

ORIGINAL RESEARCH

Body image dissatisfaction and associated behavioural factors among pre-university college adolescents in Bangalore: A cross-sectional studyM G Madhukumar^{1*}, Suvarna²¹ Associate Professor, Department of General Surgery, Sri Siddhartha Institute of Medical Sciences, Tumkur, Bangalore, Karnataka² Professor, Department of Community Medicine, MVJ Medical College & RH Bangalore, Karnataka

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ABSTRACT

Body image dissatisfaction (BID) is increasingly recognised as an important public health issue during adolescence, a period characterised by rapid physical, emotional, and sociocultural transitions. In India, evidence regarding BID among pre-university college (PUC) students remains sparse, and studies that include both male and female adolescents are particularly limited. To determine the prevalence of BID among PUC students in Bangalore and to examine its associations with body mass index (BMI), dietary behaviours, physical activity, and perceived sociocultural pressures. This cross-sectional study was conducted from October to December 2024 among 400 PUC students attending a college in Bangalore. Body image dissatisfaction was assessed using the validated Body Shape Questionnaire-16B (BSQ-16B). Participants were categorised into two groups: moderate-to-marked concern versus no-to-mild concern. Bivariate associations were examined using chi-square tests, and independent predictors were identified through binary logistic regression. The mean age of participants was 16.84 ± 1.70 years (51.5% male, 48.5% female). Overall, 22.5% of adolescents reported moderate-to-marked body image dissatisfaction. Overweight/obesity ($p = 0.009$), perceived pressure to alter body fat levels ($p = 0.001$), perceived pressure to attain a better physique ($p = 0.001$), and deliberate meal skipping ($p = 0.001$) were significantly associated with BID on bivariate analysis. After multivariable adjustment, meal skipping remained the only independent predictor (adjusted odds ratio [AOR] = 24.63; 95% CI: 8.64–70.18; $p < 0.001$). No statistically significant sex difference in BID was observed. BID is prevalent among PUC adolescents in Bangalore. Deliberate meal skipping is a strong independent predictor of BID, underscoring the need for college-based interventions that promote body positivity, healthy dietary practices, and critical media literacy.

Keywords: Body image dissatisfaction; Adolescents; Pre-university college; Meal skipping; BSQ-16B; India; Cross-sectional study

INTRODUCTION

Body image an individual's subjective perception of and attitude toward their own physical appearance is a multidimensional construct shaped by a complex interplay of psychological, biological, and sociocultural influences [1]. Body image dissatisfaction (BID) arises when there is a perceived discrepancy between an individual's actual body and the idealised standard promoted by the society in which they live. It is increasingly recognised as a public health concern of considerable magnitude, particularly during adolescence [1,2].

Adolescence is a critical developmental period during which the individual undergoes rapid and far-reaching physical, cognitive, and psychosocial changes. Pubertal maturation heightens body-related self-awareness, intensifies social comparison, and makes young people especially susceptible to external influences regarding physical appearance [2]. Within the college environment, adolescents are simultaneously exposed to peer pressure, academic demands, and pervasive societal norms regarding appearance. These converging pressures render college-going adolescents a particularly vulnerable group for developing BID [3].

The past decade has witnessed a dramatic expansion of digital social media platforms, fundamentally altering the landscape of body image perception in young people. Regular exposure to digitally altered images and appearance-focused content fosters social comparison processes and promotes the internalisation of unrealistic body ideals [3,4]. Shroff and Thompson documented a significant association between media and interpersonal influences and body dissatisfaction among Indian adolescents, suggesting that Western ideals of thinness are increasingly shaping body perceptions in India [5].

A negative body image among adolescents is associated with a spectrum of adverse health behaviours, including restrictive eating, meal skipping, disordered eating patterns, and reduced physical activity [6,7]. These behaviours, in turn, can compromise nutritional status, mental well-being, and academic performance. Longitudinal evidence demonstrates that BID in adolescence predicts the development of eating disorders and persistent unhealthy weight-control behaviours into adulthood [7,8].

In the Indian context, published studies on BID have predominantly focused on female adolescents, with comparatively few investigations including male students or examining both sexes simultaneously [6,9,10]. Moreover, studies specifically targeting pre-university college (PUC) students a group positioned at a particularly sensitive academic and developmental transition are scarce. Given that India's PUC cohort represents a substantial population of adolescents aged 15–18 years undergoing formative identity and body image development, characterising the prevalence and correlates of BID in this group is both timely and important [2].

The present study was therefore undertaken with two primary objectives: (i) to determine the prevalence of BID among PUC students in Bangalore using the validated Body Shape Questionnaire-16B (BSQ-16B), and (ii) to examine the associations of BID with BMI, dietary behaviours, exercise habits, and perceived sociocultural pressures, thereby identifying modifiable risk factors amenable to targeted intervention.

MATERIALS AND METHODS

Study Design and Setting: This was a cross-sectional, institution-based study conducted from October to December 2024 in a pre-university college in Bangalore, Karnataka, India. The institution had an enrolled strength of approximately 712 students at the time of the study.

Ethical Approval and Informed Consent: Ethical clearance was obtained from the Institutional Ethics Committee of Sri Siddhartha Institute of Medical Sciences (IEC No: SSIMS/IEC/2025/104, dated 14 August 2025). Written permission was obtained from the college authorities prior to data collection. Written or electronic informed consent was obtained from all student participants before enrolment, and those who declined to participate were excluded without penalty.

Participants: All pre-university college students present on the day(s) of data collection who provided informed consent were eligible for inclusion. Who declined participation were excluded. Of the 712 enrolled students, 400 were present and consented, yielding a final study sample of 400 participants. No formal sample size calculation was performed; the study adopted a census approach among those present and consenting.

Data Collection Instrument: Data were collected using a structured, self-administered online questionnaire administered through a secure digital platform. The instrument comprised three sections: (i) sociodemographic and anthropometric information (age, sex, height, weight); (ii) behavioural variables including dietary practices (meal-skipping frequency and its perceived purpose) and physical activity (subjective felt need to exercise and actual frequency of regular exercise); and (iii) perceived sociocultural pressures, including pressure from peers, family, or media to alter body fat levels or attain a better physique.

Body Image Assessment: Body image dissatisfaction was assessed using the Body Shape Questionnaire-16B (BSQ-16B), a validated shortened derivative of the original BSQ developed by Evans and Dolan [9]. The BSQ-16B comprises 16 items, each rated on a 6-point Likert scale (1 = never to 6 = always), yielding a total score ranging from 16 to 96. Higher scores indicate greater body shape concern. Based on established scoring conventions, participants were categorised as follows: no concern (16–38), mild concern (39–51), moderate concern (52–66), and severe concern (67–96) [9]. For

analytical purposes, participants were dichotomised into two groups: moderate-to-marked concern (scores ≥ 52) versus no-to-mild concern (scores ≤ 51).

Anthropometric Assessment: Height and weight were self-reported and used to calculate body mass index (BMI; kg/m²). BMI was classified using the Asian-specific cut-off values recommended by the World Health Organization, wherein a BMI of < 23 kg/m² is classified as normal or underweight, and ≥ 23 kg/m² is classified as overweight or obese [2]. For dichotomous analysis, participants were grouped as underweight/normal (BMI < 23) and overweight/obese (BMI ≥ 23).

Statistical Analysis: Data were entered and analysed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY). Descriptive statistics were reported as frequencies, percentages, and means \pm standard deviations (SD) as appropriate. Chi-square tests were used to examine bivariate associations between BID and categorical predictor variables; odds ratios (OR) with 95% confidence intervals (CI) were calculated. Binary logistic regression was performed to identify independent predictors of moderate-to-marked BID, entering all variables that showed significance ($p < 0.05$) on bivariate analysis. Statistical significance was set at $p < 0.05$ throughout.

Health Education Component: Following completion of the survey, all participants received a structured group health education session delivered by the research team. The session addressed the importance of maintaining healthy dietary habits, the long-term consequences of meal skipping and disordered eating, the role of regular physical activity in well-being, and the critical consumption of social media content related to body image and appearance standards.

RESULTS

Socio-demographic and Anthropometric Characteristics: The study population comprised 400 PUC adolescents, of whom 203 (51.5%) were male and 197 (48.5%) were female. The mean age was 16.84 ± 1.70 years. The overall mean BMI was 24.14 ± 3.30 kg/m², with males recording a mean BMI of 22.67 ± 3.35 kg/m² and females 23.58 ± 3.17 kg/m². Based on Asian BMI classification, 204 participants (51.0%) were classified as underweight or normal weight (BMI < 23 kg/m²) and 196 (49.0%) as overweight or obese (BMI ≥ 23 kg/m²) (Table 1).

Table 1. Distribution of Study Participants by BMI Category (Asian Classification)

BMI Category (Asian Classification)	n	%
Underweight + Normal (BMI < 23 kg/m ²)	204	51.0
Overweight + Obese (BMI ≥ 23 kg/m ²)	196	49.0
Total	400	100.0

BSQ-16B Scores and Prevalence of Body Image Dissatisfaction: The mean BSQ-16B score for the overall study population was 37.89 ± 16.78 . Among males, the mean score was 34.09 ± 15.81 , compared to 37.80 ± 17.63 among females; this difference was not statistically significant (Table 2).

Table 2. BSQ-16B Scores and Prevalence of Body Image Dissatisfaction

	The mean BSQ-16B score
Male	34.09 ± 15.81
Female	37.80 ± 17.63
Overall participants	37.89 ± 16.78

Distribution of BSQ-16B score categories among study participants ($n = 400$): No concern, $n = 155$ (38.8%); Mild concern, $n = 155$ (38.7%); Moderate concern, $n = 63$ (15.7%); Severe concern, $n = 27$ (6.8%). Of those with moderate-to-marked concern, 57 (63.3%) were female and 33 (36.7%) were male. No statistically significant sex difference in BID was observed (chi-square = 1.70, $p = 0.192$), suggesting an emerging convergence in body image concerns between male and female adolescents in this population (fig 1)

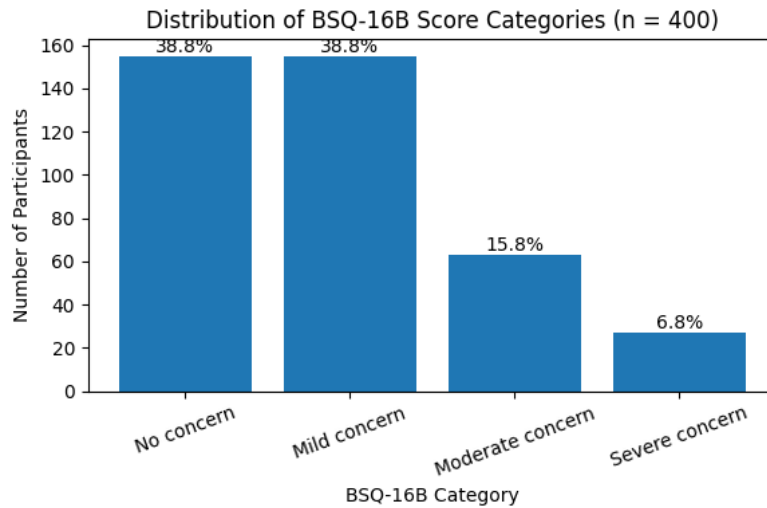


Figure 1. Distribution of BSQ-16B score categories among study participants

Table 3. Bivariate Analysis: Association between Selected Factors and Body Image Dissatisfaction

Variables	Moderate to Marked Concern (n = 90), n (%)	No to Mild Concern (n = 310), n (%)	Chi-square	p-value	OR	95% CI
BMI Category			6.90	0.009	2.63	1.26–5.49
Overweight & Obese	53 (58.9)	108 (34.8)				
Normal & Underweight	37 (41.1)	202 (65.2)				
Sex			1.70	0.192	0.62	0.30–1.28
Male	38 (42.2)	165 (53.2)				
Female	52 (57.8)	145 (46.8)				
Pressure to change body fat level			15.07	0.001	4.82	2.07–11.22
Yes	70 (77.8)	131 (42.3)				
No	20 (22.2)	179 (57.7)				
Pressure to attain a better physique			11.25	0.001	3.96	1.70–9.19
Yes	70 (77.8)	146 (47.1)				
No	20 (22.2)	164 (52.9)				
Deliberately skipped meals			57.81	0.001	21.45	8.22–56.01
Yes	75 (83.3)	59 (19.0)				
No	15 (16.7)	251 (81.0)				
Felt need to exercise			1.63	0.202	3.52	0.45–27.58
Yes	87 (96.7)	282 (91.0)				
No	3 (3.3)	28 (9.0)				
Regular exercise			0.42	0.515	0.76	0.32–1.76
Yes	23 (25.6)	63 (20.3)				
No	67 (74.4)	247 (79.7)				

Bold rows indicate variable headings; OR, odds ratio; CI, confidence interval; BMI, body mass index. Chi-square tests applied throughout. p-values < 0.05 are statistically significant

Bivariate Analysis: Factors Associated with Body Image Dissatisfaction: Table 3 presents the bivariate associations between selected variables and BID. Overweight or obese students were significantly more likely to report moderate-to-

marked concern (58.9%) compared to those with normal or underweight BMI (34.8%) (Chi-square = 6.90, $p = 0.009$; OR = 2.63; 95% CI: 1.26–5.49).

Perceived sociocultural pressure to change body fat levels was reported significantly more frequently among those with moderate-to-marked BID (77.8%) versus those with no-to-mild concern (42.3%) (Chi-square = 15.07, $p = 0.001$; OR = 4.82; 95% CI: 2.07–11.22). Similarly, perceived pressure to attain a better physique was more prevalent among those with moderate-to-marked BID (77.8% vs. 47.1%; chi-square = 11.25, $p = 0.001$; OR = 3.96; 95% CI: 1.70–9.19).

Deliberate skipping of meals to influence body weight or shape was reported by 83.3% of participants with moderate-to-marked BID, compared with only 19.0% of those with no-to-mild concern (chi-square = 57.81, $p = 0.001$; OR = 21.45; 95% CI: 8.22–56.01). Although a high proportion of participants across both groups (96.7% and 91.0%, respectively) reported a perceived need to exercise to achieve their ideal body, only 21% of the overall study population engaged in regular physical activity. Neither felt need to exercise nor regular exercise was significantly associated with BID on bivariate analysis (Table 3).

Although a large majority of participants (92%) reported feeling the need to exercise to attain an ideal body image, only 21% reported engaging in regular exercise. Sex and regular exercise were not significantly associated with body image dissatisfaction on bivariate analysis.

Multivariable Binary Logistic Regression : Binary logistic regression was performed, entering BMI category, pressure to change body fat level, pressure to attain a better physique, and meal skipping as covariates (Table 3). After mutual adjustment, meal skipping was the sole factor that retained independent statistical significance as a predictor of moderate-to-marked BID (AOR = 24.63; 95% CI: 8.64–70.18; $p < 0.001$).

The associations of BMI (AOR = 1.64; 95% CI: 0.64–4.22; $p = 0.305$), pressure to change body fat levels (AOR = 3.34; 95% CI: 0.98–11.32; $p = 0.053$), and pressure to attain a better physique (AOR = 2.80; 95% CI: 0.81–9.69; $p = 0.105$) were attenuated to non-significance after adjustment, suggesting that their apparent effects on bivariate analysis were substantially confounded by, or mediated through, their relationship with meal-skipping behavior (Table 4).

Table 4. Binary Logistic Regression Analysis: Independent Predictors of Moderate-to-Marked Body Image Dissatisfaction

Predictor Variable	AOR	95% CI	p-value
BMI: Overweight/Obese vs. Normal/Underweight	1.64	0.64 – 4.22	0.305
Pressure to change body fat level: Yes vs. No	3.34	0.98 – 11.32	0.053
Pressure to attain a better physique: Yes vs. No	2.80	0.81 – 9.69	0.105
Skipped meals deliberately: Yes vs. No	24.63	8.64 – 70.18	< 0.001*

AOR, adjusted odds ratio; CI, confidence interval; BMI, body mass index. *Statistically significant at $p < 0.05$. Model adjusted for all variables listed in the table simultaneously

DISCUSSION

Adolescence represents a critical developmental window during which the convergence of rapid pubertal change, heightened self-consciousness, and pervasive sociocultural pressures renders body image perceptions particularly susceptible to disturbance [1,2]. The present study reports a prevalence of moderate-to-marked BID of 22.5% among PUC adolescents in Bangalore approximately one in four students. This finding is broadly consistent with earlier Indian studies examining body image concerns in adolescent and young adult populations. Siraj et al., using the same BSQ-16B instrument among medical students in Kerala, reported a comparable prevalence of moderate-to-marked concern [3], and Ganesan et al. observed dissatisfaction in 77.6% of college-going adolescent girls in Tamil Nadu using a broader semi-structured assessment [6]. The present estimate, derived from a mixed-sex PUC sample, situates these findings within a relevant public health context and underscores the need for early identification and intervention in the college setting.

A significant positive association was observed between overweight/obese BMI and BID on bivariate analysis, a pattern that is well established in both Indian and international literature [6,10,11]. However, this association was substantially attenuated and did not retain statistical significance following multivariable adjustment. This finding suggests that the

relationship between BMI and BID is not direct and independent, but rather operates through shared pathways involving sociocultural pressures and behavioural responses such as meal skipping. This interpretation aligns with the tripartite influence model, which posits that the effect of weight status on body dissatisfaction is largely mediated by internalisation of appearance ideals and social comparison processes [12].

A notable finding of the present study was the absence of a statistically significant sex difference in BID. This contrasts with the traditional view well-supported in earlier literature that female adolescents consistently report higher levels of body dissatisfaction than males [13]. Emerging evidence, however, suggests a narrowing of the gender gap in body image concerns. Mitchison and Mond documented increasing rates of body dissatisfaction among male adolescents, attributable in part to growing media-driven pressure to conform to muscular and lean male body ideals [14]. The present finding may similarly reflect the growing sociocultural pressures that now target adolescent males through fitness-oriented social media content and peer influence. This underscores the need for gender-inclusive approaches in the design and delivery of body image interventions [4,14].

Perceived sociocultural pressure both to reduce body fat and to attain a better physique was highly prevalent in this study and was significantly associated with BID on bivariate analysis. A substantial proportion of adolescents with no-to-mild concern also endorsed these pressures, raising the concern that they may be at risk of developing greater dissatisfaction in the future. Rodgers, McLean, and Paxton demonstrated longitudinally that internalisation of appearance ideals and social comparison are important upstream determinants of body dissatisfaction [12], while Tiggemann and Slater demonstrated that Internet and social media exposure significantly predict body image concern in adolescent girls [4]. In the Indian context, Shroff and Thompson similarly reported significant associations between media exposure and body dissatisfaction [5]. Although sociocultural pressure variables did not retain significance after adjustment in the present analysis, this is likely attributable to their strong shared variance with meal-skipping behaviour, rather than an indication that they are unimportant in the causal pathway.

The most striking finding of the present study was that deliberate meal skipping emerged as the only independent predictor of moderate-to-marked BID after multivariable adjustment (AOR = 24.63; 95% CI: 8.64–70.18). This association is epidemiologically and clinically important for several reasons. Adolescence is a period of heightened nutritional vulnerability, characterised by increased requirements for energy, protein, iron, and calcium to sustain growth and pubertal development [2]. Deliberately skipping meals to influence body shape or weight compromises nutritional adequacy and may initiate or perpetuate a cycle of caloric restriction, compensatory overeating, and psychological preoccupation with food and body weight. Neumark-Sztainer et al, in a landmark five-year longitudinal study, demonstrated that body dissatisfaction in adolescents predicted engagement in unhealthy weight-control behaviours including meal skipping [7], while Eisenberg et al further showed that such behaviours predicted persistent weight gain and increasing disordered eating over time [8].

Larson et al. similarly found that meal skipping was strongly associated with body dissatisfaction across diverse socioeconomic groups in a large US longitudinal cohort [11]. The cross-sectional design of the present study precludes causal inference regarding the directionality of the relationship between meal skipping and BID; however, the consistency of this finding across diverse settings and study designs strongly suggests that meal skipping is both a marker and a mechanism of BID in adolescent populations.

Despite nearly 92% of participants reporting a felt need to exercise to achieve an ideal body, only 21% engaged in regular physical activity. This intention-behaviour gap has been documented extensively in adolescent populations and reflects the influence of academic pressures, limited access to recreational facilities, and poorly structured physical education programmes [2,7]. The finding that physical activity was not significantly associated with BID may reflect the inadequacy of the exercise behaviour as a compensatory mechanism, or alternatively, that the motivational basis for exercise in this population was appearance-driven rather than health-oriented. Appearance-motivated exercise has been associated with greater body dissatisfaction in adolescents and merits specific attention in intervention frameworks.

Taken collectively, these findings point toward the urgent need for structured, college-based, multi-component interventions addressing BID and its associated behavioural correlates among PUC students. Such programmes should

integrate nutritional counselling, media literacy education, promotion of body positivity and self-compassion, and facilitation of health-motivated physical activity [1,15]. Training college health personnel and teachers to recognise early indicators of BID and disordered eating is equally essential for timely referral and support.

Limitations

The cross-sectional design of this study precludes the establishment of causal relationships between the identified predictors and BID. The single-institution, urban sample limits the generalisability of findings to rural settings and the broader Indian adolescent population. Anthropometric data were self-reported and may be subject to social desirability bias, particularly regarding weight. The relatively small sample size, while adequate for the study's analytical objectives, may have limited statistical power to detect associations for variables with low prevalence. Future studies with larger, multi-site, and longitudinal designs are warranted to corroborate and extend these findings.

CONCLUSION

This study demonstrates that body image dissatisfaction is prevalent among approximately one in four PUC adolescents in Bangalore, affecting males and females in broadly similar proportions. Deliberate meal skipping a nutritionally hazardous and psychologically driven behaviour is the strongest independent predictor of BID in this population. The effects of BMI and perceived sociocultural pressures on BID appear to operate through shared pathways and are substantially mediated by eating behaviours. These findings collectively highlight the urgent need for early, evidence-based, college-level interventions that promote body positivity, healthy eating, and health-oriented physical activity, while fostering critical engagement with appearance-focused media content among Indian adolescents.

DECLARATIONS

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