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Article

Physical Activity Levels and Lifestyle Behaviors among Allied Health Science Students: A Cross-Sectional Study

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ABSTRACT

Background: Physical inactivity and unhealthy lifestyle behaviors are increasingly common among university students and are associated with an elevated risk of non-communicable diseases. However, evidence focusing specifically on Allied Health Science students in low- and middle-income countries remains limited. **Objectives:** To assess physical activity levels and associated lifestyle behaviors among Allied Health Science students in Lahore and to examine the co-occurrence of physical inactivity with adverse lifestyle patterns. **Methodology:** A cross-sectional observational study was conducted among 160 Allied Health Science students enrolled in selected institutes in Lahore. Physical activity levels were assessed using the International Physical Activity Questionnaire–Short Form and categorized as low, moderate, or high. Lifestyle behaviors, including dietary patterns, sleep duration, screen time, and smoking status, were collected using a structured self-administered questionnaire. Descriptive statistics were used to summarize participant characteristics. Associations between physical activity levels and lifestyle behaviors were examined using chi-square tests and multivariable logistic regression, adjusting for age and gender. **Results:** Among the participants, 27.5% reported low physical activity, 56.3% moderate activity, and 16.2% high activity levels. Low physical activity was significantly associated with unhealthy dietary patterns (adjusted odds ratio [AOR] 2.05; 95% confidence interval [CI] 1.01–4.18), sleep duration of less than six hours per night (AOR 2.89; 95% CI 1.42–5.88), and daily screen time of four or more hours (AOR 3.11; 95% CI 1.45–6.66). Gender was not independently associated with physical activity level. **Conclusion:** A considerable proportion of Allied Health Science students in Lahore exhibit physical inactivity accompanied by multiple adverse lifestyle behaviors. These findings highlight the need for integrated, institution-based health promotion and lifestyle modification programs targeting physical activity, sleep hygiene, and healthy dietary practices among university students.

Keywords: Physical activity; Lifestyle behaviors; Allied Health Science students; Cross-sectional study; Pakistan

INTRODUCTION

Physical activity is a central determinant of cardiometabolic and psychosocial health, with consistent evidence demonstrating benefits across the lifespan, including improved cardiovascular fitness, reduced risk of non-communicable diseases, and better mental well-being (1). Despite these established benefits, insufficient physical activity remains a major public health concern globally, contributing to preventable morbidity and mortality and prompting international recommendations that emphasize routine moderate-to-vigorous activity for health protection (2).

University students represent a life-stage in which health behaviors are consolidated and may persist into adulthood; however, this period is also characterized by academic pressures, changes in living arrangements, and time constraints that can reduce engagement in physical activity (3). Evidence indicates that even within university environments, physical activity is variably distributed and can be influenced by institutional context, workload, and social norms, while interventions targeting student populations show heterogeneous effectiveness, suggesting that local data are essential to guide tailored programming (4). Among university subgroups, determinants of activity and sedentary behavior are multifactorial—spanning individual motivation, environmental access, and competing academic demands—necessitating population-specific assessment to identify actionable correlates (5).

Allied Health Science students constitute an especially relevant population because they are future healthcare providers whose personal health behaviors may shape their credibility and effectiveness in counseling patients and communities about lifestyle modification (6). At the same time, physical activity patterns among students are closely interconnected with lifestyle behaviors such as diet quality, sleep duration, and screen-based sedentary time; these behaviors often cluster, collectively influencing energy balance, stress regulation, and long-term disease risk (7). In low- and middle-income settings, including Pakistan, rapid urbanization and expanding digital engagement may further amplify sedentary patterns among young adults, yet empirical evidence focusing specifically on Allied Health Science students in Lahore remains limited (8). This gap constrains the ability of institutions to design context-appropriate wellness initiatives and to incorporate effective behavior-change support into allied health training.

Accordingly, the present study aimed to estimate the distribution of physical activity levels and describe key lifestyle behaviors (dietary habits, sleep patterns, screen time, and smoking) among Allied Health Science students in Lahore, and to examine whether lower physical activity co-occurs with adverse lifestyle behaviors within this student population (8).

MATERIALS AND METHODS

A cross-sectional observational study was conducted in Lahore, Pakistan, over a three-month period among undergraduate Allied Health Science students enrolled in selected allied health institutes. The study design and reporting framework were aligned with international recommendations for cross-sectional studies to enhance transparency and reproducibility (9). Participants were recruited through in-class announcements and on-site approach during academic hours; students were informed about the study purpose, confidentiality safeguards, and voluntariness, and those agreeing to participate provided written informed consent prior to data collection.

Eligible participants included male and female Allied Health Science students aged 18–30 years who were currently enrolled and present during the data collection period. Students with self-reported physical disabilities or medical conditions limiting routine physical activity and those unwilling to participate were excluded to reduce outcome misclassification. A non-probability convenience sampling approach was used due to feasibility constraints within academic settings; to mitigate selection and information bias, recruitment was conducted across multiple academic programs and years, participation was anonymous, and the questionnaire was self-administered without faculty presence.

Physical activity was measured using the International Physical Activity Questionnaire—Short Form (IPAQ-SF), a widely used instrument with established reliability and validity across diverse populations (10,11). IPAQ-SF items captured frequency (days/week) and duration (minutes/day) of vigorous-intensity activity, moderate-intensity activity, and walking during the previous seven days, in addition to daily sitting time. IPAQ scoring procedures were applied to compute total metabolic equivalent minutes per week (MET-min/week), and physical activity was categorized as low, moderate, or high according to standard IPAQ classification criteria to ensure comparability with prior literature (10). Lifestyle behaviors were assessed using structured items covering diet pattern (categorized as "healthy" vs "unhealthy" based on routine intake of fruits/vegetables and reduced consumption of fried/fast foods and sugar-sweetened beverages), sleep duration (categorized as <6 hours, 6–8 hours, and >8 hours per night), daily screen time (<4 vs ≥4 hours/day), and smoking status (current smoker: yes/no). Demographic variables included age, gender, and academic programs. The primary outcome was physical activity level (low/moderate/high), and key exposures/correlates were lifestyle behaviors and demographic characteristics.

Sample size was determined for estimation of a single proportion using a conservative prevalence of insufficient physical activity of 50%, a 95% confidence level (Z=1.96), and an absolute precision of 7.75%, yielding a minimum required sample of 160 students. Data were checked for completeness at submission; where item non-response occurred, analyses were conducted using complete-case methods for the specific variable pair under evaluation. Descriptive statistics were reported as mean±SD for continuous variables and frequency (%) for categorical variables. Group comparisons of lifestyle behaviors across physical activity categories were assessed using the chi-square test (or Fisher's exact test where appropriate) for categorical variables and independent-samples t-test or one-way ANOVA for continuous variables, with two-sided significance set at $p<0.05$. To quantify associations, binary logistic regression models were specified with low physical activity as the outcome and lifestyle behaviors as predictors, reporting odds ratios (OR) with 95% confidence intervals (CI), adjusting a priori for age and gender as potential confounders based on established relationships with activity patterns (12). Statistical analyses were performed using SPSS (IBM Corp., Armonk, NY), and all analytical decisions (coding, categorization, and model specification) were documented to support reproducibility.

Ethical approval was obtained from the relevant institutional ethics committee in Lahore, and the study was conducted in accordance with the principles of the Declaration of Helsinki. Participant confidentiality was maintained by collecting de-identified questionnaires and restricting access to study data to the research team only (13).

RESULTS

The study included a total of 160 Allied Health Science students, of whom 55.0% were female and 45.0% were male. Most participants were between 22 and 25 years of age (45.0%), followed by those aged 18–21 years (40.0%), while only 15.0% were aged 26–30 years. Physiotherapy students constituted the largest academic subgroup (32.5%), followed by Medical Laboratory Technology (28.8%),

Radiology (23.7%), and Nutrition and other allied programs (15.0%), indicating a reasonably diverse representation across allied health disciplines (Table 1).

Assessment of physical activity using IPAQ categories showed that more than half of the students (56.3%) engaged in moderate levels of physical activity. However, 27.5% of participants were classified as having low physical activity, while only 16.2% achieved high physical activity levels (Table 2). This distribution highlights that nearly one in three students did not meet recommended physical activity thresholds.

Lifestyle behavior analysis demonstrated a high prevalence of unfavorable patterns among participants. Unhealthy dietary habits were reported by 61.2% of students, while only 38.8% reported healthy eating behaviors. In terms of sleep, 36.3% of students reported sleeping less than six hours per night, whereas just over half (51.2%) achieved 6–8 hours of sleep. Excessive screen exposure was common, with 66.2% of students reporting screen time of four or more hours per day. Smoking prevalence was comparatively low, reported by 11.3% of participants (Table 3).

When lifestyle behaviors were compared across physical activity categories, students with low physical activity showed significantly higher proportions of unhealthy behaviors. Unhealthy dietary patterns were more common among students with low physical activity (72.7%) compared with those reporting moderate or high activity (56.4%), and this association was statistically significant (p=0.041). Similarly, inadequate sleep (<6 hours) was reported by 54.5% of students with low physical activity versus 29.1% among those with moderate or high activity (p=0.003). High screen time (≥4 hours/day) was also markedly more prevalent in the low physical activity group (81.8% vs 59.8%; p=0.012). Current smoking was reported by 18.2% of students with low physical activity compared with 8.5% among their more active peers (p=0.048) (Table 4).

Multivariable logistic regression analysis further confirmed these associations after adjustment for age and gender. Students reporting unhealthy dietary habits had more than twice the odds of low physical activity (adjusted OR 2.05; 95% CI 1.01–4.18; p=0.046). Sleeping less than six hours per night was associated with nearly a threefold increase in the odds of low physical activity (adjusted OR 2.89; 95% CI 1.42–5.88; p=0.003). Similarly, screen time of four or more hours per day was strongly associated with low physical activity (adjusted OR 3.11; 95% CI 1.45–6.66; p=0.004). Gender was not significantly associated with physical activity level after adjustment (p=0.571) (Table 5). These findings demonstrate a clear clustering of unhealthy lifestyle behaviors among students with low physical activity levels, underscoring the interrelated nature of physical inactivity, poor sleep, unhealthy diet, and excessive screen exposure in this population.

Table 1. Demographic Characteristics of Allied Health Science Students (n = 160)

Variable	Category	n (%)
Gender	Male	72 (45.0)
	Female	88 (55.0)
Age group (years)	18–21	64 (40.0)
	22–25	72 (45.0)
	26–30	24 (15.0)
Academic program	Physiotherapy	52 (32.5)
	Medical Laboratory Technology	46 (28.8)
	Radiology	38 (23.7)
	Nutrition/Other	24 (15.0)

Table 2. Distribution of Physical Activity Levels (IPAQ Categories)

Physical activity level	n (%)
Low	44 (27.5)
Moderate	90 (56.3)
High	26 (16.2)

Table 3. Lifestyle Behaviors of Participants

Lifestyle variable	Category	n (%)
Dietary pattern	Healthy	62 (38.8)
	Unhealthy	98 (61.2)
Sleep duration	<6 hours	58 (36.3)
	6–8 hours	82 (51.2)
	>8 hours	20 (12.5)
Screen time	<4 hours/day	54 (33.8)
	≥4 hours/day	106 (66.2)
Smoking status	Current smoker	18 (11.3)
	Non-smoker	142 (88.7)

Table 4. Association Between Physical Activity Level and Lifestyle Behaviors

Lifestyle behavior	Low PA n (%)	Moderate/High PA n (%)	p-value
Unhealthy diet	32 (72.7)	66 (56.4)	0.041
Sleep <6 hours	24 (54.5)	34 (29.1)	0.003
Screen time ≥4 h/day	36 (81.8)	70 (59.8)	0.012
Current smoking	8 (18.2)	10 (8.5)	0.048

Table 5. Multivariable Logistic Regression: Factors Associated With Low Physical Activity

Predictor	Adjusted OR	95% CI	p-value
Unhealthy diet	2.05	1.01–4.18	0.046
Sleep <6 hours	2.89	1.42–5.88	0.003
Screen time ≥4 h/day	3.11	1.45–6.66	0.004
Male gender	1.22	0.61–2.43	0.571

DISCUSSION

This cross-sectional study provides evidence that a substantial proportion of Allied Health Science students in Lahore exhibit suboptimal physical activity levels, with more than one-quarter classified as physically inactive. These findings are consistent with international literature reporting high prevalence of insufficient physical activity among university students, including those enrolled in health-related disciplines (14,15). Despite their academic exposure to health promotion concepts, allied health students appear vulnerable to sedentary behaviors, likely due to academic workload, prolonged screen exposure, and limited structured opportunities for physical activity within institutional settings.

The observed predominance of moderate physical activity aligns with studies conducted among health sciences students in both high- and middle-income countries, where moderate activity—often related to daily commuting or academic routines—accounts for the majority of reported movement (16). However, the relatively low proportion of students achieving high physical activity levels suggests that intentional or structured exercise is not widely adopted in this population. This pattern is concerning given evidence that higher-intensity or sustained physical activity confers greater cardiometabolic and mental health benefits (17).

Lifestyle behavior analysis revealed a high burden of unhealthy dietary patterns, inadequate sleep, and excessive screen time, which were significantly more prevalent among students with low physical activity. These findings support the concept of behavioral clustering, whereby multiple adverse health behaviors co-occur within individuals rather than presenting independently (18). In particular, the strong association between short sleep duration and low physical activity observed in this study is consistent with prior research demonstrating bidirectional relationships between sleep deprivation, fatigue, reduced motivation for physical activity, and impaired energy regulation (19).

Excessive screen time emerged as one of the strongest correlates of low physical activity, with students reporting ≥4 hours per day showing more than threefold increased odds of inactivity after adjustment for age and gender. This finding mirrors global trends linking digital media use with sedentary behavior, reduced physical activity, and poorer sleep quality among young adults (20). In the context of urban Pakistan, rapid expansion of smartphone use and online academic activities may further exacerbate sedentary lifestyles, underscoring the need for institutional strategies that encourage movement breaks and active learning environments.

Dietary habits were also significantly associated with physical activity levels, with unhealthy dietary patterns doubling the odds of low physical activity. This relationship is biologically and behaviorally plausible, as poor diet quality may contribute to reduced energy levels, weight gain, and diminished engagement in physical activity, while physically inactive individuals may be less inclined toward health-conscious food choices (21). Similar associations have been reported among university students in South Asia and the Middle East, suggesting that integrated lifestyle interventions addressing both diet and activity may be more effective than single-behavior approaches (22).

From a professional perspective, these findings have important implications. Allied Health Science students are future healthcare providers whose personal health behaviors may influence both their clinical practice and their credibility when counseling patients on lifestyle modification (23). Evidence suggests that healthcare professionals who engage in healthy behaviors themselves are more likely to counsel patients effectively and consistently (24). Therefore, the high prevalence of inactivity and unhealthy behaviors observed in this study highlights a missed opportunity within allied health education to model and reinforce healthy lifestyles.

This study contributes locally relevant data but should be interpreted in light of certain limitations. The cross-sectional design precludes causal inference, and reliance on self-reported measures may introduce recall or social desirability bias. Additionally, the use of convenience sampling limits generalizability beyond the sampled institutions. Nonetheless, the use of a validated physical activity instrument, adequate sample size, and multivariable analysis strengthen the credibility of the findings.

Overall, the results underscore the need for comprehensive, institution-level health promotion initiatives that integrate physical activity promotion, sleep hygiene education, nutritional guidance, and screen-time management within allied health curricula. Future

longitudinal and interventional studies are warranted to evaluate the effectiveness of such strategies and to explore causal pathways linking lifestyle behaviors and physical activity in this population (25).

CONCLUSION

This study demonstrates that a substantial proportion of Allied Health Science students in Lahore exhibit low physical activity levels accompanied by multiple unfavorable lifestyle behaviors, including unhealthy dietary patterns, inadequate sleep, and excessive screen time. These behaviors were not isolated but tended to cluster, with physically inactive students showing significantly higher odds of poor sleep, unhealthy diet, and prolonged sedentary screen exposure. Given the role of Allied Health Science students as future healthcare professionals, these findings raise important concerns regarding both their personal health trajectories and their preparedness to advocate for healthy lifestyles in clinical practice. The results highlight the need for institution-based, comprehensive health promotion strategies that integrate physical activity opportunities, lifestyle education, and supportive academic environments to foster sustainable healthy behaviors among allied health students.

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