

Assessment of Physical Activity and Sleeping Pattern Among Medical Students and Their Impact on Academic Performance

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Abstract: Background & objectives: Medical education is academically demanding and often associated with irregular sleep patterns and reduced physical activity among students. Inadequate sleep and sedentary behavior may adversely affect cognitive functioning, stress levels, and overall academic performance. The present study was conducted to assess sleep quality and physical activity levels among MBBS students and to examine their association with academic performance. **Methods:** A cross-sectional survey was conducted among 254 undergraduate medical students at Shyam Shah Medical College, Rewa, M.P. Data was collected using a structured Google Form. The form included Demographic details of Participants, The International Physical Activity Questionnaire-short form (IPAQ-sf) to assess physical activity. The Pittsburgh Sleep Quality Index (PSQI) to assess sleep patterns. Academic performance was assessed using academic percentage scores obtained from internal assessments. **Results:** Among the 254 participants, 39.4 per cent were females and 60.6 per cent were males. Majority of the students had poor sleep quality (69.3%). A statistically significant association was observed between physical activity levels and sleep quality ($p=0.05$). Physical activity levels were also significantly associated with academic grading ($p<0.001$). Academic percentage differed significantly according to gender and levels of physical activity ($p<0.001$). **Conclusion:** Physical activity demonstrated a significant association with academic performance among medical students, The promotion of regular physical activity may contribute to improved academic performance and overall well-being among medical students.

Keywords: Academic performance, medical students, Physical activity, PSQI, Sleep quality.

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INTRODUCTION

Sleep is an essential biological process that plays a crucial role in cognitive functioning, emotional regulation, and overall health. Adequate and good-quality sleep is fundamental for memory consolidation, attention, learning efficiency, and optimal academic performance. Variations in sleep-wake patterns may influence neurocognitive functioning and scholastic outcomes. However, evidence regarding the direct relationship between sleeping patterns and academic performance remains inconsistent. A study among medical students reported that different sleeping patterns were not significantly associated with academic performance [1], suggesting that academic achievement may be influenced by multiple interacting factors [1].

Sleep quality, beyond mere sleep duration, is an important determinant of cognitive efficiency. Poor sleep quality has been associated with impaired

concentration and reduced academic productivity. A study conducted among undergraduate medical students demonstrated a significant association between poor sleep quality and lower academic performance [2].

Medical education is widely recognized as academically rigorous and psychologically demanding. Students often compromise sleep and physical activity due to prolonged study hours and examination stress. A cross-sectional study among medical students reported significant correlations between sleep quality, physical activity, and academic performance [3], indicating that these modifiable lifestyle factors may independently and collectively influence scholastic outcomes.

Physical activity is an important determinant of mental well-being and sleep regulation. A study from South India assessing doctors and medical students reported a high prevalence of poor sleep quality along with varying levels of physical activity [4]. Similarly,

research conducted among healthcare students demonstrated a significant association between physical activity levels and sleep quality [5], suggesting that balanced physical activity may contribute to improved sleep outcomes.

Despite growing evidence on sleep quality and physical activity, limited research has comprehensively examined their combined association with academic performance across different professional years within the same academic setting. Therefore, the present study was undertaken to assess sleep quality and physical activity levels among MBBS students and to examine their association with academic performance across different professional years [6].

Objectives

- 1.To assess sleep quality among undergraduate medical students.
- 2.To assess levels of physical activity among undergraduate medical students.
- 3.To study the association of physical activity and sleep quality with academic performance.

METHODS

Study Setting

The study was conducted at Shyam Shah Medical College (SSMC), Rewa, Madhya Pradesh.

Study Duration

The study was carried out during 3 months

Study Population

The study population comprised undergraduate MBBS students enrolled in different professional years at SSMC during the study period [2].

Study Design

This was cross-sectional study conducted to assess sleep quality and physical activity levels and their association with academic performance among MBBS students.

Sample Size

According to previous studies [5], the prevalence of the outcome was around 79%. Assuming a similar prevalence (79%) in the present study, the sample size was calculated using the standard formula for cross-sectional studies ($n = Z^2pq/L^2$). A 95% confidence interval and 5% absolute precision were considered for the calculation. Based on this, the required sample size was calculated to be 254 participants.

Participant Selection

All MBBS students from various professional years were invited to participate in the study. Participation was voluntary. Students who provided informed consent and completed the questionnaire were included in the analysis. A total of 254 students participated in the study.

Statistical Analysis

Data were collected using a structured, pre-designed Google Form and subsequently entered into Microsoft Excel for coding and cleaning. Statistical analysis was performed using appropriate statistical software.

Descriptive statistics were used to summarize the data. Categorical variables were expressed as frequencies and percentages.

Chi-square test was applied to assess associations between categorical variables such as sleep quality, physical activity levels, gender, and professional year. For comparison of non-normally distributed continuous variables, Mann–Whitney U test and Kruskal–Wallis test was applied where appropriate.

A p-value of less than 0.05 was considered statistically significant.

Outcome Variables

The primary variables assessed in the study were sleep quality, physical activity level, and academic performance.

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). Based on global PSQI score: PSQI <5 was categorized as good sleep quality PSQI ≥5 was categorized as poor sleep quality

Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ). Based on MET-minutes per week, physical activity was classified as:

Low: <600 MET-minutes/week
Moderate: 600–3000 MET-minutes/week
High: >3000 MET-minutes/week

Academic performance was assessed using academic percentage scores obtained from internal assessments.

Ethical Issues

The study was conducted after obtaining approval from the Institutional Ethics Committee of Shyam Shah Medical College, Rewa. Informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity of the participants were strictly maintained.

RESULT

As shown in table 1- A total of 254 undergraduate medical students participated in the study. Among them, 154 (60.6%) were males and 100 (39.4%) were females. With regard to professional year, 66 (26.0%) students belonged to 1st professional year, 57 (22.4%) to 2nd professional year, 71 (28.0%) to Final Part-1, and 60 (23.6%) to Final Part-2. Male students reported higher levels of physical activity (33.8%) as compared to females (8%) and the difference was statistically significant. Higher academic scores were observed



among females 41% compared to males 21.4%, with significant difference. Significant association of professional years was observed with levels of physical activity, sleep quality and academic performance of undergraduate medical students.

As shown in table 2-majority of students had poor sleep quality (69.3%) and low physical activity 42%. Students with poor sleep quality demonstrated a relatively higher proportion of low physical activity (42%) compared to those with good sleep quality. Sleep quality was significantly associated with levels of physical activity.

As shown in table 3- Students with poor academic scores had poor sleep quality, with 69.4% belonging to the poor sleep group. Similarly, 36.7% of students with low academic performance had low levels of physical activity. A statistically significant association was observed between levels of physical activity and academic grading.

As shown in table 4-female students had higher median academic score compared to males. And the difference was statistically significant. Academic performance was also statistically significantly associated with physical activity levels, with better performance observed among students with higher physical activity.

Table -1 Association of sleep quality, physical activity levels and academic performance according to professional year and gender among MBBS students

		SLEEP QUALITY		LEVELS OF PHYSICAL ACTIVITY			Academic Grading	
		GOOD	POOR	HIGH	LOW	MEDIUM	High	Low
BATCH	1 ST PROFF (66)	17	49	7	35	24	49	17
	2 ND PROFF (57)	19	38	11	24	22	9	48
	FINAL PART-1 (71)	20	38	18	33	20	11	60
	FINAL PART-2 (60)	22	51	24	16	20	5	55
	TOTAL	78	176	60	108	86	74	180
	P value	p= 0.540		p=0.005			P=0.001	
GENDER	FEMALE	31	69	8	46	46	41	59
	Male	47	107	52	62	40	33	121
	TOTAL	78	176	60	108	86	74	180
	P VALUE	p= 0.935		P <0.001			P <0.001	

Table 2-Association Between Physical Activity and Sleep Quality

SLEEP QUALITY	LEVEL OF PHYSICAL ACTIVITY			TOTAL
	HIGH	LOW	MODERATE	
GOOD	19	35	24	78
POOR	41	73	62	176
TOTAL	60	108	86	254

$\chi^2 = 5.49$, $p = 0.05$

Table-3 Association of Academic Grading with Selected Variables (N = 254)

	Academic Grading				p-value
	Category	High	Low	χ^2	
SLEEP					
	Good	23	55	0.0068	0.934
	Poor	51	125		



LEVEL OF PHYSICAL ACTIVITY					
	High	28	32	11.9	<0.001
	Low	27	81		
	Moderate	19	67		

Table-4 Comparison of Academic percentage according to Selected Variables (N = 254)

	Academic score	
GENDER		<0.001*
Female	46.5 (30.8-58)	
Male	30 (20-44.8)	
SLEEP QUALITY		P< 0.744*
Good	37.5(23-53)	
Poor	35 (24-52.8)	
PHYSICAL ACTIVITY		
High	45(34-58)	p<0.001**
Low	29.5(19-50.3)	
Moderate	35(24.3-50)	

*Mann whitney u test **kruskalwallis test

DISCUSSION

The present study explored the association between sleep quality, physical activity, and their impact on academic performance among undergraduate medical students.

Gender differences were observed, with female students demonstrating better academic performance, while male students reported higher levels of physical activity. Similar gender-based differences have been reported in previous studies [1,6]. Significant association of professional years was observed with levels of physical activity, sleep quality and academic performance of undergraduate medical students. Corrêa *et al.* also reported similar findings. [6].

In our study, majority of students had poor sleep quality and low physical activity. Students with poor sleep quality demonstrated a relatively higher proportion of low physical activity compared to those with good sleep quality [8]. Sleep quality was significantly associated with levels of physical activity [5,7].

The findings suggest that higher levels of physical activity were associated with better cognitive performance and overall academic outcomes which were reported in other studies also [2,3]. Physical activity demonstrated a positive and statistically significant relationship with academic performance. These findings are in agreement with previous studies which have reported similar association between physical activity and academic performance among

students [2,9]. Regular physical activity is known to improve cerebral blood flow, reduce stress, and enhance cognitive functioning, thereby positively influencing academic performance.

Although poor sleep quality was prevalent among students, it was not significantly associated with academic grading. Similar findings have been reported in some studies where sleep quality did not show a direct association with academic performance [4,10]. However, other studies have demonstrated a significant relationship between sleep quality and academic outcomes [11-13], suggesting variability in findings across different populations. This indicates that while sleep disturbances are common among medical students, their direct measurable impact on short-term academic performance may vary depending on contextual and individual factors. It is possible that students adapt to sleep deprivation or compensate academically despite suboptimal sleep patterns.

Strengths of the present study include the use of standardized and validated instruments (PSQI and IPAQ), inclusion of students from all professional years, and application of appropriate non-parametric statistical tests. However, certain limitations should be considered. The cross-sectional design limits causal inference, and the use of self-reported data may introduce reporting bias. Additionally, the study was conducted in a single institution, which may limit generalizability of the findings.



Despite these limitations, the findings emphasize the importance of promoting regular physical activity among medical students. Similar recommendations have been highlighted in previous studies, suggesting that incorporation of physical activity into daily routines may improve both health and academic performance [14,15]. Institutional initiatives encouraging structured exercise programs and awareness regarding healthy lifestyle behaviors may contribute to improved academic outcomes and overall well-being.

CONCLUSION

In conclusion, the present study demonstrated that physical activity showed a significant association with sleep quality and academic performance among undergraduate medical students. Female students demonstrated comparatively better academic performance, while male students reported higher levels of physical activity. These findings highlight the importance of promoting regular physical activity and healthy lifestyle behaviours among medical students to support both academic performance and overall well-being.

Ethics Approval and Informed Consent

Ethical approval for this study was obtained from the Institutional Ethics Committee, Shyam Shah Medical College and Associated SGMH, Rewa (IEC Approval No. IEC.034/25). Written informed consent was obtained from all participants prior to data collection.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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