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Original Article

Correlation Between Physical Activity and Stress Levels in Allied Health Science Students During Examination Periods

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ABSTRACT

Background: Allied health science students often experience elevated academic stress due to the demanding nature of their curricula, which blend theoretical instruction with clinical practice. Examination periods, in particular, exacerbate psychological pressure, potentially compromising academic performance and overall well-being. Physical activity (PA) has been widely recognized for its protective role against stress, yet limited research has been conducted specifically among allied health science students. This study examined the correlation between physical activity and perceived stress levels among undergraduate allied health students during examination periods at Desh Bhagat University.

Methods: A descriptive cross-sectional correlational study was conducted over eight weeks, from October to November 2024. 250 undergraduate students were proportionately and randomly selected from the Nursing, Physiotherapy, Radiography, and Medical Laboratory Science departments. Data collection instruments included the International Physical Activity Questionnaire–Short Form (IPAQ-SF) and the Perceived Stress Scale (PSS-10). Descriptive statistics, Pearson's correlation, and one-way ANOVA were performed using SPSS version 25 to analyze the data.

Results: Out of 250 questionnaires distributed, 237 were deemed valid for analysis. Among the respondents, 40.9% reported low physical activity, 38.4% moderate, and 20.7% high. In terms of stress levels, 65.4% experienced moderate stress, and 19.4% reported high stress. A statistically significant negative correlation was observed between physical activity and perceived stress ($r = -0.42$, $p < 0.001$). Furthermore, one-way ANOVA revealed that students with higher physical activity levels had significantly lower stress scores ($F = 18.93$, $p < 0.001$).

Conclusion: Physical activity is an effective non-pharmacological strategy for mitigating academic stress among allied health science students. The results highlight the importance of promoting regular physical activity, particularly during high-stress academic periods, as a means of enhancing mental well-being and academic success.

Key words: Allied Health Students, Physical Activity, Academic Stress, Examination Periods, IPAQ-SF, PSS-10, Student Wellness, Mental Health

INTRODUCTION

Academic-related stress is increasingly prevalent among students in allied health disciplines such as nursing, physiotherapy, medical laboratory science, and radiography. These programs typically integrate rigorous theoretical instruction with skill-based learning and complex evaluative components. [1,2] Examination periods, in particular, are marked by heightened expectations, limited preparation time, and performance anxiety, which may contribute to diminished academic functioning and long-term psychological issues, including anxiety and depression. [3,4]

In recent years, there has been growing interest in non-pharmacological, cost-effective interventions to manage academic stress, with physical activity gaining significant attention. [5] Physiologically, sustained engagement in physical activity enhances the release of endorphins, reduces cortisol levels, promotes neuroplasticity, and improves sleep quality—factors that collectively alleviate stress and elevate mood. [6-8] Psychologically, both structured and unstructured physical activity offer students a respite from academic pressures, providing opportunities for social interaction, emotional regulation, and autonomy—core elements of resilience. [9,10]

Previous research has consistently identified an inverse relationship between physical activity and perceived stress, indicating that students who regularly engage in physical activity report lower levels of stress and anxiety, even during academically intense periods. [11-13] Despite this evidence, students, particularly those enrolled in demanding health programs, frequently reduce their physical activity during exams, prioritizing sedentary coping mechanisms such as excessive studying or rest. [14,15] This behavior contradicts the health knowledge they acquire academically, revealing a paradox in their stress management practices.

This discrepancy prompts a critical examination of how health science students cope with stress and whether their strategies reflect evidence-based health behaviors. A nuanced understanding of the interplay between physical activity and perceived stress during exam periods is essential to enhance student well-being and foster professional behaviors that future health practitioners can model in patient care.

The current study aims to assess the relationship between self-reported physical activity and perceived stress among Allied Health Sciences students during examination periods. Findings from this research may guide the development of campus-based interventions promoting physical activity as a viable stress-reduction strategy.

MATERIALS AND METHODS

Research design

This study adopted a descriptive cross-sectional correlational design to assess the association between physical activity and perceived stress at a single time point. This design is appropriate for identifying relationships and trends among variables without manipulating study conditions.

Study population and sample size

The study population comprised undergraduate students enrolled in allied health science programs at Desh Bhagat University, specifically in the departments of Nursing, Physiotherapy, Radiography, and Medical Laboratory Science. These departments were purposively selected based on the demanding nature of their academic and clinical curricula, which are known to correlate with elevated stress levels during examination periods.

The sample size was determined using Cochran's formula, which is widely applied in health and behavioral sciences to estimate sample sizes for large populations. The final sample included 250 students, and proportionate stratified random sampling was employed to ensure that each discipline was adequately represented in the sample.

This study's sample size was calculated using Cochran's formula, which is common in health and behavioural sciences, regarding large populations:

$$n_0 = \frac{Z^2 \cdot p \cdot q}{e^2}$$

n_0= set sample size
Z = Z value at the 95% confidence level = 1.96
p = assumed proportion of the population (0.5 is used to ensure sample size is maximized)
q = 1 - *p* = 0.5
e = margin of error (0.05)

$$n_0 = \frac{(1.96)^2 \cdot 0.5 \cdot 0.5}{(0.05)^2} = \frac{3.8416 \cdot 0.25}{0.0025} = 384.16$$

Sample size determination and sampling technique

Based on standard statistical power calculations using Cochran's formula, a minimum sample size of 384 respondents was deemed necessary to ensure generalizability and sufficient statistical power. However, due to practical constraints such as limited access to students during the examination period, time limitations, and the requirement to obtain administrative clearance, only 250 students were ultimately available to participate in the study.

To ensure equitable representation from all four academic departments, a proportionate stratified random sampling method was employed. This technique allocated the number of participants from each department relative to its total student population, ensuring a balanced representation. Furthermore, the sample achieved demographic diversity in terms of gender, year of study, and academic load, thereby enhancing the representativeness and internal validity of the findings. Although the final sample size was slightly below the optimal threshold for large population studies, it was considered sufficient for correlation analysis. According to Cohen's guidelines for effect size and statistical power, the

sample retained adequate sensitivity to detect moderate correlations between variables.

Inclusion and exclusion criteria

Inclusion criteria:

Full-time enrolment in an undergraduate Allied Health Sciences program (nursing, physiotherapy, radiography, or medical laboratory science).
Availability during the academic term when examinations were being conducted.
Provision of informed consent to participate in the study.

Exclusion criteria:

Individuals diagnosed with psychiatric or psychological conditions.
Students engaged in competitive sports training or registered members of athletic teams to avoid confounding effects due to structured exercise regimens.

Tools for Data Collection

Assessment of Physical Activity

The International Physical Activity Questionnaire—Short Form (IPAQ-SF) was employed to assess the physical activity levels of participants. The IPAQ-SF is a widely validated tool for use among diverse populations, including university students. It captures self-reported data on walking, moderate, and vigorous physical activity undertaken during the previous seven days. Activity levels were reported as metabolic equivalent task (MET) minutes/week and classified into three categories:

Low: <600 MET-min/week
Moderate: 600–2999 MET-min/week
High: ≥3000 MET-min/week

Assessment of Stress Levels

Perceived stress was measured using the 10-item Perceived Stress Scale (PSS-10), a standardized instrument developed by Cohen et al. Each item is rated on a five-point Likert scale ranging from 0 (never) to 4 (very often), generating a total score between 0 and 40. Based on established scoring thresholds:

Low Stress: 0–13
Moderate Stress: 14–26
High Stress: 27–40

Both the IPAQ-SF and PSS-10 have demonstrated high internal consistency and construct validity in previous studies involving university students.

Data Collection Procedure

Data collection spanned three weeks. Before data collection, ethical approval was obtained from the Institutional Review Board (IRB), and written informed consent was secured from all participants. The questionnaires were distributed in person across lecture halls, with trained research personnel present to assist and ensure unbiased administration.
Participants completed the self-administered questionnaires anonymously and returned them by placing them in sealed collection boxes designed for secure data storage and subsequent disposal. This approach minimized social desirability bias and maintained confidentiality throughout the process.

Data Analysis

The collected data were analyzed using IBM SPSS Statistics version 25. The analytical process included the following steps (Table 1):

Descriptive Statistics: Frequencies, percentages, means, and standard deviations were calculated to summarize demographic characteristics, physical activity levels, and stress scores.
Pearson's Correlation Coefficient (r): Used to determine the strength and direction of the relationship between total physical activity (MET scores) and perceived stress (PSS scores).
One-Way ANOVA: Employed to compare stress levels across the three physical activity categories (low, moderate, and high). When significant group differences were observed, Tukey's Honestly Significant Difference (HSD) test was applied for post hoc comparisons.

Table 1: Overview of Statistical Methods.

Objective	Test Applied	Variables Analyzed
Describe PA and stress patterns	Descriptive Statistics	IPAQ-SF and PSS-10 scores
Examine relationship between PA & stress	Pearson's Correlation	MET-min/week vs. PSS score
Compare stress levels by PA categories	One-way ANOVA	PA category (low/mod/high) vs. stress levels

Ethical Considerations

Ethical approval for this study was obtained from the Research Ethics Committee of Desh Bhagat University. Participation was entirely voluntary, and all prospective respondents were informed of their right to withdraw from the study at any stage without any academic or personal repercussions. Anonymity and confidentiality were strictly maintained throughout the research process. All collected data were securely stored in password-protected digital files, accessible only to members of the research team, by data protection protocols.

RESULTS

Demographic Characteristics of Respondents

Out of the 250 questionnaires distributed, 237 were deemed valid and included in the final analysis, yielding a high response rate of 94.8%. The demographic characteristics of the respondents are summarized in (Table 2).

Table 2: Demographic Profile of Respondents (N = 237)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	102	43.0
	Female	135	57.0
Age Group (years)	18–20	92	38.8
	21–23	114	48.1
	≥24	31	13.1
Program of Study	Nursing	80	33.8
	Physiotherapy	58	24.5
	Radiography	47	19.8
	Medical Laboratory Science	52	21.9

Physical Activity Levels (IPAQ-SF)

Based on MET-min/week scores, students were categorized into three levels of physical activity (Table 3):
Low activity: (<600 MET-min/week): 97 students (40.9%)
***Moderate activity*:** (600–2999 MET-min/week): 91 students (38.4%)
High activity: (≥3000 MET-min/week): 49 students (20.7%)
The mean physical activity level among participants was 1,643.3 ± 962.7 MET-min/week, indicating a generally low to moderate engagement in physical activity during the examination period.

Perceived Stress Levels (PSS-10)

Stress levels among the respondents were classified based on their PSS-10 scores as follows:
Low stress: (0–13): 36 students (15.2%)
Moderate stress: (14–26): 155 students (65.4%)
High stress: (27–40): 46 students (19.4%)
The mean perceived stress score was 21.3 ± 5.4, suggesting that the majority of students experienced moderate stress during the examination period.

Correlation between Physical Activity and Perceived Stress

Pearson's correlation analysis revealed a statistically significant negative correlation between physical activity levels (measured in MET-min/week) and perceived stress scores (PSS-10):
$r = -0.42$, $p < 0.001$
This indicates that higher levels of physical activity were associated with lower levels of perceived stress among allied health science students.

Comparison of Stress Across Physical Activity Categories

A one-way Analysis of Variance (ANOVA) was conducted to examine the differences in stress levels across the three physical activity categories (low, moderate, and high). Results demonstrated a statistically significant difference in perceived stress scores between the groups.

Table 3: ANOVA Summary – Perceived Stress by Physical Activity Category

Group	Mean PSS Score (± SD)
Low Activity	24.5 ± 4.8
Moderate Activity	21.0 ± 4.6
High Activity	18.2 ± 5.0

ANOVA Results

A one-way ANOVA revealed a statistically significant difference in perceived stress levels across the three physical activity categories:
$F(2, 234) = 18.93$, $p < 0.001$
Post hoc analysis using Tukey's HSD test indicated the following:
Students in the low physical activity group reported significantly higher stress levels compared to both the moderate ($p < 0.01$) and high activity groups ($p < 0.001$).
A significant difference in stress levels was also found between the moderate and high activity groups ($p < 0.05$).

Key Findings

The majority of allied health students reported moderate levels of physical activity and moderate stress during the examination period.
A significant inverse relationship was found between physical activity and perceived stress.
Higher levels of physical activity were associated with lower stress levels, suggesting a stress-buffering effect of exercise during academically demanding periods.

DISCUSSION

The findings of this study contribute to the growing body of literature demonstrating the inverse relationship between physical activity and perceived stress, particularly among students in health-related academic disciplines. The statistically significant negative correlation identified between MET-minutes/week of physical activity and PSS-10 scores confirms previous assertions that regular physical activity acts as a buffer against psychological stress. [5] This supports the psychophysiological framework in which exercise modulates stress through hormonal pathways, such as decreasing cortisol and increasing endorphin secretion, as well as through enhanced cardiovascular function and improved sleep quality. [16] An unexpected and particularly salient finding was the high proportion of students classified as low-active during examination periods, despite being enrolled in health science programs that emphasize the importance of physical activity. This paradox where students possessing knowledge of the benefits of exercise fail to apply it in times of stress has not been extensively documented in the literature, particularly among allied health cohorts. While earlier studies have shown that physical activity levels often decline during periods of

academic pressure [17] the present findings point to a deeper behavioral incongruence that may reflect institutional, motivational, or structural barriers.

This discrepancy between knowledge and behavior aligns with self-determination theory, which posits that intrinsic motivation is crucial for the initiation and maintenance of health-promoting behaviors. [9] The stress associated with examinations may override students' intrinsic motivation or perceived self-efficacy to engage in physical activity, leading them to adopt more passive or sedentary coping mechanisms. Consequently, this research enhances current understanding by situating physical activity not only as a protective health behavior but also as a dynamic response vulnerable to contextual academic stressors.

Furthermore, the identification of a clear dose-response relationship between physical activity intensity and stress levels reinforces global public health guidelines. The results echo the [18] recommendation of 150–300 minutes of moderate-intensity activity per week for optimal mental and physical health. Importantly, these findings validate such guidelines within a specific, academically stressed student population, strengthening the case for integrating targeted physical activity interventions into university curricula, especially in health science faculties.

Limitations

Nonetheless, several limitations must be acknowledged. The sample, while reasonably sized (n = 237), was restricted to a single institution, potentially limiting generalizability to other allied health science populations. Additionally, the use of self-reported instruments such as the IPAQ-SF and PSS-10, though validated, may be subject to recall bias or social desirability bias, which could distort actual activity levels and perceived stress. Moreover, the cross-sectional design precludes any inference of causality. While associations were detected, it remains unclear whether lower stress facilitates more frequent physical activity, whether the reverse holds, or if a bidirectional relationship exists.

Given these constraints, future research should consider longitudinal or experimental designs to track changes in physical activity and stress across academic timelines and to evaluate the causal impact of physical activity interventions. Multi-institutional studies would also bolster the representativeness of findings. Furthermore, qualitative exploration into the barriers that hinder health science students from maintaining physical activity during high-stress periods could provide deeper insights into the motivational and contextual dynamics at play.

In light of these findings, educational institutions particularly those offering health science programs are encouraged to actively foster an environment where physical activity is normalized and supported throughout the academic year. Recommendations include the integration of movement breaks into lectures, promotion of flexible fitness schedules, and provision of accessible recreational facilities. Such institutional initiatives may not only reduce student stress but also reinforce professional modeling of health-promoting behaviors, aligning student practice with public health advocacy.

CONCLUSION

This study examined the association between physical activity and perceived stress among allied health science students during examination periods. The findings revealed a significant inverse relationship, indicating that students who engaged more frequently in physical activity reported lower levels of perceived stress. This supports a growing body of evidence highlighting the therapeutic potential of physical activity as a non-pharmacological intervention for stress reduction, especially within high-pressure academic environments.

Paradoxically, although students are generally aware of the benefits of exercise, many reduce their physical activity during examinations, thereby increasing their vulnerability to stress-related health and academic challenges. This behavioral inconsistency points to systemic gaps in institutional support mechanisms during peak academic periods. As future healthcare professionals, allied health students are expected not only to manage their stress effectively but also to model and promote evidence-based wellness practices, including physical activity.

To address these gaps, academic institutions must take a proactive role in fostering a culture of wellness. This includes integrating structured, evidence-based wellness programs into the academic calendar, with a particular focus on high-stress periods such as examinations. Such programs could feature scheduled wellness breaks, access to fitness resources, and peer-led physical activity sessions aimed at reducing stress and enhancing academic performance.

Furthermore, collaboration between faculty and student support services is vital to identifying and eliminating barriers to student engagement in physical activity. Cultivating an institutional ethos that prioritizes self-care and mental health awareness will not only improve student well-being but also contribute to more resilient and empathetic health professionals.

Further longitudinal and interventional research is recommended to elucidate the mechanisms through which physical activity influences psychological well-being and academic performance. Such evidence will provide a more robust foundation for policy development and the design of targeted interventions that promote holistic student development.

Based on our findings, academic institutions integrate wellness programs that promote physical activity into the academic calendar, particularly during examination periods. Collaboration between faculty and student support services should be encouraged to eliminate systemic barriers to physical activity. Moreover, fostering a culture of self-care and mental health awareness within academic institutions is crucial.

AUTHORS' CONTRIBUTION

Each author has made a substantial contribution to the present work in one or more areas, including conception, study design, conduct, data collection, analysis, and interpretation. All authors have given final approval of the version to be published, agreed on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

None.

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