

PREVALENCE OF SLEEP PROBLEMS AND ITS ASSOCIATION WITH SPORTS PARTICIPATION AMONG UNDERGRADUATE UNIVERSITY STUDENTS

Original Research

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ABSTRACT

Background: Sleep is a fundamental physiological process essential for cognitive function, mental well-being, and overall health. However, sleep disturbances among university students have become increasingly prevalent, often leading to adverse academic and health-related outcomes. Physical activity, particularly sports participation, has been suggested to enhance sleep quality, but conflicting findings exist. Limited research has directly examined the association between sports participation and sleep quality among university students. This study aimed to assess the prevalence of sleep disturbances and evaluate the impact of sports participation on sleep quality in undergraduate university students.

Objective: To investigate the association between sports participation and the prevalence of sleep disturbances among undergraduate students and compare the sleep quality of student-athletes and non-athlete students.

Methods: A cross-sectional study was conducted among 378 undergraduate university students (males = 211, females = 167), aged 17–28 years ($M = 21.30$, $SD = 1.822$), randomly selected from five universities. Data collection involved the Pittsburgh Sleep Quality Index (PSQI), demographic information, and an assessment of physical activity levels. Sleep quality was analyzed using independent samples t-tests and chi-square tests with IBM SPSS Statistics V22.0.

Results: The mean global PSQI score was significantly lower in student-athletes ($M = 4.53$, $SD = 1.73$) than in non-athletes ($M = 7.22$, $SD = 3.02$), $t(376) = 10.37$, $p < .001$, indicating better sleep quality in student-athletes. Good sleepers ($PSQI \leq 5$) were significantly more prevalent among athletes (77.6%) compared to non-athletes (32.4%) ($p < .001$). Student-athletes showed significantly lower scores in subjective sleep quality ($M = 0.55$ vs. $M = 1.16$, $p < .001$), sleep latency ($M = 1.16$ vs. $M = 1.81$, $p < .001$), sleep disturbances ($M = 1.01$ vs. $M = 1.15$, $p = .002$), and daytime dysfunction ($M = 0.92$ vs. $M = 1.50$, $p < .001$). However, 22.4% of student-athletes still exhibited poor sleep quality, highlighting sleep-related concerns even among active individuals.

Conclusion: While student-athletes exhibited significantly better sleep quality compared to non-athletes, sleep disturbances were prevalent in both groups. Promoting structured physical activity programs and targeted interventions in university settings may help mitigate sleep-related issues. Addressing sleep hygiene in both athletic and non-athletic populations remains crucial for overall health and academic success.

Keywords: Athletic performance, Physical activity, Pittsburgh Sleep Quality Index, Sleep hygiene, Sleep latency, Sleep quality, University students.

INTRODUCTION

Sleep is a fundamental physiological process crucial for maintaining optimal physical and mental health across all age groups. Adequate sleep, both in quality and duration, is essential for sustaining an active and healthy lifestyle. However, university students often experience sleep disturbances, which may have adverse consequences on their overall well-being and academic performance. Research has linked sleep problems in student populations with anxiety, inattention, depression, hyperactivity-impulsivity, and attention deficits (1). Additionally, poor sleep has been associated with self-efficacy (2), self-harm and suicidal behavior (3), fatigue (4), and academic performance and motivation (5,6). The prevalence of sleep disturbances among university students is alarmingly high, as indicated by findings from multiple countries, including Lithuania (69%) (7), India (47.1%) (8), Hong Kong (70%) (9), and Nepal (31.5%) (10). Various factors contribute to poor sleep among students, such as academic stress, family conflicts, environmental factors like air quality, and psychological distress (11). Given the significant implications of sleep disturbances, addressing this issue in university students is imperative to safeguard their overall health and well-being.

Physical activity, including sports participation and structured exercise programs, has been widely recognized as a potential strategy to enhance sleep quality. Some studies suggest that regular engagement in physical exercise improves sleep patterns and overall physical health among university students (12,13). Furthermore, evidence highlights the beneficial effects of moderate-intensity physical activity on sleep in adults (14). However, conflicting findings exist regarding the impact of athletic participation on sleep quality, with some research indicating no effect (15,16) or even a negative influence (11,12,15). Notably, several studies have reported a higher prevalence of sleep disturbances among student-athletes than non-athlete students (12,17-20). These inconsistencies in the literature underscore the need for further investigation into the relationship between sports participation and sleep quality among university students. Despite growing research on sleep disturbances and their determinants, there remains a gap in understanding the prevalence of sleep problems in undergraduate university students and their association with sports participation. Therefore, this study aims to examine the relationship between sports engagement and sleep disturbances in undergraduate students. Specifically, it seeks to compare Pittsburgh Sleep Quality Index (PSQI) scores between students who participate in sports and those who do not and determine whether the global PSQI score and its sub-components differ between these groups. By addressing this gap, the study aims to provide valuable insights for healthcare professionals, educators, and policymakers, facilitating the development of targeted interventions to mitigate sleep-related challenges and improve students' health and academic performance.

METHODS

This study employed a cross-sectional design to examine the prevalence and variations in sleep problems among undergraduate university students, comparing student-athletes and non-athlete students. A total of 378 university students (males = 211, females = 167) aged between 17 and 28 years ($M = 21.30$, $SD = 1.822$) were recruited through random sampling from five universities. The sample size was determined using Yamane's formula (21), which provided an estimated overall sample, and the allocation of participants into two groups was based on study design considerations. A total of 174 student-athletes and 204 non-athlete students participated in the study. Inclusion criteria required participants to be currently enrolled undergraduate students and provide informed consent. Individuals with a history of diagnosed sleep disorders or chronic medical conditions affecting sleep were excluded to ensure sample homogeneity. Data were collected using a structured questionnaire, which comprised three sections: demographic information, physical activity level assessment, and sleep quality evaluation. The demographic section gathered details regarding age, gender, marital status, athletic status (intervarsity, national, or international level), type of sport, and years of experience in sports. The physical activity level was assessed using a validated four-item scale developed by Fulton and Kohl (22), categorizing participants into four activity levels: inactive (no exercise beyond daily routine), low active (less than 150 minutes of exercise per week), moderately active (150–300 minutes per week), and highly active (more than 300 minutes per week). The Pittsburgh Sleep Quality Index (PSQI), a widely used and validated instrument for assessing sleep quality and sleep-related issues (23), was employed to classify individuals as "good sleepers" or "poor sleepers." This tool measures subjective sleep duration, latency, and overall quality over the past month through 19 self-reported items (24). The PSQI has demonstrated strong validity in college populations (25) and exhibited satisfactory internal consistency in this study (Cronbach's $\alpha = .721$).

Data collection was conducted in person during May and June 2022. All participants provided written informed consent before participation, and confidentiality was assured by clarifying that the collected data would be used solely for research purposes. Participants were informed of their right to withdraw from the study at any stage without any repercussions. Additionally, they were encouraged to ask any questions regarding the survey and questionnaire before proceeding. The data collection process was standardized across all participants to minimize potential biases. Ethical approval for the study was obtained from the Institutional Review Board (IRB), ensuring adherence to ethical research guidelines. Data were analyzed using IBM SPSS Statistics V22.0. Descriptive statistics, including means and frequencies, were computed to summarize participant characteristics. An independent samples t-test was performed to compare mean PSQI scores between student-athletes and non-athlete students. Additionally, a chi-square test for two independent samples was conducted to examine associations between categorical variables across the two groups.

RESULTS

The analysis of Pittsburgh Sleep Quality Index (PSQI) scores revealed significant differences between student-athletes and non-athletes. Lower PSQI scores across all components indicated better sleep quality. An independent samples t-test demonstrated that student-athletes had significantly better subjective sleep quality ($M = 0.55$, $SD = 0.62$) than non-athletes ($M = 1.16$, $SD = 0.78$), $t(376) = 8.24$, $p < .001$, Cohen's $D = 0.86$. Sleep latency was also significantly lower in student-athletes ($M = 1.16$, $SD = 0.87$) compared to non-athletes ($M = 1.81$, $SD = 1.03$), $t(376) = 6.59$, $p < .001$, Cohen's $D = 0.68$, indicating that student-athletes took less time to fall asleep. Sleep duration was significantly longer in student-athletes ($M = 0.64$, $SD = 0.69$) compared to non-athletes ($M = 1.00$, $SD = 0.88$), $t(376) = 4.29$, $p < .001$, Cohen's $D = 0.46$. The mean score for sleep disturbances was also significantly lower in student-athletes ($M = 1.01$, $SD = 0.37$) than in non-athletes ($M = 1.15$, $SD = 0.47$), $t(376) = 3.20$, $p = .002$, Cohen's $D = 0.45$. Habitual sleep efficiency was significantly higher in student-athletes ($M = 0.20$, $SD = 0.61$) than in non-athletes ($M = 0.49$, $SD = 0.85$), $t(376) = 3.68$, $p < .001$, Cohen's $D = 0.38$.

No significant difference was found in the use of sleep medication between student-athletes ($M = 0.05$, $SD = 0.21$) and non-athletes ($M = 0.12$, $SD = 0.47$), $t(376) = 1.85$, $p = .065$, Cohen's $D = 0.19$. However, daytime dysfunction was significantly lower in student-athletes ($M = 0.92$, $SD = 0.68$) compared to non-athletes ($M = 1.50$, $SD = 0.83$), $t(376) = 7.36$, $p < .001$, Cohen's $D = 0.76$, suggesting that student-athletes experienced fewer daytime impairments due to sleep disturbances. The global PSQI score, which represents overall sleep quality, was significantly lower in student-athletes ($M = 4.53$, $SD = 1.73$) compared to non-athletes ($M = 7.22$, $SD = 3.02$), $t(376) = 10.37$, $p < .001$, Cohen's $D = 1.09$. These results indicate that student-athletes generally had better overall sleep quality than non-athlete students. A chi-square test further analyzed the classification of participants as either "good sleepers" (PSQI score ≤ 5) or "bad sleepers" (PSQI score > 5). The results showed that a significantly higher proportion of student-athletes (77.6%) were classified as good sleepers compared to non-athletes (32.4%) ($p < .001$). Conversely, bad sleepers were more prevalent among non-athletes (67.6%) than among student-athletes (22.4%), reinforcing the trend that student-athletes generally exhibited superior sleep quality. However, the presence of poor sleepers among student-athletes (22.4%) highlights that a notable proportion of athletes still experience sleep disturbances.

Table 1: Demographic Characteristics of the Non-Athlete students (N = 204)

Characteristics	Category	frequency	Percentage (%)
Age	18-24 years	195	95.6
	25-30 years	9	4.4
Gender	Male	106	52
	Female	98	48
Marital status	Single	202	99
	Married	2	1.0
Athletic status	Do not play sports	204	100

Table 2: Demographic Characteristics of Students Athletes (N = 174)

Characteristics	Category	frequency	Percentage (%)
Age	18-24 years	162	93.1
	25-30 years	12	6.9
Gender	Male	105	60.3
	Female	69	39.7
Marital status	Single	173	99.4
	Married	1	0.6
Athletic status	Intervarsity level	60	34.5
	National level	108	62.1
	International level	6	3.4
Type of sport	Football	47	27
	Cricket	18	10.3
	Volleyball	17	9.8
	Athletics	25	14.4
	Boxing	1	0.6
	Mountaineering	1	0.6
	Basketball	16	9.2
	Cycling	2	1.1
	Badminton	4	2.3
	Rowing	11	6.3
	Baseball	1	0.6
	Martial arts	14	8.0
	Rugby	2	1.1
	Archery	6	3.4
	Table tennis	7	4
	Hockey	2	1.1
Years of experience in sport	1-2 years	39	19.4
	3-4 years	49	28.2
	5-6 years	63	36.2
	7-8 years	15	8.6
	Above ten years	8	4.6

Table 3: Level of physical activity

Physical activity level	Athletes	Percentage	Non-athletes	Percentage
None	0	0.0	132	64.7
Low	7	4	52	25.5
Moderate	18	10.3	14	6.9
High	149	85.6	6	2.9
Total	174	100	204	100

Table 4: Subjective Sleep Quality in Athletes and Non-Athletes

	Athletes	Non-Athletes				
Variables	M ± SD	M ± SD	t	df	p	Cohen
Subjective sleep quality	0.55±0.62	1.16±0.78	8.24	376	0.000	0.86
Sleep latency	1.16±0.87	1.81±1.03	6.59	376	0.000	0.68
Sleep duration	0.64±0.69	1.00±.88	4.29	376	0.000	0.46
Sleep disturbances	1.01±0.37	1.15±0.47	3.20	376	0.002	0.45
Habitual sleep efficiency	0.20±0.61	0.49±0.85	3.68	376	0.000	0.38
Use of sleep medication	0.05±0.21	0.12±0.47	1.85	376	0.065	0.19
Daytime dysfunction	0.92±0.68	1.50±0.83	7.36	376	0.000	0.76
Global score	4.53±1.73	7.22±3.02	10.37	376	0.000	1.09

Table 5: Global score

Response	Score	Athletes n=174 (46%)	Non-athletes n=204 (54%)	P-value
Good sleeper	≤5	n=135(77.6%)	n=66(32.4%)	0.000
Bad sleeper	>5	n=39(22.4%)	n=138(67.6%)	
Mean ± SD	t statistic	4.53 ±1.72	7.22± 3.02	0.000

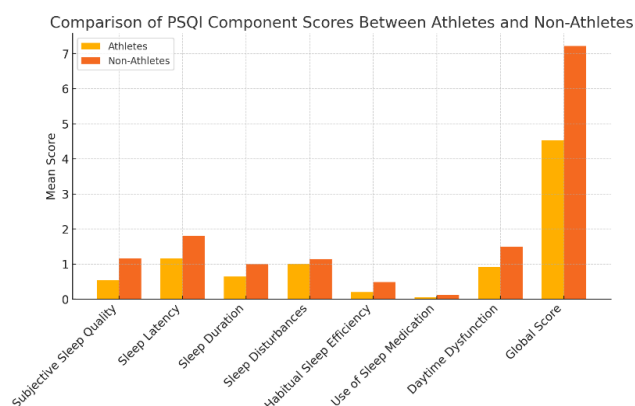


Figure 2 Comparison of PSQI Component Scores Between Athletes and Non-Athletes

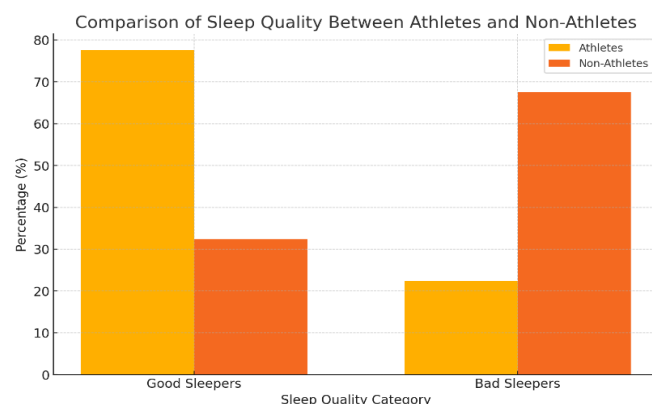


Figure 1 Comparison of Sleep quality between Athletes and Non-Athletes

DISCUSSION

The findings of this study highlight a significant difference in sleep quality between student-athletes and non-athlete university students. The global Pittsburgh Sleep Quality Index (PSQI) score was considerably lower among student-athletes, indicating better sleep quality in comparison to their non-athlete counterparts. The mean PSQI score among athletes was 4.53, whereas non-athletes had a substantially higher mean score of 7.22, exceeding the threshold for poor sleep quality. Consistently, student-athletes demonstrated significantly better outcomes across multiple sleep parameters, including subjective sleep quality, sleep latency, daytime dysfunction, habitual sleep efficiency, and sleep duration. These findings support existing literature that has reported a strong association between physical activity and improved sleep quality in university students (26,27). Previous studies have documented similar trends, with student-athletes exhibiting better sleep quality than non-athletes. Regular engagement in physical activities, particularly moderate to high-intensity exercise, has been associated with improved sleep patterns, including reduced sleep latency and fewer sleep disturbances. Exercise has been suggested to positively influence sleep by regulating circadian rhythms, reducing stress levels, and promoting physiological relaxation, which may explain the observed differences in sleep quality between both groups. However, despite the overall superior sleep quality among student-athletes, a notable proportion (22.4%) of athletes still experienced poor sleep quality, underscoring that participation in sports does not entirely eliminate sleep problems (28,29).

The prevalence of poor sleep quality among university students, particularly non-athletes, remains concerning. More than two-thirds (67.6%) of non-athlete students in this study were categorized as poor sleepers, with an average PSQI score of 7.22, reflecting significant sleep disturbances. These findings align with global trends, where a high proportion of university students report sleep difficulties, irrespective of their academic field or geographic location. The prevalence of sleep disturbances among non-athletes in this study was alarmingly high across multiple sleep parameters, including subjective sleep quality, sleep latency, daytime dysfunction, and sleep duration. The lack of physical activity among non-athlete students may contribute to these adverse outcomes, as nearly two-thirds (64.7%) of this group reported a sedentary lifestyle, and only a small fraction engaged in moderate or high-intensity physical activity (30,31). The high prevalence of sleep problems in both groups, although more pronounced in non-athletes, suggests that university students may be at a heightened risk of sleep-related disorders. Factors such as academic stress, digital screen exposure, irregular sleep schedules, and lifestyle habits could contribute to poor sleep quality. The presence of sleep disturbances among athletes also warrants attention, particularly given the physical and cognitive demands of sports participation. Competitive athletes often experience disrupted sleep schedules due to training sessions, travel, and pre-competition stress, which may contribute to sleep deficits despite their overall better sleep quality compared to non-athletes (32,33).

One of the strengths of this study is its comparative approach, which provides insight into the sleep disparities between athletes and non-athletes within a university setting. The use of a validated sleep assessment tool (PSQI) enhances the reliability of the findings. However, certain limitations must be acknowledged. The cross-sectional nature of the study restricts the ability to establish causality between physical activity and sleep quality. Additionally, self-reported sleep measures may be subject to recall bias, and objective measures such as actigraphy or polysomnography could provide more accurate assessments in future studies. The study did not account for potential confounders such as academic workload, dietary habits, or screen time, which may also influence sleep patterns (34). Future research should consider longitudinal studies to assess sleep patterns over an extended period, particularly across different academic seasons, including examination periods, training seasons, and competitive phases. The impact of specific sports and their intensity levels on sleep quality warrants further investigation. Exploring gender-based differences in sleep disturbances among university students could also provide additional insights. Interventional studies focusing on sleep hygiene education, stress management strategies, and structured exercise programs could be valuable in mitigating sleep-related issues in university populations (12). The findings emphasize the critical role of physical activity in promoting sleep health among university students. Encouraging sports participation and structured exercise programs could be an effective strategy to address the increasing prevalence of sleep problems in this population. Given the substantial proportion of poor sleepers among university students, early screening for sleep disturbances and preventive strategies should be integrated into university health programs to enhance overall well-being and academic performance.

CONCLUSION

This study highlighted the widespread prevalence of sleep problems among university students, with significant differences observed between student-athletes and non-athletes. While both groups exhibited sleep disturbances across multiple parameters, student-athletes demonstrated comparatively better sleep quality and fewer sleep-related issues. These findings underscore the potential benefits of sports

participation in promoting healthier sleep patterns among university students. However, relying solely on physical activity may not be sufficient to address the growing concern of sleep disturbances in this population. A comprehensive approach, including structured exercise programs, sleep hygiene education, and targeted interventions, is essential to improving sleep health in university settings. Prioritizing sleep as a fundamental component of student well-being can contribute to better academic performance, mental health, and overall quality of life.

AUTHOR CONTRIBUTIONS

Author	Contribution
Mahpara Kanwal	Substantial Contribution to study design, analysis, acquisition of Data
	Manuscript Writing
	Has given Final Approval of the version to be published
Fariq Ahmed	Substantial Contribution to study design, acquisition and interpretation of Data
	Critical Review and Manuscript Writing
	Has given Final Approval of the version to be published
Muhammad Azam	Substantial Contribution to acquisition and interpretation of Data
	Has given Final Approval of the version to be published
Asif Ali*	Contributed to Data Collection and Analysis
	Has given Final Approval of the version to be published

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