

Body Image and its Relation with Body Mass Index among Indian Adolescents

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Objective: To evaluate association of body mass index with perception and attitude towards bodyweight, shape and body image among adolescents. **Methods:** This cross-sectional study was done on 1811 adolescents. Attitude towards body image was assessed by using a self-administered Multidimensional Body-Self Relations Questionnaire. Perceived body shape was measured using the Stunkard scale. **Results:** Adolescents showed significant difference ($P<0.005$) in perceptions and behaviors related to appearance, fitness, health, body areas and weight across various body mass index and socioeconomic categories. Girls articulated significantly higher ($P<0.005$) body dissatisfaction than boys. **Conclusions:** Attitudes and perceptions towards body image differ with sex, body mass index and socioeconomic class.

Keywords: Adolescents, Body image, Body mass index.

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Body image is the way a person perceives or thinks about his/her body and how it looks to others. It can be divided into perceptual and attitudinal body image. A person is said to be suffering from poor body image when he/she focuses on the negative or imaginary negative aspects related to own body or its competence to the total exclusion of positive aspects [1]. A study on factors of body image in Japanese and Vietnamese adolescents concluded that girls from both Vietnam and Japan prefer a thinner body image than healthy body image but Japanese girls desire a smaller ideal size than Vietnamese girls do. Besides, Vietnamese boys desire more muscular body than Japanese boys [2]. This signifies that there are sociocultural differences in body image perception among various groups of adolescents. This highlights the need to study body image concerns in adolescents from various sociocultural backgrounds, as not many such studies have been done on Indian adolescents [3-5]. Besides, majority of studies focused only on female adolescents and college-going population [6]. In this study, we evaluated association of body mass index (BMI) with perception and attitude towards body weight, shape and body image among adolescents.

METHODS

This cross-sectional study was conducted during academic year 2015-2016 in Pune, India. The study procedures were approved by the Ethics Committee of our institute. All the schools in the city of Pune were

enlisted. Convenient sampling was used for selection of schools. Data were collected after permission from school authorities. The socioeconomic variables were considered to be associated to type of school attended and fee structure of school. BMI was categorized according to revised Indian Academy of Pediatrics (IAP) cut-off points [7]. Perceived body shape was measured using the Stunkard scale, which consists of silhouette drawings [8]. The difference between current body shape and ideal body shape was used to determine the level of dissatisfaction with body image. Participant's attitude towards body image was assessed by using a self-administered Multidimensional Body-Self Relations Questionnaire (MBSRQ) [9]. There are 69 items in this measure, which are broken down into subscales: the first three special multi item subscales are the revised Body-Self Relations Questionnaire subscales, the Body Areas Satisfaction Scale and the weight attitude scales. An interpretation for each subscale is based on high and low scores. The questionnaire was translated into Marathi language according to universal translation method and tested for internal consistency. Internal consistency of the MBSRQ was obtained using Cronbach's Alpha, ($\alpha=0.781$) indicating reliability of questionnaire. Statistical analyses were performed with Statistical Package for the Social Sciences version 20.0 (SPSS, Inc., Chicago, IL, USA).

RESULTS

A total of 1811 participants (956 boys) of age group 13-

16 years (mean (SD) 13.9 (0.63) years) from different schools were included.

There was a significant association ($P<0.005$) between attitude towards body image and BMI among boys and girls. Significant difference ($P<0.005$) was found in mean score of sub scales of MBSRQ such as appearance, fitness, body areas satisfaction and overweight preoccupation according to BMI categories among boys; whereas among girls, this difference was noted in subscales of appearance, health, body area satisfaction and overweight preoccupation (**Table I**).

Significant association ($P<0.05$) was observed about self and others' perception of body weight and BMI categories for boys and girls as well as for both the socioeconomic class. (**Web Tables I and II**). There was noticeable difference in the perception of body weight between the genders with 40% of overweight boys considering themselves as having normal weight compared to girls from the same class.

We observed statistical significant ($P<0.05$) difference among boys and girls of both the

socioeconomic classes regarding perception of current body shape, ideal body shape and body dissatisfaction. Compared to boys, girls chose significantly ($P<0.05$) smaller ideal body shapes and articulated a significantly higher level of body dissatisfaction (**Table II**).

DISCUSSION

In this cross-sectional study, we found significant body image concerns in Indian adolescents in both boys and girls across socioeconomic classes. Body shape dissatisfaction was more in girls. Boys preferred a larger figure while girls chose a smaller figure than their current body shape as ideal. Higher number of girls misperceived their body weight. As compared to normal weight adolescents, under weight and overweight/obese boys and girls were unhappy with size and appearance of several body areas. These adolescents also showed fat anxiety, weight vigilance, dieting and eating restraint. Significant association was found between various BMI categories and attitude towards appearance.

Our study had limitation of being focussed only on

TABLE I ATTITUDE TOWARDS BODY IMAGE AMONG BOYS ($N=956$) AND GIRLS ($N=855$) ACCORDING TO BMI CATEGORY

Attitude scales of MBSRQ	BMI category			P value
	Underweight	Normal weight	Overweight and Obese	
<i>Boys</i>				
Appearance evaluation	3.41 (0.5)	3.49 (0.59)	3.33 (0.68)	0.003
Appearance orientation	3.52 (0.59)	3.43 (0.64)	3.39 (0.67)	0.321
Fitness evaluation	3.61 (0.88)	3.88 (0.82)	3.79 (0.79)	0.035
Fitness orientation	3.67 (0.56)	3.87 (0.58)	3.80 (0.63)	0.033
Health orientation	3.39 (0.49)	3.51 (0.55)	3.48 (0.55)	0.262
Health evaluation	3.33 (0.65)	3.46 (0.63)	3.36 (0.61)	0.06
Illness orientation	3.44 (0.71)	3.30 (0.85)	3.31 (0.74)	0.43
Body areas satisfaction scale	3.51 (0.81)	3.92 (0.69)	3.70 (0.74)	0.001
Overweight preoccupation	2.36 (0.78)	2.37 (0.89)	2.79 (0.91)	0.001
<i>Girls</i>				
Appearance evaluation	3.10 (0.58)	3.34 (0.57)	3.18 (0.62)	0.001
Appearance orientation	3.69 (0.55)	3.62 (0.59)	3.69 (0.65)	0.32
Fitness evaluation	3.47 (0.8)	3.73 (0.8)	3.67 (0.75)	0.06
Fitness orientation	3.60 (0.48)	3.77 (0.57)	3.73 (0.54)	0.09
Health orientation	3.43 (0.44)	3.53 (0.54)	3.54 (0.53)	0.47
Health evaluation	3.30 (0.60)	3.48 (0.62)	3.33 (0.63)	0.004
Illness orientation	3.53 (0.74)	3.56 (0.88)	3.46 (0.88)	0.36
Body areas satisfaction scale	3.59 (0.56)	3.81 (0.63)	3.50 (0.62)	0.001
Overweight preoccupation	2.51 (0.90)	2.60 (0.95)	3.21 (0.91)	0.001

All values in mean (SD); BMI: body mass index, MBSRQ: multidimensional body self relations questionnaire.

WHAT THIS STUDY ADDS?

- Indian adolescents (age 13 to 16 years) have inaccurate perception of their body weight and shape which varies across different BMI categories.

TABLE II PERCEPTION OF BODY SHAPE IN ADOLESCENTS (N=1811)

Body Shape	Boys	Girls	P value
<i>High Socioeconomic Class</i>			
Current body shape	4.44 (1.30)	3.64 (1.20)	<0.001
Ideal body shape	4.62 (0.66)	3.32 (0.79)	<0.001
Body dissatisfaction	-0.19 (1.33)	0.31 (1.12)	<0.001
<i>Low Socioeconomic Class</i>			
Current body shape	4.32 (1.34)	3.67 (1.19)	<0.001
Ideal body shape	4.59(0.98)	3.62 (0.89)	<0.001
Body dissatisfaction	-0.27 (1.31)	0.27 (1.11)	<0.001

Body dissatisfaction = current body shape - ideal body shape. Based on the Modified Figure Rating Scale of Stunkard. All values in mean (SD).

urban children from a single city. We did not include children from early or late adolescence. We could not assess specific entities like breast size or penile length. Unlike our study, most other studies were on girls or late adolescence age (>16 yrs), and focused on perception of body shape rather than attitude.

In our study, we used BMI as an objective marker of the adolescent's overall bodyweight against the subjective evaluation by the adolescent of his/her own bodyweight. A few studies found that compared to males, females tend to be more dissatisfied with their body image during puberty phase [10-12]. Similar to our results, literature shows higher number of girls misperceiving their body weight [13,14]. The body weight misperception may lead to body image dissatisfaction, eating disorders and unhealthy diet practices among adolescents. Self-esteem plays a big role in how a person perceives his/her own body. This may explain why some of the normal weight adolescents in our study were unhappy.

Body shape is quite a sensitive topic in adolescents. The ideal body shape may differ by gender as well as sociocultural norms. Most of the studies reported that boys relate to muscular fitness while girls want thinner and slimmer body [3,5,13]. Tendency of boys to desire muscular body is related to physical strength, hardness and power. In our study, boys selected a larger figure than their current body shape while girls chose a smaller figure

than their current body shape as ideal body shape. This is similar with previously reported studies [15]. The society considers looks more important in girls where as other things such as strength matter in boys. As against normal weight boys and girls, underweight and overweight/obese adolescents were unhappy with size or appearance of several areas in our study. The parents and peer influence, media portrayal and cultural invasion have reinforced this stereotype.

We suggest appropriate interventions such as life skills education and media literacy to minimize body image issues. In addition, information regarding normal growth and its variations should be provided to adolescents. Nationwide research is recommended to generalise our findings as well as to examine the parents' and peers' perception of adolescents' body image.

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Contributors: VRD: conception and design of the study; VRD, AAK: organized the conduct of the study, supervised acquisition of data, analyzed the data and reviewed the literature. Both authors contributed to drafting of the work, approved the final version of the article, and agree to be accountable for all aspects of the work.

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WEB TABLE I PERCEPTION OF BODY WEIGHT BY SELF (I THINK I AM) FOR GENDER AND SOCIOECONOMIC CLASS IN BOYS AND GIRLS

Perception		BMI Category, No (%)				P value
<i>Boys</i>						
HSEC	I Think I am	Underweight (n = 11)	Normal (n = 309)	Ow/Ob (n = 164)	Total (n = 484)	0.0001
	Underweight	7 (63.6%)	92(29.8%)	3 (1.8%)	102 (21.1%)	
	Normal	4 (36.4%)	193(62.5%)	65 (39.6%)	262 (54.1%)	
	Ow/Ob	0	24 (7.8%)	96 (58.5%)	120 (24.8%)	
LSEC	I Think I am	Underweight (n = 46)	Normal (n = 338)	Ow/Ob (n = 88)	Total (n = 472)	0.0001
	Underweight	34 (73.9%)	120 (35.5%)	09 (10.2%)	163 (34.5%)	
	Normal	07 (15.2%)	174 (51.5%)	31 (35.2%)	212 (44.9%)	
	Ow/Ob	05 (10.9%)	44 (13.0%)	48 (54.5%)	97 (20.6%)	
<i>Girls</i>						
HSEC	I Think I am	Underweight (n = 17)	Normal (n = 295)	Ow/Ob (n = 143)	Total (n = 455)	0.0001
	Underweight	13 (76.5%)	69 (23.4%)	3 (2.1%)	85 (18.7%)	
	Normal	04 (23.5%)	197 (66.8%)	39 (27.3%)	240 (52.7%)	
	Ow/Ob	0	29 (9.8%)	101(70.6%)	130 (28.6%)	
LSEC	I Think I am	Underweight (n=31)	Normal (n = 306)	Ow/Ob (n = 63)	Total (n = 400)	0.0001
	Underweight	27 (87.1%)	74 (24.2%)	03 (4.8%)	104 (26.0%)	
	Normal	03 (9.7%)	173 (56.5%)	11(17.5%)	187 (46.75%)	
	Ow/Ob	01(3.2%)	59 (19.3%)	49(77.8%)	109 (27.25%)	

Ow /Ob= Overweight and Obese; HSEC= High Socioeconomic Class; LSEC= Low Socioeconomic Class.

WEB TABLE II PERCEPTION OF BODY WEIGHT BY OTHERS (OTHER THINK I AM) FOR GENDER AND SOCIAL CLASS.

Perception		BMI Category, No (%)				P value
<i>Boys</i>						
HSEC	I Think I am	Underweight (n = 11)	Normal weight (n = 309)	Ow/Ob (n = 64)	Total (n = 484)	<0.001
	Underweight	10 (90.9)	129 (41.7%)	5 (3.0%)	144 (29.8%)	
	Normal	01 (9.1)	158 (51.1%)	74 (45.1%)	233 (48.1%)	
	Ow/Ob	0	22 (7.1%)	85 (51.8%)	107 (22.1%)	
LSEC	I Think I am	Underweight (n = 46)	Normal weight (n = 338)	Ow/Ob (n = 88)	Total (n = 472)	<0.001
	Underweight	34 (73.9%)	120 (35.5%)	09 (10.2%)	163 (34.5%)	
	Normal	07 (15.2%)	174 (51.5%)	31 (35.2%)	212 (44.9%)	
	Ow/Ob	05 (10.9%)	44 (13.0%)	48 (54.5%)	97 (20.6%)	
<i>Girls</i>						
HSEC	I Think I am	Underweight (n = 17)	Normal weight (n = 295)	Ow/Ob (n = 143)	Total (n = 455)	0.001
	Underweight	13 (76.5%)	94 (31.9%)	8 (5.6%)	115 (25.3%)	
	Normal	3 (17.6%)	175 (59.3%)	53 (37.1%)	231(50.8%)	
	Ow/Ob	1 (5.9%)	26 (8.8%)	82 (57.3%)	109 (24.0%)	
LSEC	I Think I am	Underweight (n = 31)	Normal weight (n = 306)	Ow/Ob (n = 63)	Total (n = 400)	0.001
	Underweight	25 (80.6%)	116 (37.9%)	1 (1.6%)	142 (35.5%)	
	Normal	6 (19.4%)	145 (47.4%)	18 (28.6%)	169 (42.2%)	
	Ow/Ob	0	45 (14.7%)	44 (69.8%)	89 (22.2%)	

Ow /Ob= Overweight and Obese. HSEC= High Socioeconomic Class; LSEC= Low Socioeconomic Class.