

# Prevalence and Determinants of Overweight and Obesity Among Medical Students in Mysuru: A Cross-Sectional Analytical Study

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## ABSTRACT

**Introduction:** Obesity and overweight represent a growing global epidemic driven by energy imbalances and shifting food landscapes. As future healthcare providers, the health behaviors of medical students are critical, as they directly influence their future capacity to provide effective health promotion and counselling to patients.

**Objectives:** The study aimed to assess the prevalence of overweight and obesity among undergraduate medical students at a government medical college in Mysuru and to identify independent behavioral and familial predictors using the WHO Asia-Pacific BMI criteria.

**Methods:** A cross-sectional analytical study was conducted among 202 medical students selected through stratified random sampling. Data were collected via a validated 20-item self-administered online questionnaire covering lifestyle habits, stress eating, and anthropometric measurements. Statistical analysis, including multivariable logistic regression, was performed using SPSS version 28.0.

**Results:** The overall prevalence of overweight and obesity was 33.2% (15.3% overweight and 17.8% obese). Multivariable analysis identified stress eating as the strongest independent predictor, with affected students having 3.15 times higher odds of being overweight/obese (AOR: 3.15; 95% CI: 1.68–5.89;  $p < 0.001$ ). Family history was also a significant predictor (AOR: 1.98;  $p = 0.034$ ). Physical activity levels and social media usage were not significantly associated with BMI status.

**Conclusion:** One-third of medical students were affected by excess body weight, primarily influenced by psychological factors like stress eating and genetic predisposition. These findings underscore the urgent need for institutional wellness programs focused on stress management and lifestyle modification.

**Keywords:** BMI, India, Medical Students, Public Health, Obesity, Stress Eating.

## INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that could harm one's health. Obesity and overweight are primarily caused by an imbalance in energy between calories consumed and calories burned. One in eight people worldwide suffered from obesity in 2022. Adolescent obesity has quadrupled and adult obesity has more than doubled globally since 1990.<sup>[1]</sup> Excess fat can be linked to a number of morbidities. Allergic airway illness, cancer, degenerative diseases, inflammatory diseases, heart and cerebrovascular diseases, diabetes, infertility, sleep difficulties, and psychiatric morbidities are all made worse by obesity. As a result, the outcomes may be problematic, catastrophic, and even lead to a rise in mortality. Therefore, it is imperative to manage extra fat and maintain body weight.<sup>[2]</sup>

A major contributing factor to the growing obesity epidemic is the shifting food landscape, where processed foods that are high in energy and low in nutrients are heavily advertised, easily accessible, and frequently less expensive than healthy options. It is becoming more widely accepted that the global rise in obesity is also a result of economic goals and policies that support consumption-based growth as well as regulatory policies that support market and trade liberalization.<sup>[3]</sup>

When compared to other students in the college age group, it is believed that medical students are more knowledgeable about good eating and lifestyle practices. Medical students' views toward exercise, sickness prevention, and health promotion are among the most significant predictors of their physical health. Nevertheless, there is no evidence that this knowledge has turned into practice. Since medical students will eventually become doctors, it is even more crucial that they embrace healthy lifestyles. Students who neglect to do so are more likely to fail to provide their patients with opportunities for health promotion.<sup>[4]</sup> A study conducted among medical students in

Kancheepuram showed that 34.1% of students were overweight and 11.6% were obese. Elevated BMI was substantially correlated with high fast-food consumption, frequent late-night eating, and poor fruit intake.<sup>[5]</sup>

Study conducted in central India showed that the Prevalence of overweight and obesity according to WHO classification of BMI, was 14.33% and 3.34% respectively and according to Asia Pacific classification, it was 9.7 % and 17.66 % respectively.<sup>[6]</sup> Although several studies have assessed the prevalence of overweight and obesity among medical students in India, there is limited evidence identifying independent predictors of overweight and obesity using multivariable analytical approaches.

Furthermore, behavioral factors such as stress eating and sedentary lifestyle have not been consistently evaluated in an integrated analytical framework. Through a variety of mechanisms, psychological stress and academic stress has been identified as one of the factors influencing weight growth. Stress-related biological reactions include dysregulation of the HPA axis, altered secretion of numerous biochemicals related to weight (such as cortisol, leptin, ghrelin, and neuropeptide Y), and impaired gastrointestinal function that slows gastric emptying and encourages energy storage. Stress can also have an impact on behaviors like eating more and leading a sedentary lifestyle.<sup>[7]</sup> Stigma experienced due to overweight can lead to negative effects on self-esteem, health, and well-being. These individuals may also be prone to self-stigmatization. Their overall health and well-being are affected due to negative, self-condemning attitudes about themselves.<sup>[8]</sup>

The World Health Organization (WHO) Western Pacific Regional Office has suggested decreasing the BMI cut-off threshold for Asian persons to 23.0 for overweight and 25.0 for obesity. Populations of ethnic Asians experience obesity-related diseases at a substantially lower body mass index (BMI) than those of ethnic Caucasians. There is well

documented evidence of cardiovascular risks at a lower body mass index levels among Asian people, including Indians.<sup>[9]</sup> Given the rising burden of obesity among young adults, the unique lifestyle challenges faced by medical students, and the lack of analytical studies identifying independent determinants, there is a need for a comprehensive assessment of behavioural and familial factors influencing overweight and obesity in this population. It was hypothesized that lifestyle factors such as stress eating, physical inactivity, and increased screen time are independently associated with overweight and obesity among medical students. This study is conducted to assess the prevalence of obesity and overweight among medical students in government medical college at Mysore, based on Asia-Pacific BMI guideline.

## **MATERIALS & METHODS**

### **Participants and procedure**

A cross-sectional questionnaire-based study was conducted to evaluate the prevalence of overweight and obesity and their associated factors among students in a government medical college at Mysore, India.

### **Sample size estimation**

Study conducted by Chauhan A et al <sup>[10]</sup> at Uttarakhand medical college showed that the prevalence of overweight and obesity among medical students is 54%.

Sample size is calculated by the formula:

$$N = Z^2 \alpha^2 PQ / d^2$$

Where N is the sample size,

$Z \alpha = 1.96$  at 95% confidence interval

$P = 54\%$ ; proportion of students who are overweight

$d = 7\%$

Therefore,  $N = 195$ .

Final sample size obtained was 202.

Stratified sampling technique was used. Equal number of students were selected from each year of study by simple random sampling.

50 students each were selected from 1<sup>st</sup> and 2<sup>nd</sup> year while 51 students each were selected from 3<sup>rd</sup> and final year.

The study was conducted online by sending the google form link to the participants as a personal invitation with detailed information of the study. One time only link was attached to the form so that duplicate entries could be avoided. The participant was giving informed consent electronically after reading the detailed information by clicking on agreeing to participate.

### **Ethics**

The study involved a minimal-risk anonymous questionnaire-based survey among adult medical students. Participation was entirely voluntary, and informed consent was obtained from all participants prior to data collection. No invasive procedures or interventions were performed, and confidentiality of participant information was maintained throughout the study. Personal identifiers were not collected.

Formal Institutional Ethics Committee approval was not obtained prior to commencement of the study. The investigators acknowledge this limitation and affirm that the study was conducted in accordance with the principles of voluntary participation, confidentiality, and the ethical standards outlined in the Declaration of Helsinki.

### **Research instrument**

The interview questions were formulated based on an extensive review of the literature and discussions with colleagues and obesity research experts. This approach facilitated and ensured the validity of the survey. The questionnaire was in English. In the second phase, all questions were checked to ensure issues related to health behaviors that contribute to obesity and overweight were included in the survey. A pilot study of 30 students was commenced to check language simplicity and question understandability. The survey instrument comprised 20 items with a closed-ended

response format. The questionnaire was anonymous, confidential, and self-administered. It comprised of health-related behaviors that contribute to obesity and overweight: sociodemographic information; dietary behaviors, physical activity profile information, stress eating habits, time spend on social media, factors related to obesity like genetic, socioeconomic, metabolic factors, lifestyle choices and anthropometric measurements such as weight, height, and BMI measurements. The internal consistency of the questionnaire was assessed using Cronbach's alpha and was found to have acceptable reliability.

BMI was categorized according to WHO Asia-Pacific guidelines.

### Statistical Analysis

Data analysis was done by using IBM Statistical Package for the Social Sciences (SPSS) Version 28.0 statistical software. Descriptive statistics were expressed as frequencies and percentages. Chi-square test was used for bivariate analysis. Overweight/obesity ( $BMI \geq 23$ ) was taken as the dependent variable for regression analysis. Variables with  $p < 0.2$  were included in multivariable logistic regression to identify independent predictors. Adjusted Odds Ratios (AOR) with 95% Confidence Intervals were calculated. A  $p$ -value  $< 0.05$  was considered statistically significant.

### RESULT

A total of 202 undergraduate medical students participated in the study. Most participants were aged between 19 and 22 years.

#### Prevalence of overweight and obesity

Based on the WHO Asia-Pacific BMI classification, 66.8% ( $n = 135$ ) of students had normal BMI, while 33.2% ( $n = 67$ ) were either overweight or obese. The prevalence of overweight and obesity was 15.3% ( $n = 31$ ) and 17.8% ( $n = 36$ ), respectively (Table 1).

#### Association between lifestyle factors and overweight/obesity

The association between selected lifestyle factors and overweight/obesity is shown in Table 2.

A significantly higher proportion of students with stress eating behavior were overweight or obese (52.8%) compared to those without stress eating (26.2%) ( $p < 0.001$ ). Similarly, students with a family history of overweight had a higher prevalence of overweight/obesity (44.4%) compared to those without such history (26.9%) ( $p = 0.039$ ).

However, no statistically significant association was observed between regular physical activity and overweight/obesity ( $p = 0.426$ ).

#### Social media usage pattern

The distribution of time spent on social media among participants is depicted in Figure 1. Most students (86.6%) reported spending more than one hour daily on social media, with 39.1% spending more than 2 hours per day.

#### Independent predictors of overweight/obesity

Multivariable logistic regression analysis was performed to identify independent predictors of overweight/obesity (Table 4).

After adjusting for confounding variables, stress eating emerged as the strongest independent predictor, with students having stress eating behavior showing 3.15 times higher odds of being overweight or obese (AOR: 3.15; 95% CI: 1.68–5.89;  $p < 0.001$ ). Family history of overweight was also found to be a significant predictor (AOR: 1.98; 95% CI: 1.05–3.74;  $p = 0.034$ ).

In contrast, regular physical activity (AOR: 1.21;  $p = 0.426$ ) and time spent on social media greater than 2 hours per day (AOR: 1.29;  $p = 0.382$ ) were not significantly associated with overweight/obesity.

### Correlation between BMI and social media usage

Correlation analysis between BMI and duration of social media use is presented in

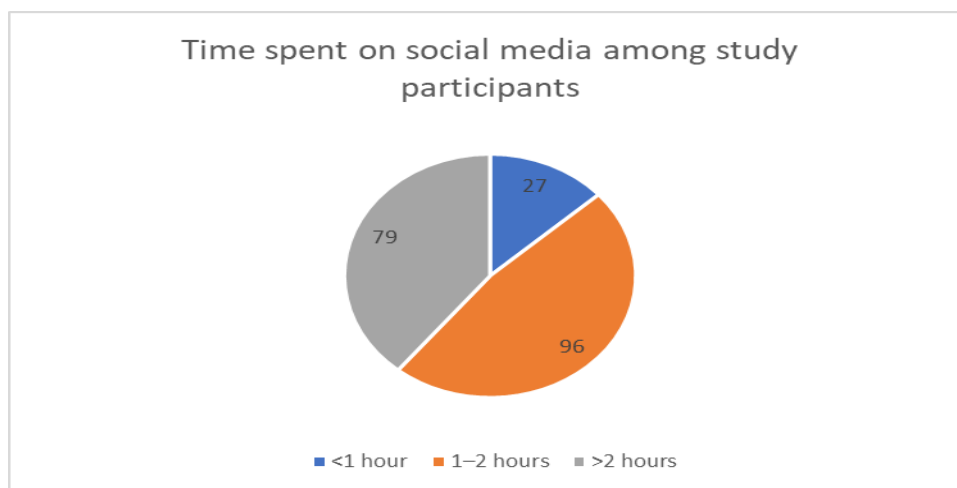
Table 5. A weak positive correlation was observed ( $r = 0.12$ ), which was not statistically significant ( $p = 0.09$ )

**Table 1: Distribution of BMI categories among study participants (n = 202)**

BMI Category (Asia-Pacific)	Frequency (n)	Percentage (%)
Normal (18–22.9)	135	66.8
Overweight (23–24.9)	31	15.3
Obese ( $\geq 25$ )	36	17.8

**Table 2: Association between selected lifestyle factors and overweight/obesity (BMI  $\geq 23$ )**

Variable	Category	Overweight/Obese n (%)	Normal n (%)	p-value
Stress eating	Yes	28 (52.8)	25 (47.2)	<0.001
	No	39 (26.2)	110 (73.8)	
Family history of overweight	Yes	32 (44.4)	40 (55.6)	0.039
	No	35 (26.9)	95 (73.1)	
Regular exercise	Yes	34 (31.2)	75 (68.8)	0.426
	No	33 (35.5)	60 (64.5)	



**Fig 1: Time spent on social media among study participants**

**Table 4: Multivariable logistic regression analysis for predictors of overweight/obesity**

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Stress eating (Yes)	3.15	1.68 – 5.89	<0.001
Family history (Yes)	1.98	1.05 – 3.74	0.034
Regular exercise (No)	1.21	0.66 – 2.23	0.426
Social media (>2 hrs)	1.29	0.72 – 2.31	0.382

**Table 5: Correlation between BMI and duration of social media use**

Variables	Correlation coefficient (r)	p-value
BMI vs social media hours	0.12	0.09

## DISCUSSION

The present study found that one-third of medical students were either overweight or obese, indicating a substantial burden of excess weight in this population. On multivariable logistic regression analysis, stress eating emerged as the strongest independent predictor, with students having

stress eating behavior showing more than three times higher odds of being overweight or obese (AOR: 3.15; 95% CI: 1.68–5.89). Family history was also found to be a significant predictor (AOR: 1.98; 95% CI: 1.05–3.74), whereas physical activity and screen time were not independently associated after adjustment for confounders.

The prevalence of obesity in this study was quite high compared to other studies conducted by Anupama et al at a medical college in Tumkur, where the prevalence of overweight was 14.5% and obesity was 1.5%.<sup>[11]</sup> In contrast to the present study, a study conducted among medical students reported a higher prevalence of overweight (36.8%) and a lower prevalence of obesity (11.1%), with a greater proportion observed among males compared to females.<sup>[12]</sup> The variation in prevalence across studies may be attributed to differences in study settings, dietary patterns, and the use of different BMI classification criteria.

In the present study, family history was found to be a significant predictor of overweight and obesity, which is consistent with findings from previous studies conducted by Anupama et al., Baruah et al., and Kalasker et al., all of which demonstrated a similar association.<sup>[11,13-14]</sup> This relationship may be explained by a combination of genetic predisposition and shared familial lifestyle factors, including dietary habits and physical activity patterns. In contrast, no significant association was observed between physical activity and BMI in the present study. Similar findings have been reported by Anupama et al. and Deotale et al., suggesting that self-reported physical activity may not accurately reflect actual energy expenditure.<sup>[11,15]</sup> However, other studies have demonstrated a significant inverse relationship between physical activity and BMI, indicating that the intensity, duration, and consistency of physical activity may play a crucial role in influencing body weight.

Furthermore, stress eating was found to be significantly associated with higher BMI in the present study and emerged as the strongest independent predictor. This finding is supported by the study conducted by Moustafa Alhashemi et al., where a substantial proportion of participants reported stress eating behavior, which was significantly associated with increased BMI.<sup>[16]</sup> This highlights the critical role of behavioral and psychological factors in the

development of obesity among medical students.

In the present study, a weak positive correlation was observed between BMI and duration of social media use; however, this was not statistically significant. This suggests that increased screen time alone may not directly influence BMI, and its effect may be mediated through other behavioral factors such as dietary habits and sleep patterns.

Overall, the findings suggest that behavioral factors, particularly stress-related eating patterns, play a more significant role in influencing BMI among medical students than individual lifestyle factors such as physical activity or screen time when considered independently.

Since data were collected via an online questionnaire, anthropometric measurements (height and weight) were self-reported, which may lead to underestimation or overestimation of BMI compared to clinical measurements. Also, the study was conducted at a single government medical college in Mysuru, so results might differ in private institutions or other geographical regions.

## CONCLUSION

Overweight and obesity are prevalent among medical students, with one-third of participants affected in the present study. Stress eating and family history were identified as significant independent predictors, highlighting the important role of behavioral and familial factors. The findings of this study underscore the need for institutional-level interventions focusing on stress management, healthy dietary practices, and lifestyle modification among medical students. Incorporating wellness programs, mental health support, and structured opportunities for physical activity within medical colleges may help reduce the burden of obesity in this population.

### *Declaration by Authors*

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**Conflict of Interest:** The authors declare no conflict of interest.

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