JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

Vol. 4 Issue 6, 2026
Open Access | DOI: 10.61919/9hx62151

Original Article

Prevalence of Sedentary Behaviour and Its Association with Body Mass Index (BMI) Among the Undergraduate Students

Alisha Afzal[1], Ayesha Younis[1], Ayesha Atif[1], Dr. Muhammad Saad Shafique[2], Amreen Shabbir[3], Dr. Jassia Ramzan[3], Dr. Ibraheem Zafar[4]

[1] Mohi-ud-din Institute of Rehabilitation Sciences, Mohi-ud-din Islamic University, Mirpur, Pakistan.
[2] Assistant Professor, Mohi-ud-din Institute of Rehabilitation Sciences, Mohi-ud-din Islamic University, Mirpur, Pakistan.
[3] Lecturer, Mohi-ud-din Institute of Rehabilitation Sciences, Mohi-ud-din Islamic University, Mirpur, Pakistan.
[4] Associate Professor, Mohi-ud-din Institute of Rehabilitation Sciences, Mohi-ud-din Islamic University, Mirpur, Pakistan.

✉ **Correspondence:** Alisha Afzal, alishaafzal7866@gmail.com

Received: 21 February 2025 **Revised:** 28 February 2025 **Accepted:** 06 March 2026 **Published:** 30 March 2026

HOW TO CITE

Alisha Afzal et al. 2026. Prevalence of Sedentary Behaviour and Its Association with Body Mass Index (BMI) Among the Undergraduate Students. Journal of Health, Wellness and Community Research. 4, 6 (Mar. 2026), 1–7. DOI:https://doi.org/10.61919/9hx62151

ARTICLE INFORMATION

Author Contributions	Concept: AA, MSS; Design: AA, MSS, IZ; Data Collection: AA, AY, AAT; Analysis: MSS, AS, JR; Drafting: AA, AY, AAT, MSS, AS, JR, IZ
Ethical Approval	The study was approved by research ethical board of Mohi-ud-din Islamic University, Mirpur, Pakistan
Informed Consent	Written informed consent was obtained from all participants
Conflict of Interest	The authors declare no conflict of interest.
Funding	No external funding.
Data Availability	Available from the corresponding author on reasonable request.
AI Declaration	No generative AI was used for conceptualization, analysis, or content generation. AI use was limited to language refinement, and the authors remain fully responsible for the accuracy, originality, validity, and integrity of the manuscript's content.

ABSTRACT

Background: Sedentary behaviour is common among university students and may contribute to adverse health outcomes, although its relationship with body mass index remains inconsistent. Objective: To determine the prevalence of sedentary behaviour and assess its association with BMI categories among undergraduate students in Mirpur, Azad Jammu and Kashmir. Methods: This analytical cross-sectional study was conducted over six months in 2025 at three universities. Students aged 18–26 years were recruited through convenience sampling. Of 266 students assessed, 10 met the exclusion criteria, leaving 256 for analysis. Sedentary behaviour was assessed using the Sedentary Behavior Questionnaire and categorized as low, moderate, or high. Height and weight were recorded to calculate and classify BMI. Data were analyzed using descriptive statistics and Pearson's chi-square test in IBM SPSS Statistics version 27. Results: Among the analyzed participants, 101 (39.5%; 95% CI 33.7%–45.6%) had low, 89 (34.8%; 95% CI 29.2%–40.8%) had moderate, and 66 (25.8%; 95% CI 20.8%–31.5%) had high sedentary behaviour. Overall, 155 (60.5%; 95% CI 54.4%–66.3%) had moderate or high sedentary behaviour. Sedentary-behaviour category was not associated with BMI category, $\chi^2(10) = 4.377$, $p = 0.929$; Cramér's $V = 0.092$. Conclusion: Moderate or high sedentary behaviour was common, but no unadjusted cross-sectional association with BMI category was identified. Keywords: Body mass index; cross-sectional study; sedentary behaviour; undergraduate students; university students.

INTRODUCTION

Sedentary behaviour refers to walking activities performed while sitting, reclining, or lying with an energy expenditure of 1.5 metabolic equivalents or less. It is conceptually distinct from physical inactivity because an individual may meet recommended physical activity levels while still accumulating prolonged periods of sedentary time. Extended sedentary behaviour has been associated with impaired glucose and lipid metabolism, increased

adiposity, adverse cardiometabolic health, and other unfavorable health outcomes (1). Prolonged sitting has also been associated with an increased risk of all-cause mortality, although the magnitude of this relationship may be influenced by physical activity level and underlying health status (2,3).

Undergraduate students may be particularly susceptible to sedentary behaviour because academic activities commonly involve prolonged classroom attendance, studying, computer use, screen-based recreation, and transportation while sitting. A scoping review of university students identified sedentary behaviour as an important component of student lifestyle and emphasized its relationship with physical activity, stress, and other health-related behaviours (4). Sedentary behaviour and inadequate physical activity have also been associated with poorer quality of life among university students (5). In Saudi Arabia, a substantial burden of sedentary behaviour has been documented among university students using the Sedentary Behavior Questionnaire, indicating that prolonged sedentary time is an important concern among young adults in university settings (6).

Body mass index is a commonly used anthropometric indicator for classifying weight status and monitoring population-level risks related to underweight, overweight, and obesity. However, the relationship between sedentary behaviour and BMI among students remains uncertain. Some studies have reported that sedentary behaviour, unhealthy lifestyle practices, and screen-based activities are associated with higher BMI or overweight and obesity among students and younger populations (7–10). These relationships may be influenced by the type of sedentary activity assessed, physical activity, dietary behaviour, sleep, sex, age, and other sociodemographic or metabolic factors. Consequently, differences in study populations, measurement methods, and control of potential confounders may contribute to inconsistent findings across studies.

Although international evidence demonstrates that sedentary behaviour is common among students, its prevalence and relationship with BMI have not been established among undergraduate students at the selected universities in Mirpur, Azad Jammu and Kashmir. Local investigation is important because academic environments, programme requirements, transportation patterns, recreational opportunities, and student characteristics may influence sedentary time. Examining both the distribution of sedentary behaviour and its association with BMI can provide baseline evidence for future student-health research and appropriately targeted health-promotion initiatives. However, because the present investigation uses a cross-sectional design, it can identify an association but cannot establish temporal or causal relationships.

Therefore, this analytical cross-sectional study aimed to determine the prevalence of sedentary behaviour and assess its association with BMI categories among undergraduate students enrolled at selected universities in Mirpur, Azad Jammu and Kashmir.

MATERIALS AND METHODS

An analytical cross-sectional study with a prevalence component was conducted over six months in 2025 following approval from the Ethical Review Committee of the Mohi-ud-Din Institute of Rehabilitation Sciences. The study was designed to estimate the prevalence of sedentary behaviour and examine its cross-sectional association with body mass index among undergraduate students. Participants were recruited from Mohi-ud-Din Islamic University, Mirpur Campus; Mirpur University of Science and Technology; and Mirpur Institute of Medical Sciences in Mirpur, Azad Jammu and Kashmir. The target population comprised male and female undergraduate students enrolled in any academic department or semester at the participating institutions.

Students aged 18–26 years who were enrolled in an undergraduate programme and provided informed consent were eligible to participate. Students with musculoskeletal disorders, including fractures or arthritis, or eating disorders, including anorexia nervosa or bulimia nervosa, were excluded. Participants were selected through non-probability convenience sampling according to these eligibility criteria. A total of 266 students were assessed, of whom three were excluded because of musculoskeletal disorders, six because of eating disorders, and one because of both conditions. Consequently, 256 eligible participants were included in the final analysis.

The required sample size was estimated using the Raosoft sample-size calculator for a target undergraduate population of 13,087 students, a 5% margin of error, and a 90% confidence level, resulting in an estimated sample requirement of 266 participants. Recruitment was undertaken at the three participating institutions until the planned sample had been assessed. Before data collection, eligible students were informed about the study and

provided consent to participate. Participant privacy and the confidentiality of the collected information were maintained throughout the study.

Sedentary behaviour was assessed using the Sedentary Behavior Questionnaire, a self-report instrument that measures time spent in common sedentary activities on weekdays and weekends (11). Responses were used to calculate total sedentary time in hours per week. For the present analysis, total sedentary behaviour was categorized as low when reported sedentary time was less than 28 hours per week, moderate when it was 28–56 hours per week, and high when it exceeded 56 hours per week. The prevalence of sedentary behaviour was determined from the number and proportion of participants classified in each category. Moderate and high categories were also combined to describe the proportion of participants reporting at least 28 hours of sedentary behaviour per week.

Height and weight values were recorded for each participant and used to calculate BMI as weight in kilograms divided by height in metres squared. BMI was classified as underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), obesity class I (30.0–34.9 kg/m^2), obesity class II (35.0–39.9 kg/m^2), or obesity class III (≥40.0 kg/m^2). Sedentary-behaviour category was treated as the exposure variable, while BMI category was treated as the outcome variable for the association analysis. Age, sex, university, degree programme, academic year, and marital status were recorded to characterize the sample. The analysis did not include covariate adjustment for demographic, dietary, physical-activity, or other potential confounding factors.

Data were analyzed using IBM SPSS Statistics version 27. Continuous participant characteristics were summarized using means and standard deviations, while categorical variables were summarized using frequencies and percentages. The prevalence of each sedentary-behaviour category was calculated using the 256 eligible participants included in the analysis. A cross-tabulation of sedentary-behaviour category and BMI category was constructed, and their unadjusted association was examined using Pearson's chi-square test. Statistical significance was evaluated using a two-sided significance threshold of $p < 0.10$, and exact p-values were reported where available. No subgroup, multivariable, or adjusted analyses were undertaken.

The study was conducted following approval from the Ethical Review Committee of the Mohi-ud-Din Institute of Rehabilitation Sciences. Informed consent was obtained before participation, and the privacy and confidentiality of participant information were maintained during data collection and analysis.

RESULTS

Of the 266 students assessed for eligibility, 10 (3.8%) were excluded: three had a musculoskeletal disorder, six had an eating disorder, and one had both conditions. The final analytical sample therefore comprised 256 participants. Among all students assessed, the mean age was 21.24 ± 1.91 years, mean height was 1.62 ± 0.10 m, and mean weight was 64.44 ± 17.07 kg. Most were female (215/266, 80.8%), single (252/266, 94.7%), enrolled at MIU (190/266, 71.4%), and studying in the DPT programme (174/266, 65.4%).

Among the 256 participants included in the analysis, 101 (39.5%; 95% CI 33.7%–45.6%) had low sedentary behaviour, 89 (34.8%; 95% CI 29.2%–40.8%) had moderate sedentary behaviour, and 66 (25.8%; 95% CI 20.8%–31.5%) had high sedentary behaviour. Overall, 155 participants (60.5%; 95% CI 54.4%–66.3%) were classified in the combined moderate or high sedentary-behaviour categories.

Regarding BMI, 121 participants (47.3%) had normal weight, 46 (18.0%) were underweight, and 43 (16.8%) were overweight. The remaining 46 participants (18.0%) were classified as having obesity class I, II, or III. The proportion with normal weight was 50.5% in the low, 49.4% in the moderate, and 39.4% in the high sedentary-behaviour categories.

Table 1. Characteristics of students assessed for eligibility (N = 266)

Characteristic	Category	n (%) or mean ± SD
Age, years	—	21.24 ± 1.91
Height, m	—	1.62 ± 0.10
Weight, kg	—	64.44 ± 17.07
University	MIU	190 (71.4)
	MUST	59 (22.2)

Characteristic	Category	n (%) or mean ± SD
	MIMS	17 (6.4)
Degree programme	DPT	174 (65.4)
	D Pharm	27 (10.2)
	Psychology	21 (7.9)
	MBBS	13 (4.9)
	HND	20 (7.5)
	MLT	11 (4.1)
Academic year	First year	61 (22.9)
	Second year	38 (14.3)
	Third year	58 (21.8)
	Fourth year	72 (27.1)
	Fifth year	37 (13.9)
Sex	Male	51 (19.2)
	Female	215 (80.8)
Marital status	Single	252 (94.7)
	Married	14 (5.3)

SD, standard deviation; MIU, Mohi-ud-Din Islamic University; MUST, Mirpur University of Science and Technology; MIMS, Mirpur Institute of Medical Sciences; DPT, Doctor of Physical Therapy; D Pharm, Doctor of Pharmacy; MBBS, Bachelor of Medicine and Bachelor of Surgery; HND, Human Nutrition and Dietetics; MLT, Medical Laboratory Technology. Percentages are column percentages calculated using N = 266.

Table 2. Participant eligibility and analytical sample

Participant status	n (%)
Assessed for eligibility	266 (100.0)
Excluded	10 (3.8)
Musculoskeletal disorder	3 (1.1)
Eating disorder	6 (2.3)
Both disorders	1 (0.4)
Included in analysis	256 (96.2)

Percentages were calculated using the 266 students assessed for eligibility. Exclusion categories are mutually exclusive.

Table 3. Prevalence of sedentary-behaviour categories among analyzed participants (N = 256)

Sedentary-behaviour category	n (%)	95% CI (%)
Low, <28 hours/week	101 (39.5)	33.7–45.6
Moderate, 28–56 hours/week	89 (34.8)	29.2–40.8
High, >56 hours/week	66 (25.8)	20.8–31.5
Moderate or high, ≥28 hours/week	155 (60.5)	54.4–66.3

CI, confidence interval. Confidence intervals were calculated using the Wilson score method.

Table 4. Association between sedentary-behaviour and BMI categories (N = 256)

Sedentary-behaviour category	Underweight, n (%)	Normal weight, n (%)	Overweight, n (%)	Obesity class I, n (%)	Obesity class II, n (%)	Obesity class III, n (%)	Total, n (%)	χ^2 (df)	p-value	Cramér's V
Low	16 (15.8)	51 (50.5)	19 (18.8)	5 (5.0)	5 (5.0)	5 (5.0)	101 (100.0)	4.377 (10)	0.929	0.092
Moderate	16 (18.0)	44 (49.4)	14 (15.7)	5 (5.6)	5 (5.6)	5 (5.6)	89 (100.0)			
High	14 (21.2)	26 (39.4)	10 (15.2)	5 (7.6)	6 (9.1)	5 (7.6)	66 (100.0)			
Total	46 (18.0)	121 (47.3)	43 (16.8)	15 (5.9)	16 (6.2)	15 (5.9)	256 (100.0)			

BMI, body mass index; df, degrees of freedom. Percentages in sedentary-behaviour rows are row percentages; percentages in the total row use N = 256. BMI categories were defined as underweight, <18.5 kg/m^2; normal weight, 18.5–24.9 kg/m^2; overweight, 25.0–29.9 kg/m^2; obesity class I, 30.0–34.9 kg/m^2; obesity class II, 35.0–39.9 kg/m^2; and obesity class III, ≥40.0 kg/m^2. The association was examined using Pearson's chi-square test. Cramér's V represents the effect size.

Pearson's chi-square test did not identify evidence of an association between sedentary-behavior category and BMI category, $\chi^2(10) = 4.377$, $p = 0.929$. The corresponding effect size was small (Cramér's V = 0.092). These results describe an unadjusted cross-sectional association and do not account for demographic, dietary, physical-activity, or other potential confounding variables.

DISCUSSION

The present study found that sedentary behaviour was common among undergraduate students at the selected universities, with approximately three in five participants classified in the combined moderate or high sedentary-behaviour categories. However, no evidence of an association between sedentary-behaviour category and BMI category was identified, and the observed effect size was small. These findings suggest that sedentary behaviour represents a relevant lifestyle concern in this student population, although categorized sedentary time alone did not distinguish participants across BMI categories in the unadjusted analysis.

The observed burden of sedentary behaviour is broadly consistent with evidence from other university populations. Alahmadi et al. documented a substantial prevalence of sedentary behaviour among university students in Saudi Arabia using the Sedentary Behavior Questionnaire (6). Similarly, Tao et al. reported prolonged sitting among college students in Guangdong, China, with total sitting time differing across selected participant characteristics (12). University students may accumulate sedentary time through classroom attendance, studying, computer-based academic activities, transportation, and screen-based recreation. Nevertheless, direct numerical comparisons between studies should be made cautiously because estimates may differ according to questionnaire content, recall period, cultural context, participant characteristics, and the threshold used to define prolonged or elevated sedentary behaviour.

The absence of a statistically detectable association between sedentary-behaviour and BMI categories differs from several previous studies. Saintila et al. identified relationships between BMI and lifestyle practices among Peruvian university students, whereas Putri et al. reported a relationship between sedentary lifestyle and BMI among students during the COVID-19 pandemic (7,9). Al-Nuaim and Safi also demonstrated that sedentary and nutritional behaviours were related to overweight and obesity among young people from different demographic backgrounds in Saudi Arabia (10). Differences between these findings and the present results may reflect variation in study populations, sample sizes, sedentary-behaviour definitions, dietary patterns, physical activity, outcome classification, and the social circumstances under which the studies were conducted.

Studies involving younger populations have similarly reported associations between sedentary behaviour and body weight. Tanveer et al. found that screen-based sedentary behaviour was associated with overweight and obesity among school-aged children and adolescents in Pakistan (8). Tan et al. also identified a relationship between screen-based sedentary behaviour and BMI among Chinese adolescents while examining the potential roles of weight concern and body-image perception (13). These studies assessed younger participants and emphasized screen-based behaviour, whereas the present study measured several forms of sedentary activity among undergraduate students. The different age groups and exposure definitions may partly explain the contrasting results.

Several methodological and biological considerations may also explain why sedentary behaviour was not associated with BMI in this sample. BMI reflects the combined influence of energy intake, physical activity, metabolic characteristics, sleep, genetics, and other behavioural and environmental factors. Sedentary time may contribute to adverse metabolic health through reduced skeletal-muscle activity and changes in glucose and lipid metabolism, but its relationship with body weight is not necessarily direct or immediate (1). Physical activity may also modify the health effects associated with prolonged sitting (3). Tarp et al. further emphasized the joint importance of physical activity and sedentary time when examining their relationships with BMI and subsequent health outcomes (14). Because physical activity and dietary intake were not assessed in the present study, their potential contributions to BMI and their interaction with sedentary behaviour could not be evaluated.

The use of broad sedentary-behaviour and BMI categories may have reduced the ability to detect subtle relationships. Categorization removes information available in continuous measurements and may group together participants with meaningfully different exposure or weight profiles. The cross-sectional design also captured sedentary behaviour and BMI at a single point and therefore could not establish whether sedentary behaviour

preceded changes in BMI. Furthermore, the small observed effect should not be interpreted as evidence that sedentary behaviour has no health relevance, because prolonged sitting may be associated with cardiometabolic outcomes independently of BMI (1–3).

This study provides descriptive evidence from undergraduate students recruited across three institutions in Mirpur and used an established questionnaire to assess multiple forms of sedentary behaviour (11). However, several limitations should be considered. Convenience sampling and the predominance of female, DPT, and MIU participants limit the representativeness of the sample. Sedentary behaviour was self-reported and was therefore susceptible to recall and reporting bias. The applicability of the questionnaire and the low, moderate, and high thresholds to this specific population was not independently established. The analyzed sample was smaller than the calculated target, and no multivariable adjustment was performed for sex, university, academic programme, physical activity, diet, sleep, or other potential confounders. In addition, uncertainty regarding whether height and weight were measured or self-reported may affect the reliability of BMI classification.

From a public-health perspective, the high proportion of students accumulating at least 28 hours of sedentary behaviour per week supports attention to prolonged sitting within university health programmes. Institutional strategies could encourage regular movement breaks, active transportation, recreational physical activity, and reduced discretionary screen time. Nevertheless, the present study did not evaluate these strategies and cannot establish their effectiveness. Future studies using probability-based sampling, objective or validated measures of sedentary time, measured anthropometry, continuous-variable analysis, and adjustment for physical activity, diet, sleep, and demographic characteristics would provide a more robust assessment of the relationship between sedentary behaviour and BMI.

CONCLUSION

Sedentary behaviour was common among undergraduate students at the selected universities in Mirpur, with 60.5% classified as having moderate or high sedentary behaviour; however, sedentary-behaviour category was not associated with BMI category in the unadjusted cross-sectional analysis. These findings support attention to sedentary behaviour as a student-health concern while indicating that BMI is likely related to multiple factors that were not captured by the present analysis.

REFERENCE

1. Franssen WM, Nieste I, Verboven K, Eijnde BO. Sedentary behaviour and cardiometabolic health: integrating the potential underlying molecular health aspects. Metabolism. 2025;170:156320.

2. Wang L, Wu X, Guo Z, Dong Y, Yu B. Prolonged sitting time and all-cause mortality: the mediating and predictive role of kidney function markers. Ren Fail. 2025;47(1):2486568.

3. Ekelund U, Steene-Johannessen J, Brown WJ, Fagerland MW, Owen N, Powell KE, et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. Lancet. 2016;388(10051):1302–1310.

4. Guerriero MA, Dipace A, Monda A, De Maria A, Polito R, Messina G, et al. Relationship between sedentary lifestyle, physical activity and stress in university students and their life habits: a scoping review with PRISMA checklist (PRISMA-ScR). Brain Sci. 2025;15(1):78.

5. Lalović L, Živković D, Đošić A, Cicović V, Cicović B, Pavlović B, et al. Physical activity, BMI, and their effects on university students' quality of life. Healthcare. 2025.

6. Alahmadi MA, Almasoud KH, Aljahani AH, Alzaman NS, Al-Nozha OM, Alahmadi OM, et al. The prevalence of sedentary behavior among university students in Saudi Arabia. BMC Public Health. 2024;24(1):605.

7. Saintila J, Calizaya-Milla YE, Carranza-Cubas SP, Serpa-Barrientos A, Oblitas-Guerrero SM, Ramos-Vera C. Body mass index and healthy lifestyle practices among Peruvian university students: a comparative study among academic discipline. Front Nutr. 2024;11:1361394.

8. Tanveer M, Tabnjh AK, Yujun C, Badicu G, Asghar E, Tanveer U, et al. Association of screen-based sedentary behavior with overweight and obesity among school-aged children and adolescents in Pakistan: an empirical cross-sectional study. Sport Sci Health. 2025;21(4):3007–3018.

9. Putri NR, Kusmawati II, Argaheni NB, Nugraheni A, Sukamto IS. Relationships between sedentary lifestyle and body mass index in students in pandemic COVID-19. J Epidemiol Public Health. 2023;8(3):410–414.

10. Al-Nuaim A, Safi A. Exploring sedentary and nutritional behaviour patterns in relation to overweight and obesity among youth from different demographic backgrounds in Saudi Arabia. Int J Environ Res Public Health. 2025;22(5):813.

11. Rosenberg DE, Norman GJ, Wagner N, Patrick K, Calfas KJ, Sallis JF. Reliability and validity of the Sedentary Behavior Questionnaire (SBQ) for adults. J Phys Act Health. 2010;7(6):697–705.

12. Tao X, Wu X, Zhuo S, Fu J, Xiao Y, Zhao Y, et al. Unveiling the sedentary epidemic through insights from college students in Guangdong. Sci Rep. 2025;15(1):35197.

13. Tan S, Zhou L, Abdukerima G, Yin W, Chen N, Yuan L, et al. Screen-based sedentary behavior and BMI among Chinese adolescents: weight concern as a mediator moderated by body image perception. BMC Public Health. 2025;25(1):2302.

14. Tarp J, Rossen J, Ekelund U, Dohrn IM. Joint associations of physical activity and sedentary time with body mass index: a prospective study of mortality risk. Scand J Med Sci Sports. 2023;33(5):693–700.