# The relationship between physical activity and academic performance among health professional students: a correlational study

*Relación entre la actividad física y el rendimiento académico en estudiantes de profesionales de la salud: un estudio correlacional*


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## Abstract

Introduction: Physical activity (PA) is widely recognized for its cognitive and psychological benefits, yet its direct relationship with academic performance remains inconclusive. This study examined the correlation between physical activity (PA) levels and academic performance among physiotherapy students.
Objective: This study aimed to determine the association between PA levels and academic performance in undergraduate physiotherapy students and explore whether demographic factors, such as gender and Body Mass Index (BMI), influence this relationship.
Methodology: A cross-sectional, correlational study was conducted with 102 undergraduate physiotherapy students aged 18 to 25 years. PA levels were assessed using the International Physical Activity Questionnaire (IPAQ), while academic performance was determined through self-reported Grade Point Average (GPA). Data were analyzed using descriptive statistics, Spearman's correlation, and chi-square tests.
Results: The findings showed no significant correlation between PA levels and GPA ($p > 0.05$), suggesting that PA does not directly influence academic achievement. However, most students maintained high PA levels, indicating that exercise is an integrated aspect of their lifestyle rather than a competing demand. Additionally, gender and BMI were not significantly associated with PA or academic performance.
Discussion: These results align with previous studies suggesting that PA supports cognitive function and well-being but does not necessarily enhance academic outcomes. Factors such as study habits, motivation, and curriculum structure may have a more substantial influence on academic performance than PA alone.
Conclusions: Although PA does not directly impact GPA, it remains essential for student well-being and stress management. Future research should explore different PA types and their effects on academic performance using objective measures and longitudinal designs.



## Keywords

Academic performance; cognitive function; health occupations; lifestyle; physical activity.



## Resumen

Introducción: La actividad física (AF) es ampliamente reconocida por sus beneficios cognitivos y psicológicos, pero su relación directa con el rendimiento académico sigue siendo inconclusa. Este estudio se centró en la correlación entre los niveles de AF y el rendimiento académico en estudiantes de fisioterapia.
Objetivo: Este estudio tuvo como objetivo determinar la asociación entre los niveles de AF y el rendimiento académico en estudiantes de fisioterapia de pregrado. También exploró si factores demográficos, como el género y el Índice de Masa Corporal (IMC), influían en esta relación.
Metodología: Se realizó un estudio transversal y correlacional con 102 estudiantes de fisioterapia de pregrado, de entre 18 y 25 años. Los niveles de AF se evaluaron mediante el Cuestionario Internacional de Actividad Física (IPAQ), mientras que el rendimiento académico se determinó a través del Promedio de Calificaciones (GPA) autoinformado. Los datos se analizaron mediante estadísticas descriptivas, correlación de Spearman y pruebas de chi-cuadrado.
Resultados: Los hallazgos no mostraron una correlación significativa entre los niveles de AF y el GPA ($p > 0.05$), lo que sugiere que la AF no influye directamente en el rendimiento académico. Sin embargo, la mayoría de los estudiantes mantuvo altos niveles de AF, lo que indica que el ejercicio es una parte integrada de su estilo de vida en lugar de una demanda que compite con sus estudios. Además, el género y el IMC no mostraron asociaciones significativas con la AF o el rendimiento académico.
Discusión: Estos resultados coinciden con estudios previos que sugieren que la AF favorece la función cognitiva y el bienestar, pero no necesariamente mejora los resultados académicos. Factores como los hábitos de estudio, la motivación y la estructura curricular pueden influir más en el rendimiento académico que la AF por sí sola.
Conclusiones: Aunque la AF no afecta directamente al GPA, sigue siendo fundamental para el bienestar y la gestión del estrés de los estudiantes. Se recomienda que futuras investigaciones exploren los diferentes tipos de AF y sus efectos en el rendimiento académico mediante medidas objetivas y estudios longitudinales.



## Palabras clave

Rendimiento académico; función cognitiva; ocupaciones de la salud; estilo de vida; actividad física.

## Introduction

Physical activity (PA) plays a crucial role in maintaining overall health, reducing the risk of cardiovascular diseases, type 2 diabetes, and stroke, as well as improving psychological well-being. PA plays a fundamental role in maintaining overall health and cognitive function; however, its direct impact on academic performance remains inconclusive. While some studies suggest that PA enhances cognitive abilities, attention, and stress regulation, potentially leading to improved academic outcomes, the evidence remains mixed. Further investigation is needed to clarify the relationship between PA and academic performance, considering factors such as intensity, duration, and individual differences (Colcombe & Kramer, 2003; Cheng, 2016; Newtonraj et al., 2017). However, other research reports no significant relationship between PA and academic achievement (Calestine, 2017; Franz & Feresu, 2013). These conflicting findings–where some studies indicate positive effects, others show negative or null associations–highlight the need for further research, particularly in healthcare education settings (Kayani et al., 2018; Castro-Sánchez et al., 2019).

University students often experience a decline in PA due to academic pressure and lifestyle changes (Acampado & Valenzuela, 2018; Alkhateeb et al., 2019; Ceron Bedoya et al., 2023). However, some researchers argue that PA is a buffer against stress and cognitive fatigue, potentially improving academic outcomes (Boozer, 2017; So, 2012). Increasing the duration and intensity of Physical Education has been linked to improved cognitive performance and academic achievement, particularly among adolescents. Due to the physical demands of their professional training, Physiotherapy students are expected to lead an active lifestyle, making them a suitable population for studying the relationship between PA patterns and academic performance (Cipriano et al., 2024; Stea et al., 2014). Despite this expectation, research explicitly focusing on PA and academic performance in physiotherapy students remains limited.

Previous studies on the relationship between PA and academic performance have yielded mixed results. Some findings suggest that PA positively influences brain function and academic achievement (Mandolesi et al., 2018; Castro-Sánchez et al., 2019), while others report no significant correlation (Calestine, 2017; Franz & Feresu, 2013). Notably, most research has focused on school-age students or general university populations, with limited emphasis on healthcare students, who may exhibit unique PA patterns due to their academic and professional demands (Cipriano et al., 2024; Strain et al., 2024).

University life introduces numerous lifestyle changes that can impact both physical activity (PA) levels and academic performance (Acampado & Valenzuela, 2018; Alkhateeb et al., 2019). Increased academic workload, particularly in senior years, may lead to decreased physical activity (PA), yet some students successfully balance fitness and studies (Mohamed et al., 2014; Kriemler et al., 2011). Understanding these dynamics in physiotherapy students can help educators develop strategies to support both physical well-being and academic success (Kemmler et al., 2015).

While physical activity (PA) is known to affect cognitive function and mental health positively (Correa-Burrows et al., 2017), various demographic factors–including gender, age, and Body Mass Index (BMI)–may influence PA engagement and academic performance (Akhmad et al., 2024; Sánchez-Miguel et al., 2017). Gender, age, and BMI can impact physical activity (PA) and academic performance (Voyles, 2011). For example, younger individuals and those with a healthy BMI may engage in more PA, which can enhance cognitive function and academic outcomes. Gender differences also play a role, as males often participate in more vigorous activities, which may influence performance differently than females. Some research highlights a strong correlation between PA and academic success, whereas others emphasize the role of dietary habits and overall lifestyle (Burrows et al., 2017; Janković G et al., 2018; Javed et al., 2021). Additionally, university students face barriers and facilitators to maintaining consistent PA levels (Crossman et al., 2024), making it essential to explore these factors in the context of physiotherapy education.

Given the inconsistent findings and the lack of studies explicitly targeting physiotherapy students, this study aims to examine the association between PA and academic performance using validated measures such as the International Physical Activity Questionnaire (IPAQ) and self-reported Grade Point Average (GPA)(Curo Yllaconza et al., 2024). Additionally, this study aims to investigate the impact of demographic variables (gender, age, and BMI) on physical activity levels and academic performance. By

addressing gaps in prior research, the findings will contribute to the growing literature on student well-being and academic success, informing university policies that promote active lifestyles without compromising academic rigour.

## Method

This cross-sectional, correlational study explored the association between physical activity (PA) and academic performance among undergraduate physiotherapy students. It was conducted between March 2024 and December 2024 at Saveetha College of Physiotherapy, Thandalam, Chennai, Tamil Nadu, India.

### *Participants and Recruitment*

A total of 102 physiotherapy students aged 18–25 participated, selected using convenience sampling. Students were recruited through in-class announcements and institutional emails. Participation was voluntary and required informed consent.

#### *Inclusion Criteria*

Enrollment in the physiotherapy program at the time of data collection.

Willingness to participate and provide self-reported academic performance.

#### *Exclusion Criteria*

Students with health conditions that prevent them from participating in PA.

Students who repeated coursework or withdrew from courses may have their GPA affected.

Incomplete or inconsistent responses in the survey.

### *Measures*

Physical Activity (PA) Assessment

PA levels were assessed using the International Physical Activity Questionnaire (IPAQ), which categorizes activity into low, moderate, and high-intensity PA based on the Metabolic Equivalent of Task (MET-min/week) (Lee et al., 2011; Medina et al., 2013)

#### *The following cut-off points were used*

Low PA: <600 MET-min/week

Moderate PA: 600–3000 MET-min/week

High PA: >3000 MET-min/week

#### *Academic Performance Measurement*

Academic performance was measured using self-reported Grade Point Average (GPA). GPA was categorized as:

Distinction: ≥3.67

Credit: 3.33–2.67

Pass: <2.67

#### *Demographic and Lifestyle Variables*

A structured questionnaire collected data on:

Age, gender, year of study

Body Mass Index (BMI) (calculated from self-reported height and weight)

Lifestyle factors: Smoking and alcohol consumption

BMI categories were classified as

Underweight: <18.5 kg/m²

Normal: 18.5–24.9 kg/m²

Overweight: 25.0–29.9 kg/m²

### *Statistical Analysis*

Descriptive statistics, including mean, standard deviation, and percentage, characterized the sample.

Spearman's correlation assessed the relationship between PA and GPA.

Chi-square tests evaluated associations between PA, gender, and BMI.

All analyses were conducted using SPSS version 2020, a widely recognized software for statistical computing, ensuring accuracy, reproducibility, and adherence to standard analytical practices.

Statistical power: A post-hoc power analysis was conducted to determine whether the sample size (N = 102)) provided sufficient power to detect correlations between physical activity and academic performance. These findings suggest that the sample size (n = 102) provides sufficient statistical power (0.80) to detect moderate correlations (α = 0.05) and is also sufficient to detect moderate to significant associations.

## Results

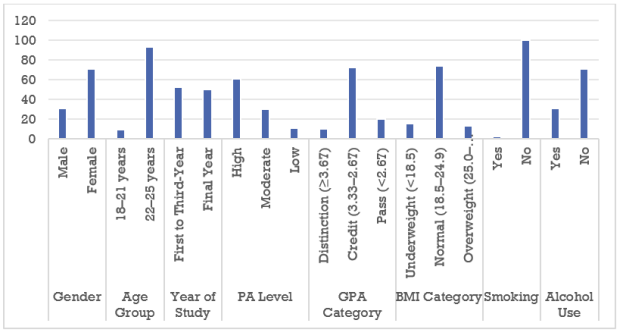
A total of 102 physiotherapy students participated in this study, with 70% female and 91.2% aged 22–25 years. Nearly half of the students (49.1%) were in their final year of study.

Table 1. Demographic and Lifestyle Characteristics of Participants

| Variables | Categories | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 31 | 30.40% |
| | Female | 71 | 69.60% |
| Age Group | 18–21 years | 9 | 8.80% |
| | 22–25 years | 93 | 91.20% |
| Year of Study | First to Third-Year | 52 | 50.90% |
| | Final Year | 50 | 49.10% |
| PA Level | High | 61 | 59.80% |
| | Moderate | 30 | 29.40% |
| | Low | 11 | 10.80% |
| GPA Category | Distinction (≥3.67) | 10 | 9.80% |
| | Credit (3.33–2.67) | 72 | 70.60% |
| | Pass (<2.67) | 20 | 19.60% |
| BMI Category | Underweight (<18.5) | 15 | 14.70% |
| | Normal (18.5–24.9) | 74 | 72.50% |
| | Overweight (25.0–29.9) | 13 | 12.70% |
| Smoking | Yes | 2 | 2.00% |
| | No | 100 | 98.00% |
| Alcohol Use | Yes | 31 | 30.40% |
| | No | 71 | 69.60% |

PA = Physical Activity; GPA = Grade Point Average; BMI = Body Mass Index.

Figure 1. Demographic and Lifestyle Characteristics of Participants




## Relationship Between PA and GPA

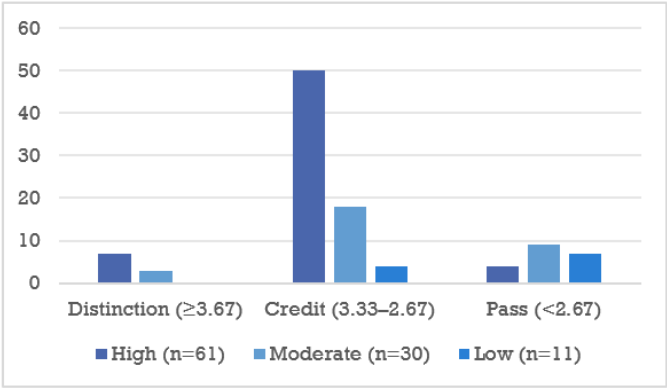
Spearman correlation analysis revealed a weak, non-significant association between physical activity (PA) levels and GPA ($r = -0.120$, $p = 0.228$), suggesting that PA does not have a direct influence on academic performance.

Table 2. Relationship Between PA Levels and GPA Categories

| PA Level | Distinction (≥3.67) | Credit (3.33–2.67) | Pass (<2.67) |
|---|---|---|---|
| High (n=61) | 7 | 50 | 4 |
| Moderate (n=30) | 3 | 18 | 9 |
| Low (n=11) | 0 | 4 | 7 |

Values represent participant frequencies (n) in each PA category.

Figure 2. Relationship Between PA Levels and GPA categories




Values represent participant frequencies (n) in each PA category.

## Gender and PA Relationship

Chi-square analysis revealed no significant association between gender and physical activity (PA) levels ($\chi^2 = 2.14$, $p = 0.343$), indicating that male and female students participate in PA at similar rates.

## BMI and Academic Performance

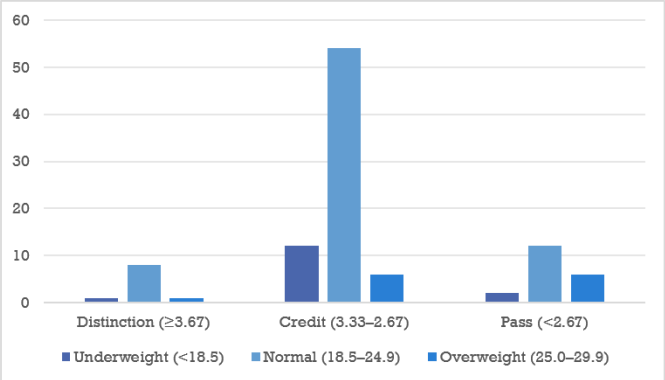
BMI was not significantly correlated with GPA ($p = 0.415$), supporting previous findings that BMI may not be a strong predictor of academic success (Calestine et al., 2017).

Table 3. BMI Categories and Academic Performance

| BMI Category(n) | Distinction (≥3.67) (n) | Credit (3.33–2.67) (n) | Pass (<2.67) (n) |
|---|---|---|---|
| Underweight (<18.5) | 1 | 12 | 2 |
| Normal (18.5–24.9) | 8 | 54 | 12 |
| Overweight (25.0–29.9) | 1 | 6 | 6 |

Values represent participant frequencies (n) in each BMI category.

Figure 3. BMI Categories and Academic Performance




Values represent participant frequencies (n) in each BMI category.

Lifestyle Factors (Smoking & Alcohol Consumption)

98% of students did not smoke.

69.6% abstained from alcohol.

These findings align with Gignon et al. (2015), suggesting that physiotherapy students tend to engage in health-conscious behaviours.

## Discussion

This study examined the correlation between physical activity (PA) and academic performance (AP) among physiotherapy students. The findings revealed no significant association between PA levels and GPA ($r = -0.120$, $p = 0.228$), suggesting that higher PA engagement does not necessarily enhance academic performance in this population. These results align with previous studies by Kayani et al. (2018) and Castro-Sánchez et al. (2019), which found that PA primarily benefits overall well-being rather than directly influencing academic success.

Although PA has been associated with cognitive function, memory, and stress reduction, several factors may explain why no significant correlation was found in this study. Academic performance is multifactorial – GPA is influenced by variables such as study habits, learning environments, motivation, and curriculum structure, which may outweigh the effects of PA (Tomporowski et al., 2011)

PA type and intensity were not analyzed separately – Different forms of PA (e.g., aerobic exercise vs. strength training) may have distinct cognitive effects, which were not differentiated in this study.

Time displacement hypothesis – Some research suggests that increased PA may reduce study time, potentially neutralizing any cognitive benefits in terms of GPA (Calestine et al., 2017).

Self-reported data limitations – Both PA levels and GPA were self-reported, introducing potential biases in measurement accuracy.

A notable finding was that 59.8% of participants reported high PA levels, contradicting studies that suggest university students experience a decline in PA due to academic pressures (Acampado & Valenzuela, 2018). This may be due to the nature of physiotherapy education, which emphasizes physical movement and exercise, encouraging students to maintain an active lifestyle despite the demands of their academic pursuits.

Additionally, no significant gender differences were found in PA engagement ($\chi^2 = 2.14$, $p = 0.343$), in contrast to studies suggesting that female students are less active due to exhaustion and social priorities (Boozer, 2017; Alkhateeb et al., 2019). This could be attributed to the professional emphasis on physical health in physiotherapy training, leading to similar PA participation rates among male and female students.

BMI was not significantly correlated with GPA ($p = 0.415$), supporting previous findings that BMI may not strongly predict academic success (Calestine et al., 2017). Most participants (72.5%) had normal BMI levels, and those classified as overweight included individuals engaged in high-intensity physical activity (e.g., strength training), which may have mitigated any adverse academic effects.

Lifestyle data also showed low smoking rates (2%) and moderate alcohol consumption (30.4%), aligning with studies suggesting that medical and health science students adopt health-conscious behaviours (Gignon et al., 2015). However, Kötter et al. (2019) noted that some students use alcohol as an academic stress-coping mechanism, indicating that external lifestyle influences may play a role in student performance.

Although no significant PA-GPA relationship was found, PA remains crucial for cognitive health, mental well-being, and stress management. Future research should differentiate PA types (aerobic vs. anaerobic) to explore their specific cognitive and academic effects. A key limitation of our study is the inability to perform linear regression analysis and adjust for potential confounders due to data constraints. While these analyses would have provided more profound insights, we have explicitly acknowledged this limitation in our discussion. Future research should address these aspects to enhance the robustness of findings in this area.

Employ objective PA measures (e.g., wearable activity trackers) to minimize self-reporting bias.

Conduct longitudinal studies to assess long-term PA trends and their academic impact over time.

## Conclusions

According to this study, students pursuing a career in physiotherapy maintain high physical activity (PA) levels without compromising their academic achievement. Although physical activity (PA) improves general health and well-being, it does not appear to affect GPA directly. These results suggest that students in health-related disciplines can successfully incorporate PA into their academic timetables. More longitudinal studies are required to investigate long-term patterns and possible indirect advantages of PA on academic results.

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## Author contributions

Conceptualization, T.A., A.S., and S.S.; Methodology, A.S. and S.S.; Validation, L.A and R.A.; Writing — Original Draft Preparation, S.S.; T.A., and A.S.; Editing, K.R., A.F., and P.A and Supervision, S.S., and Project Administration, A.S., S.S., and K.C.

## Conflicts of Interest

All authors clearly stated that they have no conflicts of interest.

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