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ASSESSMENT OF LIFESTYLE FACTORS INFLUENCING BODY MASS INDEX AMONG UNDERGRADUATE MBBS STUDENTS IN URBAN UNIVERSITIES

Original Article

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Short Title: Lifestyle Factors Influencing BMI in MBBS Students

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Abstract

Background: Body mass index (BMI) serves as an important measure of overall nutritional condition and a useful predictor of later metabolic complications. Students in universities, particularly those engaged in rigorous medical training, are especially prone to adopting poor lifestyle practices that may alter their BMI. The demanding academic load often brings stress, erratic eating schedules, lack of physical activity, and insufficient sleep, all of which contribute to overweight and obesity. Gaining insight into how daily lifestyle patterns interact with BMI is crucial for designing effective health-focused strategies.

Objective: To evaluate the association of dietary habits, physical activity, and daily routines with BMI among undergraduate MBBS students in urban universities.

Methods: This four-month cross-sectional study involved 377 medical (MBBS) students from city-based universities in Lahore, Pakistan, selected via stratified random sampling. Using a structured questionnaire, information was gathered on their diet, physical activity levels (measured with the Global Physical Activity Questionnaire), sleep patterns, and screen use. Body Mass Index (BMI) was calculated following WHO standards. The data were analyzed in SPSS version 26, employing independent t-tests and ANOVA to examine links between these lifestyle factors and BMI, with statistical significance set at $p<0.05$.

Results: The mean BMI of participants was 22.8 ± 3.7 kg/m², with 59.9% in the normal range, 19.1% overweight, 9.8% obese, and 11.1% underweight. Frequent fast-food consumption and high screen time were positively associated with higher BMI ($p=0.01$), while regular breakfast and moderate-to-high physical activity were protective against overweight ($p=0.02$ and $p<0.001$, respectively). Inadequate sleep was also linked to elevated BMI ($p<0.05$).

Conclusion: Lifestyle factors such as diet quality, physical activity, sleep, and screen exposure significantly influenced BMI among MBBS students. Early interventions promoting healthy eating, regular exercise, and balanced routines are critical to preventing overweight and obesity in future healthcare professionals.

Keywords: Body Mass Index, Cross-Sectional Studies, Diet, Lifestyle, Medical Students, Obesity, Physical Activity, Sleep.

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Introduction

Body mass index (BMI) is a widely recognized indicator of nutritional status and a key measure for assessing the risk of metabolic and cardiovascular diseases (1). In recent years, the prevalence of overweight and obesity has risen sharply among young adults, including university students, due to changes in lifestyle patterns and dietary habits. Medical students, despite their knowledge of health and disease, are not immune to these trends (2). The demanding nature of medical education, combined with irregular schedules, high academic pressure, and limited time for self-care, creates an environment that can negatively influence eating behaviors, physical activity levels, and overall lifestyle balance (3). As future healthcare providers, the health behaviors of medical students not only impact their personal well-being but also shape their credibility and effectiveness in counseling patients about healthy living (4). Urban universities present unique challenges and opportunities that may influence lifestyle behaviors. Rapid urbanization has led to increased availability of fast food, sedentary entertainment options, and reliance on motorized transport, all of which contribute to unhealthy weight gain (5). Simultaneously, urban environments may also provide access to recreational facilities and diverse dietary options, offering opportunities for healthier choices (6). Among medical students, however, the long hours spent in lectures, clinical rotations, and exam preparation often result in inadequate physical activity, reliance on calorie-dense foods, and disrupted sleep cycles (7). Studies conducted in South Asia and other developing regions have highlighted a concerning pattern of overweight and obesity in this population, with prevalence rates ranging from 20% to 35% depending on the setting (8). These findings underscore the complex interplay of behavioral, environmental, and cultural factors that shape BMI in young adults.

Dietary practices play a central role in determining body weight and composition (9). Skipping meals, frequent snacking on processed foods, and excessive consumption of sugary beverages are common habits observed among students experiencing academic stress. Irregular meal timing, particularly late-night eating, has been associated with increased adiposity and metabolic dysregulation (10). Similarly, inadequate intake of fruits, vegetables, and high-fiber foods contributes to an imbalance in energy consumption and expenditure. Physical activity is another critical determinant of BMI. Despite widespread knowledge of its benefits, medical students often struggle to meet recommended activity levels, citing lack of time, fatigue, and academic commitments as barriers. The combination of poor dietary habits and insufficient exercise creates a high-risk environment for gradual weight gain and related health complications. Daily routines, including sleep patterns and study habits, also influence metabolic health (11). Sleep deprivation, a common issue during exam periods and clinical postings, has been linked to hormonal changes that increase appetite and promote fat storage. Furthermore, excessive screen time and sedentary behavior reduce overall energy expenditure, compounding the effects of poor diet and physical inactivity. The cumulative impact of these factors highlights the importance of adopting a holistic approach to understanding BMI among medical students, one that considers not only diet and exercise but also the broader lifestyle context.

While previous research has examined obesity and lifestyle factors in general university populations, there remains a need to focus specifically on medical students in urban Pakistani universities. Cultural dietary preferences, social norms, and environmental influences differ from those in Western settings, making local data essential for effective health promotion strategies. Moreover, as future physicians, medical students serve as role models for their patients and communities. Their personal health practices can influence their attitudes toward preventive medicine and their ability to counsel patients about nutrition and exercise. This study aims to evaluate the relationship between lifestyle factors and body mass index among undergraduate MBBS students in urban universities. By examining dietary habits, physical activity levels, and daily routines, the research seeks to identify modifiable behaviors that contribute to underweight, normal, overweight, or obese categories. The objective is to generate evidence that will inform targeted interventions and health education programs designed to promote healthy lifestyles among medical students, ultimately fostering a culture of wellness within the medical profession.

Methods

This descriptive cross-sectional study was conducted over a period of four months in two major urban universities of Lahore to assess the association between lifestyle factors and body mass index (BMI) among undergraduate MBBS students. The study population consisted of currently enrolled students from first to final year of the MBBS program. The sample size was calculated using the World Health Organization sample size calculator for prevalence studies, assuming a 30% estimated prevalence of

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overweight or obesity based on recent regional literature, a 95% confidence level, and a 5% margin of error. The minimum required sample size was determined to be 380, and to account for possible non-response, 420 students were invited to participate through stratified random sampling proportional to the size of each academic year. All students aged 18 to 25 years who were currently registered in the MBBS program and willing to provide written informed consent were eligible for inclusion. Students with known chronic medical conditions such as thyroid disorders, diabetes mellitus, or other metabolic diseases that could independently affect BMI were excluded. Those on long-term medications influencing weight, such as corticosteroids or antidepressants, were also excluded to reduce confounding. Recruitment was carried out through announcements in lecture halls and student groups, and participation was voluntary with no academic incentives.

Data were collected using a structured and validated questionnaire focusing on diet, physical activity, and daily habits. Dietary patterns were evaluated with a modified WHO-based food frequency questionnaire, capturing daily meal counts, consumption of fruits, vegetables, fast food, sugary drinks, and late-night snacks. Physical activity was measured with the International Physical Activity Questionnaire (short form), which recorded the duration and intensity of weekly activities to categorize participants into low, moderate, or high activity levels. Additional lifestyle factors like sleep, screen time, study hours, and meal regularity were also assessed. Trained staff followed standard protocols to measure body weight and height precisely, from which BMI was calculated. Participants were then classified into WHO Asian BMI categories: underweight, normal, overweight, or obese. To ensure data quality, measurements were taken in light clothing without shoes, questionnaires were administered in English under supervision, and confidentiality was maintained through coded, secure files. The study received ethical approval from the participating universities, and written consent was obtained from all students beforehand.

The collected data were processed and analyzed using SPSS version 26. Continuous factors including age, BMI, MET scores, and sleep duration were described as means along with standard deviations, while categorical factors such as gender, eating behaviors, activity levels, and BMI groupings were summarized in terms of frequencies and percentages. The normality of continuous data was checked through the Shapiro–Wilk test and histogram inspection, which confirmed approximate normal distribution for most variables. For comparisons of mean BMI across categories of diet frequency, activity level, and sleep patterns, independent sample t-tests and one-way ANOVA were applied. Associations between categorical lifestyle indicators and BMI groups were examined using chi-square analysis. Pearson's correlation was carried out to assess relationships among continuous factors such as study hours, MET values, and BMI. Additionally, a multiple linear regression model was developed to determine independent predictors of BMI, controlling for variables including age, sex, and living arrangement (hostel versus day scholar). A significance threshold of $p < 0.05$ was used for all analyses. This methodological approach allowed for accurate assessment of lifestyle influences on BMI among medical students. The use of validated tools, standardized anthropometric techniques, and rigorous statistical procedures ensured reliable outcomes, minimized potential bias, and strengthened reproducibility.

Results

The study successfully involved 377 undergraduate medical (MBBS) students, achieving a high response rate of 94.3%. Participants had an average age of 21.1 years (±1.8) and a nearly equal gender split, with 178 males (47.2%) and 199 females (52.8%). Students from all five academic years were included, with the largest groups coming from the second (25.1%) and third years (24.3%). Just over half (50.7%) lived off-campus as day scholars, while 49.3% resided in university hostels. The average Body Mass Index (BMI) for the group was 22.8 kg/m² (±3.7). According to WHO standards, most students (59.9%) fell into the normal weight category. The remainder were classified as overweight (19.1%), obese (9.8%), or underweight (11.1%). A closer look showed that a higher combined percentage of overweight and obesity was seen in male students (34.8%) compared to females (25.6%). No significant difference in average BMI was found across the different years of study ($p = 0.13$). The overall spread of these BMI categories is displayed in Figure 1.

Dietary behavior analysis showed that regular breakfast consumption was reported by 289 students (76.7%). Only 134 students (35.5%) achieved the recommended daily intake of five or more servings of fruits and vegetables. Frequent fast-food consumption (≥3 times per week) was noted among 156 students (41.4%), and 102 students (27.1%) consumed sugary drinks at least five times per week (Table 3). Higher fast-food intake was associated with elevated BMI ($p = 0.01$), whereas regular breakfast was inversely

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associated with overweight status (p = 0.02). Physical activity levels indicated that 98 participants (26.0%) reported low activity, 183 (48.5%) engaged in moderate activity, and 96 (25.5%) maintained high activity levels (Table 4). Figure 2 presents the proportional distribution of physical activity levels. Low physical activity was significantly more prevalent among students classified as overweight or obese compared to those with normal BMI ($p < 0.001$). Lifestyle routines further revealed that 157 students (41.6%) reported sleeping less than six hours per night, and 204 students (54.1%) reported screen time exceeding four hours per day (Table 5). Both insufficient sleep and prolonged screen exposure demonstrated positive associations with higher BMI ($p < 0.05$ for both variables). No significant differences in sleep duration were observed between hostel residents and day scholars. Overall, these findings underscore a multifactorial pattern in which dietary habits, physical activity, and daily routines collectively influence BMI among MBBS students. Regular breakfast consumption and moderate-to-high physical activity emerged as protective factors against overweight and obesity, while frequent fast-food intake, insufficient sleep, and prolonged screen time were associated with increased BMI.

Table 1: Demographic characteristics of participants (n = 377)

Variable	***Category***	***n (%)***
Age (years)	Mean ± SD	21.1 ± 1.8
Gender	Male	178 (47.2)
	Female	199 (52.8)
Year of Study	First	65 (17.2)
	Second	95 (25.1)
	Third	92 (24.3)
	Fourth	71 (18.8)
	Final	54 (14.3)
Residence	Hostel	186 (49.3)
	Day Scholar	191 (50.7)

Table 2: Distribution of BMI categories

BMI Category	***n (%)***
Underweight (<18.5 kg/m²)	42 (11.1)
Normal (18.5–24.9 kg/m²)	226 (59.9)
Overweight (25–29.9 kg/m²)	72 (19.1)
Obese (≥30 kg/m²)	37 (9.8)
Mean BMI (kg/m²)	22.8 ± 3.7

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Table 3: Dietary patterns among participants

Dietary Variable	*n (%)*
Regular breakfast consumption	289 (76.7)
≥5 servings fruits/vegetables daily	134 (35.5)
Fast-food ≥3 times/week	156 (41.4)
Sugary drinks ≥5 times/week	102 (27.1)

Table 4: Physical activity levels

Activity Level	*n (%)*
Low	98 (26.0)
Moderate	183 (48.5)
High	96 (25.5)

Table 5: Sleep duration and screen time

Variable	*n (%)*
Sleep <6 hours/night	157 (41.6)
Screen time >4 hours/day	204 (54.1)

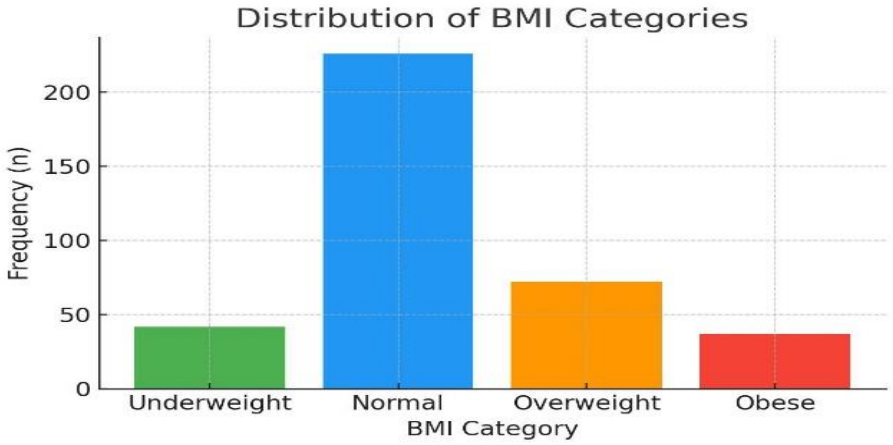

Figure 1 Distribution of BMI Categories

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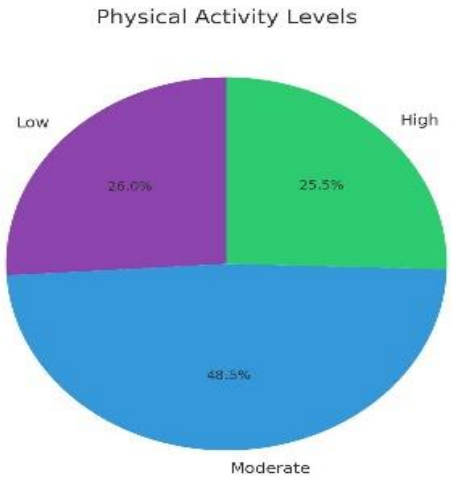

Figure 2 Physical Activity Level

Discussion

The present study provided a comprehensive assessment of lifestyle factors influencing body mass index among undergraduate MBBS students in an urban university setting (12). The findings highlighted a predominance of normal BMI but revealed a considerable proportion of overweight and obesity, emphasizing the early emergence of weight-related health risks within this population. The association of dietary habits, physical activity levels, sleep duration, and screen time with BMI reflects the multifactorial determinants of body composition and underscores the need for integrated health promotion strategies (13). The observed prevalence of overweight and obesity aligned with global reports of rising weight-related concerns among medical students, particularly in South Asian contexts where urbanization and academic stress contribute to sedentary behaviors and poor dietary practices (14). The protective role of regular breakfast consumption and the inverse relationship between moderate-to-high physical activity and elevated BMI supported previous evidence that consistent meal patterns and adequate physical engagement mitigate weight gain. Similar findings have been documented in cross-sectional studies conducted in India and Malaysia, where medical students with regular breakfast habits and at least moderate physical activity demonstrated significantly lower BMI (15). The association of frequent fast-food intake, prolonged screen time, and insufficient sleep with higher BMI further confirmed the influence of modern lifestyle behaviors described in earlier literature on young adults. The present findings strengthen the argument that medical students, despite their theoretical knowledge of health, remain vulnerable to unhealthy patterns during demanding academic schedules.

These results carry meaningful implications for health promotion in medical education. The coexistence of knowledge and risky behavior calls for targeted interventions within universities to foster healthy dietary habits, structured physical activity, and sleep hygiene. Institutional support, including accessible healthy meal options, student counseling, and organized sports programs, may help counteract the high demands of medical curricula that often limit opportunities for self-care (16). The data also suggest that lifestyle education must extend beyond theoretical instruction and include practical, habit-forming initiatives to improve long-term outcomes. The study possessed several strengths, including a robust sample size, validated measurement tools, and the use of standardized BMI classification to ensure comparability with global data (17). The inclusion of diverse lifestyle variables allowed for a nuanced analysis of interacting factors affecting BMI (18). Furthermore, the high response rate enhanced the representativeness of the findings within the targeted student population.

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Several limitations should be noted. The study's cross-sectional nature means we cannot establish cause-and-effect relationships, and depending on students' own reports of diet and activity could lead to memory or social desirability biases. Furthermore, focusing only on urban universities may mean the findings do not fully apply to students in rural areas or from other fields of study. Unmeasured factors, like seasonal changes in habits, might have also affected the outcomes. Future work would benefit from longer-term studies to track changes and test interventions, as well as comparisons between medical students and their peers in other disciplines to understand program-specific pressures. Even with these constraints, this research offers valuable insights into how lifestyle factors collectively influence the weight status of tomorrow's doctors. It underscores the need for medical schools to actively foster student wellness, which is crucial both for their personal health and their future role as credible health advocates.

Conclusion

This study demonstrated that BMI among MBBS students was significantly influenced by diet, physical activity, sleep, and screen time, with unhealthy habits contributing to overweight and obesity despite widespread health knowledge. These findings call for university-level interventions and sustained health education programs to promote balanced nutrition, regular physical activity, and adequate rest among medical students, ultimately fostering healthier lifestyles and better long-term health outcomes.

Author Contributions

Author	Contribution
Vaneeza Iftikhar[1]*	Designed the study, performed data collection and analysis, and prepared the manuscript. Approved the final draft for submission.
Anees Rafique[2]	Contributed to study design, data acquisition, interpretation of findings, and performed critical review and editing of the manuscript. Approved the final draft for submission.

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