

Research Article

The Prevalence of Disordered Eating Behaviors (DEBs) among Female University Students in Lahore, Pakistan: A cross sectional study

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Abstract

Background: Disordered Eating Behaviors (DEBs) mean the ongoing disruptions in eating behaviors, including dietary restrictions, emotional eating, self-induced vomiting, taking hunger pills, fasting, abusing laxatives and diuretics. These behaviors can result in fully diagnosable eating disorders.

Objectives: To evaluate the prevalence of Disordered Eating Behaviors (DEBs) among female university students and to investigate the association between DEBs, age, and Body Mass Index (BMI).

Methods: This descriptive cross-sectional study was conducted at King Edward Medical University, Lahore, involving 190 female participants aged between 18-25 years. Participants completed the Eating Attitude Test (EAT-26) and provided demographic data, including height and weight. The EAT-26, a validated self-report instrument, was used to categorize participants into high-risk and low- groups for DEBs. Logistic regression and Chi-square tests were performed to explore associations between BMI, age, and DEBs.

Results: Among the 190 participants, the average age was 21.33 years, with an average BMI of 21.17 kg/m². Of the study population, 24.74% students reported having a score of 20 or above, which denotes a high risk of DEBs and 75.2% (n = 143) had a score of less than 20, indicating a low risk of DEBs. Logistic regression analysis revealed a significant association between higher BMI categories and increased odds of DEBs (adjusted odds ratio = 1.883, p = 0.029). Age did not show positive relationship with DEBs.

Conclusion: The study revealed a direct relation of BMI with DEBs among female college students i.e. the greater the BMI higher is the chance of developing an eating disorder. Age, however, was a less significant predictor. These findings suggest the need for targeted interventions focusing on weight-related issues and promoting healthy body image to mitigate DEBs.

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Introduction

Disordered Eating Behaviors (DEBs) refer to ongoing disruptions in eating habits, leading to significant

impairments in both physical health and psychosocial well-being.¹ These behaviors include dietary restrictions, binge-eating, emotional eating, self-induced vomiting, hunger pills, fasting, abusing laxatives and diuretics which can result in fully diagnosable eating disorders.²

These disorders comprise of anorexia nervosa (AN), bulimia nervosa (BN), binge-eating disorder (BED), pica etc. Each disorder has specific diagnostic criteria and can manifest



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across all age groups.¹ According to current studies, eating disorders (ED) have a median age range of 12-25 years with greater percentage lying in the higher age group.^{3,4} Substantial empirical research indicates a significant association between depression, anxiety, and maladaptive eating behaviors among women.⁵ Binge eating disorder, bulimia nervosa, and anorexia nervosa are widely acknowledged as prevalent types of eating disorders in clinical settings.⁶ The hallmarks of anorexia nervosa (AN), a severe eating illness, include an intense dread of gaining weight, abnormal body shape, and amenorrhea.¹ Recurrent episodes of binge eating are associated with bulimia nervosa (BN), which is characterized by attempts to expel calories. People who suffer from binge-eating disorder (BED) have an obsessive need to eat.

Variability in attitudes towards eating is evident among individuals, particularly girls, who frequently exhibit a heightened consciousness regarding body weight, shape, and dissatisfaction with physical appearance.⁷

According to studies, women are more likely than men to have DEBs. In a study comparing male and female students, the lifetime prevalence rates of anorexia nervosa might be up to 4% among females and 0.3% among males. Regarding bulimia nervosa, up to 3% of females and more than 1% of males suffer from this disorder during their lifetime.⁸ It is also reported that females living in urban areas, as a keen media follower, are more liable for developing eating disorders. Research has demonstrated the impact of media and its negative consequences on women who are predisposed to body dissatisfaction.⁶ According to a questionnaire-based survey conducted on college students (age 18-25) in Florida, USA, EAT results stated that 96 respondents (10.0%) were highly concerned about their eating habits, body weight and body shape.⁹ Another research study conducted among medical students in Karachi reports that 22.75% students were more prone to developing eating disorders, comprising of 87.9% female and 12.1% male students. The results of the BMI calculation showed that there was a direct correlation between DEBs and BMI.⁶

Despite the widespread presence of DEBs worldwide, fewer studies have been done in Pakistan. Lahore, the major city of Punjab, Pakistan, is chosen to determine the prevalence of DEBs because it is the major hub of education in the Punjab Province and we identify a lack of research here. This city has not been completely assessed for DEBs before to analyze the factors leading to fully diagnosable eating disorders. Addressing this increasing disordered eating behaviors is essential for both physical and mental fitness of females. Early detection, evidence-based treatments, public awareness campaigns, and policy changes are essential to mitigate the impact. By prioritizing prevention, healthcare providers

and policymakers can improve the wellbeing of females affected by these behaviors.

Materials and Methods

This descriptive cross-sectional study was conducted at King Edward Medical University in Lahore, Pakistan. The study duration was of three months following ethical approval from IRB (Institutional Review Board) committee of King Edward Medical University Lahore, Pakistan. The sample size had been estimated to be 190 patients, calculated with a confidence level of 95%, 7% absolute precision, and 29.6% of expected prevalence rate as suggested in our reference study.¹⁰

The sampling technique employed was non-probability convenient sampling, allowing for the inclusion of participants who were readily available and willing to participate. This approach ensured that the sample was easy to gather, although it might not have fully represent the larger population.

The study focused on female adults aged 18-25 who had given their consent to participate. This age group was chosen to provide insights into the prevalence and patterns of DEBs among young women, a demographic that is often at higher risk for such behaviors. Exclusion criteria were strictly applied to be sure of the study's findings.

The study excluded female adults with a clinical diagnosis of an eating disorder or those with chronic conditions such as diabetes, hypertension, hyper- or hypothyroidism. This was done to avoid any confounding variables that could have skewed the results and to focus specifically on the target population without underlying health conditions that could influence eating behaviors. A total of 190 female students were admitted to the study if they satisfied the inclusion and exclusion criteria from a reputable medical university in Lahore. The data was collected using online questionnaire based proformas created through Google Forms. These were shared online via social media platforms with eligible students only, meeting the criteria, following nonprobability, convenience sampling method. The responses were kept anonymous and participant names and signatures were not needed in order to maintain strict secrecy. They were made aware of their freedom to leave the study at any moment, indicating their participation was entirely on a voluntary basis. The participants completed the eating attitude test (EAT-26), a validated instrument used in DEB evaluation.

This test consists of 26 questions in total, divided into 3 subscales: oral control (7 items), bulimia/food obsession (5 items), and dieting (13 items). The answers to the questions are on a 6 point Likert scale, with the possible scores being 0 to 3 ("Never", "Rarely", and "Sometimes": 0; "Often", "Usually", and "Always": 1-3). Question 26 has the opposite

score of the others, with "Often", "Usually", and "Always": 0; "Sometimes": 1; "Rarely": 2; "Never": 3.

DEBs are indicated by a score of > 20 . The score range is 0 to 78. Five more behavioural questions about eating patterns over the last six months round out the EAT-26 questionnaire.

Four questions include: never, once a month or less, twice a month, once a week, twice a week, and once a day or more. Other questions ask about how often you exercise, use laxatives, selfinduce vomiting, and binge eat. The sixth question is a yes/no question concerning having lost nine kilograms or more in the last six months. The questionnaire was used in English. Translations were not accepted. The weight and height provided in the questionnaire were used to calculate the body mass index.

The collected data was cleaned, edited and coded before analysis. After evaluating the original data using questionnaire code numbers, any mistakes recognized was corrected. Data obtained was entered and analyzed using STATA-17. The following descriptive data were displayed: Means, frequencies, standard deviations (S.D.), and percentages (%). Participants were split into two groups: high-risk (EAT-26 > 20) and low-risk (EAT-26 < 20) based on their EAT-26 results. The variations in scores between age and BMI were examined using a regression analysis. The results of the behavioural questions and EAT-26 subscales were presented as means and standard deviations (S.D.). To ascertain the diversity in answers between age groups, BMI groups, and EAT-26 categories, a Chi-square test (χ^2) was employed. p-value less than 0.05 was considered significant.

Table 1: Demographic Characteristics

Variables	N	%
Gender Female	190	100%
Age (mean \pm SD)	21.3315 \pm (22.1183)	
BMI(mean \pm SD)	21.1726 \pm (3.6582)	
Height in cm (mean \pm SD)	161.0126 \pm (7.0849)	
Weight in kg (mean \pm SD)	54.7342 \pm (9.1870)	
Eat 26 score		
< 20	143	75.26%
> 20	47	24.745
BMI categories		
Underweight	41	21.58%
Normal weight	120	63.16%
Overweight	29	15.26%
Eat26 categories		
Low Risk	143	75.26%
High Risk	47	24.74%

Results

Demographic Characteristics

Total of 190 students, chosen from a government medical university in Lahore, Pakistan, participated in this study.

All of the students ranged in age from 18 to 25, with a mean age of 21.33 years (SD = 2.11). 21.17 kg/m² was the mean BMI (SD = 9.18). Overweight students (n = 29, 15.26%) were in second place after students with normal BMIs (n = 120, 63.16%). Twenty-one pupils (21.58%) were identified as underweight. The individuals' height ranged from 121.92 cm to 175.26 cm, with an average of 161.01 cm and a S.D of 7.08 cm.

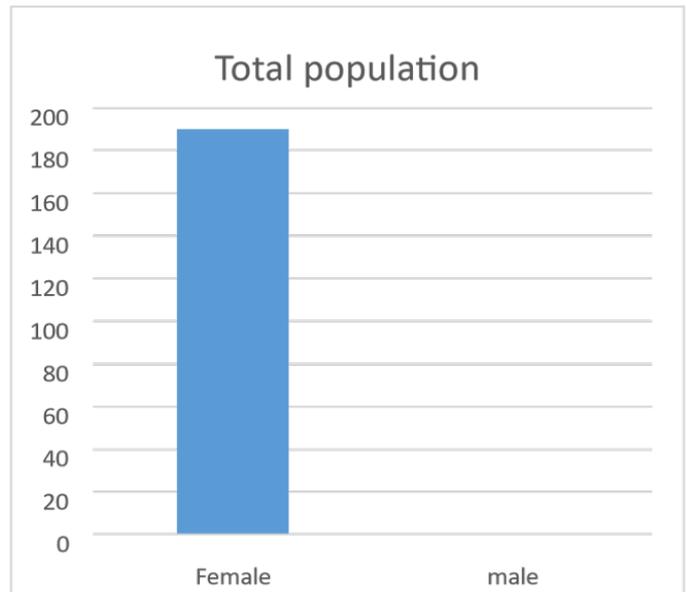


Figure 1: Bar Chart for Total population

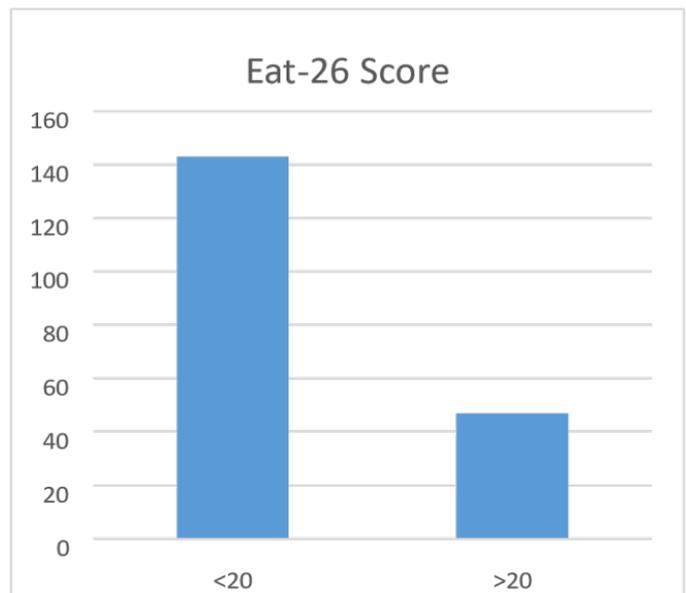


Figure 2: Eat-26 Score: < 20 low risk, > 20 high risk

EAT-26 Scores:

Of the total participants in the study, 47 (24.74%) had a score of 20 or higher, which means they had a high chance of developing DEBs. A low risk of DEBs was reported by 75% (n=143, 75.2%) of the study group, whose scores were

below 20. To determine the prevalence of DEB risk across age groups, and BMI a binary logistic regression was used. The distribution of age and BMI across the EAT-26 categories is shown in Table 1. BMI significantly predicted the risk of DEBs (OR = 1,882, 95% CI= 1.068–3.317), with the overweight population reporting a higher risk than the normal weight adults ($p = 0.029$). The highest risk was reported by students in the overweight category (15.26%), followed by students in the normal weight category (63.16%). Age did not significantly predict the risk of DEBs ($p = 0.717$).

EAT-26 Subscales (Dieting, Oral Control and Bulimia

Table 2: Response of EAT-26 questions in the form of mean and standard deviations (S.D)

Dieting Scale Questions	Mean \pm SD
1. I am terrified about being overweight	1.49 \pm 1.14
6. Aware of the calorie content of food that I eat	0.509 \pm 1.013
17. Particularly avoid food with a high carbohydrate content (bread, rice, potatoes, etc.)	0.356 \pm 0.851
10. Feel extremely guilty after eating	0.65 \pm 1.08
11. Am preoccupied with a desire to be thinner	0.92 \pm 1.16
12. Think about burning up calories when I exercise	1.3 \pm 1.34
14. Am preoccupied with the thought of having fat on my body	1.28 \pm 1.30
16. Avoid foods with sugar in them	0.88 \pm 1.14
17. Eat diet foods	0.447 \pm 0.756
22. Feel uncomfortable after eating sweets	0.52 \pm 0.857
23. Engage in dieting behaviour	0.467 \pm 0.728
24. Like my stomach to be empty	0.407 \pm 0.754
26. Enjoy trying new rich foods	0.467 \pm 0.755
Students' Responses to EAT-26 Oral Control Subscale	
Oral Control Scale Questions	Mean \pm SD
2. Avoid eating when I am hungry	0.6 \pm 0.971
5. Cut my food into small pieces	0.62 \pm 0.84
8. Feel that others would prefer if I ate more	0.44 \pm 0.78
13. Other people think that I am too thin	0.61 \pm 0.92
15. Take longer than others to eat my meals	0.42 \pm 0.74
Dieting Scale Questions	Mean \pm SD
19. Display self-control around food	0.447 \pm 0.774
20. Feel that others pressure me to eat	0.487 \pm 0.830
Students' Responses to EAT-26 Bulimia and Food Preoccupation Subscale	
Bulimia and Food preoccupation Scale Questions	Mean \pm SD
3. Find myself preoccupied with food	0.44 \pm 0.782
4. Have gone on eating binges where I feel that I may not be able to stop	0.353 \pm 0.638
9. Vomit after I have eaten more	0.08 \pm 0.39
18. Feel that food controls my life	0.247 \pm 0.599
21. Give too much time and thought to food	0.68 \pm 1.09
25. Have the impulse to vomit after meals	0.3 \pm 0.731

and Food Preoccupation):

Students' responses on the EAT-26 test's dieting subscale revealed that the statements related to burning calories while exercising (1.3 ± 1.34), fear of being overweight (1.49 ± 1.14), and obsession with having fat on my body (1.28 ± 1.30) had the highest means. Among the responses to the oral control subscale statements, cutting my food into little pieces had the highest mean (0.62 ± 0.84). This was followed by thinking that I'm too thin from the opinions of others (0.61 ± 0.92) and not eating when I'm hungry (0.6 ± 0.971). The highest mean score on the bulimia and food obsession subscale was for giving excessive thought and time to food (0.68 ± 1.09), followed by being preoccupied with food (0.44 ± 0.782).

Behavioural Questions:

Based on their replies to behavioral questions. Table 3 displays the frequency of laxative use, exercise, weight loss, binge eating, and artificial vomiting among students. About 3.59% of students ($n = 7$) said they experienced binge episodes at least once a day, and 2.05% ($n = 4$) said they did so twice a week or more. About 5.10% of Students stated that they had gone through induced-vomiting episodes two or more times a month, in the past six months. Ten students (4.9%) reported taking laxatives to control weight two times or more in a month and to lose or maintain their weight, 24 students (12.83%) reported working out for 60 minutes two times or more in the previous six months. About the weight loss question in the past six months, almost 28.4% of students ($n = 54$) reported losing 9 kilograms.

Correlation between EAT-26 Subscales with Age and BMI

In terms of BMI categories, 21.58% of the participants are classified as underweight, 63.16% as normal weight, and 15.26% as overweight. Regarding disordered eating behaviors, 24.74% of the participants fall into the high-risk category, while the remaining 75.26% are considered low risk. The unadjusted logistic regression model demonstrated a robust link between BMI category and disordered eating behavior. Specifically, the odds ratio (OR) for BMI category was 1.900 with a 95% confidence interval (CI) of [1.075, 3.359], indicating that individuals with higher BMI categories have twice the likelihood of exhibiting disordered eating behaviors as compared to those with lower BMI. This relationship was statistically significant, with a p -value of 0.027.

Conversely, age did not show a significant association with disordered eating behavior in the unadjusted model, with an OR of 1.029 (95% CI: [0.883, 1.199]), and a p -value of 0.717. Upon adjusting for the confounding effect of age, the logistic regression model confirmed the significant associa-

Table 3: Percentages of Behavioural Questions

Behavioural Questions	(n, %)					
	Never	Once a month or less	2-3 times a month	Once a week	2-6 times a week	Once a day or more
QA: Gone on binges where you feel that you may not be able to stop?	80, 42.6%	52, 27.1%	25, 13.33%	21, 11.05%	5, 2.6%	7, 3.6%
QB: Ever made yourself sick (vomited) to control your weight or shape?	160, 84.1%	5, 2.6%	9, 4.7%	7, 3.6%	4, 2.1%	5, 2.6%
QC: Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?	158, 83%	5, 2.6%	10, 5.2%	6, 3.15%	6, 3.15%	5, 2.6%
QD: Exercised more than 60 min a day to lose or control your weight?	109, 57.3	19, 10%	24, 12.6%	15, 7.8%	16, 8.4%	7, 3.6%
	YES			NO		
QE: Lost 9 kg or more in the last 6 month	54, 28.4%			136, 71.5%		

tion between BMI category and disordered eating behavior. The adjusted odds ratio for BMI category was 1.883, has a z-value of 2.19, a p-value of 0.029, and a 95% confidence interval of [1.069, 3.317].

This signifies the robust association between BMI category and disordered eating behavior remains robust even after accounting for age. Age continued to show no significant association with disordered eating behavior in the adjusted model, reinforcing the conclusion that BMI is a more relevant factor in predicting these behaviors. The findings from the logistic regression analyses suggest that higher BMI categories are strongly linked with a higher chances of developing disordered eating behaviors. The adjusted odds ratio of 1.883 implies that with each increase in BMI category, the odds of exhibiting disordered eating behaviors increase by approximately 88%. This underscores the significance of considering BMI in the assessment and intervention strategies for disordered eating behaviors, while age appears to play a less significant role.

Discussion

In this study, we investigated the relationship between BMI, age, and disordered eating behaviors (DEBs) using the Eating Attitude Test-26 test by assessing each individual's behaviour. We used binary logistic regression analysis to find the correlation between the variables mentioned. One noteworthy discovery was that, 24.74% of female students in Lahore were classified as having a high risk of DEBs with greater than 20 EAT-26 score. More than half of the students had a normal BMI (n=120, 63.16%) followed by overweight students (n = 29, 15.26%). For the behavioural questions, about 3.59% of students stated binge eating on a daily basis, 5.10% claimed having caused vomiting twice a month or more, and 4.9% reported using laxatives to manage their weight. Furthermore, 12.83% worked out to manage their

weight, and 28.4% dropped about 9 kg in the preceding six months.

The findings provide significant insights into the factors influencing disordered eating behaviors, particularly highlighting the role of BMI. The results of the logistic regression analysis indicated a robust link between higher BMI category and the prevalence of DEBs. In both the unadjusted and adjusted models, increased BMI categories were consistently affiliated with increased odds of DEBs which is concomitant to the findings of previous researches that suggest overweight individuals are more prone to develop eating disorders than underweight individuals.⁶ The adjusted odds ratio of 1.883 suggests that individuals in higher BMI categories have nearly double the odds of exhibiting disordered eating behaviors compared to those in lower BMI categories.

The results of this study are consistent with earlier studies that showed a link between an increased BMI and a higher risk of developing eating disorders.^{11,12} In same vein, research from the US and the UK revealed a substantial increase in the number of DEBs in groups that were obese and overweight.^{13,14} The association between BMI and disordered eating behaviors can be understood through various mechanisms. Individuals with higher BMI may experience greater societal pressure and stigma related to weight, which can develop negative body perceptions and the adoption of disordered eating patterns as a coping mechanism.¹⁵ Moreover media exposure also leads to development of body dissatisfaction and consequently DEBs.¹⁶ Additionally, dieting and weight control behaviors, which are more common in individuals with higher BMI, can escalate into more severe disordered eating behaviors. DEB are also associated with comorbid conditions. Binge eating is linked with obesity and related complications including anorexia nervosa and bulimia nervosa.³ On the other hand anorexia nervosa leads to liver dysfunction, diabetes and acrocyanosis.¹⁷ DEBs

can also lead to psychopathologies such as depression and anxiety.¹⁸

Contrary to BMI, age did not show a significant association with disordered eating behaviors in our sample. Both the unadjusted and adjusted models revealed non-significant odds ratios for age, suggesting that age is not a robust indicator of disordered eating behaviors in this population. This finding is somewhat surprising given that the previous researchers have identified age as a contributing element to the emergence of eating disorders, with certain age groups, particularly adolescents and young adults, being at higher risk.^{19,20}

Several reasons could explain the absence of a meaningful correlation between age and disordered eating behavior in our study. The relatively narrow age range of our sample, with a mean age of 21.33 years, might limit the variability needed to detect age-related differences. Additionally, the developmental stage of the participants, primarily young adults, might represent a period of heightened vulnerability to disordered eating behaviors, thus minimizing the impact of age differences within this group. The significant association between BMI and disordered eating behaviors underscores the need for targeted interventions that address weight-related issues. Health care providers need to understand the heightened risk of disordered eating behaviors among individuals with higher BMI and provide appropriate support and resources. Interventions should focus on promoting healthy body perceptions, reducing weight stigma, and encouraging balanced eating behaviors without emphasizing weight control. Preventive measures should also be directed at young populations, educating them about the risk factors of disordered eating and the importance of positive association with food and body image. Schools and Community-based initiatives can be extremely important for spreading these messages and creating supportive environments that discourage unhealthy eating practices.

Despite the useful insights yielded by this study, there are several setbacks that must be recognized. The fact that this study was a cross-sectional study, this restricts one's capacity to deduce the causality between BMI, age, and disordered eating behaviors. Studies that are longitudinal are required to determine temporal links and better understand the directionality of these associations.

The reliance on self-reported data for BMI and disordered eating behaviors may introduce reporting biases and inaccuracies. Future studies should consider using objective measures of BMI and clinically validated assessments of disordered eating behaviors to enhance the reliability of the findings. The relatively homogeneous sample, predominantly composed of young female adults, restricts the results' capacity

to be generalized to broader populations. Future studies should aim to focus more on diverse age groups and demographic characteristics to capture a more comprehensive picture of the factors influencing disordered eating behaviors.

Conclusion

In conclusion, our study highlights the noteworthy association between BMI and DEBs, with higher BMI categories being connected to a rise in odds of disordered eating. Still, among this generation of individuals, age did not turn out to be a significant predictor. These findings emphasize the significance of dealing with weight-related issues in initiatives meant to reduce the prevalence of eating disorders. By promoting healthy body perceptions and reducing weight stigma, we can work towards creating a supportive environment that fosters positive eating behaviors and overall well-being

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Conflict of interests:

The authors declare no conflict of interests.

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