceives himself to be may want to add weight to his set 'ideal'. This may push him from his desirable body weight to overweight or even obese, if it is unabated. The overweight females, however, whose ideal and desired BIs are lower than their self-perceived BI may desire to lose weight and this may not stop even when they have achieved reasonable weight loss to normal weight and may be tempted into unhealthy practices for further weight loss. This feeling of the need to lose weight may be chronic and persistent. In fact, Brodie and Slade [30] found that the desire to diet was positively associated with a larger discrepancy between the actual and ideal BIs in a sample of adult women. Body image discrepancy can have a negative impact on self-concept and can potentially impact

healthy weight control efforts and long-term success³¹. Riley et al³² found in a sample of 1143 black women that a higher BMI was associated with both a lower self-image and lower BI satisfaction. The data, in this study, underscore the need to prevent obesity and the associated health risks, in overweight females, for a variety of reasons, including preventing the development of body dissatisfaction. This implies that healthy eating and exercise patterns, and a positive BI need to be developed and nurtured at younger ages in these young adults.

The females desired and considered as ideal for themselves a smaller BI than males desired and considered, and males considered as ideal for females a smaller BI and vice versa. These findings are consistent with previous findings that girls showed stronger preference for the lower weight silhouette than boys^{33,34}. These findings are of concern because they may not only suggest that these girls harbor a strong appreciation for the extremely thin female body, but that they also believe that this BI, suggestive of under-nutrition, depicts good health²². In this regard, several authors have observed that the same idealized images of male and female attractiveness, conveyed by the print and film media in industrialized societies, are being disseminated continuously in developing societies, where they appear to be promoting change in traditional standards of masculine and feminine attractiveness^{34,35}.

Generally, the findings in this study are similar to those from previous studies of different ethnic and cultural backgrounds. These similarities, albeit different cultural backgrounds and value systems, may indicate the gradual disappearance of cultural boundaries worldwide, through globalization and advances in information technology which allow for acculturation of individuals even when being far away from the original sources of such cultures. Most of the previous studies in this area of research are on western samples. University undergraduates are the sample for the current study. Undergraduates are exposed to western cultures in many forms, such as, through the media, books, movies, and the internet, and these exposures, consciously or subconsciously, tend to mould their views and attitudes in the western way. It is thus not surprising that their perceptions are similar to those from the western worlds.

Some limitations in this study have to be kept in mind in interpreting the findings. The first is the small sample size for a survey like this which limited

analyses in some actual body weight categories. Secondly, the findings in this study cannot be generalised beyond young adults. To understand the perceptual dimension of BI and perceived body weight with regards to actual body weight in other age groups, more studies of this nature are eagerly awaited. Furthermore, future studies exploring the association between body satisfaction and discrepancies between perceived and desired BIs as well as weight control practices commonly employed to control or maintain body weight are recommended.

Conclusion

Normal-weight males estimated their actual body weight and ideal BI higher than their perceived BI. Normal-weight males and females had their perceived BI greater than their perceived body weight. The overweight females estimated their ideal and desired BIs higher than their perceived BI. Perceived body weight and perceived BI are different notions to the normal-weight males and females. Males perceived smaller self-ideal BI for the female than the female perceived for the male. Desired BI and self-ideal BI are perceived as the same by males and the females.

References

1. Dolce JJ, Thompson JK, Register A, Spana RE. Generalization of body size distortion. *International Journal of Eating Disorder*. 1987; 6:401– 8.
2. Thompson JK, Altabe MN. Psychometric qualities of the Figure Rating Scale. *International Journal of Eating Disorder*. 1991; 10:615–9.
3. Jstes D. A. (1999). Body Image: How You See It, How You Don't. National Undergraduate Research Clearinghouse, 2. Available online at <http://www.webclearinghouse.net/volume/>. Retrieved January 3, 2011.
4. Befort CA & Rickard KM. Gender similarities in response to figure-size feedback in a selected non-clinical population. *Sex Roles* 2003; 49: 71-80
5. Brener ND, Eaton DK, Lowry R, Mamanus T. The association between weight perception and BMI among high students. *Obesity Research* 2004; 12:1866-1874
6. Holdsworth M, Gartner A, Landais E, Maire B, Depleuch F. Perception of healthy and desirable body size in urban Senegalese women.

- International Journal of Obesity and Related Metabolic Disorder* 2004; 28: 1561-1568
7. Flynn K, Fitzgibbon BM Body images and obesity risk among black females: a review of literature. *Annals of Behavioural Medicine* 1998; 20: 13-24
 8. Metcalf PA, Seragg RK, Willoughby P, Finau S, Tippen-Leach D Ethnic differences in perceptions of body size in middle-aged European, Maori and Pacific people living in New Zealand. *International Journal of Obesity and Related Metabolic Disorder* 2000; 24:593-599
 9. Crawford, M. Transformations: Women, Gender and Psychology. McGraw-Hill: New York, U.S.A. 2006
 10. Von Bothmer, M., & Fridlund, B. Gender Differences in Health Habits and in Motivation for a Healthy Lifestyle among Swedish University Students. *Nursing and Health Sciences* 2005; 7: 107-11
 11. Nolen-Hoeksema, S Possible Contributors to the Gender Differences in Alcohol Use and Problems. *The Journal of General Psychology* 2006; 133(4): 357-374.
 12. Mahalik, J., Burns, S., & Syzdeky, M. Masculinity and perceived normative health as predictors of men's health behaviors. *Social Science and Medicine*, 2007; 64: 2201-2209
 13. Shih, M. Y., & Kubo, C. Body Shape Preference and Body Satisfaction in Taiwanese College Students. *Psychiatry Research* 2002; 111: 215-228.
 14. Sánchez-Villegas A, Madrigal H, Martínez-González MA, Kearney J, Gibney MJ, de Irala J, JMartínez JA Perception of body image as indicator of weight status in the European Union. *Journal of Human Nutrition & Dietetics* 2001; 14:93
 15. Supranowicz P Relative validity of self-assessment of silhouette and body mass index. *Am J Health Behav*, 2004; 28(5):437-43
 16. Nicolaou M, Doak C, van Dam R, Hosper K, Jaap Seidell J, Stronks K Body size preference and body weight perception among two migrant groups of non-Western origin; *Public Health Nutrition*, 2008; 11(12): 1332-1341
 17. Swami V & Tovee MJ The relative contribution of profile body shape and weight to judgement of women's physical attractiveness in Britain and Greece. *Sex Role*; 2007 54:201-211
 18. Mahmud N & Crittenden N A comparative study of body image of Australian and Pakistani young females. *British Journal of Psychology* 2007; 98:187-198
 19. McArthur L H, Holbert D, Pena M. An exploration of the attitudinal and perceptual dimensions of body image among male and female adolescents from six Latin American Cities. *Adolescence* 2005; 40(160): 801-816
 20. Rguibi M & Belahsen R Body size preferences and sociocultural influences on attitudes towards obesity among Moroccan Sahraoui women. *Body Image* 2006; 3: 395-400
 21. Stunkard, A. J; Sorenson, T. & Schulsinger, F. "Use of the Danish Adoption Registry for the Study of Obesity and Thinness"; In: SS Kety, LP Rowland, R Sidman, & SW Matthyse, editors. *Genetics of Neurological and Psychiatric Disorders*. New York: Raven Press; 1983: 115-120.
 22. World Health Organization. Body mass index. 2009 www.who/bmi/classification.com accessed on 2/10/2009
 23. Raich R.M, Rosen J, Deus J., Perez, D., Requena, A. & Gross, J. Eating disorder symptoms among adolescents in the United States and Spain: A comparative study. *International Journal of Eating Disorders*. 1992; 11, 63-72.
 24. Rand, C.S. & Wright, B.A. Continuity and change in the evaluation of ideal and acceptable body sizes across a wide age span. *International Journal of Eating Disorders*. 2000; 28: 90-100.
 25. Bergstrom, E., Stenlund, H. & Svedjehall, B. Assessment of body perception among Swedish adolescents and young adults. *Journal of Adolescent Health*. 2000; 261, 70-75.
 26. Olivardia R. Body image and muscularity. In: Cash TF, Pruzinsky T, eds. *Body image: a handbook of theory, research, and clinical practice*. New York: Guilford Press, 2002:210-18.
 27. Pope HG, Phillips KA, Olivardia R. *The Adonis complex*. New York: Free Press, 2000.
 28. Gruber AJ, Pope HG, Borowiecki JJ, et al. The development of the somatomorphic matrix: a bi-axial instrument for measuring body image in women and men. In: Olds TS, Dollman J, Norton KI, eds. *Kinanthropometry VI*. Sydney: International Society for the Advancement of Kinanthropometry, 1999: 217-31.
 29. Vander Wal JS & Thelen, M.H. Eating and body image concerns among obese and average weight children. *Addictive Behavior*. 2000; 25, 775-778.

30. Brodie SM & Slade PD. The relationship between body image and body fat in adult women. *Psychological Medicine*. 1988; 18:623–31.
31. Fitzgibbon ML, Blackman LR, Avellone ME. The relationship between body image discrepancy and body mass index across ethnic groups. *Obesity Research*. 2000; 8(8) (e-publication)
32. Riley NM, Bild DE, Cooper L, Schreiner P, Smith DE, Sorlie P, Thompson JK. Relation of self-image to body size and weight loss attempts in black women. *American Journal of Epidemiology*. 1998; 148:1062– 1068.
33. Fonseca VM, Sichieri R, & Veiga GV. Factores asociados a obesidade em adolescentes [Factors associated with obesity in adolescents]. *Revista Saude Publica*, 1998; 32, 541-549.
34. Durvasula S, Lysonski S, & Watson J. Does vanity describe other cultures? A cross-cultural examination of the vanity scale, *Journal of Consumer Affairs*. 2001; 35, 180-199.
35. Devlin MJ, & Zhu AJ. Body image in the balance. *Journal of the American Medical Association*. 2001, 286, 21-59.