JOURNAL OF CLINICAL AND HEALTH SCIENCES

ORIGINAL ARTICLE

Assessment of Obesity and Body Image Satisfaction amongst Students of AMC MET Medical College, Ahmedabad, Gujarat

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Received
26th August 2016
Received in revised form
25th January 2017
Accepted
21st April 2017

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ABSTRACT

Introduction: Body image satisfaction (BIS) may have an effect on body weight, which in turn contributes to healthier lifestyle practices. The present study aimed to measure the BMI of students, and to relate this to the students' own perceptions of their body image and assessing body image satisfaction using the Stunkard figure rating scale. **Methods:** A cross sectional study was carried out on 200 students selected by stratified random sampling technique. Variables that were used in the current study are perception of self-body size, ideal body size, and body size satisfaction. The assessment was carried out using the Stunkard figure rating scale. **Results:** Mean age of the students was 20.4 years. Mean BMI of the boys was 25.63 and of the girls was 25.09. There was a significant difference between perceived body size and body size as per BMI. Overall the girls had significantly more satisfaction with their body image as compared to boys. The body image satisfaction and BMI had positive correlation. Most of the time students thought they were thinner than they actually were, with obvious implications for health and health seeking behaviour. **Conclusions:** Correct perception of the body size may become the motivation to lose weight and contribute to high success rate in attaining it. A wholesome community approach is needed to change weight status perceptions and improve exercise and dietary behaviour.

KEYWORDS: Body image, body image satisfaction, body mass index, obesity, stunkard figure rating scale

INTRODUCTION

The epidemic of obesity is well documented globally with its starting point at a very young age. Globally the prevalence of obesity has more than doubled since 1980. Prevalence of obesity was 11% and 15% respectively amongst men and women aged 18 years and older in the year 2014. During the year 2010, overweight and obesity accounted for 3.4 million deaths per year and 93.6 million Disability Adjusted Life Years (DALYs). Obesity leads to increase in non-communicable diseases such as diabetes, hypertension, coronary heart disease, stroke, certain cancers, obstructive sleep apnoea, poor reproductive performance and osteoarthritis in the population [1].

An essential determinant of attempts to lose weight is awareness of having excessive weight status, which has a higher impact than the objective current weight status [2]. Earlier studies found that people tend to underestimate their current weight and overestimate their height [3], and artificially lower their risk factor profile perception, which may have negative health outcome implications amongst them. Body image and, more specifically, body weight dissatisfaction have been shown to be positively associated with intending or trying to lose weight in adults [4-8]. Estimation of perceived Body Image (BI) and body satisfaction amongst young individuals is important for understanding their weight loss behaviors and it is also a significant predictor of psychological outcomes such as depression amongst them. An increasing number of studies indicate the importance of a healthy BI, particularly in association with eating disorders [9], but also in the context of mental health and depression [10]. BI can be defined as "the picture of our own body which we form in our mind [11]. If desired appearance of the persons is different from how they view themselves,

there may be influence on their food intake, physical activity, and attitudes toward weight change and weight control. The body image in this manner can become a very important determinant of maintenance of ideal body weight and controlling obesity which in turn is responsible for many non-communicable diseases.

Better knowledge of the factors of self-perception of body characteristic may be an important factor in weight control practices. The current study, which was carried out amongst the students of AMC MET Medical College aimed at assessment of obesity based on their BMI values, finding the difference between the desired and perceived body images, assessing the satisfaction of the students with their body image and associating the body image perception and satisfaction with the actual BMI.

METHODS

A cross sectional study was carried out amongst 200 undergraduate students of AMC MET Medical College. Students were selected by stratified random sampling method so as to have an equal representation from all classes. The study was carried out from 28th of April to the 17th of September, 2014. The validation of questionnaire was carried out by the four faculties of the same department and suggestions were discussed/ incorporated in the final questionnaire. Pre-testing was carried out by performing a pilot study amongst 10 boys and 10 girls of the same college before carrying out the final survey. After the pilot study, final changes were carried out in the questionnaire. Pretested questionnaires were distributed to the students and the forms were filled anonymously by the students. Weight and height of the students were measured at the time of carrying out the survey. Data were analyzed using Microsoft Excel 2007 and SPSS version 17. Calculations of frequencies, percentages, proportions, mean, standard deviation and correlation coefficient were carried out. Chi-square and unpaired t-test were applied for comparing the observations between boys and girls. Three body size perceptions were used in the current study; namely, self-body size, ideal body size, and body size satisfaction. The assessment was done by using the Stunkard figure rating scale [12]. In the Stunkard scale there are 9 silhouette figures in which there is gradual increase in size from very thin to very obese. Each silhouette is given a number from 1 to 9, which is in proportion to body size. Very thin is given a value of 1 and very obese is given a value of 9. The silhouettes are different for men and women. These figures are classified as underweight, normal weight, overweight, and obese. The participants were asked to choose the figure which they think they look like and the number of that figure is self-body size. Similarly the participants were asked to select the ideal figure for them and number of that figure is taken as ideal body size.

The difference between perceived self-body size and perceived ideal body size was taken as an indicator of body size satisfaction of the respondent. This variable was created for each respondent by subtracting the number of the figure selected by them as their ideal body size from the number of the figure selected as their self-body size. Based on this difference, four dummy variables were created for body size satisfaction. The body size satisfaction was categorized as too small if (self-ideal < 1), satisfied if (self = ideal), a bit too large if (self-ideal = 1), and much too large if (self-ideal > 1). Body Mass Index (BMI) [defined as weight/height^2 (kg/m^2)] was used for assessing obesity. Those with BMI < 18.5 were classified as underweight, 18.5-24.9 normal range and > 25 overweight. Further BMI of 25-29.9 was classified as pre-obese, 30-34.9 obese I, 35-39.9 obese II and > 40 obese III [13, 14]. The BMI values were co-related with the perceived and desired body size [15, 16].

RESULTS

A total of 200 students were studied and out of that 152 (76%) belonged to the age category of between 20-22 years. The mean age was 20.4 years and standard deviation was 1.32 years. Male female ratio was 1:1.3 with girls comprising 56.5% of the study population. The sample was stratified with representatives from all the semesters including interns. Fifty-eight percent of the students were residing in the hostels. However, 97% students had their permanent residence in the urban areas (Table 1).

Table 1 Socio-demographic profile of study population

Variables	n	(%)	Range
Age (years)			
17	1	0.5	(17-23)
18	23	11.5	
19	17	8.5	
20	62	31.0	
21	55	27.5	
22	35	17.5	
23	7	3.5	
Gender			
Male	87	43.5	
Female	113	56.5	
Semester			
2	28	14.0	
3	3	1.5	
4	26	13.0	
5	18	9.0	
6	60	30.0	
7	5	2.5	
8	43	21.5	
9	0	0.0	
Interns	17	8.5	
Current Residence			
Local	84	42.0	
Hostel	116	58.0	
Permanent Residence			
Urban	194	97.0	
Rural	6	3.0	

There were 6 (5.3%) girls and 2 (2.3%) boys having BMI of less than 18.5. Sixty four (56.6%) girls and 44 (50.6%) boys had BMI in the normal range. Mean BMI for boys was 25.63 with standard deviation of 5.26 and for girls it was 25.09 with a standard deviation of 5.13. There was no significant difference in mean BMI between boys and girls ($z = 0.69$, $p > 0.05$).

The prevalence of overweight amongst boys and girls was 31.0% and 27.4% respectively. This difference in prevalence of overweight was statistically not significant (chi square value = 0.30, $p = 0.58$).

The prevalence of obesity amongst boys and girls was 18.3% and 10.6% respectively. This difference in prevalence of obesity was statistically not significant (chi square value 2.41, $p = 0.12$) (Table 2).

Table 2 BMI wise distribution of study population

BMI (kg/m^2)	Boys		Girls	
	n	(%)	n	(%)
< 18.50	2	(2.3)	6	(5.3)
18.50 – 24.99	42	(48.3)	64	(56.6)
25.00 – 29.99	27	(31.0)	31	(27.4)
30.00 – 34.99	11	(12.6)	10	(8.8)
35.00 – 39.99	4	(4.6)	1	(0.9)
≥ 40.00	1	(1.1)	1	(0.9)
TOTAL	87	100	113	100

While assessing the body size satisfaction by difference between perceived and desired body size as per the Stunkard scale, it was observed that 17 (19.5%) boys and 36 (31.9%) girls were satisfied with their body size. This difference in body image satisfaction between boys and girls was statistically significant ($z = 2.03$, $p < 0.05$). This suggests that girls were more satisfied with their body image as compared to boys. Twenty-three percent of boys and 13.3% girls perceived their body size as too small, 34.5% boys and 40.7% girls perceived their body size as a bit too large. Twenty-three percent of of boys and 14.1% girls perceived their body size as very large (Table 3).

Table 3 Body image satisfaction amongst study subjects as per visual scale

Body Image Satisfaction	Boys (n = 87)	Girls (n = 113)
Too small (P – D < 0)	20 (23)	15 (13.3)
Satisfied (P – D = 0)	17 (19.5)	36 (31.9)
Bit too large (P – D = 1)	30 (34.5)	46 (40.7)
Very large (P – D > 1)	20 (23)	16 (14.1)

The body image satisfaction was estimated by finding out the difference between the perceived and desired body image as mentioned in the methodology for all the categories of BMIs. In the BMI category < 18.5 there were 6 girls and 2 boys. However only 2 girls perceived themselves as too small whereas one girl in this category was satisfied with her BI and 3 perceived themselves as a bit large whereas both the boys perceived themselves as too small. Out of 64 girls who had normal BMI, 21 (32.8%) were satisfied with their BI whereas the rest perceived themselves in the other three categories. Out of the 44 boys who had normal BMI, 11 (25%) were satisfied with their body size. Out of 31girls who were overweight, 12 (38.7%) were satisfied with their BI whereas out of 25 boys who were overweight 4 (16%) were satisfied with their body size. There were 12 girls who were overweight according to their BMI and out of them 2 (16.6%) were satisfied with their BI whereas out of 16 boys who were obese 2 (12.5%) were satisfied with their BI. As far as difference in body image satisfaction in all the BMI categories is concerned, there was no significant difference between the boys and girls (Table 4). The BMI of the students was associated with the body image satisfaction. There was a positive correlation between BMI and the body image satisfaction ($r = 0.42$ and $p < 0.000$).

Table 4 BMI versus body image satisfaction in the study subjects

Body Image Satisfaction Category	BMI (kg/m^2) n	(%)	n	(%)	P value
	BMI < 18.5kg/m^2				
	Girls (n = 6)		Boys (n = 2)		
Too small	2	(33.3)	2	(100)	0.10
Satisfied	1	(16.7)	0	(0.0)	-
Bit large	3	(50)	0	(0.0)	-
Too large	0	(0.0)	0	(0.0)	-
	BMI 18.5 to 24.99 kg/m^2				
	Girls (n = 64)		Boys (n = 44)		
Too small	11	(17.2)	13	(29.6)	0.12
Satisfied	21	(32.8)	11	(25)	0.38
Bit large	29	(45.3)	15	(34.1)	0.24
Too large	3	(4.7)	5	(11.4)	0.19
	BMI 25 to 29.99 kg/m^2				
	Girls (n = 31)		Boys (n = 25)		
Too small	1	(3.3)	4	(16)	0.09
Satisfied	12	(38.7)	4	(16)	0.06
Bit large	9	(29)	10	(40)	0.38
Too large	9	(29)	7	(28)	0.92
	BMI 30 to 34.99 kg/m^2				
	Girls (n = 10)		Boys (n = 11)		
Too small	1	(10)	1	(9.1)	0.94
Satisfied	1	(10)	1	(9.1)	0.94
Bit large	5	(50)	3	(27.3)	0.28
Too large	3	(30)	6	(54.5)	0.25
	BMI 35 to 39.99 kg/m^2				
	Girls (n = 1)		Boys (n = 4)		
Too small	0	(0.0)	0	(0.0)	-
Satisfied	0	(0.0)	1	(25)	-
Bit large	0	(0.0)	2	(50)	-
Too large	1	(100)	1	(25)	0.17
	BMI > 40 kg/m^2				
	Girls (n = 1)		Boys (n = 1)		
Too small	0	(0.0)	0	(0.0)	-
Satisfied	1	(100)	0	(0.0)	-
Bit large	0	(0.0)	0	(0.0)	-
Too large	0	(0.0)	1	(100)	-

The BMI of the students was associated with the body image satisfaction. There was a positive correlation between BMI and the body image satisfaction ($r = 0.42$ and $p < 0.000$).

DISCUSSION

Self-perception of body shape is an important factor in weight control practices. The present study was carried out among the medical students in the age category of between 17-23 years and aimed at understanding their satisfaction of their body image. The mean age of the study participants was 20.4 ± 1.32 years. The assessment of excess body weight, and patterns and determinants of other risk factors for NCDs is important to provide useful guidelines in the planning of interventions to counter a growing problem. Many other studies were carried out with the similar objectives amongst subjects more than 18 years of age [15-19]. In the present study the young adults were included as participants thinking that they are more concerned about their body image. In a study by Titilola et al, the study participants were adolescents and in the age range of 11-15 years [20]. The M:F in the present study was 1:1.3.

Assessment of over-weight and obesity was carried out according to the WHO criteria for BMI. The prevalence of overweight and obesity in the current study was 28.7% and 18.4% respectively amongst boys whereas in the girls it was 27.4% and 10.6% respectively. In the present study based on the visual scale, 57.5% boys and 54.8% girls perceived themselves as overweight and obese. A large proportion of overweight/obese participants in our study were either content or not concerned about their weight which can be explained by social and cultural factors, which influence the standards accepted for weight in the local community. However, underestimation of weight status contributes to denial or minimization of current weight being a health risk and thus contributes to increase in health problems associated with obesity due to failure to respond to health professionals' advice [21-23]. Michelle Dey et al reported low prevalence of overweight and obesity as compared to present study [24]. In some other studies prevalence was reported higher than our study [19, 25, 26]. Mean BMI of boys in the present study was 25.63 ± 5.26 and mean BMI of girls was 25.09 ± 5.13, which was similar to another study [25] whereby Lori et al reported BMI of 34.6 (± 7.5) and 32.2 (± 6.2) for males and females respectively [11].

In our study, BMI was positively correlated with the self-perception of BI as assessed by the figure rating scale using silhouettes. This is similar to findings of the other studies where there was strong correlation between the two [27, 28].

In our study, body image satisfaction amongst boys was 19.5% and amongst girls it was 31.9%. This finding is in contrast to findings of the other studies [18, 20, 24, 29] where women had more dissatisfaction with their body image as compared to men. This can be

attributed to relatively less prevalence of overweight and obesity in girls as compared to boys in this study. In the present study, more boys and girls wanted to have slimmer body, which is similar to the finding in many other studies [18, 20, 24, 25, 29]. While some researchers proposed body weight dissatisfaction as an important factor in preventing weight gain and promoting weight loss [30, 31], other researchers proposed body weight dissatisfaction as a driver of unhealthy dieting behaviours [32, 33]. In the present study, it was observed that despite high BMI participants were satisfied with their BI, which is similar to the findings of another study where it was observed that despite mass media and health policies being focused on raising awareness about healthy weights, an increasing number of participants with excessive weight failed to recognize that their weight is a cause of concern [34]. In the present study, it was observed that the body image satisfaction was almost the same irrespective of the actual BMI indicating that even overweight and obese had similar level of satisfaction with their body image. This contrast between satisfaction and actual size implies that a person can be overweight or obese without having a negative body image or dissatisfaction with his or her body size. This is similar to finding by another study [35]. Thus, it is of great importance to have a realistic idea about one's body weight in order to prevent various morbidities including psychological problems.

CONCLUSIONS

The present study showed that the baseline weight status was not a determinant of the dissatisfaction with body size. As body size dissatisfaction is associated with weight loss behaviours in obese men and women, self-perception of being obese may motivate them for implementing the dietary and behavioural changes required for weight control, which is very crucial for control of non-communicable diseases. The study findings suggest that many young adults are struggling with body image and desiring "unhealthy" body shapes, either too thin or too fat. This necessitates the critical need for policy intervention, which would aim to educate and promote a healthy body size in them and improve access to counselling support.

Conflict of Interest

Authors declare none.

Acknowledgement

We would like to acknowledge all the students and interns who participated and provided all the required information for this study.

REFERENCES

1. WHO global status report of non-communicable diseases.http://apps.who.int/iris/bitstream/10665/148114/1/9789241564854_eng.pdf?ua=1. Accessed 27 July 2016.
2. Bhanji S, Khuwaja AK, Siddiqui F, Azam I, Kazmi K. Underestimation of weight and its associated factors among overweight and obese adults in Pakistan: a cross sectional study. BMC Public Health. 2011; 11: 363. doi: 10.1186/1471-2458-11-363.
3. Connor-Gorber S, Tremblay M, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. Obes Rev. 2007; 8: 307–26. doi: 10.1111/j.1467-789X.2007.00347.x.
4. Anderson LA, Eyler AA, Galuska DA, Brown DR, Brownson RC. Relationship of satisfaction with body size and trying to lose weight in a national survey of overweight and obese women aged 40 and older, United States. Prev Med. 2002; 35: 390–96. doi: 10.1006/pmed.2002.1079.
5. Heywood S, McCabe MP. Negative affect as a mediator between body dissatisfaction and extreme weight loss and muscle gain behaviors. J Health Psychol. 2006; 11: 833–44. doi: 10.1177/1359105306069077.
6. Kuk JL, Ardern CI, Church TS, Hebert JR, Sui X, Blair SN. Ideal weight and weight satisfaction: Associations with health practices. Am J Epidemiol. 2009; 170: 456–63. doi: 10.1093/aje/kwp135.
7. McCabe MP, McGreevy SJ. Role of media and peers on body change strategies among adult men: is body size important? Eur Eat Disord Rev. 2011; 19(5): 438-46. doi: 10.1002/erv.1063.

8. Millstein RA, Carlson SA, Fulton JE, Galuska DA, Zhang J, Blanck HM, Ainsworth BE. Relationships between body size satisfaction and weight control practices among US adults. Medscape J Med. 2008; 10: 119.
9. Stice E, Shaw HE. Role of body dissatisfaction in the onset and maintenance of eating pathology: a synthesis of research findings. J Psychosom Res. 2002; 53(5): 985–93. doi: 10.1016/S0022-3999(02)00488-9.
10. Jackson KL, Janssen I, Appelhans BM, Kazlauskaite R, Karavolos K, Dugan SA, Avery EA, Shipp-Johnson KJ, Powell LH, Kravitz HM. Body image satisfaction and depression in midlife women: the study of women's health across the nation (SWAN). Arch Womens Ment Health. 2014; 17(3): 177–87. doi: 10.1007/s00737-014-0416-9.
11. Carter-Edwards L, Bastian LA, Revels J, Durham H, Lokhnygina Y, Amamoo MA, Ostbye T. Body image and body satisfaction differ by race in overweight postpartum mothers. J Womens Health (Larchmt). 2010; 19(2): 305–11.
12. Stunkard AJ, Sorensen T, Schulsinger F. Use of the Danish adoption register for the study of obesity and thinness. Res Publ Assoc Res Nerv Ment Dis. 1982; 60: 115–20.
13. Obesity: preventing and managing global epidemic. Report of a WHO consultation. WHO Technical Report Series 894. Geneva, World Health Organization, 2000.
14. Redefining obesity and its treatment as available on.http://www.wpro.who.int/nutrition/documents/docs/Redefiningobesity.pdf?ua=1 Accessed 5 August 2016.
15. Lynch E, Liu K, Wei GS, Spring B, Kiefe C, Greenland P. The relation between body size perception and change in body mass index over 13 years. Am J Epidemiol 2009; 169(7): 857–66.
16. Ratcliff MB, Eshleman KE, Reiter-Purtill J, Zeller MH. Prospective changes in body image dissatisfaction among adolescent bariatric patients: the importance of body size estimation. Surg Obes Relat Dis. 2012; 8(4): 470–75.
17. Alipour B, Abbasalizad Farhangi M, Dehghan P, Alipour M. Body image perception and its association with body mass index and nutrient intakes among female college students aged 18-35 years from Tabriz, Iran. Eat Weight Disord. 2015; 20(4): 465-71. doi: 10.1007/s40519-015-0184-1.
18. del Mar Bibiloni M, Coll JL, Pich J, Pons A, Tur JA. Body image satisfaction and weight concerns among a Mediterranean adult population. BMC Public Health. 2017; 17: 39. doi:10.1186/s12889-016-3919-7.
19. Pooransingh S, Ramgulam K, Dialsingh I. Body mass index in clinic attenders: patient self-perception versus actual measurements. Advances in Public Health. 2014. doi:10.1155/2014/160206.
20. Pedro TM, Micklesfield LK, Kahn K, Tollman SM, Pettifor JM, Norris SA. Body image satisfaction, eating attitudes and perception of female silhouettes in rural South African adolescents. PLoS One. 2016; 11(5) e0154784.
21. Gregory CO, Blanck HM, Gillespie C, Maynard LM, Serdula MK. Health perceptions and demographic characteristics associated with underassessment of body weight. Obesity (Silver Spring) 2008; 16: 979–86. doi: 10.1038/oby.2008.22.
22. Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults. N Engl J Med. 2003. pp. 3481625–1638.
23. Field AE, Coakley EH, Must A, Spadano JL, Laird N, Dietz WH, Rimm E, Colditz GA. Impact of overweight on the risk of developing common chronic diseases during a 10-year period. Arch Intern Med. 2001; 161: 1581–6. doi: 10.1001/archinte.161.13.1581.
24. Dey M, Gmel G, Mohler-kuo M. Body mass index and health-related quality of life among young Swiss men. BMC Public Health. 2013; 13:1028 doi.10.1186/1471-2458-13-1028.
25. Benkeser RM, Biritwum R, Hill AG. Prevalence of overweight and obesity and perception of healthy and desirable body size in urban, Ghanaian women. Ghana Med J. 2012; 46(2): 66–75.

26. Gilbert-Diamond D, Baylin A, Mora-Plazas M, Villamor E. Correlates of obesity and body image in Colombian women. J Womens Health (Larchmt). 2009; 18(8): 1145-51.
27. Bays HE, Bazata DD, Fox KM, Grandy S, Gavin JR. Perceived body image in men and women with type 2 diabetes mellitus: correlation of body mass index with the figure rating scale. Nutr J. 2009; 8(1): 57.
28. Henriques A, Alves E, Barros H, Azevedo A. Women's satisfaction with body image before pregnancy and body mass index 4 years after delivery in the mothers of generation XXI. PLoS ONE. 2013; 8(7): e70230. doi:10.1371/journal.pone.0070230.
29. von Lengerke T, Mielck A. Body weight dissatisfaction by socioeconomic status among obese, preobese and normal weight women and men: results of the cross-sectional KORA Augsburg S4 population survey. BMC Public Health. 2012; 12: 342. doi 10.1186/1471-2458-12-342.
30. Anderson LA, Eyler AA, Galuska DA, Brown DR, Brownson RC. Relationship of satisfaction with body size and trying to lose weight in a national survey of overweight and obese women aged 40 and older, United States. Prev Med. 2002; 35: 390–6. doi: 10.1006/pmed.2002.1079.
31. Cash TF, Melnyk SE, Hrabosky JI. The assessment of body image investment: an extensive revision of the appearance schemas inventory. Int J Eating Dis. 2004; 35: 305–16. doi: 10.1002/eat.10264.
32. Millstein RA, Carlson SA, Fulton JE, Galuska DA, Zhang J, Blanck HM, Ainsworth BE. Relationships between body size satisfaction and weight control practices among US adults. Medscape J Med. 2008; 19: 119.
33. Duncan DT, Wolin KY, Scharoun-Lee M, Ding EL, Warner ET, Bennett GG. Does perception equal reality? Weight misperception in relation to weight-related attitudes and behaviors among overweight and obese US adults. Int J Behav Nutr Phys Act. 2011; 8:20. doi: 10.1186/1479-5868-8-20.
34. Crawford D, Campbell K. Lay definitions of ideal weight and overweight. Int J Obes. 1999; 23: 738–45. doi: 10.1038/sj.ijo.0800922.
35. Richard A, Rohrmann S, Lohse T, Eichholzer M. Is body weight dissatisfaction a predictor of depression independent of body mass index, sex and age? Results of a cross-sectional study. BMC Public Health. 2016; 16(1): 863. doi:10.1186/s12889-016-3497-8.