Prevalence and Psychosocial Predictors of Body Image Dissatisfaction Among Undergraduate Medical Students at a Tertiary Care Institution in Western Gujarat, India: A Cross-Sectional Study

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Citation: Kadalarasu D, Rohit Kumar Ram, Hemangi Ladani, Yogesh M. Prevalence and Psychosocial Predictors of Body Image Dissatisfaction Among Undergraduate Medical Students at a Tertiary Care Institution in Western Gujarat, India: A Cross-Sectional Study. Indian J Comm Health. 2026;38(5): Page Number 806-813 https://doi.org/10.47203/IJCH.2026.v38i05.011

Article Cycle: Received: 08/06/2026; **Accepted:** 05/08/2026; **Published:** 31/10/2026

Abstract:

Background: Body image dissatisfaction (BID) is an emerging public health concern among college students due to its association with depression, anxiety, and low self-esteem. Sociocultural pressures during the transition to adulthood increase vulnerability. Evidence from Western Gujarat remains limited. The objective of the study was to determine the prevalence of BID and identify its sociodemographic and psychological predictors among undergraduate students in Western Gujarat. **Materials and Methods:** A cross-sectional study was conducted among 297 undergraduate students (18-24 years) from a medical college in Western Gujarat. Data were collected using a structured questionnaire, including MBSRQ-AS, BDI-II, HAM-A, and RSES. BMI was calculated using standard anthropometric measurements. Data were analyzed using SPSS v25 with chi-square tests, independent t-tests, and binary logistic regression. Statistical significance was set at $p < 0.05$. **Results:** The prevalence of BID was 58.2%. Females reported significantly higher dissatisfaction than males (66.1% vs. 48.5%, $p < 0.001$). Higher BID was observed among overweight/obese students (75.4%) and underweight students (66.7%). Multivariate analysis identified female gender (AOR = 1.95, 95% CI: 1.13-3.37), overweight/obesity (AOR = 3.59, 95% CI: 1.85-6.97), higher depression scores (AOR = 1.05 per unit), and lower self-esteem (AOR = 0.89 per unit) as independent predictors (Nagelkerke $R^2 = 0.398$). **Conclusion:** BID is highly prevalent among undergraduate students in Western Gujarat, particularly among females and those with higher BMI, depression, and low self-esteem. Targeted campus-based interventions promoting body positivity, self-esteem, and mental well-being are warranted.

Keywords: Body image; Body image dissatisfaction; Depression; Anxiety; Self-esteem; Undergraduate students; Gujarat; India

Introduction

Body image is an individual's perceptions, thoughts, and feelings about their appearance, shape, and weight is a multidimensional construct shaped by biological, psychological, and sociocultural factors.[1] Concerns often intensify during late adolescence and early adulthood amid rapid physical, cognitive, and social change, making college students with heightened self-concept formation and social comparison particularly vulnerable to negative body image and related distress.[2,3]

Body image dissatisfaction (BID) is a negative discrepancy between perceived and desired body shape, size, or weight is a growing global public health concern, serving as an upstream risk factor for disordered eating, clinical eating disorders, depression, anxiety, and reduced quality of life, and is increasingly seen as a modifiable target for preventive mental health intervention.[4,5] Western studies report BID in 50-70% of young women and 30-50% of young men.[6] In India, media globalization and shifting beauty standards have intensified dissatisfaction among urban college students exposed to Western thinness/muscularity ideals, with recent studies reporting prevalence of 45-65% among undergraduates.[7-9]

Among Indian medical undergraduates specifically, a 2024 Ujjain study found BID in 43.3% of females and 26% of males;[10] a 2023 Mysuru study and a 2025 study linking problematic social media use to body shape concerns in South Indian medical students both estimated ~30.6% prevalence, highlighting social media as an emerging determinant.[11,12] A 2024 review further emphasized cultural, economic, and gender-specific factors, but noted sparse region-specific data outside major metropolitan and southern Indian centers, particularly from Western India/Gujarat, and especially studies jointly modeling psychosocial (depression, anxiety, self-esteem) and sociodemographic predictors.[12]

Cultural factors are central to body image formation: in collectivistic societies like India, family expectations, peer influence, and sociocultural attractiveness norms matter

substantially,[10] and in rapidly urbanizing Gujarat, the interplay of traditional and modern aesthetic ideals may compound these concerns, though regional evidence remains limited.[11] BID is not merely cosmetic; it predicts depression, anxiety, and eating disorders,[12,13] with self-esteem acting as a mediating factor linking body image to psychological well-being.[14]

Given this gap, the present cross-sectional study aimed to estimate BID prevalence among undergraduate medical students at a tertiary institution in Western Gujarat and identify independent psychosocial (depression, anxiety, self-esteem) and sociodemographic predictors via multivariable logistic regression. We hypothesized that higher depression/anxiety and lower self-esteem would be independently associated with greater BID odds after adjusting for BMI and sociodemographic covariates, contributing region-specific data to inform campus-based screening and counselling for this population's unique academic and appearance-related pressures.

Materials and Methods

Study Design, Setting, and Population: This cross-sectional study was conducted among undergraduate medical students (annual intake ~250) across all professional years present on campus (First MBBS through Internship) at Shri M.P. Shah Medical College, Jamnagar, Gujarat, a mixed urban/semi-urban catchment over six months (January-June 2025), using institutional enrollment records via year-wise coordinators. A quantitative cross-sectional design was chosen to assess prevalence and predictors of body image perception in this late-adolescent/early-adult population, where such concerns are particularly salient to psychological well-being and academic performance, allowing simultaneous examination of multiple variables at a single time point.

Sample Size: Calculated using the Krejcie and Morgan method for finite populations,[15] assuming p=0.50 (maximum variability, in the absence of a region-specific BID prevalence estimate), 95% confidence (Z=1.96), and 5% margin of error (d=0.05). Against an estimated population of 1,300 (institutional 2024-25 enrollment, all years), this yielded a minimum of 297; the final analyzed sample was 297 complete, valid questionnaires.

Inclusion/Exclusion Criteria: students aged 18-24 years, able to respond in English, and willing to consent, across all academic years were included. Those aged <18/>24, postgraduates, students under treatment for eating disorders, exchange/visiting students, and those unwilling/unable to consent or complete the questionnaire were excluded. Eligible participants were identified via class attendance registers; those present on data-collection days meeting criteria were invited.

Sampling Method: Convenience sampling was used, chosen for feasibility given the single-institution setting, six-month window, and absence of a centralized registry for random selection. Recruitment spanned departments, class years, and time points to minimize bias, with efforts toward proportional representation by gender, year, and discipline. This approach may still introduce selection bias. Students absent on data-collection days or differing in participation willingness may differ systematically from those captured a limitation addressed further in the discussion.

Data Collection Instruments: A self-designed, expert-validated, pilot-tested questionnaire captured sociodemographic data (age, gender, religion, academic year, course, residence, socioeconomic background), while body image dissatisfaction and allied psychological status were assessed using standardized tools previously validated in Indian populations with acceptable reliability/validity.[16] The 34-item Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS) assessed body image across five domains: appearance evaluation, appearance orientation, overweight preoccupation, self-classified weight, and body areas satisfaction on a 5-point Likert scale (1=Very dissatisfied to 5=Very satisfied), with higher scores indicating greater satisfaction/endorsement except for Overweight Preoccupation, where higher scores reflect greater weight-related anxiety, and showed good internal consistency in prior Indian studies and acceptable reliability here.[17] The 21-item Beck Depression Inventory-II (BDI-II) assessed depressive symptoms (range 0-63: minimal 0-13, mild 14-19, moderate 20-28, severe 29-63), with established high internal consistency/validity in college populations[18] The 14-item Hamilton Anxiety Rating Scale (HAM-A) measured anxiety severity (range 0-56: minimal <8, mild 8-14, moderate 15-23, severe >24), assessing anxious mood, tension, fears, insomnia, somatic/cognitive symptoms, and autonomic features.[19] The 10-item Rosenberg Self-Esteem Scale (RSES) assessed global self-esteem (range 10-40, higher=greater self-esteem), with reverse scoring on five negatively worded items (Cronbach's α=0.84 in this sample).[20] Height (nearest 0.1 cm, portable stadiometer, barefoot/erect) and weight (nearest 0.1 kg, calibrated digital scale, light clothing) were measured per standard procedure, and BMI (weight[kg]/height[m2]) was classified using WHO Asian-specific cut-offs: underweight <18.5, normal 18.5-22.9, overweight 23.0-24.9, obese >25.0 kg/m^2.[21]

Data Collection Procedure: Following ethical approval, two trained researchers administered a self-report questionnaire (30-45 minutes) in classrooms after explaining the study and obtaining electronic informed consent; participants were assured of anonymity, voluntary participation, and the right to withdraw. No identifying information was collected; a numeric code linked data only during quality checks before deletion. Researchers remained present to address queries without influencing responses, and completed questionnaires were

checked for missing items. Quality control included standardized data-collector training, pilot testing (n=30), reliability checks for all scales (Cronbach's α>0.7), double data entry, outlier checks, and review of missing-data patterns.

Ethical Considerations

The study protocol (Ref. No. 213/03/23) was approved by the Institutional Ethics Committee and conducted as per the Declaration of Helsinki and ICMR ethical guidelines.[22] Electronic informed consent was obtained from all participants. Data were de-identified at entry, stored on a password-protected institutional server accessible only to the research team, and reported in aggregate. Participants with clinically significant depressive or anxiety symptoms were referred to institutional counselling services per protocol.

Statistical Analysis

Data were analysed using IBM SPSS v25.0. Categorical variables were summarized as frequencies/percentages; continuous variables as mean ± SD or median (IQR) if non-normally distributed (Shapiro-Wilk test). Bivariate associations with body image dissatisfaction were tested using chi-square (categorical) and independent t-tests (continuous), with effect sizes (Cramér's V, Cohen's d) alongside p-values. Variables with p<0.2 were entered into a binary logistic regression model to identify independent predictors, reporting adjusted odds ratios with 95% CIs; model fit was assessed via the Hosmer-Lemeshow test and Nagelkerke R^2, and multicollinearity via VIF (<5).[23]

Pearson's correlations assessed relationships among continuous variables (body image scores, BMI, depression, anxiety, self-esteem; weak r<0.3, moderate 0.3-0.5, strong >0.5), with Bonferroni correction for multiple comparisons. Gender-stratified analyses compared MBSRQ-AS domain scores (t-tests, Cohen's d) and the BMI category × gender interaction on body image dissatisfaction (chi-square).

Observations were treated as independent, given individual-level recruitment across varied times and settings. All tests were two-tailed (α=0.05), with 95% CIs. Missing data (<2%), confirmed random by Little's MCAR test, were handled by pairwise deletion; sensitivity analyses assessed robustness.

Results

The study included 297 undergraduate students (Table 1). Mean age was 20.3 ± 1.6 years (18-19: 33.0%; 20-21: 41.8%; 22-24: 25.2%), with a slight female majority (55.6% vs. 44.4% male). Most were Gujarati (71.7%), followed by other Indian ethnicities (22.6%) and tribal (5.7%). Academic-year distribution: first year 30.0%, second 28.6%, third 26.3%, fourth 15.1%. All percentages are based on N=297; missing data (<2% per variable) were handled by pairwise deletion, so denominators did not materially differ from 297.

Table 1. Socio-demographic Characteristics, BMI, and Psychological Profile of Study Participants (N = 297)

Characteristics (Mean ± SD)		N = 297 (%)
Age (years) (20.3 ± 1.6)	18-19	98 (33.0)
	20-21	124 (41.8)
	22-24	75 (25.2)
Gender	Male	132 (44.4)
	Female	165 (55.6)
Ethnicity[a]	Gujarati	213 (71.7)
	Other Indian	67 (22.6)
	Tribal	17 (5.7)
Academic Year	First year	89 (30.0)
	Second year	85 (28.6)
	Third year	78 (26.3)
	Fourth year	45 (15.1)
BMI Classification (Asian cut-offs)[b]	Underweight (< 18.5 kg/m^2)	48 (16.2)
	Normal weight (18.5-22.9 kg/m^2)	127 (42.8)
	Overweight (23.0-24.9 kg/m^2)	86 (29.0)
	Obese (≥ 25.0 kg/m^2)	36 (12.1)
Psychological Measures		
Depression (BDI-II) score[c] (15.7 ± 9.8)	Minimal (0-13)	141 (47.5)
	Mild (14-19)	78 (26.3)
	Moderate (20-28)	52 (17.5)
	Severe (29-63)	26 (8.7)
Anxiety (HAM-A) score (12.3 ± 8.4)	Minimal (< 8)	108 (36.4)
	Mild-to-severe (≥ 8)[d]	189 (63.6)
Self-Esteem (RSES) score (24.8 ± 5.7)	High	117 (39.4)
	Moderate	142 (47.8)
	Low	38 (12.8)
Body Image Dissatisfaction[e]		173 (58.2)

a. Self-reported ethnicity/community category, collected on the sociodemographic questionnaire.

b. WHO Asian-specific BMI cut-offs applied (WHO Expert Consultation, 2004).

c. Score ranges: BDI-II (0-63; minimal 0-13, mild 14-19, moderate 0-28, severe 29-63), HAM-A (0-56; minimal < 8, mild 8-14, moderate 15-23, severe > 24), RSES (10-40; higher score = higher self-esteem).

d. HAM-A mild, moderate, and severe bands (defined in note b) are combined here into a single "mild-to-severe" category (HAM-A > 8), consistent with how anxiety severity is summarized in the main text.

e Body image dissatisfaction defined as Appearance Evaluation score < 3.0 OR Body Areas Satisfaction score < 3.0 on MBSRQ-AS (Cash, 2000).

Note: All percentages are calculated on the full analytic sample (N =

297). Item-level missing data were <2% for every variable (see Methods) and were addressed by pairwise deletion; observed denominators therefore do not differ materially from N = 297 for any variable shown.

Using WHO Asian-specific BMI cut-offs, mean BMI was 22.8 ± 3.9 kg/m^2, with 42.8% normal, 16.2% underweight, 29.0% overweight, and 12.1% obese (41.1% overweight/obese combined). Because Asian-specific thresholds are lower than international WHO criteria, this overweight/obese proportion would likely be lower under international cut-offs; a formal re-classification was not performed, and Asian-specific criteria are reported as primary, per South Asian recommendations.

Mean BDI-II (depression) score was 15.7 ± 9.8 (47.5% minimal; 52.5% at least mild: 26.3% mild, 17.5% moderate, 8.7% severe). Mean HAM-A (anxiety) score was 12.3 ± 8.4 (36.4% minimal, 63.6% mild-to-severe). Mean RSES (self-esteem) score was 24.8 ± 5.7 (39.4% high, 47.8% moderate, 12.8% low). Overall body image dissatisfaction (BID; Appearance Evaluation or Body Areas Satisfaction score <3.0 on MBSRQ-AS) was 58.2% (173/297) Over half the sample reported negative appearance perceptions.

Gender was significantly associated with body image dissatisfaction (x^2=9.38, df=1, p=0.002, ?=0.18): females reported higher dissatisfaction than males (66.1% vs. 48.5%; unadjusted OR=2.07, 95% CI 1.29-3.31). BMI category also showed a strong, U-shaped association (x^2=36.37, df=2, p<0.0001, Cramér's V=0.35), with both underweight (66.7%; OR=3.18, 95% CI 1.58-6.40) and overweight/obese (75.4%; OR=4.88, 95% CI 2.83-8.42) students more dissatisfied than normal-weight peers (38.6%)-indicating that deviation from normal BMI in either direction was linked to greater dissatisfaction, though the cross-sectional design precludes inferring temporal direction.

Dissatisfied students also had higher depression (18.9±9.7 vs. 11.2±8.3; diff=7.7, 95% CI 5.6-9.8; t(295)=-7.12, p<0.0001, d=0.84) and anxiety (14.9±8.5 vs. 8.6±7.1; diff=6.3, 95% CI 4.4-8.2; t(295)=?6.68, p<0.0001, d=0.79), and lower self-esteem (22.7±5.4 vs. 27.8±4.6; diff=5.1, 95% CI 3.9-6.3; t(295)=8.49, p<0.0001, d=1.01)-the largest effect size observed. As bivariate, cross-sectional comparisons, these findings reflect association only and do not establish causal direction (Table 2).

Table 2. Bivariate Analysis of Factors Associated with Body Image Dissatisfaction (N = 297)

Variables	Satisfied[a] (n = 124)	Dissatisfied[a] (n = 173)	Test Statistic (df)	p-value	Effect Size	Estimate (95% CI)[b]
Gender, n (%)			**x^2 = 9.38 (1)**	**0.002**	**φ = 0.18**	
Male	68 (51.5)	64 (48.5)				1.00 (Reference)
Female	56 (33.9)	109 (66.1)				2.07 (1.29–3.31)
BMI Category (Asian cut-offs), n (%)			**x^2 = 36.37 (2)**	**< 0. 0001**	**Cramér's V = 0.35**	
Normal weight	78 (61.4)	49 (38.6)				1.00 (Reference)
Under weight	16 (33.3)	32 (66.7)				3.18 (1. 58–6.40)
Overw eight /Obese	30 (24.6)	92 (75.4)				4.88 (2. 83–8.42)
Depres sion Score (BDI-II), Mean ± SD	11.2 ± 8.3	18.9 ± 9.7	t(295) = −7.12	< 0.00 01	d = 0.84	MD = 7.7 (5.6–9.8)
Anxiety Score (HAM-A), Mean ± SD	8.6 ± 7.1	14.9 ± 8.5	t(295) = −6.68	< 0.00 01	d = 0.79	MD = 6.3 (4.4–8.2)
Self-Esteem Score (RSES), Mean ± SD	27.8 ± 4.6	22.7 ± 5.4	t(295) = 8.49	< 0.00 01	d = 1.01	MD = 5.1 (3.9–6.3)

* Percentages for Gender and BMI Category are row percentages, i.e., the percentage of each subgroup that was satisfied or dissatisfied (row totals: Male n = 132, Female n = 165; Normal weight n = 127, Underweight n = 48, Overweight/Obese n = 122). Column headings give the overall column totals (Satisfied n = 124; Dissatisfied n = 173; N = 297).

* Estimate = unadjusted odds ratio (OR, 95% CI) for categorical variables (reference categories: Male; Normal weight), or mean difference (MD = Satisfied - Dissatisfied, 95% CI) for continuous variables.

Note: Categorical variables analyzed using Pearson chi-square tests (x^2, degrees of freedom [df] in parentheses); continuous variables using independent-samples t-tests (t, df in parentheses). Effect sizes: φ = phi coefficient (2×2 comparison); Cramér's V (3-level BMI comparison); d = Cohen's d. All tests two-tailed; exact p-values are reported except where p < 0.0001. These are cross-sectional associations and do not establish causal direction

The multivariate logistic regression model showed good fit (Hosmer-Lemeshow p=0.471), reasonable explanatory power (Nagelkerke R^2=0.398), and good discrimination (AUC=0.84, 95% CI 0.79-0.88; 76.8% classification accuracy; overall ?^{2}=103.45, df=6, p<0.0001; Table 3). Independent predictors of dissatisfaction, relative to male gender and normal BMI, were: female gender (aOR=1.95, 95% CI 1.13-3.37, p=0.017); underweight (aOR=2.44, 95% CI 1.18-5.04, p=0.016) and overweight/obese status (aOR=3.59, 95% CI 1.85-6.97, p=0.0002); and depression score (aOR=1.05/point, 95% CI 1.01-1.09, p=0.012). Anxiety was not independently significant

(aOR=1.01, 95% CI 0.97-1.05, p=0.617), possibly reflecting shared variance with depression (r=0.68, not formally tested via mediation). Self-esteem showed a strong inverse association (aOR=0.89/point, 95% CI 0.84-0.94, p<0.0001).

Table 3. Multivariate Logistic Regression

Analysis for Predictors of Body Image Dissatisfaction (N = 297)

Predictors	β	SE	p-value	Adjusted OR (95% CI)	VIF
Gender (Female vs. Male)	0.67	0.28	0.017	1.95 (1.13–3.37)	1.12
BMI Category (Asian cut-offs)[a]					
Under weight vs. Normal	0.89	0.37	0.016	2.44 (1.18–5.04)	1.08
Overweight /Obese vs. Normal	1.28	0.34	0.0002	3.59 (1.85–6.97)	1.24
Depression Score (per unit)	0.05	0.02	0.012	1.05 (1.01–1.09)	1.28
Anxiety Score (per unit)	0.01	0.02	0.617	1.01 (0.97–1.05)	2.08
Self-Esteem Score (per unit)	−0.12	0.03	< 0.0001	0.89 (0.84–0.94)	1.52

a Reference category: Normal weight (Asian-specific BMI cut-offs).

Model Performance: Nagelkerke R^2 = 0.398; Hosmer-Lemeshow test: χ^2 = 7.62, df = 8, p = 0.471; Overall model: χ^2 = 103.45, df = 6, p < 0.0001; Classification accuracy: 76.8%; AUC-ROC = 0.84 (95% CI: 0.79-0.88).

OR = Odds Ratio; CI = Confidence Interval; VIF = Variance Inflation Factor; SE = Standard Error; β = unstandardized logistic regression coefficient. Reference categories: male gender; normal BMI. Observed VIF values ranged from 1.08 to 2.18, all well below the pre-specified threshold of 5 (Methods), indicating no substantial multicollinearity. Exact p-values are reported except where p < 0.0001. Adjusted odds ratios and 95% CIs are the primary effect estimates; because they derive from a single cross-sectional assessment, they should not be interpreted as evidence of causal or protective effects.

BMI categories reflect Asian-specific cut-offs (Methods); model performance using international cut-offs was not assessed. As cross-sectional estimates, these adjusted associations do not establish causality.

Pearson correlations with Bonferroni correction (21 comparisons, adjusted α=0.0024; Table 4) showed Appearance Evaluation and Body Areas Satisfaction were strongly correlated (r=0.67, p<0.0001). Overweight Preoccupation correlated negatively with both (r=-0.38 and -0.45, p<0.0001). BMI correlated negatively with Appearance Evaluation (r=-0.29) and Body Areas Satisfaction (r=-0.36), and positively with Overweight Preoccupation (r=0.41, all p<0.0001). Depression correlated negatively with body image measures (r=-0.43, -0.39), positively with Overweight Preoccupation (r=0.35), and weakly with BMI (r=0.18, p=0.0018); anxiety showed a similar, slightly weaker pattern, with its BMI correlation (r=0.14) not surviving correction (p=0.016). Depression and anxiety were strongly correlated (r=0.68, p<0.0001). Self-esteem correlated positively with body image measures (r=0.51, 0.48) and negatively with depression (r=-0.56), anxiety (r=?0.49), Overweight Preoccupation (r=-0.42), and BMI (r=-0.21, p=0.0003). All correlations are cross-sectional and non-causal.

Table 4. Pearson Correlation Matrix of Body Image Domains, BMI, and Psychological Variables (N = 297)

Variables	1	2	3	4	5	6	7
Appearance Evaluation	—						
Body Areas Satisfaction	0.67***	—					
Overweight Preoccupation	−0.38***	−0.45***	—				
BMI	−0.29***	−0.36***	0.41***	—			
Depression Score	−0.43***	−0.39***	0.35***	0.18*	—		
Anxiety Score	−0.37***	−0.34***	0.31***	0.14 ns	0.68***	—	
Self-Esteem Score	0.51***	0.48***	−0.42***	−0.21**	−0.56***	−0.49***	—

All correlations are Pearson's r (n = 297; df = 295). Bonferroni correction applied for 21 pairwise comparisons (adjusted α = 0.0024). Significance: * p < 0.002; ** p < 0.0005; *** p < 0.0001; ns = not significant after Bonferroni correction. Exact p-values were computed from each r using $t = r\sqrt{(n-2)}/\sqrt{(1-r^2)}$, df = 295 (e.g., r = 0.18: p = 0.0018; r = 0.14: p = 0.016; r = -0.21: p = 0.0003). These are cross-sectional correlations and do not establish causal direction.

Across MBSRQ-AS domains (Table 5), males scored higher on Appearance Evaluation (3.34±0.82 vs. 2.95±0.91) and Body Areas Satisfaction (3.56±0.74 vs. 3.16±0.82; mean differences 0.39 and 0.40, respectively), while females scored higher on Appearance Orientation (3.82±0.69 vs. 3.51±0.76) and Overweight Preoccupation (3.23±1.09 vs. 2.58±1.04; mean differences -0.31 and -0.65), indicating greater appearance investment and weight concern among females. BID prevalence was higher in females (66.1% vs. 48.5%; χ^2=9.38, df=1, p=0.002, φ=0.18; OR=2.07, 95% CI 1.29-3.31). a pattern consistent across all four domains, suggesting a broad rather than domain-specific gender difference. These findings align with proposed sociocultural pressures on women, though such factors were not directly measured here.

Table 5. Gender Differences in MBSRQ-AS Domain Scores and Body Image Dissatisfaction

MBSRQ-AS Domains	Males (n = 132) Mean ± Sd[a]	Females (n = 165) Mean ± SD	t-value (df)	Mean Difference (95% CI)[b]	p-value	Cohen 's d	Interpretation
Appearance Evaluation	3.34 ± 0.82	2.95 ± 0.91	t(295) = 3.87	0.39 (0.19–0.59)	< 0.0001	0.45	Small–Medium
Appearance Orientation	3.51 ± 0.76	3.82 ± 0.69	t(295) = −3.67	−0.31 (−0.48 to −0.14)	0.0003	0.43	Small–Medium
Overweight Preoccupation	2.58 ± 1.04	3.23 ± 1.09	t(295) = −5.22	−0.65 (−0.90 to −0.40)	< 0.0001	0.61	Medium
Body Areas Satisfaction	3.56 ± 0.74	3.16 ± 0.82	x^2 = 9.38 (df = 1)	0.40 (0.22 –0.58)	< 0.0001	0.51	Medium
Overall Body Image Dissatisfaction, n (%)	**64 (48.5%)**	**109 (66.1%)**	**x^2 = 9.38 (df = 1)**	**OR = 2.07 (1.29–3.31)[b]**	**0.002**	β = 0.18	Small

[a] For the categorical row, this column instead reports the unadjusted odds ratio (OR, 95% CI) for females versus males; percentages are row percentages within each gender group (Male n = 132; Female n = 165).

[b]Mean difference = Males - Females for the four continuous MBSRQ-AS domain scores; independent-samples t-tests, two-tailed, df = 295.

Note: All t-tests are two-tailed (df = 295). Effect size interpretation: Negligible (< 0.20), Small (0.20-0.49), Medium (0.50-0.79), Large (≥ 0.80). Females showed significantly higher Appearance Orientation, Overweight Preoccupation, and overall body image dissatisfaction; males reported higher Appearance Evaluation and Body Areas Satisfaction. These are cross-sectional group comparisons and do not establish causal direction .

In summary, Female students in this sample reported lower appearance satisfaction, higher appearance investment, and greater weight-related preoccupation than males, along with a higher overall prevalence of body image dissatisfaction. This pattern held across all four MBSRQ-AS domains, suggesting a broad rather than domain-specific gender difference. It is consistent with proposed sociocultural pressures and internalized beauty standards

on women, though such factors were not directly measured and remain an interpretation rather than a demonstrated finding.

Discussion:

The 58.2% prevalence of body image dissatisfaction in this study falls within the range of previous Indian studies, toward the higher end. Reported rates include 76.7% among female undergraduates in Delhi.[24] 77.6% among college-going adolescent girls in Coimbatore,[25] and 62.8% (overall appearance), 53.1% (specific body parts) in Northeast India.[16] More recent institution-level studies report lower figures: 43.3% (females) and 26% (males) among medical undergraduates in Ujjain (2024),[4]and around 30.6% body shape concerns among South Indian medical students (2025).[10] Studies from Central Gujarat (2024) also reported body image concerns, though differing outcome measures limit direct comparison.[9] This variation likely reflects differences in instruments (MBSRQ-AS here vs. the Body Shape Questionnaire, Figure Rating Scale, or study-specific tools with differing dissatisfaction thresholds), sample characteristics, and sociocultural context, with measurement differences not necessarily true prevalence differences plausibly explaining part of the higher figure observed here.

Western studies report body dissatisfaction in 69-84% of women and 10-30% of men.[26] The gender disparity found here (66.1% females vs. 48.5% males) is directionally consistent with this pattern, though the differing absolute rates likely reflect differences in population (medical undergraduates specifically), instrument, and culture rather than comparable effect magnitude. Australian data showed self-reported body image distress among 16-25-year-olds rising from 44.2% (2009) to 77.3% (2015),[27] a trend not directly comparable to this cross-sectional estimate but noted to contextualize a broader reported rise in body image concern over time.

BMI, depression, and self-esteem emerged as correlates of body image dissatisfaction, consistent with international literature: an Indian study linked media influence and BMI to body dissatisfaction and disordered eating,[26] the Coimbatore study highlighted BMI, sociocultural thinness pressure, and depression,[25]and the Northeast India study found body image correlated with both self-esteem and anxiety.[16] As in the present study, all are cross-sectional associations, so none can establish direction on whether low self-esteem predisposes to dissatisfaction, dissatisfaction erodes self-esteem, or both share unmeasured underlying factors.

The Delhi study identified BMI, maternal education (graduate/postgraduate), and media exposure as correlates.[24] Outside India, 80% of medical students in Oman reported body image dissatisfaction, 73.5% of whom desired to be thinner.[28] The wide range across medical-student studies (30.6-80%) suggests setting- and institution-specific factors, rather than a single universal pattern, likely shape observed rates, heterogeneity that should temper broad cross-cultural generalization.

Several methodological factors warrant consideration. Single-institution convenience sampling means the sample may not represent the broader undergraduate medical population even within Western Gujarat. Students who were absent, disengaged, or otherwise systematically different are unrepresented, potentially biasing prevalence in an unknown direction. Self-report assessment of all variables in a single sitting introduces recall bias (BDI-II/HAM-A symptom-frequency items) and reporting/social-desirability bias. The cross-sectional design means all reported associations, including with BMI, depression, and self-esteem, are

correlations at a single time point, not evidence of causal direction.

Broadly similar psychosocial correlates (BMI, depression, self-esteem) across diverse Indian states suggest some shared pattern, though concluding a single national causal mechanism from cross-sectional data would be speculative. Gujarat-specific factors such as dietary patterns, clothing norms, or marriage-market expectations were not measured here; while plausible, their role cannot be concluded from these findings and remains a direction for future research using purpose-designed measures.

Limitations

As a cross-sectional study, causal inference is not possible, and the direction of observed associations (e.g., depression or self-esteem with body image dissatisfaction) remains unclear. low self-esteem/depression may predispose to dissatisfaction, dissatisfaction may contribute to depression and lowered self-esteem over time, or both may be bidirectional or driven by unmeasured shared factors. All reported associations should be interpreted as correlational, not causal.

Convenience sampling from a single institution, chosen for feasibility, has specific limitations: students absent on data-collection days, less willing to participate voluntarily, or systematically different in psychological profile or body image concern are not represented. The English-language inclusion criterion may have further reduced representativeness by excluding students with lower English proficiency, who could differ in socioeconomic background, schooling medium, or urban/rural origin factors plausibly related to body image and mental health.

Self-reported data on depression, anxiety, and body image may be affected by response, social-desirability, or underreporting bias, particularly as questionnaires were administered in classrooms with researchers present, which may have influenced willingness to disclose distressing symptoms.

Although the multivariable model adjusted for several socio-demographic and psychosocial covariates, unmeasured confounders remain. Media/social media exposure, sociocultural and peer pressure, eating behaviours, physical activity, family history of body image/eating concerns, and medical-training-specific academic stress were not assessed. The model's moderate explanatory power (Nagelkerke R^2=0.398) reflects this: additional psychosocial, environmental, or biological determinants likely contribute meaningfully to body image dissatisfaction in this population.

Conclusion

The study found a high prevalence of body image dissatisfaction among undergraduate medical students in Western Gujarat, with a significant association observed between dissatisfaction and female sex, overweight/obese status, and symptoms of depression or low self-esteem. As this was a cross-sectional study, these associations should be interpreted as correlational rather than causal, and findings are limited to the study population and may not be generalizable to medical students in other regions or educational settings.

Incorporate brief, validated body image and self-esteem screening tools into existing periodic mental health check-ups already conducted for medical students, allowing early identification of at-risk students without requiring additional infrastructure. Strengthen referral pathways from student health services to campus counseling cells for students identified with co-occurring body image dissatisfaction and depressive symptoms, given the association observed between these factors in this study.

Future research using longitudinal designs is needed to clarify the temporal relationship between body image dissatisfaction and the associated factors identified in this study, and intervention studies should evaluate the feasibility and effectiveness of the above measures within Indian medical education settings before wider implementation.

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