© JAN 2026 | IRE Journals | Volume 9 Issue 7 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I7-1713580

Lifestyle and Dietary Correlates of Body Weight among Female College Students in Kangra District, Himachal Pradesh

SHITANSHU[1], ANURADHA SHARMA[2], BOVINDER CHAND[3]
[1, 2, 3]*Department of Zoology, Shaheed Captain Vikram Batra Government College, Palampur, District Kangra, Himachal Pradesh, India*

Abstract- ***Excessive or insufficient body weight is an emerging public-health challenge among young adults. Female college students are especially vulnerable due to lifestyle transitions, irregular eating patterns, and limited awareness of healthy weight maintenance. This study assessed the prevalence of underweight and overweight among female college students and their associations with lifestyle behaviours, dietary habits, and body-weight perception. A cross-sectional survey was conducted among 503 undergraduate and postgraduate students at a government degree college in Kangra District, Himachal Pradesh, India. BMI was calculated from anthropometric measurements and classified using World Health Organization guidelines. Data on physical activity, sedentary behaviour, sleep, dietary patterns, fast-food and fruit intake, and weight perception were collected via a structured questionnaire and analysed descriptively. Over half of the participants had normal BMI (53.67%), while 41.35% were underweight and 4.97% were overweight. Underweight was associated with meal skipping, irregular breakfast, low physical activity, and prolonged sedentary time, whereas overweight students reported higher fast-food intake, shorter sleep, and minimal exercise. Misperception of body weight was common in both groups, with most participants expressing a need for professional guidance on healthy weight management. The findings highlight a dual burden of malnutrition, with underweight as a significant yet under-recognized concern. Lifestyle and dietary practices strongly influence BMI, underscoring the need for institution-based interventions such as nutrition education, dietary counselling, promotion of physical activity, and awareness of healthy weight perception to support healthier outcomes.***

Keywords: Body Mass Index; Female College Students; Lifestyle Factors; Dietary Habits; Body-Weight Perception; Dual Burden of Malnutrition

I. INTRODUCTION

Abnormal body weight is a well-recognized determinant of health outcomes across the lifespan. Body mass index (BMI), recommended by the World Health Organization as a simple and reliable indicator of nutritional status, categorizes individuals into underweight, normal weight, overweight, and obese groups [1]. Both extremes of BMI are associated with adverse health consequences, ranging from nutritional deficiencies, impaired immunity, and reduced physical capacity among underweight individuals to metabolic disorders, cardiovascular disease, and type 2 diabetes among overweight populations [2,3].

Globally, the prevalence of overweight and obesity has increased substantially over recent decades, while undernutrition continues to persist in many developing regions. This simultaneous presence of underweight and overweight within the same population is commonly described as the "double burden of malnutrition" [3]. Adolescents and young adults are particularly affected by this phenomenon, as this life stage is characterized by rapid physiological, behavioural, and psychosocial changes.

College students constitute a nutritionally vulnerable group due to the transition from structured home environments to independent living. This transition is often accompanied by irregular meal patterns, increased consumption of energy-dense foods, reduced physical activity, altered sleep behaviour, and heightened academic stress [4]. Studies across diverse populations have demonstrated that the first years of college life are critical for the establishment of long-term lifestyle behaviours that influence body weight and metabolic health [4,5].

Female college students face additional biological, social, and cultural pressures that may predispose them to unhealthy weight patterns. Frequent skipping of breakfast, inadequate intake of nutrient-dense foods, excessive reliance on fast foods, sedentary academic routines, and limited engagement in structured physical activity are commonly reported among female students [6,7]. Furthermore, misconceptions regarding ideal body image and limited awareness of healthy weight standards often influence eating behaviours and weight-control practices, increasing vulnerability to both underweight and overweight conditions.

Evidence from international and South Asian studies indicates that underweight remains prevalent among female students in low- and middle-income settings, frequently driven by food insecurity, economic constraints, and academic stress [8,9,10]. In contrast, overweight and obesity among college students are more often associated with sedentary lifestyles, high-calorie diets, short sleep duration, and prolonged screen exposure [11,12]. Despite increasing recognition of these issues, region-specific data from hilly northern Indian states, including Himachal Pradesh, remain limited.

Understanding the prevalence and determinants of abnormal BMI among female college students is essential for developing targeted public-health interventions. Early identification of unhealthy lifestyle patterns during the college years can help prevent long-term health complications and promote sustainable behavioural change [5,13]. Therefore, the present study was undertaken to assess bodyweight pattern among female college students of Shaheed Captain Vikram Batra Government Degree College, Palampur, Kangra district, Himachal Pradesh, and to examine their association with lifestyle behaviours, dietary habits, and self-perception of body weight.

II. MATERIALS AND METHODS

2.1 Study Area and Population

The study was carried out at Shaheed Captain Vikram Batra Government Degree College, Palampur, located in Kangra district of Himachal Pradesh, India. Kangra district lies in the northwestern Himalayan region and is characterized by mixed rural–urban demographics, diverse socioeconomic backgrounds, and distinct dietary and lifestyle practices influenced by geography and culture. The college enrolls students from arts, science, commerce, and allied academic streams, providing a heterogeneous student population suitable for examining lifestyle-related health outcomes. The study population comprised female undergraduate and postgraduate students enrolled during the academic year 2024–2025.

2.2 Sampling Technique

A total of 503 female students participated in the study. Participants were selected using a random sampling approach, ensuring representation across different academic years and disciplines. Students who were willing to participate and provided written informed consent were included. Participants with incomplete anthropometric data or those who declined consent were excluded from the analysis. Data were collected using a structured questionnaire designed to obtain information on sociodemographic characteristics, anthropometric measurements, dietary habits, physical activity patterns, sedentary behaviour, sleep duration, self-perception of body weight, and weight-management practices along with the perceived need for professional guidance. A mixed-mode data collection approach was employed, in which anthropometric measurements were recorded through offline physical assessments, while data on lifestyle behaviours, dietary practices, and body-weight perception were collected using an online questionnaire administered via Google Forms.

2.3 Anthropometric Measurements and BMI Classification

Height was measured using a stadiometer to the nearest 0.1 cm, and body weight was measured using a calibrated digital weighing scale to the nearest 0.1 kg. Measurements were recorded with participants wearing light clothing and without footwear.

Body Mass Index (BMI) was calculated using the standard formula:

BMI = weight (kg) / height (m^2)

BMI values were categorized according to World Health Organization guidelines [1] as follows:

- Underweight: < 18.5 kg/m^2
- Normal weight: 18.5–24.9 kg/m^2
- Overweight: 25.0–29.9 kg/m^2
- Obese: ≥ 30.0 kg/m^2

For analytical clarity, participants were grouped into underweight, normal weight, and overweight categories, as the prevalence of obesity in the study population was negligible.

2.4 Ethical Considerations

The study followed ethical guidelines for research involving human participants. All participants were informed about the study objectives and procedures, and written informed consent was obtained. Participation was voluntary, with the option to withdraw at any time, and confidentiality and anonymity were strictly maintained; data were used solely for academic and research purposes without personal identifiers.

2.5 Statistical Analysis

Data were entered, cleaned, and analysed using Microsoft Excel. Continuous variables were summarized using means and standard deviations, while categorical variables were expressed as frequencies and percentages. Associations between BMI categories and lifestyle or dietary variables were examined using appropriate inferential statistics, primarily Chi-square tests for categorical data. A p-value < 0.05 was considered statistically significant. Statistical interpretations were made in accordance with the cross-sectional design, and no causal inferences were drawn.

III. RESULTS

3.1 Participant Characteristics and BMI Distribution

A total of 503 female college students were included in the final analysis (Table 1). Based on Body Mass Index (BMI) classification, the majority of participants were within the normal weight range (53.67%). A substantial proportion of students were classified as underweight (41.35%), while a comparatively smaller proportion were categorized as overweight (4.97%). No meaningful prevalence of obesity was observed in the study population. Overall, underweight status was considerably more prevalent than overweight among the surveyed female students, indicating a predominance of undernutrition within this institutional population.

Table 1: Distribution of participants according to Body Mass Index (BMI) categories

BMI Category	Number (n)	Percentage (%)
Underweight	208	41.35
Normal weight	270	53.67
Overweight	25	4.97
Total	503	100.00

3.2 Association Between BMI Categories and Physical Activity

Levels of physical activity varied across BMI categories. Among overweight students, 72% reported no engagement in physical activity, and none reported daily exercise (Table 2). In comparison, daily physical activity was reported by 14.4% of normal-weight students and 11.1% of underweight students. Low levels of physical activity were common across all BMI groups. More than half of underweight students (52.9%) and a substantial proportion of normal-weight students (42.6%) reported no regular physical activity. Moderate physical activity (1–2 times per week) was most frequently observed among normal-weight students (36.7%).

Table 2: Association between BMI categories and physical activity levels

Physical Activity Frequency	Underweight n (%)	Normal weight n (%)	Overweight n (%)
No physical activity	110 (52.9)	115 (42.6)	18 (72.0)
1–2 times per week	62 (29.8)	99 (36.7)	5 (20.0)
3–4 times per week	13 (6.3)	17 (6.3)	2 (8.0)
Daily	23 (11.1)	39 (14.4)	0 (0.0)
Total	208 (100)	270 (100)	25 (100)

3.3 Sleep Duration and Sedentary Behaviour

Distinct patterns of sleep duration were observed across BMI categories. A majority of overweight students (64%) reported sleeping for less than five hours per night. In contrast, underweight students more frequently reported longer sleep durations, with 51.9% sleeping for more than seven hours and 42.3%

sleeping for five to seven hours per night. Normal-weight students most commonly reported sleeping for five to seven hours per night (51.1%), followed by more than seven hours (44.1%). Short sleep duration was least common among normal-weight participants (4.8%).

Prolonged sedentary behaviour was observed across all BMI categories. Nearly half of overweight students (48%) reported sitting for more than five hours per day. Similar patterns were noted among underweight (38.9%) and normal-weight (35.5%) students. Moderate sitting duration (three to five hours per day) was most prevalent among normal-weight students (41.5%). Fewer participants across all BMI groups reported sitting for less than three hours daily.

3.4 Dietary habits

Regular breakfast consumption was most common among normal-weight students (73.3%). In contrast, a majority of underweight students (70.2%) and a considerable proportion of overweight students (40%) reported skipping breakfast (Table 3). Regarding meal frequency, 60.4% of normal-weight students reported consuming three meals per day. Underweight students most commonly consumed two meals per day (53.9%), whereas overweight students reported a higher frequency of consuming more than three meals per day (48%).

Fast food consumption varied substantially across BMI categories. Daily fast-food intake was highest among overweight students (48%), compared with 4.8% among underweight students and 3% among normal-weight students (Table 3). Avoidance of fast food was most common among normal-weight students (57.4%).

Fruit intake also differed across BMI groups. Absence of fruit consumption was highest among overweight students (68%), compared with 25.6% of normal-weight and 23.1% of underweight students (Table 3). Most normal-weight (67.4%) and underweight (69.2%) students reported consuming one to two servings of fruit daily.

Table 3: Association between BMI categories and dietary habits

Dietary habits		Underweight n (%)	Normal weight n (%)	Overweight n (%)
Breakfast consumption	Regular	62 (29.8)	198 (73.3)	15 (60.0)
	Skipping	146 (70.2)	72 (26.7)	10 (40.0)
Meal frequency per day	Two meals	112 (53.9)	68 (25.2)	6 (24.0)
	Three meals	78 (37.5)	163 (60.4)	7 (28.0)
	More than three	18 (8.6)	39 (14.4)	12 (48.0)
Fast food consumption	Daily	10 (4.8)	8 (3.0)	12 (48.0)
	Occasionally	83 (39.9)	107 (39.6)	9 (36.0)
	Never	115 (55.3)	155 (57.4)	4 (16.0)
Fruit intake per day	None	48 (23.1)	69 (25.6)	17 (68.0)
	1–2 servings	144 (69.2)	182 (67.4)	8 (32.0)
	≥3 servings	16 (7.7)	19 (7.0)	0 (0.0)

3.5 Self-Perception of Body Weight

Accuracy of self-perceived body weight varied by BMI category. Among normal-weight students, 84.1% correctly perceived their weight status (Table 4). In contrast, only 51.5% of underweight students and 60% of overweight students correctly identified their BMI category. A notable proportion of underweight students (46.1%) perceived themselves as having normal body weight. Similarly, 28% of overweight students underestimated their weight status as normal.

Table 4: Comparison of actual BMI category and self-perceived body weight

Actual BMI Category	Perceived underweight n (%)	Perceived normal n (%)	Perceived overweight n (%)
Underweight (n=208)	107 (51.5)	96 (46.1)	5 (2.4)
Normal (n=270)	28 (10.4)	227 (84.1)	15 (5.5)
Overweight (n=25)	2 (8.0)	7 (28.0)	15 (60.0)

3.6 Weight Management Practices and Need for Guidance

Weight management practices differed across BMI categories. Most overweight students reported active attempts to manage body weight, primarily through exercise (48%) and dietary modification (36%). Among underweight students, 35.1% reported dietary changes and 19.2% reported exercise as strategies for weight management. The perceived need for professional guidance was high across all BMI categories. A majority of normal-weight (71.1%), underweight (79.3%), and overweight (88%) students expressed interest in receiving guidance for healthy weight management.

IV. DISCUSSION

The findings of the present study reveal a pronounced dual burden of malnutrition, characterized by a high prevalence of underweight alongside a smaller yet meaningful proportion of overweight students. Such a pattern is increasingly reported in populations undergoing nutritional transition, particularly in low- and middle-income settings [3].

A major finding of this study is the much higher prevalence of low body weight compared to high body weight among female college students. Although global attention largely focuses on overweight and obesity, undernutrition remains a significant public-health issue in many Asian and South Asian populations, particularly among women [2,7,9]. Similar patterns of high undernutrition among university students in developing regions have been reported earlier, often associated with economic limitations, food insecurity, academic stress, and irregular eating habits [7,8,10]. In contrast, studies from Western countries commonly report higher levels of excess body weight among college students [4,14], likely reflecting differences in diet, culture, physical activity, and built environments. The simultaneous presence of both forms of malnutrition within the same population reflects ongoing nutritional transition and highlights the need for public-health approaches that address both extremes of BMI [3].

Physical inactivity was prevalent across all BMI categories, particularly among students with higher body weight. Sedentary academic routines and increased screen time are known contributors to low energy expenditure in college students [10], and the association between inactivity and excess weight is consistent with earlier findings linking low physical activity to metabolic risk [15]. Importantly, many students with low body weight also reported minimal activity, indicating that inactivity may negatively affect fitness and health regardless of BMI status, as reported in other studies [16]. These findings support the need for universal physical activity promotion rather than weight-specific approaches.

Sleep duration showed clear associations with BMI status. Students with higher body weight more often reported short sleep, which is known to disrupt appetite-regulating hormones and increase weight-gain risk, consistent with earlier findings among college populations [11]. In contrast, students with low body weight more frequently reported longer sleep, possibly reflecting low energy intake or fatigue, though causal links cannot be inferred due to the cross-sectional design. Prolonged sedentary behaviour was common across all BMI groups, supporting evidence that extended sitting is widespread among students and independently linked to adverse metabolic outcomes regardless of activity levels [10], highlighting the need to reduce sitting time through active routines.

Dietary patterns were strongly associated with BMI status. Regular breakfast and structured meals were most common among normal-weight students, while breakfast skipping and low meal frequency predominated among those with low body weight, consistent with links to inadequate nutrient intake and abnormal BMI [6,17]. Students with higher body weight reported greater fast-food intake and lower

fruit consumption, supporting evidence that energy-dense, nutrient-poor diets increase metabolic risk [14,18] and reduce protective fibre and micronutrient intake. Notably, frequent fast-food consumption was also observed among undernourished students, indicating that poor diet quality can coexist with insufficient overall energy intake, contributing to compromised nutritional status [3].

Body-weight perception was generally accurate among normal-weight students but frequently distorted among those at both BMI extremes. Underestimation of weight status, especially among undernourished students, may delay appropriate nutritional intervention and has been identified as a major barrier to effective health-seeking behaviour [19]. Weight-management efforts were more common among students with higher body weight; however, a concerning proportion of undernourished students also reported attempts to lose weight, suggesting body-image dissatisfaction and poor awareness of healthy weight standards, patterns commonly linked to disordered eating among young women [20,21].

The widespread demand for professional guidance across all BMI categories highlights significant gaps in nutritional literacy and access to reliable health information. These findings reinforce recommendations for integrated, campus-based interventions that combine nutritional education, physical activity promotion, and psychological support to address both underweight and overweight effectively [22,23].

V. CONCLUSION

The study reveals a clear dual burden of malnutrition among female students of Shaheed Captain Vikram Batra Government Degree College, Palampur, with a substantial proportion having low BMI and a smaller yet notable group having high BMI, despite over half being in the normal range. This indicates that nutritional problems extend beyond excess weight to include significant undernutrition. BMI status was closely linked to lifestyle and dietary factors such as physical inactivity, prolonged sedentary behaviour, irregular sleep, breakfast skipping, poor meal frequency, frequent fast-food intake, and low fruit consumption. Inaccurate body-weight perception and inappropriate weight-control practices were also observed, reflecting gaps in health awareness. Overall, the findings highlight the need for institution-based health interventions that address both forms of malnutrition through promotion of balanced diets, regular physical activity, adequate sleep, and realistic understanding of healthy body weight.

VI. LIMITATIONS OF THE STUDY

Despite its strengths, the study has limitations: its cross-sectional design prevents causal inference, several variables were self-reported and may involve recall bias, and data from a single college limit generalizability. Moreover, biochemical measures and detailed dietary assessments were not included.

VII. FUTURE SCOPE AND RECOMMENDATIONS

To strengthen evidence, future research should use longitudinal, multi-institutional designs to better understand how lifestyle factors influence BMI over time, and include detailed diet, fitness, and biochemical assessments for deeper health insights. At the institutional level, colleges should strengthen health education, regular screening, counselling, campus physical activity, and access to healthy food, while addressing body-image concerns, to promote lifelong healthy behaviours among students.

ACKNOWLEDGEMENTS

The authors express their sincere gratitude to the Principal, Shaheed Captain Vikram Batra Government Degree College, Palampur, for providing the necessary institutional support and facilities to conduct this study. The authors also sincerely thank all the female students who participated in the study for their voluntary cooperation and valuable contributions.

REFERENCES

[1] World Health Organization. *Obesity and Overweight*. World Health Organization; 2021.
[2] Afshin A, Sur PJ, Fay KA, et al. Health effects of dietary risks in 195 countries, 1990–2017: A systematic analysis for the Global Burden of

Disease Study 2017. *The Lancet*. 2019;393(10184):1958–1972.

[3] Popkin BM, Corvalan C, Grummer-Strawn LM. Dynamics of the double burden of malnutrition and the changing nutrition reality. *The Lancet*. 2020;395(10217):65–74.

[4] Vadeboncoeur C, Townsend N, Foster C. A meta-analysis of weight gain in first year university students. *BMC Obesity*. 2015;2:22.

[5] Burrows T, Goldman S, Pursey K, Lim R. Is there an association between dietary intake and academic achievement? A systematic review. *Journal of Human Nutrition and Dietetics*. 2017;30(2):117–140.

[6] Sogari G, Velez-Argumedo C, Gómez MI, Mora C. College students and eating habits: An ecological model. *Nutrients*. 2018;10(12):1823.

[7] Gan WY, Mohd Nasir MT, Zalilah MS, Hazizi AS. Differences in eating behaviours, dietary intake and body weight status between male and female Malaysian university students. *Malaysian Journal of Nutrition*. 2011;17(2):213–228.

[8] Pengpid S, Peltzer K. Health behaviour and self-reported academic performance among university students: An international study. *Journal of Psychology in Africa*. 2014;24(5):387–394.

[9] Misra A, Shrivastava U. Obesity and dyslipidemia in South Asians. *Nutrition*. 2013;29(3):546–549.

[10] Ng M, Fleming T, Robinson M, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013. *The Lancet*. 2014;384(9945):766–781.

[11] Sa J, Choe S, Cho BY, et al. Relationship between sleep and obesity among college students. *BMC Public Health*. 2020;20(1):96.

[12] Gupta N, Goel K, Shah P, Misra A. Childhood obesity in developing countries: Epidemiology, determinants, and prevention. *Endocrine Reviews*. 2012;33(1):48–70.

[13] Senbanjo IO, Oshikoya KA, Olutekunbi OA, Njokanma OF. Body fat distribution of children and adolescents in southwest Nigeria. *American Journal of Physical Anthropology*. 2013;150(4):647–654.

[14] Nelson MC, Story M, Larson NI, Neumark-Sztainer D, Lytle LA. Emerging adulthood and college-aged youth: An overlooked age for weight-related behavior change. *Obesity*. 2008;16(10):2205–2211.

[15] Andrade A, Dos Santos KM, D'Oliveira A, Claudino VM, da Cruz WM. Physical activity as a protective factor in the mood of children and adolescents: Association with overweight and obesity. *Frontiers in Pediatrics*. 2025;13:1494998.

[16] Liang C, Lee PF, Yeh PC. Relationship between regular leisure-time physical activity and underweight and overweight status in Taiwanese young adults. *International Journal of Environmental Research and Public Health*. 2022;20(1):284.

[17] Kumar R, Kumar A, Rajpal S, Joe W. Underweight and overweight prevalence among Indian women. In: *Atlas of Gender and Health Inequalities in India*. Springer Nature; 2024:17–27.

[18] Chand B, Sharma C, Malik S, Gupta NJ. Crosstalk between circadian rhythms, sleep and eating habits to improve public health. *Journal of Applied and Natural Science*. 2021;13(4):1470–1478.

[19] Russell-Mayhew S, McVey G, Bardick A, Ireland A. Mental health, wellness, and childhood overweight/obesity. *Journal of Obesity*. 2012;2012:281801.

[20] Schaumberg K, Anderson DA, Anderson LM, Reilly EE, Gorrell SJC. Dietary restraint and eating pathology. *Clinical Obesity*. 2016;6(2):89–100.

[21] Keel PK, Forney KJ. Psychosocial risk factors for eating disorders. *International Journal of Eating Disorders*. 2013;46(5):433–439.

[22] Baygi F, Djalalinia S, Qorbani M, et al. Psychological interventions targeting overweight and obesity in school-aged children: A systematic review and meta-analysis. *BMC Public Health*. 2023;23(1):1478.

[23] Rahimi A, Hashemzadeh M, Zare-Farashbandi F, Naeini AMA, Hasanzadeh A. The effect of nutrition education on awareness of overweight and obese female students. *Journal of Education and Health Promotion*. 2018;7:76.