

The Relationship of Eating Disorders Risk with Body Mass Index, Body Image and Self-Esteem among Medical Students

Bhushan Chaudhari, Abhinav Tewari, Jyotsna Vanka, Saurav Kumar, Daniel Saldanha

Department of Psychiatry, Dr. D. Y. Patil Medical College, Pimpri, Pune, Maharashtra, India

Corresponding author:

Bhushan Chaudhari,
Department of Psychiatry,
Dr. D. Y. Patil Medical College,
Pimpri, Pune, Maharashtra, India.
Tel: 918805720217;
E-mail:
drbhushan_chaudhari@rediffmail.com

Abstract

Background: Eating disorders are rapidly increasing in young population. College students, particularly medical students have shown vulnerability for developing eating disorders. Different sociodemographic factors, BMI, body image and self-esteem have complex interaction with eating disorders risk. However, there has been very little research exploring these relationships in Indian population. **Aim:** To evaluate relationship of sociodemographic factors, BMI, body image and self-esteem with eating disorders risk. **Materials and Methods:** A cross-sectional study was conducted in 193 medical students with the help of semi structured proforma consisting of sociodemographic information, self-reported height and weight to calculate BMI, Body Shape Questionnaire 16-item Short Form (BSQ-16) to assess perceived body image, Rosenberg Self-esteem Scale (RSES) to assess self-esteem and Eating Disorder Examination-Questionnaire (EDE-Q) to assess eating disorder risk. **Results:** We found male students to be at slightly more risk than female students for developing eating disorders. Male students also had significantly higher BMI and more body image dissatisfaction than female students. Eating disorders risk was significantly associated with elevated BMI and body image dissatisfaction. However, there was no significant correlation between eating disorders risk and self-esteem. **Conclusion:** The present study brings out the vulnerability of male students for developing eating disorders and highlighted elevated BMI and body image dissatisfaction as potential risk factors associated with eating disorders risk. The present study gives insight into early identification and prevention or early treatment of eating pathologies in these students.

Keywords: Eating disorders risk, Body mass index, Body image, Self-esteem, Medical students

Introduction

In recent years, eating disorders have been a cause for concern especially due to their increasing prevalence in all racial, ethnic and socioeconomic groups.^[1] Traditionally, eating disorders were considered to be restricted to the population of industrial and developed western countries.^[2] In contrary, non-western population was thought to be relatively protected from eating disorders because of their cultural differences of symbolizing fatness for beauty, affluence and fertility.^[3,4] But with increasing globalization, the western concept of lean and thin body shape as ideal body shape is spreading in non-western population also, increasing body dissatisfaction and unhealthy eating attitudes and behaviours in this population.^[5-8]

Though the literature in this regard in Indian population is scarce, researchers have shown that the Indian adolescent girls have similar body ideals as that of western girls in relation to body image disturbance and eating disorders^[9,10] and also that the rates of clinical and subclinical eating disorders are on increase in the Indian community.^[11-13]

There has been consensus among researchers that certain groups in community are at more risk than the others for developing these disorders. Adolescents and teenage population is particularly vulnerable for eating disorder risk because of transitional nature of this life phase with respect to family

relations, friendship, one's self concept and goal for future.^[14] Higher education students also showed similar high risk behaviours leading to eating disorders. Separation from parents, relatively independent lifestyle, establishment of new social relations, gaining acceptance in social relations, need for increased perfectionism, competitive environment and influence from peers can lead to this change in eating behaviours among these higher education students.^[15,16]

Some researchers have established that medical students are more at risk for developing eating disorders.^[17-19] The vulnerability of medical students can be explained by multiple factors. Stress has been found out to be one of the important triggers for precipitating disordered eating behaviours and it is a well-known fact that medical education is associated with stress. Stigma surrounding eating disorders and mental disorders in general may lead to denial or affect their treatment seeking behaviour. Even it may lead to self-treatment. These factors may delay early identification and treatment of early

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to Cite this Article: Deogade SC, Suresan V, Rathod JR, Naitam D. Prevalence and Impact of Dentine Hypersensitivity among Undergraduates in a University Campus of Central India. *Ann Med Health Sci Res.* 2017; 7:144-149.

phase symptoms, landing student in more severe and resistant phase of eating disorder.^[20]

The risk for eating disorders arises from a complex interaction of biological, developmental, sociocultural as well as psychological factors.^[21] Sociocultural influence is thought to be an important determinant for eating disorder risk. Cultural influence on the attitude towards weight has been considered as one of the important factor for determining eating disorders risk in the particular community.^[22] Changes in sociocultural structure of the community may influence body image perception of the individuals.^[23] Mismatch between perceived body image of self and desired ideal body image creates several issues including eating disorder, depressive disorder and low self-esteem.^[24] There have been several reports establishing strong correlation between disturbed body image and low self-esteem.^[25]

It is a well-accepted fact that eating disorders characteristically involve disturbed body image and several researchers have established this link between disturbed body image and eating disturbances.^[26-28] Some of the researchers have pointed out that low self-esteem can be a mediating link between dissatisfaction with body image and abnormal eating behaviours^[29,30] while others have failed to establish this connecting link.^[31,32] It has been also shown that the relation between low self-esteem and disordered eating behaviours may be modified by other factors like age, gender, Body Mass Index (BMI) and culture.^[33] There have been varied results in varied studies regarding this relationship indicating the role of sociocultural and sociodemographic factors to be taken in consideration.

Most of the studies exploring relationship among eating disorders risk, body image and self-esteem have been done in western population. Research in this regard in Indian population and that to in vulnerable medical students is very limited. The relationship among body image, self-esteem and eating disorder risk has still remained unexplored in this population. In this view, we planned this study to explore this relationship so that students at risk can be identified at the earliest and target based preventive or therapeutic interventions can be developed against eating disorders in this population.

Aims and Objectives

1. To evaluate state of the body mass index (BMI), body image, self-esteem and eating disorders risk among medical students.
2. To evaluate association of body mass index (BMI), body image and self-esteem with eating disorders risk.
3. To evaluate association of sociodemographic factors with eating disorders risk.

Materials and Methods

The present study was conducted in a medical college in an urban area in Western Maharashtra, India. A cross sectional analytical study was planned in undergraduate (M.B.B.S.), interns and postgraduate (M.D./M.S.) medical students of the college. Study sample was drawn from these students by

stratified random sampling according to their stage of education so that students from each stage would get comparable representation in the study sample. A written informed consent was obtained from each participant and all of them were assured that the information given by them would be anonymous and confidential to avoid reporting bias. The study was started after approval from Institution Head and Institutional Ethical Committee.

Participants were administered with a semi structured proforma consisting of sociodemographic information, self-reported height and weight to calculate BMI, body shape questionnaire 16-item short form (BSQ-16) to assess perceived body image, Rosenberg Self-esteem Scale (RSES) to assess self-esteem and eating disorder examination-questionnaire (EDE-Q) to assess eating disorder risk. The scales used are described below.

Body shape questionnaire 16-item short form (BSQ-16)^[34]

It is a shortened and validated version of Body Shape Questionnaire used to measure individual's concern about weight, body shape, appearance and body dissatisfaction. It is a self-reported 16-item questionnaire consisting of questions regarding one's opinion about his/ her body appearance over past 4 weeks scored on Likert scale 1 to 6. The cut off points for the scale are-less than 38-no concern with body shape, 38-51-mild concern, 52-66-moderate concern, more than 66-marked concern with body shape [Appendix-I].

Rosenberg self-esteem Scale (RSES)^[35]

It is a 10-item self-reported scale widely used to assess global self-esteem scored on Likert scale 0 to 3, the possible score range being 0 to 30. The score below 15 is considered as indicative of low self-esteem while scores of 15 and above are considered normal [Appendix-II].

Eating disorder examination-questionnaire (EDE-Q 6.0)^[36]

It is a 28-item self-report questionnaire widely used to assess attitudes and behaviours related to eating and body image over past 28 days. Respondent rates each item on 7-point (0 to 6) rating scale. It provides four subscale scores which are Restraint, Eating Concern, Shape Concern and Weight Concern, the possible score range being 0 to 6. The Global score is average of four subscales. A higher score indicates more severe eating psychopathology [Appendix-III].

BMI was calculated by dividing weight (in kilogram) by the square of height (in meter). BMI less than 18.5 was considered under-weight, less than 25 was considered normal, 25 to 29.9 was overweight and 30 or above obese. Chi square test was applied to analyse qualitative variables and one-way ANOVA test was applied to analyse quantitative variables. Forward linear regression analysis was used to find out predictive value of sociodemographic factors, BMI, body image and self-esteem for eating disorder risk as a dependent variable. A p value of <0.05 was considered as significant for all statistical correlations. Statistical analysis of data was done using SPSS 21 software.

Results

In the present study, a total of 193 students completed the questionnaire. The sociodemographic and other characteristics of the students depending on BMI, BSQ score, RSES score and EDE-Q score are depicted in Table 1. Out of 193 students, 76 (39.4%) were males and 117 (60.6%) were females. The mean age of the study sample was 23.4(2.6) years. Male students were slightly more in their mean age as compared to female students [24.1(3.5) years vs 23(1.7) years]. In these students, undergraduate (MBBS) students were 86 (33 males, 53 females), interns were 51 (16 males, 35 females) and postgraduate (MD/MS) students were 56 (27 males, 29 females).

The average BMI of the study sample was 24.5(5.3) kg/m². Male students had significantly higher BMI as compared to female students ($p < 0.01$). When divided according to BMI, 16 (8.3%) students were under weight, 88 (45.6%) students were normal, 57 (29.5%) students were overweight and 32 (16.6%) students were obese. Significantly higher numbers of male students were overweight and obese compared to female students ($p < 0.001$).

The average BSQ score was 38.9(17.3) with significantly high score in male students compared to females ($p < 0.001$). 104 (53.9%) students had no concern about their body shape, 43 (22.3%) students had mild concern about body shape, 34 (17.6%) students had moderate concern about body shape and 12 (6.2%) students had marked concern about their body shape. Significantly higher proportion of male students reported moderate or marked concern about their body shape as compared to female students ($p < 0.001$).

The mean RSES score was 19.6(4.9) with no gender difference between the mean scores. A total of 28 (14.5%) students had low

self-esteem while 165 (85.5%) students were normal regarding their self-esteem. However, when compared for the gender differences a significantly higher proportion of female students had low self-esteem compared to male students ($p < 0.001$).

The mean Global Scores for EDE-Q scale was 1.9(1.4) while mean scores for subscales were-Restraint score 1.6(1.4), Eating Concern score 1 ± 1.1, Shape Concern score 2.3(1.5) and Weight Concern score 2.2(1.6). Though there was no significant gender wise difference for Global score, Restraint score, Shape concern score and Weight concern score, the eating concern score was significantly higher in males compared to females ($p < 0.01$).

Table 2 compares the means of EDE-Q Global and subscale scores in the different groups divided on the basis of BMI (underweight, normal, overweight and obese). EDE-Q Global and all four subscale scores were significantly associated with BMI. Higher scores were observed in overweight and obese students ($p < 0.001$ for all scores).

Similarly, when EDE-Q scores were compared in groups divided on the basis of BSQ scores as shown in Table 3, it was found that body image was significantly correlated with EDE-Q scores ($p < 0.001$ for all scores). Students who had moderate or marked concern about their body shape scored high on EDE-Q scores in all subscales and Global score.

Table 4 shows correlation of EDE-Q scores with self-esteem. The results showed that Global score, Restraint score, eating concern score and weight concern score were not significantly associated with self-esteem but Shape concern score was significantly associated with low self-esteem ($p = 0.02$).

Forward linear regression analysis taking sociodemographic

Table 1: The sociodemographic and other general characteristics of the students depending on BMI, BSQ score, RSES score and EDE-Q score and their correlation with gender

Variable	Males	Females	Total	P value
Number of students	76 (39.4%)	117 (60.6%)	193 (100%)	
Age [Mean(SD)]	24.1(3.5)	23(1.7)	23.4(2.6)	<0.01*
Undergraduate	33 (43.4%)	53 (45.3%)	86 (44.6%)	
Intern	16 (21.1%)	35 (29.9%)	51 (26.4%)	0.20 †
Postgraduate	27 (35.5%)	29 (24.8%)	56 (29%)	
BMI [Mean(SD)]	26.1(4.3)	23.5(5.7)	24.5(5.3)	<0.01*
Underweight	0 (0%)	16 (13.7%)	16 (8.3%)	
Normal	31 (40.8%)	57 (48.7%)	88 (45.6%)	<0.001 †
Overweight	32 (42.1%)	25 (21.4%)	57 (29.5%)	
Obese	13 (17.1%)	19 (16.2%)	32 (16.6%)	
BSQ-16 score [Mean(SD)]	45.9(19.6)	34.4(13.9)	38.9(17.3)	<0.001*
No concern about body shape	26 (34.2%)	78 (66.7%)	104 (53.9%)	
Mild concern about body shape	17 (22.4%)	26 (22.2%)	43 (22.3%)	<0.001 †
Moderate concern about body shape	24 (31.6%)	10 (8.6%)	34 (17.6%)	
Marked concern about body shape	9 (11.8%)	3 (2.6%)	12 (6.2%)	
RSES score [Mean(SD)]	19.6(4.6)	19.6(5)	19.6(4.9)	0.97*
Low self-esteem	3 (4%)	25 (21.4%)	28 (14.5%)	<0.001 †
Normal self-esteem	73 (96.1%)	92 (78.6%)	165 (85.5%)	
EDE-Q Global score [Mean(SD)]	1.9(1.2)	1.8(1.5)	1.9(1.4)	0.53*
EDE-Q Restraint score [Mean(SD)]	1.7(1.2)	1.6(1.4)	1.6(1.4)	0.65*
EDE-Q Eating Concern score [Mean(SD)]	1.3(1.2)	0.8(1)	1(1.1)	<0.01*
EDE-Q Shape Concern score [Mean(SD)]	2.5(1.6)	2.2(1.5)	2.3(1.5)	0.29*
EDE-Q Weight Concern score [Mean(SD)]	2.3(1.5)	2.1(1.6)	2.2(1.6)	0.40*

* - ANOVA test, † - Chi square test. P value <0.05 is statistically significant

Table 2: Correlation of EDE-Q Global and Subscales scores with different weight categories based on BMI

EDE-Q Score [Mean(SD)]	Underweight	Normal	Overweight	Obese	P value (ANOVA test)
Global Score	0.6(0.5)	1.2(0.8)	2.4(1.1)	3.3(1.8)	<0.001
Restraint Score	0.4(0.6)	1.1(1.1)	2.3(1.1)	2.5(1.6)	<0.001
Eating Concern Score	0.3(0.5)	0.7(0.8)	1.2(1.2)	1.8(1.4)	<0.001
Shape Concern Score	1(0.9)	1.7(1.2)	3(1.2)	3.5(1.8)	<0.001
Weight Concern Score	0.7(0.6)	1.5(1.2)	3(1.3)	3.5(1.5)	<0.001

P value <0.05 is statistically significant

Table 3: Correlation of EDE-Q Global and Subscales scores with different body shape concern categories based on BSQ-16 score

EDE-Q Score [Mean(SD)]	No concern for body shape	Mild concern for body shape	Moderate concern for body shape	Marked concern for body shape	P value (ANOVA test)
Global Score	1.3(1.3)	2.1(1)	2.7(0.9)	3.8(1.3)	<0.001
Restraint Score	1.1(1.1)	2.1(1.3)	2.3(1.2)	2.9(1.6)	<0.001
Eating Concern Score	0.6(0.7)	0.8(0.7)	2(1.2)	2.9(1.6)	<0.001
Shape Concern Score	1.5(1)	2.8(1.3)	3.3(1.1)	4.8(2)	<0.001
Weight Concern Score	1.4(1.2)	2.4(1.4)	3.3(1)	4.6(1.7)	<0.001

P value <0.05 is statistically significant

Table 4: Correlation of EDE-Q Global and Subscales scores with different self-esteem categories based on RSES score

EDE-Q Score [Mean(SD)]	Low self-esteem	Normal	P value (ANOVA test)
Global Score	1.9(1.2)	1.9(1.4)	0.86
Restraint Score	1.5(1.1)	1.7(1.4)	0.47
Eating Concern Score	1(1.4)	1(1.1)	0.97
Shape Concern Score	2.9(1.7)	2.2(1.5)	0.02
Weight Concern Score	2.3(1.4)	2.2(1.6)	0.75

P value <0.05 is statistically significant

factors, BMI, body image (BSQ-16 score) and self-esteem (RSES score) as predictor variables and eating disorder risk (EDE-Q Global score) as an outcome variable showed mild positive correlation with male gender (Regression coefficient=0.19, Pearson Correlation Coefficient= -0.05, $p < 0.001$) and moderate positive correlation with BMI (Regression coefficient=0.4, Pearson Correlation Coefficient=0.59, $p < 0.001$) and body image (Regression coefficient=0.45, Pearson Correlation Coefficient=0.6, $p < 0.001$) [Table 5]. There was no correlation of eating disorder risk with other sociodemographic factors and self-esteem.

Discussion

We had some important findings from the present study. One of the important finding from our study showed that male students were at slightly more risk of developing eating disorders than female students. Traditionally eating disorders are considered as disorders of female gender and most of the studies in past showed female preponderance in eating disorder patients.^[37,38] However, recent studies in this regard have shown that prevalence of these disorders in males has been underreported, under diagnosed and underestimated. Infact, the trends of these disorders are on rise in male population dramatically.^[39,40] However, lack of awareness of eating disorders in males may lead to underreporting of early symptoms of eating disorders and delay in seeking help by males.^[38] It has been stated that eating disorders in males may present clinically in a different way than in females. Males have more eating disorder not otherwise specified (EDNOS) diagnoses than females^[41] and they may not show similar weight related and dieting symptoms as females.^[42] Lack of understanding of this fact on part of health care

professionals may lead to under diagnosis and undertreatment of eating disorders in males.^[42] Our study had pointed out the necessity to realise the magnitude of eating disorder related problems in male population.

Our findings also suggested higher proportion of overweight and obese male students based on BMI calculations which was relevant with the findings in other studies in student population.^[43] Male students in our study showed more body image dissatisfaction than female students. This is contrary to the findings of many other similar studies which show that females have more body image dissatisfaction compared to males.^[43,44] However, recent research on male body image dissatisfaction shows that the prevalence of body image dissatisfaction is increasing in males.^[45] Though the body dissatisfaction in adult males is not as straightforward as in adult females the level of body dissatisfaction increases with increasing BMI.^[46]

In the present study, we found eating disorder risk was associated with elevated BMI. This relationship between elevated BMI and eating disorder risk has been established in previous studies in both western and Asian setting.^[47,48] Chang *et al.*^[1] who studied medical students in China also had similar findings. This shows the possible link between being overweight and disturbed eating attitudes. The disparity between actual body weight and desired ideal "thin" body as in western culture drives students to have changes in their eating attitudes. It has been shown that weight control strategies used by overweight people are often ineffective and actually results in weight gain and eating disturbances such as binge eating which further increases risk of obesity. This indicates that elevated BMI and disturbed eating attitudes may be mutually exacerbating.^[49]

Table 5: Forward linear regression analysis of sociodemographic factors, BMI, body image (BSQ-16 score) and self-esteem (RSES score) with eating disorder risk (EDE-Q Global score)

Variables	B	Standard Error	Regression Coefficient	Pearson Correlation Coefficient	P value	95% Confidence Interval for B
Gender	0.55	0.16	0.19	-0.05	<0.001	0.24, 0.86
BMI	0.11	0.02	0.4	0.59	<0.001	0.07, 0.14
Body Image (BSQ-16 score)	0.04	0.01	0.45	0.6	<0.001	0.03, 0.05

P value <0.05 is statistically significant

Another finding from our study showed that body image dissatisfaction was significantly associated with eating disorders risk. It has been consistent with findings of other researchers and the role of body image dissatisfaction in inducing disturbed eating attitudes and eating disorders risk has been implicated in varied sociocultural and ethnic setting.^[13,22,27,28] Body image dissatisfaction may lead to eating disorders either directly or indirectly through self-esteem or negative emotions such as depression, anxiety or social phobia.^[27,50]

Our study showed no correlation between self-esteem and eating disorders risk. Researchers have assessed role of self-esteem in inducing eating disorders and had conflicting results depending on study setting and methods of assessment. Some of them found correlation of self-esteem with eating disorders^[51,52] while others have not found such relationship.^[53,54] Further investigation in this regard is warranted to ascertain the role of self-esteem in causation of eating disorders.

There are some limitations in the present study. Firstly, it was a cross-sectional study which made it difficult to determine the direction of causal association among the variable studied. Secondly, data was collected through self-reported questionnaire which may cause reporting bias of the information given. So, we propose a prospective case control study with face to face interview with study participants in future.

Conclusion

The present study underlines the fact that elevated BMI and body image dissatisfaction are related to increased risk for developing eating disorders in medical students and probably this relationship is direct, not mediated by disturbances in self-esteem. This will be of clinical implications to both medical students and health care professionals to prevent or detect eating pathologies as early as possible by identifying students at risk. Our study brought out the vulnerability of male students for obesity, body image dissatisfaction and development of eating disorders. Increasing awareness of these facts in students, especially male students, may help them seeking appropriate medical help. It is important for health care professionals also to be aware of these facts so that assessment of eating pathology to be done in all persons at risk.

Conflict of Interest

None declared.

References

- Chang WW, Nie M, Kang YW, He LP, Jin YL, Yao YS. Subclinical eating disorders in female medical students in Anhui, China: a cross-sectional study. *Nutr Hosp*. 2015; 31:1771-1777.
- Keel PK, Klump KL. Are eating disorders culture-bound syndromes? Implications for conceptualizing their etiology. *Psychol Bull*. 2003; 129:747-69.
- Nasser M. Eating disorders: the cultural dimension. *Soc Psychiatry Psychiatr Epidemiol*. 1988; 23:184-7.
- Rucker CE, Cash TF. Body images, body size perceptions and eating behaviors among African-American and white college women. *Int J Eat Disord*. 1992; 12:291-9.
- le Grange D, Stone AA, Brownell KD. Eating disturbances in white and minority female dieters. *Int J Eat Disord*. 1998; 24:395-403.
- Austin JL, Smith JE. Thin ideal internalization in Mexican girls: A test of the sociocultural model of eating disorders. *Int J Eat Disord*. 2008; 41:448-457.
- Benninghoven D, Tadic V, Kunzendorf S, Jantschek G. Body images of male patients with eating disorders. *Psychother Psychosom Med Psychol*. 2007; 57:120-127.
- Jennifer JT, Sing L, Anne EB. Updates in the epidemiology of eating disorders in Asia and the Pacific. *Curr Opinion Psychiatry*. 2016; 29(6):354-362.
- King MB, Bhugra D. Eating disorders: lessons from a cross-cultural study. *Psychol Med*. 1989; 19:955-958.
- Gupta MA, Chaturvedi SK, Chandarana PC, Johnson AM. Weight-related body image concerns among 18-24-year-old women in Canada and India: An empirical comparative study. *J Psychosom Res*. 2001; 50:193-198.
- Chug R, Puri S. Affluent adolescent girls of Delhi: Eating and weight concerns. *Br J Nutr*. 2001; 86:535-542.
- Sadana B, Khanna M, Mann SK. Consumption patterns of fast foods among teenagers. *Appl Nutr*. 1997; 22:14-17.
- Ramaiah RR. Eating disorders among medical students of a rural teaching hospital: a cross-sectional study. *Int J Community Med Public Health*. 2015; 2:25-28.
- Seepersad R. The relation between eating disorders and self-esteem in adolescents in Trinidad. *J Depart Behav Sci*. 2012; 2:102-127.
- Vohs KD, Heatherton TF, Herrin M. Disordered eating and the transition to college: A prospective study. *Int J Eat Disord*. 2001; 29:280-288.
- Cooley E, Toray T. Body image and personality predictors of eating disorder symptoms during the college years. *Int J Eat Disord*. 2001; 30:28-36.
- Herzog DB, PePOSE M, Norman DK, Rigotti NA. Eating disorders and social maladjustment in female medical students. *J Nerv Ment Dis*. 1985; 173:734-737.
- Pope HG, Hudson JI, Yurgelun-Todd D. Anorexia nervosa and bulimia among 300 women shoppers. *Am J Psychiatry*. 1984; 14:292-294.
- Bosi MLM, Nogueira JAD, Alencar CH, Moreira JA (2016) Body image and eating behavior among medical students: Eating disorders among medical students. *Epidemiology (Sunnyvale)* 6: 256.
- Ross CC. When the Healers Are Hurting: Understanding Eating Disorders. Eating disorders among health care professionals - nurses and doctors. *Psychology Today Website*. <https://www.>

- psychologytoday.com/blog/real-healing/201304/when-the-healers-are-hurting-understanding-eating-disorders. Posted Apr 29, 2013. Accessed on Aug 25, 2016.
21. Schmidt U. Aetiology of eating disorders in the 21st century: new answers to old questions. *Eur Child Adolesc Psychiatry*. 2003; 12:30-37.
 22. Mumford DB, Choudry IY. Body dissatisfaction and eating attitudes in slimming and fitness gyms in London and Lahore: A cross-cultural study. *Eur Eat Disord Rev*. 2000; 8:217-224.
 23. Akdevelioglu Y, Gu'mu's H. Eating disorders and body image perception among university students. *Pak J Nutr*. 2010; 9:1187-1191.
 24. Varnes JR, Stellefson ML, Janelle CM, Dorman SM, Dodd V, Miller MD. A systematic review of studies comparing body image concerns among female college athletes and nonathletes, 1997-2012. *Body Image*. 2013; 10:421-432.
 25. Neumark-Sztainer D, Cafri G, Wall M. Steroid use among adolescents: Longitudinal findings from Project EAT. *Pediatrics*. 2007; 119:476-486.
 26. Button EJ. Self-esteem in girls aged 11-12: Baseline findings from a planned prospective study of vulnerability to eating disorders. *J Adolesc*. 1993; 13:407-413.
 27. Keery H, Van den Berg P, Thompson JK. An evaluation of the tripartite influence model of body dissatisfaction and eating disturbance with adolescent girls. *Body Image*. 2004; 1:237-251.
 28. Iannaccone M, D'Olimpiob F, Cellaa S, Cotrufoa P. Self-esteem, body shame and eating disorder risk in obese and normal weight adolescents: A mediation model. *Eating Behaviors*. 2016; 21:80-83.
 29. Vitousek KB, Hollon SD. The investigation of schematic content and processing in the eating disorders. *Cogn Ther Res*. 1990; 14:191-214.
 30. Fairburn CG, Shafran R, Cooper Z. A cognitive behavioral theory of anorexia nervosa. *Behav Res Therapy*. 1999; 37:1-13.
 31. van den Berg P, Thompson JK, Obremski-Brandon K, Coovert M. The tripartite influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. *J Psychosom Res*. 2002; 53:1007-1020.
 32. Heywood S, McCabe MP. Negative affect as a mediator between body dissatisfaction and extreme weight loss and muscle gain behaviors. *J Health Psychol*. 2006; 11:833-844.
 33. Thakur MB, Varmani J. Self-esteem and disordered eating attitudes in female adolescents. *Ind J Mental Health*. 2015; 2:43-47.
 34. Evans C, Dolan B. Body shape questionnaire: derivation of shortened "alternate forms". *Int J Eat Disord*. 1993; 13:315-321.
 35. Rosenberg M. *Society and the adolescent self-image*. Princeton University, Princeton. 1965.
 36. Fairburn CG, Beglin SJ. Assessment of eating disorder psychopathology: Interview or self-report questionnaire? *Int J Eat Disord*. 1994; 16:363-370.
 37. Greenberg ST, Schoen EG. Males and eating disorders: Gender-based therapy for eating disorder recovery. *Prof Psychol Res Pract*. 2008; 39:464-471
 38. O'Hara SK, Smith KC. Presentation of eating disorders in the news media: What are the implications for patient diagnosis and treatment? *Patient Educ Couns*. 2007; 68:43-51.
 39. Strother E, Lemberg R, Stanford SC, Turberville D. Eating disorders in men: underdiagnosed, undertreated, and misunderstood. *Eat Disord*. 2012; 20(5):346-355.
 40. Murray SB, Griffiths S, Mond JM. Evolving eating disorder psychopathology: conceptualising muscularity-oriented disordered eating. *Br J Psychiatry*. 2016; 208:414-415.
 41. Gotestam KG, Agras WS. General population-based epidemiological study of eating disorders in Norway. *Int J Eat Disord*. 1995; 18:119-126.
 42. Greenberg ST, Schoen EG. Males and eating disorders: gender-based therapy for eating disorder recovery. *Prof Psychol Res Pract*. 2008; 39:464-471.
 43. Kuan PX, Ho HL, Shuhaili MS, Siti AA, Gudum HR. Gender differences in body mass index, body weight perception and weight loss strategies among undergraduates in Universiti Malaysia Sarawak. *Malays J Nutr*. 2011; 17:67-75.
 44. Gillen MM, Lefkowitz ES. Gender and racial/ethnic differences in body image development among college students. *Body Image*. 2012; 9:126-130.
 45. Mitchison D, Hay P, Slewa-Younan A, Mond JM. The changing demographic profile of eating disorder behaviors in the community. *BMC Public Health*. 2014; 14:943.
 46. McCabe MP, Ricciardelli LA. Body image dissatisfaction among males across the lifespan: A review of past literature. *J Psychosom Res*. 2004; 56:675-685.
 47. Yang SJ, Kim JM, Yoon JS. Disturbed eating attitudes and behaviours in South Korean boys and girls: A school-based cross-sectional study. *Yonsei Med J*. 2010; 51:302-309.
 48. Neumark-Sztainer D, Hannan PJ. Weight-related behaviors among adolescent girls and boys: Results from a national survey. *Arch Pediatr Adolesc Med*. 2000; 154:569-577.
 49. Jones JM, Bennett S, Olmsted MP, Lawson ML, Rodin G. Disordered eating attitudes and behaviours in teenaged girls: A school based study. *Can Med Assoc J*. 2001; 165:547-552.
 50. Brechan I, Kvaalem IL. Relationship between body dissatisfaction and disordered eating: Mediating role of self-esteem and depression. *Eat Behav*. 2015; 17:49-58.
 51. Furnham A, Badmin N, Sneade I. Body image dissatisfaction: Gender differences in eating attitudes, self-esteem, and reasons for exercise. *J Psychol*. 2002; 136:581-596.
 52. Soo KL, Shariff ZM, Taib MNM, Samah BA. Eating behaviour, body image, and self-esteem of adolescent girls in Malaysia. *Percept Mot Skills*. 2008; 106:833-844.
 53. Cohen DL, Petrie TA. An examination of psychosocial correlates of disordered eating among undergraduate women. *Sex Roles*. 2005; 52(1):29-42.
 54. Rogers RL, Petrie TA. Psychological correlates of anorexic and bulimic symptomatology. *J Couns Dev*. 2001; 79(2):178-187.