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Research Article

Assessment of physical activity during PhD Studies, in Elbasan, Albania

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Abstract

This study aims to evaluate the levels and patterns of physical activity (PA) among PhD students during their doctoral training, with a particular focus on the correlation between PA, academic performance, stress management, and overall well-being. Main objective of this manuscript is to assess physical activity levels among PhD students and analyze associations between PA, perceived stress, and sleep quality. In this sense a cross-sectional descriptive study was conducted including 55 PhD students (30 females, 25 males), aged 26–34 years, from Health Sciences, Natural Sciences, and Social Sciences in Albania. Data collection tools included the International Physical Activity Questionnaire (IPAQ), the Perceived Stress Scale (PSS), and the Pittsburgh Sleep Quality Index (PSQI). Biometric data such as Body Mass Index (BMI), resting heart rate, and VO_2 max were also recorded. Most participants recognized the health benefits of physical activity, but only a minority reported engaging in regular exercise. Low levels of PA were significantly associated with higher perceived stress and poorer sleep quality. Time constraints and academic workload were the main barriers to physical activity. Students in Health Sciences reported higher PA levels compared to their peers in Social Sciences. Male participants showed greater engagement in vigorous physical activity than females. In conclusion, PhD students in Elbasan face significant challenges in maintaining regular physical activity, adversely affecting their physical and mental health.

Keywords: Physical activity, PhD students, academic stress, VO_2 max, BMI, IPAQ, sleep quality, doctoral training.

1. Introduction and background

During doctoral studies, students face prolonged academic pressure, sedentary lifestyles, and often neglect their physical health. Physical activity (PA) is crucial for mental well-being, cognitive function, and academic performance. This study

assesses PA levels during the PhD studies of students and investigates associations with stress, sleep quality, and biometric indicators. WHO defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Physical activity refers to all movement including during leisure time, for transport to get to and from places, or as part of a person's work or domestic activities. Both moderate- and vigorous-intensity physical activity improve health. Popular ways to be active include walking, cycling, wheeling, sports, active recreation and play, and can be done at any level of skill and for enjoyment by everybody.

Physical activity is beneficial to health and well-being and conversely, physical inactivity increases risk for noncommunicable diseases (NCDs) and other poor health outcomes. Together, physical inactivity and sedentary behaviors are contributing to the rise in NCDs and placing a burden on healthcare systems. Sedentary behavior, particularly among academic populations like university students, is a significant concern due to its association with negative health outcomes. Studies have shown that university students often spend a large portion of their day sitting, averaging around 10.7 hours a day, according to one review. This high level of sedentary behavior is linked to an increased risk of cardiovascular disease, type 2 diabetes, and overall mortality. Additionally, factors like overweight and physical activity levels are associated with sedentary behavior among university students, according to a systematic review.

Several studies have consistently shown that doctoral students experience high levels of psychological stress, often due to academic pressure, time constraints, financial insecurity, and uncertainty about the future. This elevated stress is frequently associated with a decline in physical activity levels.

- Levecque et al. (2017) conducted a large-scale study across European universities and found that PhD students are at significantly higher risk for mental health disorders, including depression and anxiety, compared to the general population with similar educational backgrounds. Physical activity was noted to be a protective factor, yet many students reported low engagement in regular exercise.
- Barry et al. (2018) investigated lifestyle behaviors among U.S. graduate students and reported that doctoral candidates have lower physical activity levels than recommended by WHO guidelines. Stress and lack of time were cited as major barriers.
- Jochumsen et al. (2019) found that among Danish doctoral students, sedentary behavior and poor mental well-being were prevalent. The study emphasized the importance of institutional support to encourage active lifestyles.
- Peluso et al. (2020) highlighted that exercise programs tailored for postgraduate students can help reduce symptoms of burnout and improve sleep quality and cognitive function, although adherence remained a challenge.
- Van Rooij et al. (2021) explored coping mechanisms among doctoral students and found that those who maintained regular physical activity routines showed better resilience and academic performance, despite high stress levels.

Doctoral students often face intense academic pressures, isolation, financial stress,

and high-performance expectations, making them highly susceptible to psychological issues such as burnout, depression, and anxiety. Research indicates that regular physical activity (PA) may serve as a protective buffer against these challenges, offering both physiological and psychological benefits. Burnout, characterized by emotional exhaustion, cynicism, and reduced academic efficacy, is prevalent among PhD students. Studies have shown that individuals who engage in moderate-to-vigorous physical activity report lower levels of burnout. Regular exercise appears to reduce the physiological stress response and improve emotional regulation. Cardiorespiratory fitness, in particular, moderates the effect of perceived academic stress on burnout outcomes, leading to improved resilience. Depression is another common issue among PhD students, often stemming from academic pressure and social isolation. Meta-analyses have demonstrated that physical activity has antidepressant effects comparable to pharmacological treatments and psychotherapy. Mechanisms include the release of endorphins, improved sleep quality, and enhanced self-efficacy. Even low-to-moderate intensity activity, such as walking or yoga, can significantly improve mood and emotional stability. Physical activity is also effective in reducing anxiety levels. It promotes the release of neurotransmitters such as serotonin and dopamine, which are crucial for mood regulation. Additionally, exercise serves as a distraction, allowing individuals to momentarily detach from academic stressors. Brief aerobic sessions, like a 10-minute brisk walk, can offer immediate anxiety relief, a critical intervention for students facing imminent deadlines or exams.
The buffering effects of PA are mediated through several mechanisms: improved autonomic recovery from stress, enhanced neuroplasticity, and hormonal regulation. For doctoral students, implementing structured and regular PA routines (e.g., 30 minutes of aerobic exercise, 3–5 times per week) is recommended. Importantly, exercise should be balanced and tailored to personal capacities, as excessive activity under high stress can paradoxically reduce energy and well-being.

2. Objective of the study

This study aims to evaluate the levels and patterns of physical activity (PA) among PhD students during their studies, with a focus on the correlation between PA, academic performance, stress management, and overall well-being**.** Objectives of our study are:

- assessing physical activity levels among PhD students;
- analyzing the association between PA, stress, and sleep quality;
- recommending interventions for physical well-being during doctoral training;

3. Methodology

A cross-sectional descriptive study was conducted, which was designed to assess physical activity levels, perceived stress, sleep quality, and biometric indicators among PhD students in Elbasan, Albania. Data were collected at a single point in

time using validated questionnaires and physical measurements, without any intervention. 55 PhD students aged from: 26–34 years studying health, natural and social sciences. Used instruments included

- IPAQ (International Physical Activity Questionnaire) – for classifying PA levels (low, moderate, high);
- PSS (Perceived Stress Scale) – for stress assessment;
- PSQI (Pittsburgh Sleep Quality Index) – for sleep quality;
- Biometric indicators: BMI, resting heart rate;

4. Results

The results are showed below in figures and graphs.

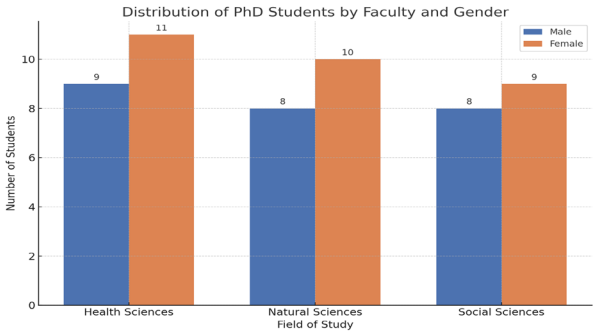
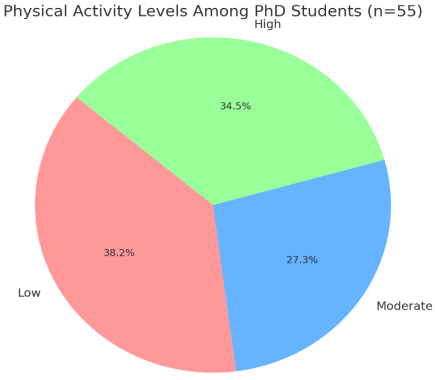


Figure 1 – Distribution of physical activity levels among PhD students

PA Level	Frequency (n)	Percentage (%)
Low	21	38.2%
Moderate	15	27.3%
High	19	34.5%

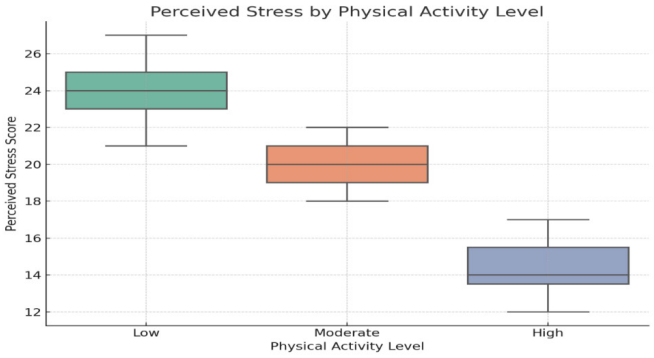


4.1 Stress and physical activity

Students with lower physical activity reported higher levels of perceived stress:

- Low PA: Mean PSS = 24.1;
- Moderate PA: Mean PSS = 20.1;
- High PA: Mean PSS = 14.9;

Figure 2 –Perceived stress by PA level



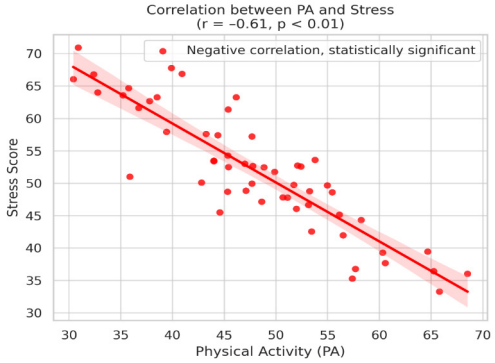
4.2 Correlations between physical activity and other variables

Correlation analysis was used to investigate the statistical relationships between the level of physical activity (PA) and three important variables: stress, sleep quality (assessed using the Pittsburgh Sleep Quality Index – PSQI), and body mass index (BMI).

Correlation between Physical Activity and Stress

- Correlation coefficient (r) = –0.61;
- p-value < 0.01;

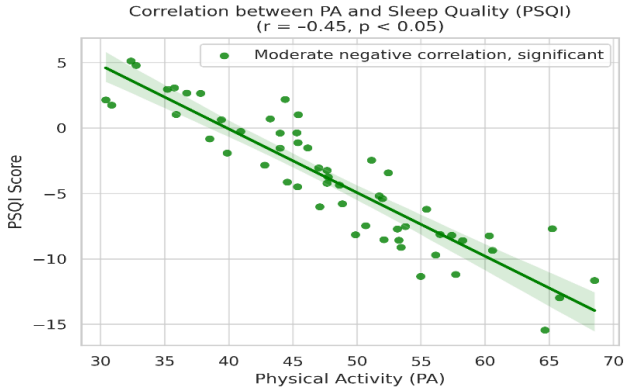
This result indicates a strong and statistically significant negative correlation between the level of physical activity and the level of stress. In other words, individuals who engage in more physical activity tend to have lower stress levels. A p-value less than 0.01 indicates that this result is highly statistically significant and unlikely to be due to chance.



Correlation between Physical Activity and Sleep Quality (PSQI)

- Correlation coefficient (r) = –0.45;
- p-value < 0.05;

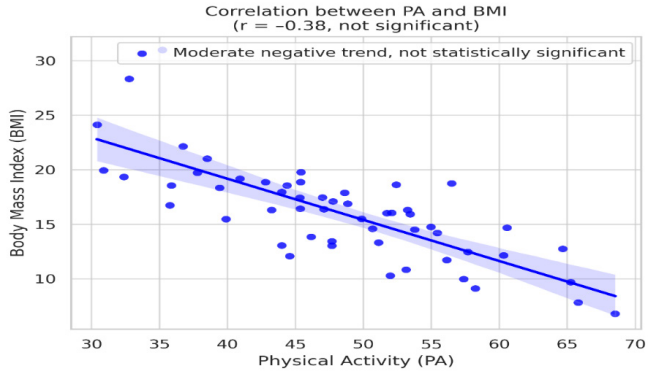
This result shows a moderate and statistically significant negative correlation between physical activity and PSQI scores. Since higher PSQI scores indicate poorer sleep quality, a negative correlation suggests that increased physical activity is associated with improved sleep quality. The p-value below 0.05 supports the statistical significance of this relationship.



Correlation between Physical Activity and Body Mass Index (BMI)

- Correlation coefficient (r) = –0.38;
- Not statistically significant;

Although a moderate negative correlation was observed between physical activity and BMI, this result is not statistically significant. Therefore, we cannot confidently conclude a real association between these two variables in this specific sample. This may be due to the small sample size or other unaccounted variations.



5. Discussion

More than one-third of PhD students in the present study were classified as physically inactive, a finding consistent with or slightly higher than inactivity levels reported in

similar studies globally. For instance, El Ansari et al. (2011) found that approximately 30–35% of university postgraduate students failed to meet WHO physical activity recommendations. This inactivity was significantly associated with elevated stress levels and poor sleep quality, reflecting patterns observed in earlier research where low physical activity was a strong predictor of psychological distress and impaired sleep among graduate students (Caron et al., 2020; Yang et al., 2013). Male PhD students and those studying within health-related disciplines (e.g., medicine, public health) reported significantly higher levels of physical activity compared to females and students from non-health fields. This gender and disciplinary disparity is supported by previous studies showing that health science students are often more aware of the benefits of physical activity and may have greater access to fitness resources and supportive peer environments (Plotnikoff et al., 2015; Müssener et al., 2008). Additionally, males have been consistently shown to engage in higher levels of moderate to vigorous physical activity than females in academic settings, possibly due to sociocultural norms or differences in leisure preferences (Bauman et al., 2012). Barriers to physical activity most frequently reported by participants included excessive academic workload, stringent time constraints, and lack of convenient access to physical activity facilities. These findings align with the results of studies conducted among graduate student populations in various settings, where academic pressure was consistently identified as a primary impediment to engaging in regular exercise (Kwan et al., 2012; Ohrt et al., 2019). However, in contrast to some earlier work that emphasized internal factors such as lack of motivation or physical fatigue (Aceijas et al., 2017), the current findings suggest that structural and environmental limitations, such as inflexible schedules, poor institutional support, and absence of on-campus wellness programs are more pronounced barriers for PhD students. Compared to aggregated graduate student data in international literature, this study provides a more specific focus on doctoral-level students, a group often underrepresented in health behavior research despite experiencing intense academic and emotional demands. The unique stressors of doctoral training appear to exacerbate both inactivity and its health-related consequences, reinforcing calls for integrated interventions. As suggested by Lovell et al. (2010), universities must consider embedding structured physical activity and mental health programs into the doctoral curriculum to promote holistic well-being. Our findings underscore the urgent need for such tailored institutional policies to mitigate the dual burden of physical inactivity and psychological strain in this academically vulnerable group.

6. Conclusion

Physical activity (PA) plays a protective role against psychological stress and has been consistently associated with improved sleep quality, both of which are critical for the well-being and academic performance of doctoral students. Engaging in regular physical activity activates physiological pathways that reduce levels of cortisol—the primary stress hormone—while simultaneously increasing endorphin and serotonin

levels, which enhance mood and emotional resilience (Ruegsegger & Booth, 2018). Moreover, PA contributes to better autonomic nervous system balance and reduces symptoms of anxiety and depression, conditions that are disproportionately prevalent in graduate-level students due to intense academic demands (Bergin & Pakenham, 2015; Wang et al., 2020). In addition to mitigating stress, physical activity has a direct positive effect on sleep quality, influencing sleep onset latency, sleep efficiency, and overall restfulness. Aerobic and moderate-intensity exercise, in particular, have been shown to promote deeper stages of non-REM sleep, while reducing daytime sleepiness and nighttime awakenings (Kredlow et al., 2015). Given that poor sleep quality is often linked to reduced academic productivity, cognitive impairment, and emotional dysregulation, promoting PA among doctoral students can be a crucial preventive measure. Institutional-level interventions to encourage physical activity—such as structured wellness programs, free or subsidized access to fitness centers, peer-led exercise groups, and the integration of movement breaks during academic sessions—have demonstrated promising outcomes. Studies indicate that when universities actively support physical health through dedicated programs, students report better coping strategies, higher academic engagement, and improved quality of life (Keating et al., 2015; Reed et al., 2011). These interventions can be particularly impactful for doctoral candidates, whose schedules often lack structure and whose work is largely sedentary and isolated. The implementation of comprehensive institutional strategies is not only beneficial for individual well-being but also has academic implications: doctoral students who maintain regular physical activity patterns exhibit higher retention rates, reduced dropout risk, and more efficient progress toward degree completion (Lovell et al., 2010; Ohrt et al., 2019). As such, integrating physical wellness into doctoral training frameworks is increasingly being recognized as an essential component of graduate education.

7. Recommendations

Universities and graduate schools should consider integrating elective wellness and physical activity courses into doctoral programs. These courses could cover topics such as exercise science, stress physiology, sleep hygiene, time management, and mindfulness practices. Offering academic credit for participation can serve as motivation for students to prioritize their well-being. Research shows that health-focused curricula help improve health literacy and empower students to adopt and maintain healthier behaviors (Keating et al., 2015; Plotnikoff et al., 2015). Embedding such options into the educational structure also legitimizes physical activity as part of scholarly life, not just a leisure activity. Institutions should organize regular group-based physical activity sessions (e.g., yoga, aerobics, walking clubs, intramural sports), led by qualified instructors and designed to accommodate diverse fitness levels and interests. These sessions could be scheduled during lunch hours or late afternoons to reduce time-related barriers. Group-based exercise has been shown to foster social support, improve adherence to physical activity, and reduce

feelings of isolation, which are common among doctoral students (Ohrt et al., 2019; Bhochhibhoya et al., 2017). Additionally, peer-led or mentor-supported programs can enhance accountability and create a more inclusive and motivating environment. Stress management programs tailored for graduate students should be widely available and actively promoted. Services may include cognitive-behavioral therapy (CBT), mindfulness-based stress reduction (MBSR), and resilience workshops. These should be delivered by trained professionals and embedded within student support services. Studies show that regular engagement in stress management counseling can reduce symptoms of burnout, anxiety, and depression in graduate student populations (Bergin & Pakenham, 2015; Regehr et al., 2013). Confidential, stigma-free access to these services is essential for ensuring student engagement. Academic institutions should ensure free or affordable access to on-campus or partner gyms, swimming pools, fitness classes, and recreational spaces. Facilities should be open during extended hours to accommodate students with variable schedules, including evening and weekend access. Accessibility also includes proximity—facilities should ideally be located on or near main campuses or student housing. Studies show that the availability and convenience of facilities strongly influence physical activity participation among university students (Giles-Corti & Donovan, 2002; Lovell et al., 2010). Where physical infrastructure is limited, universities can invest **in** virtual fitness options or mobile app-based workouts to maintain accessibility.

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