

Cross-sectional Assessment of Body Image Perception, Image Satisfaction, Body Image Discrepancy and Dietary Habits in Medical Students of Ujjain

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Abstract

Background: Being judgmental about self-body image and satisfaction or dissatisfaction with one's own body is a natural phenomenon. If perceived incorrectly can lead to dissatisfaction and negative social, emotional, psychological and physical consequences. **Methods:** A cross-sectional study was planned and the data was collected with the help of a semi-structured proforma. Body image perception, image satisfaction, and associated dietary modification were inquired about, and Body Mass Index (BMI) and Body Image Discrepancy Score (BIDS) were calculated. The body image perception of participants was collected with the help of the Figure Rating Scale (FRS). **Results:** χ^2 test, kappa statistics, Mann-Whitney test, multinomial regression, and Z-standardization were applied. Few 10% of participants perceived themselves as underweight, 48% as normal weight and 42% as overweight or obese. About 48%, 19%, and 33% of participants were satisfied, neutral and dissatisfied respectively by their perceived body image, and 43% of the participants had modified their diet. A statistically significant association was found between body image perception, image satisfaction, body image discrepancy and gender. **Conclusion:** There was a huge disagreement between perceived and actual body image. Overestimation and underestimation of body image were common in males and females respectively. Misperception of body image might lead to unnecessary dietary modifications resulting in malnutrition and somatoform disorders.

Keywords: Body image discrepancy, body image perception, diet modification, image satisfaction

INTRODUCTION

The National Eating Disorder Association defines body image as how you feel about your body, including your height shape, and weight. Body image is a multidimensional construct that may be influenced by culture, economic factors, family, friends, society, and media. Perception of body image is a subjective self-assessment of one's weight as "underweight," "normal weight," or "overweight/obese." In the absence of an objective and actual measurement of body mass, the standard Body Mass Index (BMI) is used for this purpose. It has been demonstrated that people who overestimate their body image (who perceive themselves as obese/fat despite being normal weight or even underweight) tend to develop the habit of unnecessary dietary restrictions or excessive physical activity even resulting in eating disorders such as anorexia nervosa.^[1] People who underestimate their body image (who perceive themselves as

normal/underweight despite being obese/overweight) run the risk of aggravating their obesity by not engaging themselves in weight-controlling practices like dietary restrictions and/or physical exercises.^[2] Thus, image perception is an important determinant of lifestyle, especially of dietary habits in an individual. This may also result in acquiring other non-communicable diseases. Assessment of the discrepancy between the actual BMI and the self-perceived body image is therefore important^[3] in the current scenario, particularly

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How to cite this article: Bhujade R, Sinha A, Srivastva A, Baghel AS. Cross-sectional assessment of body image perception, image satisfaction, body image discrepancy and dietary habits in medical students of Ujjain. Indian J Community Med 2024;49:837-42.

Received: 12-01-23, **Accepted:** 24-05-24, **Published:** 17-10-24

Access this article online

Quick Response Code:



Website:
www.ijcm.org.in

DOI:
10.4103/ijcm.ijcm_18_23

among the student groups as they are the ones who are the future and also have the highest influence on the various beauty and weight-related media advertisements and words of mouth publicity. This has more relevance for medical students as they are a vulnerable group and future health advisors also.^[4-6] Misperception of the self-body image is an important issue and so is its assessment and management. The present research was thus undertaken amongst the undergraduate medical students of a teaching hospital with the aim of assessing the burden of misperception of self-body image and its possible impact on their lifestyle (dietary modification).

The aim was to assess Body Image Discrepancy Score (BIDS) and associated attributes among M.B.B.S. students of R. D. Gardi Medical College Ujjain (M.P.). The objectives were to study body image perception, image satisfaction, and dietary modification in response to perceived body image.

METHODOLOGY

An analytical cross-sectional study was conducted at R D Gardi Medical College, Ujjain, M.P, India from August to January (for a total duration of 6 months). The study was conducted at R D Gardi Medical College, Ujjain, M.P, India. Undergraduate medical students enrolled in Professional 1st and 2nd at R D Gardi Medical College were chosen as study participants. Permission to conduct research was taken from the Institutional Ethics Committee of the college. A cross-sectional study was planned to conduct this research.

The sample size was calculated with the help of the Cochran formula.

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where e is the desired level of precision (i.e., the margin of error). p is the (estimated) proportion of the population which has the attribute in question q is $1-p$. The z -value is found in a Z table.

Taking the prevalence of negative body perception as 84.9% mentioned in the reference study,^[7] at a 95% confidence interval and 5% margin of error, the sample size calculated was 196. After adjusting for the 10% non-response rate, the final sample size came out to be 215. The purpose of the study was described to the study participants after obtaining written informed consent. The students who have given consent for participation in the study were included in the study. Students who were absent on the days of data collection and even after three failed attempts to contact them were excluded from the study.

Image perception, Image satisfaction, BIDS, and dietary modification were Dependent/outcome variables. Socio-demographic factors like age, sex socio-economic status, type of family, residence, dietary habits, etc., were independent predictors/experimental variables for this study. Body image perception is considered the way one sees his/

her body. This is not always a correct representation of how one actually looks. Image satisfaction is the degree to which individuals are satisfied with their physical appearance, especially weight and shape. Body image discrepancy is the disparity between the perceived body image (how an individual believes their body looks) and the ideal body image and when it is measured objectively (score) known as the BIDS. Diet modification is to make changes in diet deliberately in response to image dissatisfaction to overcome discrepancies in actual and perceived body image (if any).

Then participants' responses were collected with the help of a pre-designed structured proforma. Body image perception was assessed by using a standardized validated "Figure Rating Scale" (FRS), also known as Stunkard's scale.^[8]

The FRS included 9 schematic body figures or silhouettes, each for males and females, and has been specifically designed to gather visual perception about one's own body at a specific time. The body images are sequentially arranged from left to right (from extreme thinness to extreme obesity) such that the first two images represent underweight, the next two images represent appropriate weight, the fifth image indicates slight overweight, and the sixth and seventh image represents moderate overweight and the last two images represent very overweight. The FRS was administered to each participant and each participant was asked to self-select and encircle the silhouette that most closely reflects his or her current body size. The selected body silhouette was considered to be the self-perceived body image. Each FRS response was categorized into "underweight," "normal weight," and "overweight"/obese depending upon the selection of the body silhouette, as above.

The participants were subsequently asked to rate their satisfaction level with their perceived body image as "satisfied," "neutral," and "unsatisfied." Body weight was assessed (in kilograms) to the nearest 0.5 kg using a calibrated standard balance-beam scale. Shoes and heavy outer clothing were removed while assessing body weight. Height was measured to the nearest 0.5 cm using a standard height bar. Each participant's actual BMI was then calculated as weight (in kilograms) divided by height (in meters).^[9] The discrepancy between the self-perceived body image using FRS and the actual BMI, the BIDS, was then calculated for each participant. BIDS was calculated by estimating the difference between z -standardized values of body image perception and BMI. BIDS was classified as positive/overestimated (perception of body image as heavier than the actual standardized BMI), negative/underestimated (perception of image as lighter than the actual standardized BMI), and zero/actual (perception of image as same as the actual standardized BMI). Each participant was questioned whether he/she is satisfied with his/her body image or not and has ever modified his/her dietary habits according to the body image perception. Basic demographic data including age, gender, per capita family income, religion, residential status (day-scholar/hostel), family size (total number of family members), and usual dietary

habits (vegetarian/non-vegetarian) were also collected from each participant. Data were analyzed using SPSS version 24 applying appropriate statistical tests (including the Chi-square test, Mann–Whiney, Kappa statistics, and Z-standardization).

RESULTS

Around 51% of participants were between 17 and 20 years of age and 49% were between 21 and 34 years. Sixty-eight percent of participants were from nuclear families while 32% had a joint family. Eighty-six percent of participants were Hindu and 14% were non–Hindu. A majority (80%) of participants were hostellers. According to the modified B. J. Prasad classification (the year 2016), 65% of participants belonged to class 1 of socioeconomic status, 22% from class 2, 9% from class 3, 2% from class 4 and 1.5% from class 5 of socioeconomic status. Sixty percent of participants were vegetarian, and 40% were non-vegetarian by dietary habits. According to WHO classification of BMI around 49% were underweight, 19% were normal and 31% were either overweight or obese. A total of 3.7% of participants had systemic illness [Table 1].

Underestimation was more in males (58.40%) as compared to females (35.5%). Overestimation was more seen in females (61.10%) as compared to males (40%). Only 1.6% of males and 3.3% of females had a correct estimation of their image as normal [Figure 1].

Distribution of participants according to image perception, satisfaction, and dietary modification- (added in the supplementary file as Supplementary Table 1). Around 10% of participants perceived themselves as underweight, 48% perceived their image as normal weight and 43% perceived

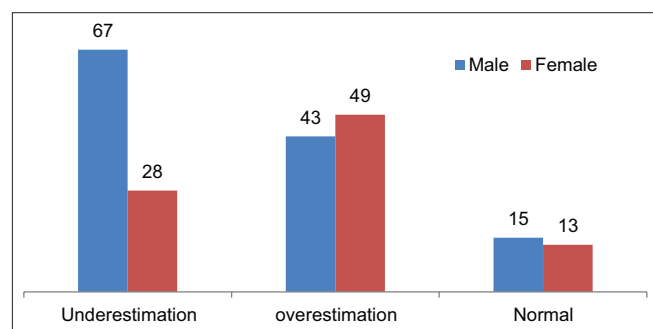


Figure 1: Bar diagram showing gender-wise BIDS interpretation (N = 215)

BMI category	Image perception category			Total
	Under-weight	Normal weight	Over weight	
Under-weight	10	13	1	24
Normal -weight	11	58	13	82
Over-weight	0	32	77	109
Total	21	103	91	215

Measurement of agreement Kappa=0.450 (P=0.000)

themselves as overweight. Forty-eight percent of participants were satisfied with their perceived image, 19% were neutral about their image and 33% were not satisfied with their perceived image. Around 16% of participants were on a special diet among them the most common (67%) diet they were following was a low-fat diet. Forty-three percent of participants had done diet modification before; around 34% were still on the dietary modification. The dietary modification in 47% of the cases was by self. For those who have not done dietary modification, the most common reason behind this was found to be they do not feel the need for this.

The Table 1 shows the agreement between the BMI category and the image perception category is moderate and significant that is the agreement score is 45%. As the Chi-square test is used to show an association between two variables it gives the results in terms of frequency and percentages. The Mann–Whitney U test is used for the same purpose but it gives the results in terms of distribution, and mean rank so we have applied both tests for our analysis.

The Table 2 indicates that after the application of the Mann–Whitney U test, it was applied for the comparison of the median (Inter quartile range) between the groups. There was a significant difference in body image perception, body image satisfaction, and interpretation of the BIDS category between males and females and a significant difference was found in image perception between the participants aged less than 20 years and more than 20 years. There was a significant difference between the image perception of the participants who had done diet modification and those who had not done diet modification. Age group, SES, and type of family are not significant factors for image perception, image satisfaction, and interpretation of BIDS.

The association of various socio-demographic variables and image perception, image satisfaction, and BIDS interpretation was found by applying Chi-square test tables added in the supplementary file (as Supplementary Tables 2-4 for image perception, image satisfaction, and BIDS interpretation). Only statistically significantly associated variables are shown in the tables that is age and sex.

Perception more participants (42.3%) perceived themselves as overweight as compared to underweight (9.76%), 48% of participants perceived themselves as normal weight. Image satisfaction overall 48% of participants were satisfied with their image, dissatisfaction was more prevalent in females (43.3%) as compared to males (26%). Fifty-six percent of males and 36% of females were satisfied with their body image. Twenty percent of females and 17.6% of males were neutral about their body image. Interpretation of BIDS revealed that there was a gross misperception of self-body images among participants. Around 98% of participants were perceiving their body image wrongly. Only 1.6% of males and 3.3% of females perceived their body image correctly. Fifty-eight percent of males overestimated their body image, and 40% of males underestimated their body image. Thirty-five percent of females underestimated their image and 61% of females

Table 2: Association of gender, age, and diet modification with image perception, image satisfaction, and interpretation of BIDS category

Variables	Groups	n	Mean rank	Sum of ranks	U	Z	P
Image perception	Male	125	124.84	15605	3520	-5.187	<0.001
	Female	90	84.61	7615			
Image satisfaction	Male	125	98.24	12280.50	4405.5	-2.946	0.003
	Female	90	121.55	10939.50			
Interpretation of BIDS	Male	125	97.88	12235	4360	-3.210	0.001
	Female	90	122.06	10985			
Image perception	≤20 years	109	96.45	10513.50	4518	-2.71	0.007
	>20 years	103	117.13	12064.50			
Image perception	Diet modification done	92	120.24	11062	4532	-2.766	0.006
	Diet modification not done	123	98.85	12158			

overestimated their image. Overestimation of body image was slightly more prevalent in females as compared to males.

The Chi-square test was applied between all socio-demographic variables (Age, gender, family type, residence, SES, and religion) and image perception, image satisfaction, and BIDS. The association between gender and image perception, image satisfaction and BIDS interpretation, and the association between age group and image perception was found to be statistically significant as the P value is <0.05 for all (Chi-square test Table 4).

To find out the true association on statistically significantly associated variables multinomial regression test was applied Supplementary Table 5 and Tables 3,4 show multinomial regression was conducted for image perception, image satisfaction, and BIDS interpretation. Only gender came out to be statistically significant for image perception, and image satisfaction. The odds of having overweight perception w.r.t. normal weight is 3.3 times more in females as compared to males. The odds of having an unsatisfied image are 62% less among females as compared to males.

Figure 2 shows that actually 49.3% of participants were under-weight but only 9.8% of participants perceived themselves as underweight, 19.1% were normal weight but 47.9% perceived themselves as normal weight and 31% of participants were overweight/obese but 42.3% of participants perceived themselves as overweight.

DISCUSSION

The results of the current study indicate that image perception 9.8% of the participants perceived that they were underweight, 47.9% of the participants thought that their weight was normal, and 42.3% of participants thought that they were overweight or obese. It may be because, in the present fitness freak generation, most of the females idolize slim bodies and male muscular bodies. Media preference for thinness may be the cause behind very few participants perceiving themselves as underweight. The image perception of participants may be the result of their attitudes, thoughts, feelings, and behavior.

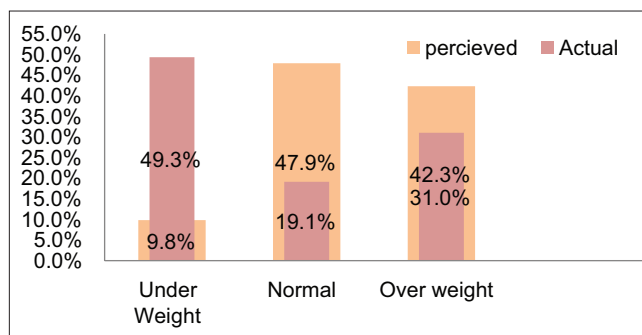


Figure 2: Actual and perceived body mass

Regarding image satisfaction, 47.9% of participants were satisfied with their perceived body image, 18.6% of participants were neutral about their body image, and 33.5% were unsatisfied with their body image. Consciousness about how you look and pressure to meet idols may be the probable cause behind significant dissatisfaction with their own body image among study participants. In terms of BIDS, 48.8% equal number {105 (48.8%)} of participants were underestimating and overestimating their body image while only 5 (2.3%) had a correct perception of their weight. Overestimation and underestimation of body image were common in males and females respectively. As overweight stigma is more strongly felt by women that may be the reason why they tend to overestimate their body image. Diet modification was done by 33.5% of participants and in most of the cases, it was done because of self-felt need. Gender and age were the independent variables found to be significantly associated with image perception, image satisfaction, BIDS, and dietary modification.

Priya *et al.*^[10] also observed discrepancies between the actual and perceived body image of the participants. Image satisfaction was found to be around 68% and as compared to 48% image satisfaction with their body image in the current study. Body image discrepancy was also observed by Rashmi BM *et al.*^[11] A study conducted by Titilola M K *et al.*^[12] revealed that overweight and obesity were more common in girls, unlike the current study. Lorraine B. Robbins *et al.*^[13] have also reported discrepancies between actual and perceived body image. The

Table 3: Multinomial regression: Image satisfaction

Image satisfaction			OR	95% CI	P*
Neutral	Age	17–20, 21–34	1.06	0.5–2.2	0.860
	Gender	Female-Male	0.59	0.27–1.25	0.17
Unsatisfied	Age	17–20, 21–34	1.07	0.57–2.02	0.81
	Gender	Female-Male	0.38	1.78–6.28	0.003

*P value <0.05 is significant. Satisfied reference category

Table 4: Multinomial regression: BIDS interpretation

BIDS Interpretation			OR	95% CI	P*
Underestimation	Age	17–20, 21–34	0.75	0.11–4.8	0.76
	Gender	Female-Male	3.2	0.50–20.7	0.21
Overestimation	Age	17–20, 21–34	0.79	0.12–5.02	0.80
	Gender	Female-Male	1.26	0.19–8.0	0.80

*P value <0.05 is significant. Normal reference category

underestimation was more prevalent than the overestimation Heba Alwan *et al.*^[14] also found that substantial proportions of students had an inaccurate perception of their weight and that weight perception was associated with weight-control behavior. Underestimation was a more common finding. Welch *et al.*,^[15] concluded that around 30% of participants were obese or overweight unlike the present study, the reason behind this may be the age group taken in both studies is different. J.L. Mayer *et al.*^[16] also concluded that perceived body image does not match expected and actual. Zainuiddin *et al.*^[17] concluded by their study that 13.8% of adolescents underestimated their weight, 35.0% overestimated, and 51.2% correctly judged their own weight. Overestimation was found in females and underestimation was found more in males like the current study by A.A. Lattif *et al.*^[18] revealed by their research that dissatisfaction was more in females as compared to males in the present study by Pon *et al.*^[19] also concluded significant body image discrepancy was there Nair and Kotian^[20] concluded by their study that the prevalence of body image dissatisfaction among adolescent girls in urban Mangalore was significant this finding was in line with the current study. They also found a significant association of body image issues with domicile, family status, and career choice, unlike the present study. Mohamed *et al.*^[21] concluded that a large number (62%) of participants thought that they were not in the ideal weight according to their height. They also enquired about behavior changes other than diet modification in response to dissatisfaction while the present study enquired about diet modification in response to overcoming dissatisfaction with body image Song H *et al.*^[22] Conducted a study on 1585 middle school students and found an 81% BI dissatisfaction rate. Females tended to overestimate their body shape this finding was identical to the result of the current study. Kumar *et al.*^[23] conducted a study on university students to find out their body image perception. Their findings revealed that the majority of business majors exhibited a positive body image perception, unlike the findings of the present study. Apart from that they also assessed the mental well-being of students which was not

assessed in the current study. A study^[24] was conducted among female students of the medical college of Mysuru. They revealed that the majority of the participants (37.1%) had a neutral perception regarding their body image followed by 33.8% being satisfied and 24.2% being unsatisfied regarding their body image. Unhealthy weight-changing patterns like skipping meals (24%), and increasing the quantity and frequency of meals (17%) were reported among study participants. The result was somewhat like the current study but the participants included both male and female students. Gruszka. *et al.*^[25] conducted a study on 744 adults and found that the degree of body dissatisfaction was greater among women than among men. Adult subjects frequently underestimate their own weight status and body size. Women with overweight and obese more often than men are dissatisfied with their body size. This finding is partially in line with the findings of the current study. Toselli, S.^[26] conducted a study on high school students and concluded that females are more concerned about body image.

CONCLUSION

As the youth has become more and more sensitive and concerned about their body image. In the current study, we found significant discrepancies in the body image of medicos, who are well aware of the physiology and normality of body image issues. So, knowledge does not seem to be a significant factor associated with image perception. To confirm we can compare the perception of medicos and non-medicos.

Recommendation- proper assessment of body image discrepancy and subsequent remedial counseling becomes highly pertinent for their adequate physical, emotional, and psychological development.

Limitation

The limitation of the present study was the small sample size, which affects the generalizability of the result. Another limitation is of FRS that was used for taking the image perception of participants The line-drawn silhouettes provided in the scale may not provide a clear presentation of the average human body. As the silhouettes in the scale shift from very thin to very obese, the figures gain more in the middle of the body. While this type of body image may be representative of some individuals, there is a wide range of possible body types that are not represented in the original scale. Some individuals may have broader shoulders or wider hips than in the images provided in the scale; therefore, the participants may have had a more difficult time choosing the appropriate figure to represent their physical appearance.

Acknowledgments

The authors would like to acknowledge the study participants as undergraduate MBBS Students of R.D. Gardi Medical College. Special thanks to Mrs. Aruna Deshpande and Dr. Dharampal Singh Chouhan, for their contribution.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: Distribution of participants according to image perception, satisfaction, and dietary modification

Variables	Frequency <i>n</i>(%)
Image perception category (<i>n</i> =215)	
Underweight	21 (9.8%)
Normal weight	103 (47.9%)
Overweight	91 (42.3%)
Image satisfaction (<i>n</i> =215)	
Satisfied	103 (47.9%)
Neutral	40 (18.6%)
Unsatisfied	72 (33.5%)
BIDS interpretation (<i>n</i> =215)	
Underestimation	105 (48.8%)
Normal	5 (2.3%)
Overestimation	105 (48.8%)
Special diet (<i>n</i> =215)	
Yes	34 (15.8%)
No	181 (84.2%)
Specific diet (<i>n</i> =34)	
Gluten-free	3 (8.8%)
Diabetic diet	2 (5.9%)
Low fat diet	23 (67.6%)
Food supplements	3 (8.8%)
Any other	3 (8.8%)
Diet modification on the basis of perceived body image (<i>n</i> =215)	
Yes	92 (42.8%)
No	123 (57.2%)
Diet modification continuing (<i>n</i> =215)	
Yes	72 (33.5%)
No	143 (66.5%)
Diet advised by (<i>n</i> =92)	
Friends	20 (21.7%)
Relatives	18 (19.6%)
Any expert	11 (12%)
Self	43 (46.7%)
Reason for no diet modification (<i>n</i> =123)	
Not needed	72 (58.5%)
Hosteller	31 (25.2%)
Lack of determination	2 (1.6%)
Lack of determination	2 (1.6%)
Lack time	6 (4.8%)
Never thought	10 (8.1%)

Supplementary Table 2: The association of various socio-demographic variables and image perception

Variable	Response	Image perception			Total	P
		Underweight	Normal	Overweight		
Sex	Male	5 (2.32)	50 (23.25)	70 (32.55)	125	0.004
	Female	16 (7.44)	53 (24.65)	21 (9.76)	90	
	Total	21 (9.76)	103 (47.90)	91 (42.32)	215	
Age (in years)	<20	15 (6.97)	57 (26.51)	39 (18.13)	111	0.036
	≥20	6 (2.79)	46 (21.39)	52 (24.18)	104	
	Total	21 (9.76)	103 (47.90)	91 (42.13)	215	

Supplementary Table 3: The association of various socio-demographic variables and image satisfaction

Variable	Response	Image Satisfaction			Total	P
		Satisfied	Neutral	Unsatisfied		
Sex	Male	70 (32.55)	22 (10.23)	33 (15.34)	125	0.013
	Female	33 (15.34)	18 (8.37)	39 (18.13)	90	
	Total	103 (47.90)	40 (18.60)	72 (33.48)	215	

Supplementary Table 4: The association of various socio-demographic variables and BIDS interpretation

Variable	Response	BIDS Interpretation			Total	P
		Under estimation	Normal	Over estimation		
Sex	Male	73 (33.95)	2 (0.93)	50 (23.25)	125	0.004
	Female	32 (14.88)	3 (1.39)	55 (25.58)	90	
	Total	105 (48.83)	5 (2.32)	105 (48.83)	215	

Supplementary Table 5: Multinomial regression: Image perception

Image perception		OR	95% CI	P
Underweight	Age 17–20, 21–34	1.8	0.64–5.08	0.26
	Gender Female-Male	0.35	0.12–1.5	0.062
Overweight	Age 17–20, 21–34	0.62	0.34–1.13	0.122
	Gender Female-Male	3.34	1.78–6.28	<0.001

Normal weight reference category