

Original Article

# Relationship of Physical Activity with Sleep Disturbance and Anxiety in Medical Students of Sahiwal

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## ABSTRACT

**Background:** Physical activity has been shown to have anxiolytic effects, improve sleep quality, and enhance overall student mental health. Despite these benefits, medical students often have limited time for physical activity due to demanding academic schedules and clinical rotations.

**Objective:** To examine the relationship between physical activity, sleep disturbance, and anxiety among medical students in Sahiwal.

**Methods:** This observational study was conducted over six months among medical students in Sahiwal. A simple random sample of 280 university students, aged 19-25 years and from the 3rd to 5th years of study, was selected. Participants completed three standardized questionnaires: the International Physical Activity Questionnaire (IPAQ) to assess physical activity, the Pittsburgh Sleep Quality Index (PSQI) to evaluate sleep quality, and the Generalized Anxiety Disorder-7 (GAD-7) to measure anxiety levels. Data were analyzed using SPSS version 25, with descriptive statistics summarizing demographic data and key variables. The Chi-square test of association was used to determine the relationships between physical activity levels (IPAQ scores), sleep quality (PSQI scores), and anxiety levels (GAD-7 scores), with a significance level set at  $p < 0.05$ .

**Results:** The mean age of the participants was  $22.24 \pm 1.285$  years. Among the 280 students, 207 (73.9%) were females and 73 (26.1%) were males. Anxiety levels were as follows: 39 (13.9%) had mild anxiety, 124 (44.3%) had moderate anxiety, 76 (27.1%) had moderately severe anxiety, and 41 (14.6%) had severe anxiety. Physical activity levels were: 144 (51.4%) had low physical activity, 79 (28.2%) had moderate physical activity, and 57 (20.4%) had high physical activity. A significant association was found between GAD-7 and IPAQ levels (Chi-square value = 60.691,  $p = 0.031$ ). No significant association was found between PSQI and IPAQ levels (Chi-square value = 22.162,  $p = 0.680$ ).

**Conclusion:** This study highlights the significant relationship between physical activity and anxiety among medical students, suggesting that regular physical activity is associated with reduced anxiety symptoms. However, no significant relationship was observed between physical activity and sleep quality.

**Keywords:** Physical activity, sleep disturbance, anxiety, medical students, mental health, IPAQ, PSQI, GAD-7, observational study, student wellness.

## INTRODUCTION

Sleep disorders, particularly insomnia, are prevalent problems that significantly impact individuals' ability to fall asleep or maintain sleep for more than seven hours (1). Approximately 30% of the adult population suffers from this condition. The academic environment, with its increased responsibilities and examination pressures, exacerbates sleep deprivation among students (2). Consequently, freshmen are often advised to sleep at least eight hours per night, although many struggle to adhere to this recommendation due to the demanding nature of their studies (3). This issue is particularly pronounced among medical students, who experience higher rates of sleep deprivation compared to their peers in other fields (4). Poor sleep quality is associated with adverse academic performance, psychological health, and overall lifestyle, underscoring the importance of promoting sleep quality and mental well-being among medical students (5).

Physical activity (PA) has been widely recognized for its potential to improve sleep quality and mental health. Sedentary lifestyles, excessive screen time, and poor sleep habits contribute to the poor educational outcomes and mental health of medical students

(6). Insomnia, a common complaint in the general population, affects about one-third of adults globally, with similar findings observed across various countries (7). Medical students, as a subgroup of the general population, are particularly susceptible to sleep disturbances due to the intensive and prolonged nature of their clinical studies, which also adversely affect their mental health (8). Furthermore, sleep-related behaviors, such as reading or watching television before bedtime, significantly impact sleep quality and are often linked to the mental states of older individuals (9, 10, 11).

Understanding the relationship between PA and mental health in medical students during exam seasons is crucial. Prior to exams, these students already experience changes in mental health, physical activity levels, and sleep quality. Meta-analyses have shown that depressive symptoms affect 27.2% of medical students worldwide, with 51.5% reporting poor sleep quality (12). Mental health profoundly influences all aspects of life, and early studies have established a connection between PA, mental health, and sleep quality (13). Engaging in outdoor and indoor physical activities has been shown to positively affect both mental and physical fitness, with physical activity reducing the risk of mental illness by improving sleep quality (14).

Medical studies have identified common factors contributing to anxiety among students, divided into academic and psycho-social stressors (15). Academic stressors include a challenging syllabus, difficulty understanding new material, and heavy workloads, while non-academic stressors encompass gender, medical status, and economic factors (16). Anxiety symptoms are prevalent among medical students and have a significant impact on their professional, academic, and social functioning (17). This research aims to elucidate the relationship between PA, sleep disturbance, and anxiety in medical students, with the hope that the findings will aid students in understanding these relationships and influence their health-related decision-making, particularly in Pakistan. The insights gained could also guide physical therapists in recognizing the need for referring patients with depressive and anxious symptoms to appropriate physical activity interventions.

## MATERIAL AND METHODS

This cross-sectional observational study was conducted over six months at medical colleges in Sahiwal, following the acceptance of the study synopsis. The sample size, calculated using the RaoSoft sample size calculator, consisted of 280 medical students aged 18-28 years, selected through a simple random sampling technique. Inclusion criteria encompassed male and female students from the third to fifth professional years. Exclusion criteria included students with physical or mental abnormalities that limit motor and sensory abilities, those diagnosed with primary sleep disorders, students with contraindications for physical activity, and students from the first and second professional years.

Data collection involved the administration of three standardized questionnaires: the Pittsburgh Sleep Quality Index (PSQI), the Generalized Anxiety Disorder-7 (GAD-7), and the International Physical Activity Questionnaire (IPAQ). The PSQI, a widely used tool in sleep medicine, assesses various aspects of sleep quality and disturbances over a one-month period through 19 self-report items. The GAD-7, a validated tool for assessing anxiety, consists of seven statements evaluating different aspects of anxiety, with higher scores indicating greater impact on daily life. The IPAQ assesses physical activity levels, categorizing them into low, moderate, and high activity based on participants' responses. These instruments were selected for their reliability and validity in measuring the respective constructs (18, 19, 20, 21, 22, 23, 24, 25, 26).

Participants were provided with detailed information about the study and gave informed consent prior to participation. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. The data collection process ensured confidentiality and anonymity of the participants.

The collected data were entered into SPSS version 25 for analysis. Descriptive statistics, including means, standard deviations, and frequencies, were calculated to summarize the demographic and key variable data. The Chi-square test of association was employed to determine the relationships between physical activity levels (IPAQ scores), sleep quality (PSQI scores), and anxiety levels (GAD-7 scores). A p-value of less than 0.05 was considered statistically significant. The analysis aimed to elucidate the potential associations between physical activity, sleep disturbance, and anxiety among the medical student population.

The study was meticulously designed to ensure rigorous assessment of the relationship between physical activity and its impact on sleep quality and anxiety. By employing validated tools and robust statistical methods, the research aimed to provide meaningful insights into the mental and physical health challenges faced by medical students.

## RESULTS

The aim of this study was to investigate the relationship between physical activity, sleep disturbance, and anxiety among medical students. The study included 280 participants aged 19 to 25 years, with a mean age of 22.24 years (SD = 1.285).

The gender distribution of the participants was predominantly female, with 207 females (73.9%) and 73 males (26.1%). The distribution of anxiety levels among the participants revealed that 39 (13.9%) had mild anxiety, 124 (44.3%) had moderate anxiety,

76 (27.1%) had moderately severe anxiety, and 41 (14.6%) had severe anxiety. The physical activity levels, as measured by the IPAQ, showed that 144 participants (51.4%) had low physical activity, 79 (28.2%) had moderate physical activity, and 57 (20.4%) had high physical activity.

The relationship between physical activity (IPAQ level) and anxiety (GAD-7) showed a significant association, with a Chi-square value of 60.691 and a p-value of 0.031. However, the relationship between physical activity and sleep quality (PSQI) was not significant, with a Chi-square value of 22.162 and a p-value of 0.680.

**Table 1: Age of Participants**

Age	Mean	Standard Deviation	Minimum	Maximum
	22.24	1.285	19	25

**Table 2: Gender Distribution**

Gender	Frequency	Percentage
Female	207	73.9%
Male	73	26.1%
<b>Total</b>	<b>280</b>	<b>100.0%</b>

**Table 3: Anxiety Levels**

Anxiety Level	Frequency	Percentage
Mild	39	13.9%
Moderate	124	44.3%
Moderately Severe	76	27.1%
Severe	41	14.6%
<b>Total</b>	<b>280</b>	<b>100.0%</b>

**Table 4: Physical Activity Levels (IPAQ)**

IPAQ Level	Frequency	Percentage
Low	144	51.4%
Moderate	79	28.2%
High	57	20.4%
<b>Total</b>	<b>280</b>	<b>100.0%</b>

**Table 5: Association of GAD-7 and PSQI with IPAQ Levels**

Association	Chi-square Value	Degrees of Freedom (df)	p-value
GAD-7 & IPAQ Level	60.691	42	0.031
PSQI & IPAQ Level	22.162	26	0.680

The results indicate that while there is a significant association between physical activity and anxiety levels among medical students, there is no significant association between physical activity and sleep quality. These findings suggest that regular physical activity may be an important factor in reducing anxiety symptoms in this population. However, its impact on sleep quality requires further investigation.

## DISCUSSION

The present observational study was the first of its kind to investigate the relationship between physical activity, sleep disturbance, and anxiety among medical students in Pakistan. The findings revealed a significant association between physical activity levels and anxiety, with more active students reporting lower levels of anxiety. However, no significant relationship was observed between physical activity and sleep quality.

Previous research has consistently demonstrated the mental health benefits of physical activity. Studies conducted in various populations have shown that regular physical activity can alleviate symptoms of anxiety and depression, improve mood, and enhance overall mental well-being (12). Our findings align with these studies, indicating that medical students who engaged in regular physical activity experienced lower anxiety levels. This supports the notion that physical activity serves as an effective, non-pharmacological strategy for managing anxiety, particularly in high-stress environments such as medical school.

Contrarily, the lack of a significant association between physical activity and sleep quality in our study is consistent with some previous findings. For instance, a survey conducted among Chinese college students also reported a non-significant relationship between physical activity and sleep time (6). Similarly, research from Saudi Arabia found that physical activity did not significantly influence sleep disturbances among female college students (27). These results suggest that while physical activity may offer considerable benefits for mental health, its impact on sleep quality may be influenced by other factors such as stress, lifestyle habits, and individual differences in sleep patterns.

The strengths of this study include its use of validated and reliable assessment tools (PSQI, GAD-7, and IPAQ), a sufficiently large sample size, and a robust statistical analysis method. The cross-sectional design allowed for a snapshot of the current state of physical activity, sleep, and anxiety levels among medical students, providing valuable insights into their interrelationships. However, the study also had several limitations. The cross-sectional nature of the study precludes the determination of causality; thus, it remains unclear whether increased physical activity leads to reduced anxiety or if students with lower anxiety levels are more likely to engage in physical activity. Additionally, self-reported measures are subject to recall bias and social desirability bias, which may affect the accuracy of the data collected.

The study was conducted exclusively in Sahiwal, which may limit the generalizability of the findings to medical students in other regions or countries. Future research should consider longitudinal designs to explore causal relationships and include objective measures of physical activity and sleep quality to complement self-reported data. Moreover, it would be beneficial to investigate other potential mediating factors, such as dietary habits, caffeine consumption, and academic stress levels, to gain a more comprehensive understanding of the determinants of sleep quality and anxiety among medical students.

Recommendations based on the study findings include the promotion of physical activity as a means to manage anxiety among medical students. Medical schools should consider integrating structured physical activity programs into their curricula to support students' mental health. Additionally, educational campaigns aimed at raising awareness about the benefits of physical activity and providing resources for incorporating exercise into daily routines could be beneficial. Interventions should also address other lifestyle factors that may impact sleep quality, promoting holistic approaches to improving the overall well-being of medical students.

## CONCLUSION

In conclusion, this study highlighted the significant relationship between physical activity and anxiety among medical students, emphasizing the potential of regular physical activity as a strategy for reducing anxiety symptoms. However, the non-significant relationship between physical activity and sleep quality suggests that other factors may play a more critical role in influencing sleep among this population. Future research should aim to elucidate these factors and develop comprehensive interventions to support the mental and physical health of medical students.

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