Section: Pediatrics

Original Research Article

STUDY ON PREVALENCE OF BODY IMAGE DISSATISFACTION AND RISK OF DEVELOPING EATING DISORDERS AMONG ADOLESCENTS AGED 11-18 YEARS

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ABSTRACT

Background: Body image dissatisfaction (BID) and eating disorders (ED) are emerging public health concerns among adolescents. The present study was conducted to determine the prevalence of body image dissatisfaction and the risk of developing eating disorders among adolescents aged 11–18 years.

Materials and Methods: A cross-sectional questionnaire-based study was conducted among 450 adolescents attending schools and junior colleges in Karimnagar, Telangana. Participants were selected through random sampling. Data were collected using a pre-structured questionnaire comprising demographic details, Stunkard's Figure Rating Scale for assessment of body image dissatisfaction, and the Eating Attitudes Test-26 (EAT-26) for evaluating the risk of eating disorders.

Results: The mean age of participants was 13.9±2.09 years, and mean BMI was 19.12±4.21 kg/m². BID was highly prevalent (79.77%), with 42.44% of participants expressing a desire to gain weight and 37.33% expressing a desire to lose weight; only 20.23% were satisfied with their body image. A total of 73 adolescents (16.22%) were identified as being at risk of developing ED based on EAT-26 scores ≥20, with a similar prevalence among boys (16.81%) and girls (15.59%). BID was observed across all BMI categories, including adolescents with normal BMI. Significant but weak correlations were found between BID and ED risk among adolescents wishing to lose weight (r= 0.105, p=0.025) and those wishing to gain weight (r=0.112, p=0.017). Socioeconomic status showed no significant association with ED risk (r=0.019, p=0.68).

Conclusion: Body image dissatisfaction is highly prevalent among adolescents and is significantly associated with the risk of developing eating disorders. Early screening, awareness programs, and school-based interventions are essential to promote healthy body image and prevent disordered eating behaviours.

Keywords: Adolescents; Body image dissatisfaction; Eating disorders; EAT-26; BMI; Risk factors; School health.

INTRODUCTION

The term adolescence is derived from the Latin word "adolescere", which means "to grow up." According to the WHO adolescence defined as the second decade of life (10–19 years of age) is a time when significant physical, psychological, and social changes occur.[1] Neurodevelopment during adolescence is marked by significant structural and functional changes. Magnetic resonance imaging (MRI) studies have showed that myelination continues throughout adolescence, making the developing brain particularly sensitive to hormonal influences such as estrogen, progesterone, and testosterone. Environmental factors, including family, peers, media exposure, dietary habits, sleep patterns, and social experiences, further shape adolescent development. Important changes occur within the limbic system, which regulates emotions, decision-making, and self-control, while increased myelination of the frontal lobe enhances cognitive abilities and executive functioning. Brain maturation

continues into early adulthood, with complete myelination generally occurring by approximately 25 years of age.[2]

The predominant age group to have eating disorders in Adolescents. According to DSM V (diagnostic and statistical manual of mental disorders 5th edition), eating disorders are placed under the category of "Feeding and eating Disorders", they include- anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), avoidant/restrictive food intake disorder (ARFID), rumination disorder, pica, other specified feeding or eating disorder (OSFED), and unspecified or eating disorder (UFED).[3] Eating disorders are characterized by a persistent disturbance of eating or eating related behavior that results in the altered consumption or absorption of food, leading to significant disturbance in physical health and psychosocial functioning and are difficult to manage. There are few studies done in India to understand the burden of eating disorder, so the accurate knowledge is less.[3,4]

One important physiological effect of eating disorder is malnutrition, like the rest of the body brain also needs nutrition to function, so malnutrition affects the brain by decreasing the white and gray matter, which correlates with a decrease in BMI (body mass index).[5] The area most affected in the brain is that, which involves in perception and integration of body stimuli. Dissatisfaction in body image is known to play a vital role in development of eating disorders. Body image is a multidimensional construct consisting of thoughts, feelings, and behaviors of an individual about their appearance. Early identification and management can be initiated, to prevent acute and long-term complications. As the eating disorder is a result of body image dissatisfaction in most of the cases, identifying children with body image dissatisfaction and intervening there would significantly decrease the incidence of eating disorders.[6,7] The study was conducted among adolescents in the semiurban setting, with the aim to study the association between body image dissatisfaction and the risk of developing eating disorder, also to determine the association between Body mass index and body image dissatisfaction, among the population studied.

MATERIALS AND METHODS

This cross-sectional questionnaire-based study was conducted in the Department of Paediatrics at a tertiary care centre in Karimnagar, Telangana, from September 2022 to March 2024 among adolescents aged 11–18 years attending schools and junior colleges in Karimnagar. A total of 450 adolescents aged 11-18 years were enrolled after obtaining institutional permission and participant assent. Adolescents with chronic illnesses such as diabetes mellitus or chronic respiratory diseases, those treated for tuberculosis within the preceding two years, those who had visited a hospital in the previous year for excessive weight gain, and those who had been prescribed a specific diet for weight loss were excluded from the study. Schools and junior colleges were selected through random sampling. Eligible students within the specified age group were recruited until the required sample size was achieved.

Data were collected using a pre-structured questionnaire comprising three sections: demographic details, Stunkard's Figure Rating Scale, and the Eating Attitudes Test-26 (EAT-26). The questionnaire was translated into Telugu, the local vernacular language, to facilitate better understanding among participants. Demographic information was obtained at the beginning of the survey. Stunkard's Figure Rating Scale was used to assess body image dissatisfaction by evaluating participants' perceptions of their current and ideal body images, while the EAT-26 questionnaire was used to assess the risk of developing eating disorders. The Eating Attitudes Test-26 (EAT-26) is a standardized 26-item questionnaire designed to evaluate eating attitudes and behaviours. It comprises three subscales: dieting behaviour, bulimia and food preoccupation, and oral control. The total score ranges from 0 to 78, with a score of ≥20 indicating behaviours suggestive of disordered eating and an increased risk of developing an eating disorder.

Socioeconomic status was assessed using the Modified Kuppuswamy Classification. Anthropometric measurements were obtained during school visits. Height was measured using a stadiometer, and weight was measured using a calibrated digital weighing scale. Body Mass Index (BMI) was calculated using the formula: BMI = weight (kg)/height² (m^2). Participants were categorized as underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), pre-obese (25–29.9 kg/m^2), obese class I (30–34.9 kg/m^2), obese class II (35–39.9 kg/m^2), and obese class III (≥40 kg/m^2).

During the school visits, participants were provided with instructions regarding the questionnaire and were asked to select responses that best reflected their perceptions and behaviours. Any doubts were clarified in simple language to ensure proper understanding. After completion of the questionnaire, brief interactive sessions on body positivity and healthy lifestyle practices were conducted. Anthropometric measurements were recorded simultaneously.

Statistical Analysis: The collected data were entered into Microsoft Excel® 2016 MSO (Version 2405 Build 16.0.17628.20006, 64-bit) and analyzed statistically. Quantitative variables such as age, height, weight, and BMI were summarized using mean and standard deviation, while categorical variables were expressed as frequencies and percentages. The prevalence of body image dissatisfaction and risk of developing eating disorders was reported using frequencies and 95% confidence intervals. Pearson's correlation coefficient and logistic regression analysis were used to assess the relationships between BMI and body image dissatisfaction, and between body image

dissatisfaction and the risk of developing eating disorders. A p-value of <0.05 was considered statistically significant.

RESULTS

The present study included 450 adolescents with a mean age of 13.9 ± 2.09 years. The largest age group was 11 years (18.0%), followed by 15 years (16.67%). Of the participants, 232 (51.55%) were boys and 218 (48.45%) were girls. Regarding socioeconomic status, the majority belonged to the lower middle class (41.5%), followed by the upper middle class (40.0%), [Table 1].

The mean BMI of the study participants was 19.12 ± 4.21 kg/m². Maximum participants (53.77%) were underweight, while 36.22% had a normal BMI. Pre-obesity was observed in 7.56% of participants, whereas obesity was relatively uncommon, with 2.00% classified as Obese Class I and 0.45% as Obese Class II. Similar BMI patterns were observed among boys and girls, with underweight being the predominant category in both sexes (53.45% and 54.12%, respectively), [Table 2].

Table 1: Demographic profile of the study participants

Demographic data		Number	Percentage (%)
Age (years)	11	81	18.00
	12	61	13.56
	13	61	13.56
	14	55	12.22
	15	75	16.67
	16	55	12.22
	17	49	10.89
	18	13	2.89
Gender	Boys	232	51.55
	Girls	218	48.45
Socioeconomic Status	Upper	31	6.88
	Upper Middle	180	40.00
	Lower Middle	187	41.50
	Upper Lower	47	10.44
	Lower	5	1.11

Table 2: BMI distribution across the study population

BMI Category	Total Population n (%)	Girls n (%)	Boys n (%)
Underweight	242 (53.77%)	118 (54.12%)	124 (53.45%)
Normal	163 (36.22%)	81 (37.16%)	82 (35.35%)
Pre-obese	34 (7.56%)	15 (6.88%)	19 (8.18%)
Obese Class I	09 (2.00%)	04 (1.84%)	05 (2.16%)
Obese Class II	02 (0.45%)	00 (0.00%)	02 (0.86%)
Obese Class III	00 (0.00%)	00 (0.00%)	00 (0.00%)
Total	450 (100%)	218 (100%)	232 (100%)

The EAT-26 score ranged from 1 to 16, with a mean score of 14.56 ± 7.24. A total of 73 students (16.22%) scored ≥20 on the EAT-26 questionnaire, indicating a risk of developing an eating disorder. Among boys, 39 (16.81%) were at risk, compared to 34 (15.59%) girls. The prevalence of risk was similar in both sexes, with a slightly higher proportion observed among boys, [Figure 1].

Overall, 191 (42.44%) participants wished to look fatter, 168 (37.33%) wished to look thinner, and only 91 (20.23%) were satisfied with their current body image. Among boys, 40.50% desired to look fatter and 39.60% desired to look thinner, while 19.80% were satisfied with their body image. Among girls, 44.49% wished to look fatter and 34.86% wished to look thinner, whereas 20.64% reported satisfaction with their body image. The mean BIDS score was 0, [Table 3].

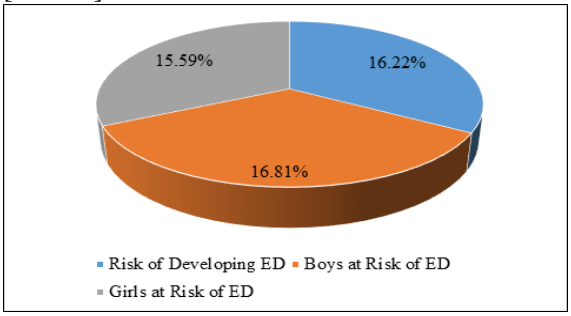

Figure 1: Risk of developing eating disorders (ED) among study participants.

Table 3: Prevalence of body image dissatisfaction score (BIDS)

Body Image Dissatisfaction Category	Total Study Population	Boys n (%)	Girls n (%)
Wants to Look Thinner (BIDS ≤ -1)	168 (37.33%)	92 (39.60%)	76 (34.86%)
Wants to Look Fatter (BIDS ≥ 1)	191 (42.44%)	94 (40.50%)	97 (44.49%)
Satisfied (BIDS = 0)	91 (20.23%)	46 (19.80%)	45 (20.64%)
Total	450 (100%)	232 (100%)	218 (100%)

Among underweight participants, the majority (114) wished to look fatter, while 82 wished to look thinner and 46 were satisfied with their body image. In the normal BMI group, 67 participants wished to look thinner, 56 wished to look fatter, and 40 were satisfied. Among pre-obese participants, most (19) desired to look thinner, whereas 13 wished to look fatter and only 2 were satisfied. In the obese groups, body image dissatisfaction remained common, with very few participants reporting satisfaction, [Table 4].

Table 4: Body image dissatisfaction score (BIDS) across different BMI groups

BMI Group	Wants to Look Thinner	Wants to Look Fatter	Satisfied
Underweight	82	114	46
Normal	67	56	40
Pre-obese	19	13	02
Obese Class I	01	05	03
Obese Class II	01	01	00
Total	170	189	91

Among participants who wished to gain weight (positive BIDS; n = 191), no significant relationship was observed between BMI and body image dissatisfaction. The desire to gain weight was present across all BMI categories, indicating that participants expressed a wish to increase their body weight irrespective of their actual BMI status, [Figure 2]. This suggests that factors other than BMI may influence the perception of body image and the desire to gain weight.

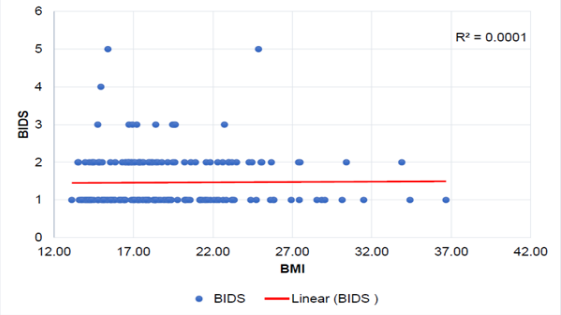

Figure 2: Relationship between BMI and positive BIDS.

Among adolescents who wished to lose weight (negative BIDS; n = 168), BMI was evaluated as an independent variable and the desire to lose weight as the dependent variable. The analysis demonstrated a positive relationship between BMI and negative BIDS, indicating that participants with higher BMI were more likely to express a desire to lose weight. This suggests that increasing BMI was associated with greater body image dissatisfaction related to weight loss.

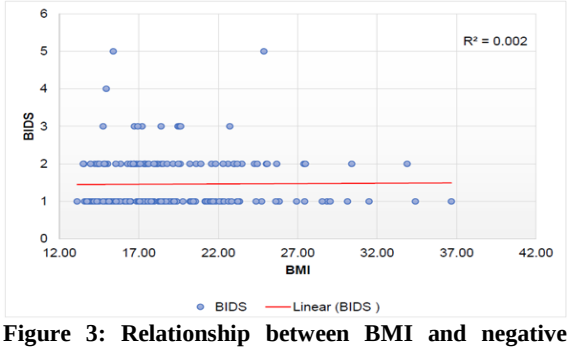

Figure 3: Relationship between BMI and negative BIDS.

A statistically significant association was observed between body image dissatisfaction and the risk of developing eating disorders. Among students who wished to lose weight, there was a weak negative correlation between BIDS and EAT-26 scores (r = -0.105, p = 0.025), indicating that a stronger desire to lose weight was associated with an increased risk of eating disorders, (Figure 4). Similarly, among students who wished to gain weight, a weak positive correlation was observed (r = 0.112, p = 0.017), suggesting that a greater desire to gain weight was also associated with a higher risk of developing eating disorders, (Figure 5). Overall, body image dissatisfaction, whether related to weight loss or weight gain, was significantly associated with eating disorder risk, although the strength of these associations was weak.

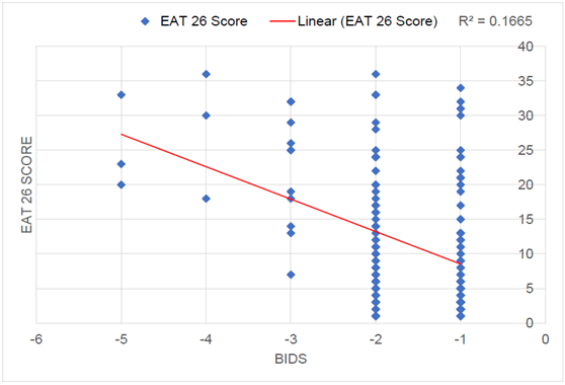

Figure 4: Line fit plot between negative BIDS scores and EAT-26 scores

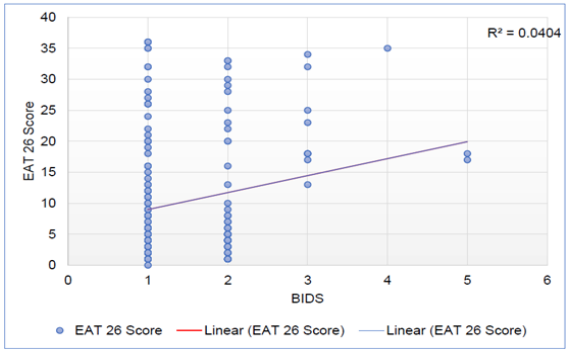

Figure 5: Line fit plot between positive BIDS and EAT-26 scores

Among participants who wished to gain weight, the scatter plot with regression line demonstrated that the desire to change body image increased with an increasing risk of developing an eating disorder. However, the association was weak, as indicated by the low coefficient of determination ($R^2 = 0.04$), suggesting that only a small proportion of the variation in body image dissatisfaction was explained by eating disorder risk. In contrast, socioeconomic status (SES) showed a very weak positive correlation with EAT-26 scores ($r = 0.019$, $p = 0.68$). The association was not statistically significant, indicating that socioeconomic status was not related to the risk of developing eating disorders in the study population.

DISCUSSION

The present community-based study assessed the prevalence of body image dissatisfaction (BID) and the risk of eating disorders (ED) among 450 adolescents (232 boys and 218 girls) with a mean age of 13.9 ± 2.09 years. Unlike many previous studies,[8,9] that reported female predominance, our study included a slightly higher proportion of male participants, similar to the findings of Anam H et al.[10] The mean BMI was 19.12 ± 4.21 kg/m², with 53.77% of participants being underweight, indicating a considerable burden of undernutrition. In contrast, a study from Beijing reported that most adolescents had normal weight (59%), while only 4% were underweight, reflecting marked nutritional differences between the two populations.[11]

The previous Indian studies have reported body image dissatisfaction prevalence ranging from 26% to 77%.[12,13] The prevalence of 79.77% observed in the present study is slightly higher than most previously reported estimates and highlights the growing burden of body image concerns among Indian adolescents. While only 20.23% were satisfied with their body image. Overall, 42.44% wished to gain weight and 37.33% wished to lose weight. Similar concerns have been reported in previous studies.[11-15] Dissatisfaction was common even among adolescents with normal BMI, indicating that body image perception may not accurately reflect nutritional status. Similar levels of dissatisfaction were observed among boys and girls, unlike findings from the Beijing study where girls more often desired to be thinner and boys to gain weight.[11] This difference may be related to the high prevalence of undernutrition in our study population. Consistent with previous studies, our findings suggest that perceived body weight has a stronger influence on body image satisfaction than actual BMI.[9,11]

The mean EAT-26 score in the present study was 14.56 ± 7.24. A total of 16.22% of adolescents scored ≥20 on the EAT-26 questionnaire, indicating a risk of developing an eating disorder. The prevalence was similar among boys (16.81%) and girls (15.59%), suggesting no significant gender predisposition. Similar findings are reported in Mousa TY et al, Kumar S.et al and Ghazzawi HA et al.[8,16,17]

The relationship between BMI and body image dissatisfaction was also examined. Although a clear linear relationship could not be established, adolescents at both extremes of BMI demonstrated greater dissatisfaction with their body image. Interestingly, the desire to lose weight was observed even among underweight adolescents, while some overweight and obese adolescents expressed a desire to gain weight. Similar observations were reported in a study among Dublin school girls, where a considerable proportion of participants desired a thinner body image despite perceiving themselves as having normal weight.[9] Among pre-obese and obese adolescents, 88.88% were dissatisfied with their body image, while body image dissatisfaction was also present among 75.46% of adolescents with normal BMI. These findings are consistent with the study done by Fu L et al and Latiff AA et al.[11,15]

Gender-wise analysis showed that only 19.80% of boys and 20.64% of girls were satisfied with their body image. The prevalence of body image dissatisfaction was nearly identical among boys (80.1%) and girls (79.35%). These finding comparable with the study done by Martini MCS et al.[18]

A significant association was observed between body image dissatisfaction and the risk of developing eating disorders. Among adolescents who wished to gain weight, there was a weak but statistically significant positive correlation between BIDS and EAT-26 scores ($r = 0.112$, $p = 0.017$). Similarly, among adolescents who wished to lose weight, a weak but statistically significant negative correlation was observed ($r = –0.105$, $p = 0.025$). These findings indicate that as dissatisfaction with body image increases, the risk of developing eating disorders also increases, regardless of whether the adolescent desires weight gain or weight loss. These findings are correlated with the study done by Yousif Ahmed RM et al.[19]

The relationship between socioeconomic status and eating disorder risk was also evaluated. No significant association was found between SES and EAT-26 scores ($r = 0.019$, $p = 0.68$). These findings suggest that eating disorder risk is not limited to specific socioeconomic groups. The widespread availability of social media, internet access, and exposure to societal beauty standards may influence adolescents across all socioeconomic strata.[20]

When compared with previous Indian studies,[21,22] the prevalence of eating disorder risk observed in the present study was relatively high. A study among female college students in Chennai reported disordered eating behaviour in 30% of participants, which was higher than the prevalence observed in our study.[21] A study conducted by Tendulkar et al. reported EAT-26 scores >20 in 13% of adolescents aged 15–19 years in Mumbai, which is comparable to our findings.[23]

Although the study had a large and representative school-based sample with a good response rate, certain limitations should be considered. The use of self-administered questionnaires may have affected data quality and introduced reporting bias. Additionally, the EAT-26 questionnaire and Stunkard's Figure Rating Scale, while widely used internationally, have not been formally validated for the Indian population. Body image dissatisfaction is a complex and multidimensional construct, which may not be fully captured by a single figure rating scale. Furthermore, variations in students' understanding of the questionnaire items could have influenced responses despite efforts to clarify doubts during data collection.

CONCLUSION

The present study demonstrated a high prevalence of body image dissatisfaction among adolescents aged 11–18 years, and was observed across all BMI categories, including those with normal BMI.A considerable proportion of adolescents were found to be at risk of developing eating disorders as assessed by the EAT-26 questionnaire. Although BMI did not show a significant association with body image dissatisfaction, body image dissatisfaction was significantly associated with the risk of developing eating disorders, irrespective of whether the adolescent desired weight gain or weight loss. Furthermore, socioeconomic status was not associated with eating disorder risk. These findings highlight that body image concerns and disordered eating behaviours are important mental health issues among adolescents and support the need for early identification, routine screening, and school-based interventions aimed at promoting healthy body image and preventing eating disorders among adolescents.

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