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Relationship of eating behavior and self-esteem with body image perception and other factors among female college students of University of Delhi

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Abstract:

BACKGROUND: Eating disorders (EDs) can lead to life-threatening nutritional deficiencies whereas self-esteem influences interpersonal relationships and academic performance. Excessive concerns about body image resulting in body dissatisfaction not only affect psychological well-being but also predisposes to disordered eating behaviors. The objective of this study is to assess the eating behavior and level of self-esteem, their relationship with body image perception and also identify factors associated with them among undergraduate female college students.

MATERIALS AND METHODS: This cross-sectional study was conducted among 180 female undergraduate students of University of Delhi. Sociodemographic characteristics and anthropometric measurements were recorded. Eating Attitude Test-26, Rosenberg Self-esteem Scale, Contour Drawing Rating Scale and Body Shape Questionnaire 34 were used to assess eating behavior, self-esteem, body image dissatisfaction and body shape concerns, respectively. Both descriptive and inferential statistics were used and binary logistic regression was applied to identify the factors determining high risk eating behavior and low self-esteem.

RESULTS: In this study, 27.8% of the study participants were overweight or obese, 30.6% had body shape concerns and 76.7% had body image dissatisfaction. Significant proportion (13.9%) of the participants was identified as high risk for the development of EDs and having low self-esteem (12.8%). Body shape concern and family influences were significant predictors of high risk eating behavior whereas type of college and family influences significantly predicted low self-esteem.

CONCLUSIONS: The study concluded that factors such as nutritional status, family influences, type of college and body shape concerns lead to high risk eating behavior and low self-esteem. These findings will help in creating awareness on importance of concept of positive body image, healthy weight control behaviors and in developing future interventions.

Keywords:

Body image perception, body shape concerns, disordered eating behavior, self-esteem

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Introduction

Obesity has become a major nutritional problem in the modern world with increase in its incidence in both developed as well as many developing countries.^[1] Overweight status has been

found to be associated with emotional problems, hopelessness and suicidal thoughts in adolescent females.^[2] A positive association between overweight and obesity with disturbed eating behaviors and attempts to change the bodyweight resulting in mental disorders, of which eating disorders (EDs) being one of them

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have been reported.^[3] Body image dissatisfaction may also, further lead to EDs such as anorexia nervosa and bulimia nervosa and can cause distortions in cognition, affect, perception, and behavior related to body weight or shape among adolescent girls and women.^[4]

EDs can lead to life-threatening nutritional deficiencies, particularly those which involve fear of obesity, dissatisfaction with body image, intensive efforts for slimness, and drastic restrictions in energy intake.^[5] It severely affects health status, leading to either immediate symptoms of anemia, malnutrition, obesity, growth disorders, or to chronic conditions such as diabetes, atherosclerosis, hypertension, and osteoporosis. Apart from these, unhealthy dietary practices can also affect the psychic performance, alertness, learning abilities, and emotionality of an individual.^[6]

Not only the development of EDs but the problem of low self-esteem has also been reported among adolescents and was found to be associated with how they perceive their own body image.^[7] Self-esteem has an influence on interpersonal relationships and academic performance and considered as one of the main predictors of favorable outcomes in adolescence. Low self-esteem refers to feelings of worthlessness and failure and a high self-esteem is related to the feelings of satisfaction and appreciation of oneself.^[8] Individuals with negative body image perception may have low self-esteem, low satisfaction in life, and feeling of inferiority and expose themselves to a higher risk for depression, anxiety, or EDs.^[9] Comparison of overweight children, adolescents, and adults with their normal-weight peers shows that the former has lower body esteem, especially in females.^[10]

There is paucity of literature from India and gaps remain in our understanding of the factors responsible for the development of abnormal eating behaviors related to body weight and appearance among young girls, hence a comprehensive assessment using standardized tools is required to fill these gaps. It is also known that cultural and environmental influences significantly affect the eating behavior and self-esteem, especially among females. Thus, local studies would be of significant importance to highlight the factors leading to abnormal eating behaviors. Such investigations may help identify those at risk of developing EDs and help seek early intervention. The current study was carried out with the objective to assess the eating behavior and level of self-esteem among undergraduate female college students, to explore the relationship of these with body image perception and also identify the factors associated with high-risk eating behavior and low self-esteem.

Materials and Methods

Study design and setting

This cross-sectional study was conducted in colleges of North Campus of University of Delhi from November 2018 to April 2020.

Study participants and sampling procedure

Data were collected from 180 randomly selected female students from different academic years from 4 randomly selected colleges, 45 from each college, after obtaining permission from the Head of the Institution of each of the selected colleges. Those selected participants who did not give consent and those who could not be contacted after 2 visits were excluded from the study and a second randomization without replacement was done to achieve the required sample size. Each study participant was contacted personally by the investigator at a suitable place and time during the college hours and within the college premises and privacy and confidentiality was ensured.

Data collection tools and technique

Semi-structured, self-prepared questionnaire was used for sociodemographic details.

Anthropometric measurements

Height (in cm) was measured using a portable stadiometer and weight (in kg) using digital weighing machine and body mass index (BMI) was calculated. Nutritional status based on BMI was classified as underweight (<18.5 Kg/m²), normal weight (18.5–22.9 Kg/m²), overweight (23.0–24.99 Kg/m²), and obese (>25.0 Kg/m²).^[11]

Eating Attitude Test (EAT)–26 was used to determine the eating behavior of the participants using 26 items. Each item of this questionnaire is graded on a 6-point Likert scale with scores ranging from 0 (“never”) to 3 (“always”) except for item number 26 which ranges from 0 (“always”) to 3 (“never”). The total score ranges from 0 to 78. A score of ≥ 21 indicates a higher risk of EDs.

Rosenberg Self-esteem Scale was used to find out the level of self-esteem of the participants. It consists of 10 items. Each item in this questionnaire is graded on 4-point Likert scale ranging from 0 (“strongly disagree”) to 3 (“strongly agree”) for the items 1, 3, 4, 7, 10 and from 0 (“strongly agree”) to 3 (“strongly disagree”) for the items 2, 5, 6, 8, 9. The scores range from 0 to 30. Scores between 15 and 25 are within normal range; scores below 15 suggest low self-esteem and >25 suggests high self-esteem.

Body shape questionnaire 34

It is a self-assessment questionnaire to find out the level of concern about the body shape. Body shape

questionnaire (BSQ) is a 34-item questionnaire. Each item is scored from 1 to 6 with 1 implying never, and 6 implying always and the overall score is the total of the 34 items, i.e., ranging from 34 to 204. A score of more than or equal to 80 is considered as having body shape concerns.

Contour Drawing Rating Scale (CDRS) scale was used to find out the presence of body image dissatisfaction. It examines nine body shapes, from 1 for the thinnest to 9 for the largest. Participants chose their current body shape and ideal body shape desired by them. Any discrepancy between the current and ideal body shape shows dissatisfaction with body image. A positive score indicates the dissatisfaction due to being overweight and a negative score indicates dissatisfaction from being underweight.

All the questionnaires were self-administered. Both English and Hindi versions of the questionnaires were made available to the participants and based on their language preference one was finally administered.

Ethical considerations

Clearance was obtained from the Institutional Ethics Committee-Human Research of UCMS. Permission from the college authority of the selected colleges and informed written consent from the participants was taken prior to conducting the study. After data collection, the study participants found at higher risk of EDs and with low self-esteem were encouraged to seek medical advice for an objective evaluation.

Statistical analysis

Data were analyzed using the software Statistical package for social sciences (SPSS version 20.0, IBM Corp., Armonk, New York). Mean and standard deviation (SD) were calculated for quantitative variables whereas qualitative variables were expressed as frequency and percentages. Scoring and classification of EAT-26, Rosenberg Self Esteem scale, CDRS, and BSQ-34 scores were done. Shapiro–Wilk test was used to determine the normality of distribution of the variables. The associations between abnormal eating behavior and low self-esteem with other factors were analyzed using Chi-Square test, Mann–Whitney *U*-test, Kruskal–Wallis test, and Spearman rank correlation coefficient. To identify the predictors of dichotomous-dependent variables, namely, eating behavior (high risk and low risk) and level of self-esteem (high and low) binary logistic regression were applied. Body shape concerns and dissatisfaction, socio-demographic and other variables having a $P < 0.25$ on univariate analysis were used as independent variables in the regression model. The variables were selected by backward stepwise elimination method to create the final logistic model

and the best fitting model based on Hosmer–Lemeshow test was selected. Associations with $P < 0.05$ at 95% confidence level were taken as statistically significant.

Results

Sociodemographic, academic, and other details

The participants included in the study had a mean age of 18.96 years (SD = 0.93), with their age ranging from 18 to 22 years. Nearly two-third of the study participants belonged to Delhi and 43% were either staying in the hostel or a Paying Guest accommodation. The majority of the participants belonged to nuclear families. Nearly one-third of the mothers of the study participants were graduate and about one-fourth had professional or a postgraduate qualification. Only 2% were found illiterate. Only 13.9% of the study participants were in a relationship with a male partner while the rest were single.

Nearly three-fourths of the study participants were pursuing Bachelor of Arts course while rest of them were pursuing either Bachelor of Science (B. Sc) or Bachelor of Commerce (B. Com) courses. Most of them were from 1st academic year of graduation course whereas 29.4% were 2nd year students and 18.4% were 3rd year students.

Nearly one-fourth of the study participants reported that they felt the pressure of being compared with their siblings by their family members, 40.6% reported that they compared their own body with that of an actress and nearly half of the participants reported that they were being compared by their peers with the other friends or batch mates. About half of the participants reported that they were involved in some kind of moderate or vigorous physical activity for at least 30 min daily for 5 days a week whereas only one-fifth of the participants had participated in any competitive sports team.

Mean BMI of the participants was 21.46 Kg/m² (SD = 3.37). The prevalence of overweight or obesity in our study was 27.8% whereas one-fifth of the participants were underweight. Body shape concerns were found among 30.6% of the study participants and 76.7% had body image dissatisfaction.

Eating behavior, level of self-esteem, and their associated factors

A significant proportion of the participants (13.9%) was identified as high risk for the development of EDs [Figure 1]. Low self-esteem was observed in 12.8% of them and similar proportion had high self-esteem [Figure 2].

The eating behavior of the study participants was significantly associated with nutritional status, pressure

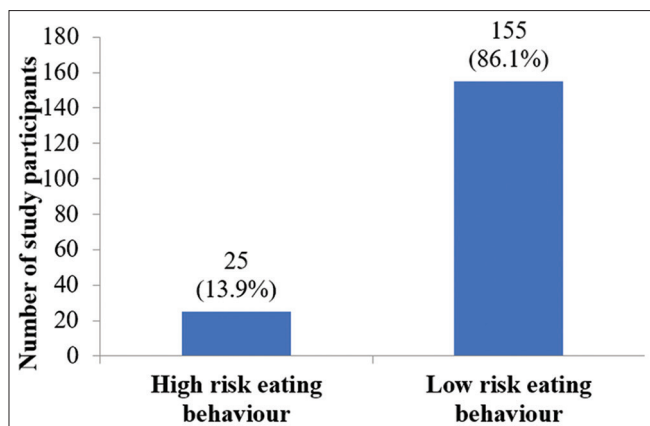


Figure 1: Distribution of eating behaviour of the study participants (n = 180)

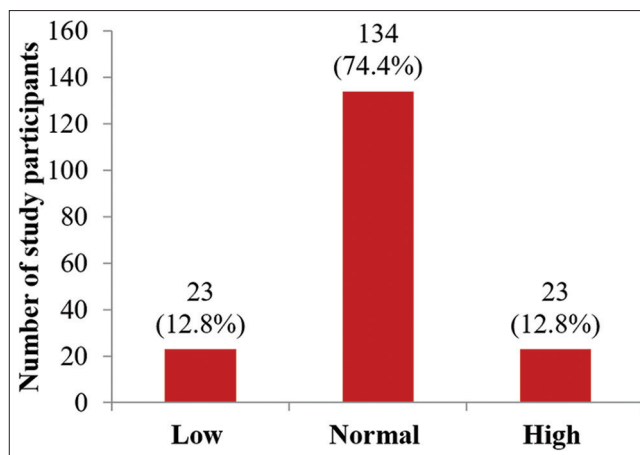


Figure 2: Distribution of level of self-esteem of the study participants (n = 180)

from the family members, media influences, and participation in any competitive sports team. Participants who were overweight or obese ($P = 0.006$), those who felt the pressure of being compared with their siblings by their parents ($P = 0.014$), who compared their own body or desired own body to be like that of an actress ($P = 0.033$) and who participated in any competitive sports-team ($P = 0.031$) were more likely to have high-risk eating behavior.

Studying in a co-educational college, pressure from peers and family members, and media influences were significantly associated with a low level of self-esteem among the study participants. The participants who were studying in co-ed colleges ($P = 0.008$), who compared or desired own body to be like that of an actress ($P = 0.002$) and who were being compared with other members of their friend circle by their batchmates ($P = 0.048$) were more likely to have low self-esteem.

The relationship of high-risk eating behavior and low self-esteem with body shape concerns and body image dissatisfaction was observed in our study [Table 1]. A positive correlation between high-risk eating behavior and body image was observed. Those who had a higher level of body shape concerns and higher degree of body image dissatisfaction were seen as having high-risk eating behavior. However, a negative correlation was seen between self-esteem and body shape concerns. The participants who had a higher level of body shape concerns reported low level of self-esteem.

Body shape concerns and pressure of being compared with siblings by the family members were significant predictors of high-risk eating behavior. These factors explained 22.2% of the high-risk eating behavior and 87.2% of the cases were correctly classified by these factors [Table 2]. Factors which were identified as predictors of low self-esteem in our study were body shape concerns and participants studying in co-ed

Table 1: Relationship between eating behaviour and level of self-esteem with body image of the participants (n=180)

	Level of body shape concerns		Degree of body image dissatisfaction	
	ρ	P	ρ	P
Eating behaviour	0.336	<0.001	0.207	0.005
Level of self-esteem	-0.356	<0.001	0.008	0.911

colleges. These factors correctly classified 87.2% of the cases and 23.7% of low self-esteem could be explained by these factors [Table 3].

Discussion

The proportion of the young females at high risk of the development of EDs has been found in the range of 10%–24% in the literature. It is noteworthy that in this study, the proportion of the females who were at high risk of development of EDs was 13.9% which was within the range reported by the previous studies. Gaddad *et al.* reported that about one-fourth of the adolescents from an adolescent health center in Delhi were at high risk of developing EDs based on EAT-26 score.^[12] 23.7% had high-risk eating behavior based on EAT-40 scores among university students in Turkey as reported by Akdevelioglu and Gümüs.^[13] Naeimi *et al.* reported that 10.5% of the medical students from Iran had high risk for the development of EDs based on EAT-26.^[14] The plausible reason for the variation in the proportion of participants at high of risk of developing EDs could be explained because of differences in the tools used, the cultural settings and degree of body shape concerns.

Factors associated with high-risk eating behavior were also investigated in this study which revealed that feeling of pressure from the family was associated with high-risk eating behavior. Quiles Marcos *et al.* in a recent review also reported that both peers and family influenced the eating behavior of young women.^[15] The participants of

Table 2: Factors predicting high risk eating behaviour based on binary logistic regression analysis

Predictors	B	SE	AOR (95% CI)	P
Relationship status (reference single)				
Single				
In a relationship	-1.579	1.094	0.206 (0.024-1.759)	0.149
Pressure of being compared with the siblings by the family members (reference not felt)				
Not felt				
Felt	1.074	0.493	2.927 (1.114-7.686)	0.029
Participation in any competitive sports team (reference did not participate)				
Did not participate				
Participated	0.755	0.516	2.127 (0.774-5.851)	0.144
Body shape concern (reference no concern)				
No concern				
Mild to marked concern	1.517	0.473	4.557 (1.804-11.507)	0.001
Final model				
χ^2 (df=4)			23.556	
P			0.001	
Hosmer-Lemeshow test			0.781	
Nagelkerke R^2			0.222	

SE=Standard error, AOR=Adjusted odds ratio, CI=Confidence interval

Table 3: Factors predicting low self-esteem based on binary logistic regression analysis

Predictors	B	SE	AOR (95% CI)	P
Type of college (reference only for women colleges)				
Only for women colleges				
Co-ed colleges	1.396	0.553	4.040 (1.367-11.940)	0.012
Comparison with other members of friend circle by batch mates or friend (reference not felt)				
Not felt				
Felt	0.864	0.511	2.374 (0.873-6.458)	0.090
Body shape concern (reference no concern)				
No concern				
Mild to marked concern	1.607	0.492	4.988 (1.901-13.089)	0.001
Final model				
χ^2 (df=4)			24.372	
P			<0.001	
Hosmer-lemeshow test			0.951	
Nagelkerke R^2			0.237	

SE=Standard error, AOR=Adjusted odds ratio, CI=Confidence interval

this study who desired own body to be like that of an actress was at higher risk of development of EDs. This can be explained as the growing exposure to the western media, the young generation has become vulnerable to the issues related to body image and further leading to the development of nutritional disorders.^[16] Physical activity was not associated with eating behavior of the participants in this study. In contrast to these findings, the study by Gaddad *et al.* reported that involvement in physical activity was associated with high-risk eating behavior among the female participants from an adolescent health center in Delhi.^[12] One of the reasons for the contrasting findings of this study could be due to the difference in the age group of the study participants as compared to the study by Gaddad *P et al.* This study included participants belonging to slightly older age group whereas the study by Gaddad *P et al.* included the adolescent age group. Moreover, this study mainly

focused on moderate or vigorous physical activities only, instead of any grade of physical activity.

A statistically significant trend was observed between the increasing BMI and the presence high-risk eating behavior in this study as a higher proportion of overweight or obese individuals were at high risk for the development of EDs as compared to those who were underweight or had a normal BMI. Similar findings were reported by Jankauskiene and Baceviciene among adolescents from Lithuania that the overweight individuals were at higher risk of development of EDs.^[17] Thus, it can be presumed that higher BMI was associated with the adoption of high-risk eating behavior probably in an attempt at weight reduction.

The regression model indicated that feeling of pressure of being compared with siblings by the family members

and having body shape concerns were significant predictors of high-risk eating behavior in this study. A study by Sharpe *et al.* corroborated the findings of our study which reported that concerns related to body image significantly predicted disordered eating behavior among the adolescents in the USA.^[18] Similar observations were made by Naeimi *et al.* who reported that poor body image, low self-esteem, father's and mother's educational status were the significant predictors of eating behavior among the medical students of Iran.^[14]

A significant proportion of the participants (12.8%) had low self-esteem in this study. Comparable findings were shown in a study by Naeimi *et al.* which reported that 14.9% of the female medical students from Iran had low self-esteem based on the Rosenberg self-esteem scale.^[14] However, Fortes Lde *et al.* reported a much higher proportion of participants (56%) as having low self-esteem based on the Rosenberg self-esteem scale.^[19] The contrasting finding of could be because of the inclusion of adolescent girls in the study who probably might not have been able to comprehend the questions and answer them appropriately while the current study was conducted on college students.

Since self-esteem is a complex multi-dimensional construct, the association of self-esteem with several factors was studied, which showed that the presence of opposite gender in the college was associated with low level of self-esteem. The participants who were from co-ed colleges had low self-esteem in this study. Similarly, a study done among Indian female students reported a significantly higher proportion of self-perception among those attending only for women colleges as compared to those attending co-ed colleges.^[20] The level of self-esteem was also associated with media influences and peer pressure. The participants of this study who compared or desired own body to be like that of an actress had low self-esteem as compared to those who did not. Similarly, those who were being compared with other friends by their peers had low self-esteem. It was seen in previous studies that low self-esteem is more sensitive to manipulations of social comparison than high self-esteem. It was also seen that the women with low self-esteem when compared with an unattractive female, displayed a higher self-esteem.^[21] The level of self-esteem was not associated with nutritional status of the study participants. The results support the findings of study done by Gaddad *et al.*^[12] Whereas the studies done by Rahim NNA reported that BMI was significantly associated with self-esteem among the adolescents living in welfare homes in Selangor state of Malaysia.^[22] Jankauskiene and Baceviciene also reported that the adolescents of Kaunas Lithuania who were overweight had the lowest self-esteem.^[17] The findings of some studies including the current study may not be

in concordance with the findings of the above-mentioned studies pointing to the fact that the level of self-esteem is a complex construct which may not always be fully explained by individual factors.

This study demonstrated that studying in co-ed colleges and having body shape concerns were the significant predictors of low self-esteem. These findings have been corroborated by the study of Tiwari GK. who reported that 74.5% variance in the self-esteem scores was explained by body shape dissatisfaction based on BSQ scores.^[23]

The strengths of this study included a nonhospital based randomly selected sample of female college students of North Campus of University of Delhi, which allowed for better generalization of the findings than participants recruited from clinical settings. The use of standardized tools for the assessment of eating behavior, level of self-esteem, body image dissatisfaction, and body shape concerns adds further evidence to the limited but growing literature on the factors like body image dissatisfaction and concerns leading to abnormal eating behavior and low self-esteem in the Southeast Asian and Indian contexts.

Limitations and recommendations

This study had few limitations such as the findings could only be generalized to the colleges of North Campus of University of Delhi rather than all the colleges of Delhi. Only female college students were included in the study but body image concerns may affect the males as well and the concerns are rising among the males although the parameters may not essentially be the same as females. The tools of this study were self-administered; hence, there could be a possibility of self-reporting bias. Some of the items in the questionnaire may not completely be culturally relevant in the Indian context as the tool was developed in western countries. Based on these findings, a larger multi-centric study including participants from different settings is recommended so that the findings could be generalized. Furthermore, any discussion on causality could only be tentative from a cross-sectional design. Hence, to determine the causal relations between the explored variables, a longitudinal or a prospective study must be conducted. The study recommends that health promotion activities should be started at an early stage in life and the importance of adopting healthy eating behaviors, concept of positive body image and its health benefits, and avoidance of bodyweight management through self-prescription need to be emphasized through appropriate intervention programs in the respective educational institutions.

Conclusions

The study concluded that the proportions of participants

with high risk for the development of EDs and low level of self-esteem in our study were significant. Higher levels of body shape concern were associated with a higher degree of body image dissatisfaction and a higher proportion of high-risk eating behavior and low self-esteem among female students. Being overweight or obese, participation in any competitive sports team, and family and media influences were associated with high-risk eating behavior and low self-esteem in our study.

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Conflicts of interest

There are no conflicts of interest.

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