

Original Research Article

Exploring the relationship between stress, sleep quality, mobile phone usage and physical activity among physiotherapy students: a survey study

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ABSTRACT

Background: Physiotherapy students are frequently exposed to academic, clinical, and personal stressors that may affect their sleep quality, smartphone usage patterns, and physical activity levels. The aim of the study is to explore the relationship between stress, sleep quality, smartphone addiction, and physical activity among physiotherapy students.

Methods: A cross-sectional correlational study was conducted among 300 physiotherapy BPT and MPT students. Data were collected using the SSI, PSQI, SAS-SV and IPAQ-SF. Descriptive statistics were used to summarize participant characteristics and study variables. Since the data were non-normally distributed, Spearman's rank correlation test was used to examine associations among variables.

Results: Among 300 participants, 203 (67.7%) were female and 97 (32.3%) were male, most were aged 21–25 years. Mild to moderate smartphone addiction was common, 55.3% showing mild and 40.3% moderate addiction. Nearly half of the students reported moderate stress (48.0%), moderate sleep disturbances (48.0%), while low physical activity was observed in 72.0%. Smartphone addiction showed a significant positive correlation with poor sleep quality ($r=0.191$, $p=0.001$), whereas physical activity was negatively correlated with sleep disturbances ($r=-0.162$, $p=0.005$). No significant associations were found between stress, smartphone addiction, physical activity, and sleep quality.

Conclusions: Smartphone addiction, poor sleep quality, moderate stress, and low physical activity were common among physiotherapy students. Higher smartphone addiction was associated with poorer sleep, while greater physical activity was linked to better sleep quality. Encouraging healthier smartphone habits and regular physical activity may support students' sleep and overall well-being.

Keywords: Physiotherapy students, Stress, Sleep quality, Smartphone addiction, Physical activity, PSQI, SAS-SV, IPAQ-SF

INTRODUCTION

Physiotherapy education is highly demanding, requiring students to cope with complex learning, clinical exposure, and a stressful academic environment. The profession demands strong theoretical knowledge, practical clinical skills, physical ability, effective communication, and self-directed learning. These multidimensional requirements often contribute to elevated stress levels among students.¹ Academic factors include prolonged study hours, clinical

postings, poor coordination between staff and students, and discriminatory or uncivil behaviour by faculty members. Non-academic factors include interpersonal problems, financial concerns, transportation difficulties, lack of family support, and challenges in social adjustment.²

Sleep plays a vital role in maintaining health and academic efficiency. Poor sleep quality or deprivation disrupts short-term memory, concentration, attention, working ability,

circadian rhythm, and mental health, making it difficult for students to process new information and respond effectively.³ Another emerging concern among students is smartphone overuse. Sleep is an important component of daily life, occupying approximately one-third of an individual's time. Sleep deprivation negatively affects cognitive functioning, memory formation, concentration, and overall mental well-being.⁴

Excessive smartphone use, particularly during study hours and before bedtime, may worsen stress and reduce academic efficiency. Similarly, lack of physical activity, which is increasingly common among students, negatively affects fitness, mental health, and lifestyle balance. Regular exercise, however, supports resilience, motor skills, and overall well-being.^{5,6} Research suggests that excessive smartphone use is associated with reduced academic performance, poor interpersonal relationships, and unhealthy lifestyle habits.^{7,8} Mobile phones, particularly smartphones, have become an integral part of students' daily lives by providing access to educational resources, entertainment, and social connectivity.⁹ However, excessive smartphone use can develop into smartphone addiction, characterized by compulsive use, withdrawal symptoms, and interference with daily activities.¹⁰ Studies have demonstrated a strong association between smartphone addiction and adverse outcomes such as poor sleep quality, increased stress, reduced concentration, and sedentary behaviour.¹¹ For physiotherapy students, whose training demands both physical activity and sustained mental concentration, excessive smartphone use may have significant consequences.¹²

Physiotherapy education is extremely challenging, and students often struggle to cope with complex learning requirements and stressful academic environments.¹³ The profession requires high levels of academic, theoretical, and clinical competence along with physical fitness, communication skills, and self-directed learning abilities.¹⁴ These demands contribute to increased stress levels among students.¹⁵ As educational demands increase, perceived stress levels tend to rise accordingly.¹⁶ Physiotherapy students are exposed to various stressors throughout their academic training, and these stressors may adversely affect sleep quality. Physical activity is a protective factor known to improve both physical and mental health.¹⁷ Regular exercise is associated with better sleep quality, lower stress levels, and a reduced risk of smartphone addiction.¹⁸ Physiotherapy students are trained to promote physical activity as a key component of patient care; however, their own participation in regular exercise is often limited due to academic workload, clinical postings, and prolonged sedentary behaviour associated with smartphone use.¹⁹

Recent findings indicate that the prevalence of stress among physiotherapy students was 99.9%, with 43.3% experiencing mild stress, 53.3% moderate stress, and 3.3% severe stress. Poor sleep quality was reported by 76.7% of

students. Regarding physical activity, 59% never engaged in vigorous exercise, and only 10% participated in vigorous exercise 4–7 days per week. Similarly, 52% did not engage in moderate sports activities, whereas only 11% participated 4–7 days per week. Walking was the most common activity, with 43% reporting walking 4–7 days per week, although most walked for less than one hour per day.²⁰ The study revealed a very high prevalence of smartphone addiction, with 78% of participants classified as addicted according to the Smartphone Addiction Scale-Short Version (SAS-SV).²¹ The majority of students reported using smartphones mainly for social networking (35.7%), while only 9.5% used them for educational purposes.²² The Prevalence of Sleep quality was 76.7% among students. The high prevalence of poor sleep quality was significantly associated with increased stress levels. The findings also showed a statistically significant negative correlation between smartphone addiction and academic performance (GPA), suggesting that higher addiction levels were linked with lower academic achievement.²² Additionally, an earlier age of first smartphone use was associated with higher addiction risk.²³

METHODS

Study setting

This study was conducted in Shri Guru Granth Sahib World University, Fatehgarh Sahib in India.

Data was collected all over the India to collect the required 300 sample size. Data was collected between March 2026 to April 2026

Study design

A cross-sectional survey was conducted during the academic year of 2025-2026 among physiotherapy students in India.

Ethical approval

The approval to conduct the study was obtained from the Institutional Ethics Committee (IEC) constituted by Sri Guru Granth Sahib World University, Fatehgarh Sahib, in accordance with the ICMR ethical guidelines with reference no. SGGSWU/IEC/2026/68.

Participants requirements

Inclusion criteria

Physiotherapy students (BPT or MPT), age between 17 and 30 years, regularly using a smartphone (≥ 2 -3 hours/day) and capable of answering questions about phone use, students who are currently enrolled and actively attending classes/clinical postings, and students willing to provide informed consent were included.

Exclusion criteria

Diagnosed sleep disorders or currently receiving treatment specifically for sleep disorders (e.g., sleep medications), current diagnosis of a major psychiatric illness (e.g., bipolar disorder, schizophrenia), students on long-term medical leave or those not actively attending academic/clinical duties during the study period, students unwilling to participate or who do not provide informed consent, and students from disciplines other than physiotherapy (non-BPT/MPT students) were excluded.

Data collection

Data was collected by both online and offline questionnaire, using tools student stress inventory (SSI), Pittsburgh sleep quality index (PSQI), smartphone addiction scale short version (SAS-SV) and international physical activity questionnaire short form.

Statistical analysis

Data were analysed using the statistical package for the social sciences (SPSS) version 26. Descriptive analysis was used for demographic variables and questionnaire scores. An appropriate statistical tests were selected based on the distribution of data. If the data were normally distributed, parametric tests were used, including the Pearson correlation test to determine the relationship between stress, sleep quality, smartphone usage, and physical activity. If the data was not normally distributed, non-parametric tests were used, including the Spearman rank correlation test. P value of less than 0.05 were considered significant. Results: The results were presented in the form of tables and graphs.

RESULTS

A total of 300 physiotherapy students participated in the study. Out of these, 203 (67.7%) were females and 97 (32.3%) were males. The majority of participants belonged to the age group of 21–25 years (49.7%), followed by 17–20 years (47.7%) and 26–28 years (2.7%). Most participants were Bachelor of Physiotherapy (BPT) students (88.7%), while 11.3% were Master of Physiotherapy (MPT) students. The demographic characteristics of the participants are presented in Table 1.

Table 1: Demographic characteristics of participants (n=300).

Variables	Category	N (%), 300 (100%)
Gender	Female	203 (67.7)
	Male	97 (32.3)
Age group (years)	17–20	143 (47.7)
	21–25	149 (49.7)
	26–28	8 (2.7)
Degree of students	BPT	266 (88.7)
	MPT	34 (11.3)

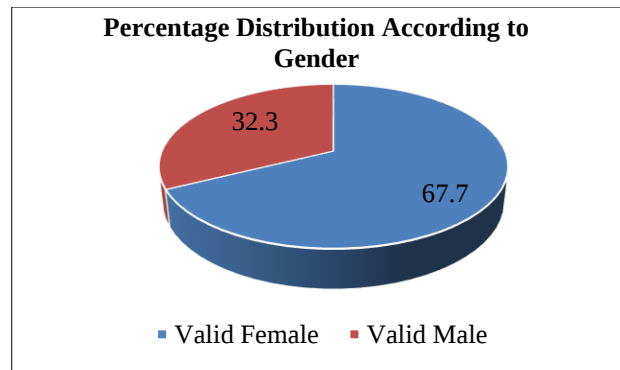


Figure 1: Depicts the gender-wise percentage distribution.

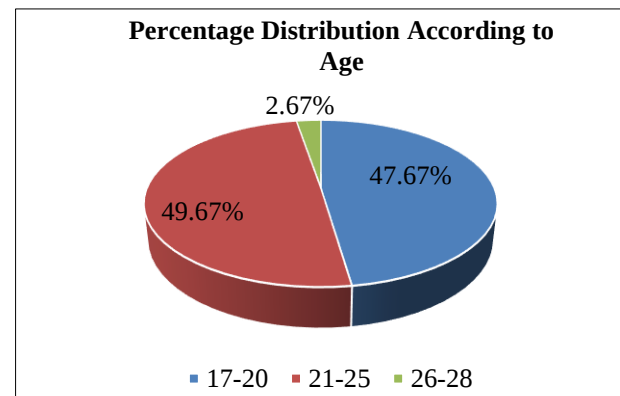


Figure 2: Demonstrate the age-wise percentage distribution.

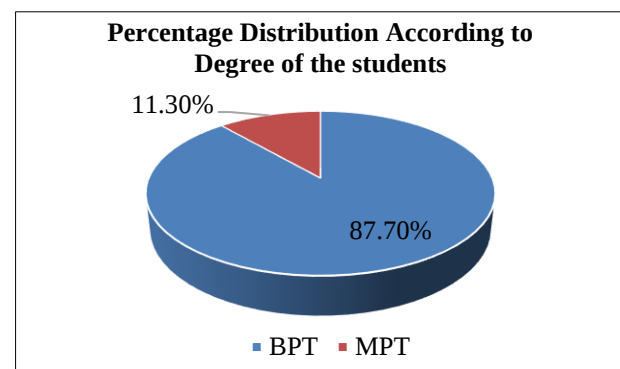


Figure 3: Presents the percentage distribution according to degree of the students.

Regarding smartphone addiction, 166 (55.3%) participants demonstrated mild addiction, 121 (40.3%) moderate addiction, and 13 (4.3%) severe addiction. Assessment of sleep quality revealed that 103 (34.3%) participants had mild sleep disturbances, 144 (48.0%) had moderate sleep disturbances, and 53 (17.7%) had severe sleep disturbances. Physical activity assessment showed that 216 (72.0%) participants had low physical activity levels, 81 (27.0%) had moderate physical activity levels, and only 3 (1.0%) had high physical activity levels. Stress assessment indicated that 99 (33.0%) participants

experienced mild stress, 144 (48.0%) moderate stress, and 57 (19.0%) severe stress.

The mean scores for the study variables were 38.4 ± 11.46 for smartphone addiction (SAS-SV), 97.13 ± 15.93 for stress (SSI), 14.40 ± 6.37 for sleep quality (PSQI), and 501.74 ± 939.93 MET-minutes/week for physical activity (IPAQ). Tests of normality demonstrated that all study variables were non-normally distributed ($p < 0.05$), and therefore Spearman's rank correlation analysis was performed. The normality of demographic characteristics and variables of the participants are presented in Table 2.

Table 2: Normality of demographic and study variables using the Kolmogorov–Smirnov test.

Variables	Mean $\pm$ SD	P value
Age	20.80 $\pm$ 1.99	<0.001
SAS-SV	38.40 $\pm$ 11.46	<0.001
SSI	97.13 $\pm$ 15.93	<0.009
PSQI	14.40 $\pm$ 6.37	<0.001
IPAQ-SF	501.74 $\pm$ 939.93	<0.001

SD-Standard deviation, SAS-SV-smartphone addiction scale–short version, SSI-student stress inventory, PSQI-Pittsburgh sleep quality index, IPAQ-SF-international physical activity questionnaire short form

The distribution of stress, sleep quality, smartphone addiction, and physical activity levels according to degree and gender among physiotherapy students. Regarding stress levels, the majority of BPT female (138) (76.24%), BPT male 59(69.41%), MPT female (17) (77.27%), and

MPT male (8) (66.67%) students reported moderate stress levels. Sleep quality assessment showed that moderate sleep disturbance was most common among BPT female (58) (49.57%), MPT female (6) (50.00%), and MPT male (7) (87.50%) students, whereas severe sleep disturbance was more prevalent among BPT male students (62) (72.94%). For smartphone addiction, moderate addiction was the most frequently observed category among BPT female (80) (44.20%), MPT female (12) (54.55%), and MPT male (6) (50.00%) students, while severe smartphone addiction was relatively more common among BPT male students (31) (36.47%). In terms of physical activity, the majority of participants across all degree and gender groups demonstrated low physical activity levels, including BPT females (127) (70.17%), BPT males (66) (77.65%), MPT females (19) (86.36%), and MPT males (11) (91.67%) presents in the Table 3.

Spearman's correlation analysis revealed a statistically significant positive correlation between smartphone addiction and sleep quality ($r=0.191$, $p=0.001$), indicating that higher smartphone addiction was associated with poorer sleep quality. A statistically significant positive correlation was also observed between physical activity and sleep quality ($r=-0.162$, $p=0.005$), suggesting that higher levels of physical activity were associated with better sleep quality. However, no significant correlations were found between stress and sleep quality ($r=0.035$, $p=0.550$), stress and smartphone addiction ($r=0.015$, $p=0.793$), stress and physical activity ($r=0.043$, $p=0.461$), or smartphone addiction and physical activity ($r=-0.058$, $p=0.318$) presented in Table 4.

Table 3: Distribution level of stress, sleep quality, smartphone addiction, and physical activity according to degree and gender (n=300).

Variables	DOS	Gender	Mild/low, N (%)	Moderate, N (%)	Severe/high, N (%)	Total, N (%)
SSI	BPT	Female	35 (19.34)	138 (76.24)	8 (4.42)	181 (60.33)
	BPT	Male	24 (28.24)	59 (69.41)	2 (2.35)	85 (28.33)
	MPT	Female	2 (9.09)	17 (77.27)	3 (13.64)	22 (7.33)
	MPT	Male	4 (33.33)	8 (66.67)	0 (0.00)	12 (4.00)
	Total score		65 (21.667)	222 (74)	13 (4.33)	300 (100)
PSQI	BPT	Female	9 (7.69)	58 (49.57)	114 (62.98)	181 (60.33)
	BPT	Male	5 (10.64)	18 (38.30)	62 (72.94)	85 (28.33)
	MPT	Female	0 (0.00)	6 (50.00)	16 (72.73)	22 (7.33)
	MPT	Male	0 (0.00)	7 (87.50)	5 (41.67)	12 (4.00)
	Total score		14 (4.66)	89 (29.667)	197 (65.667)	300 (100)
SAS-SV	BPT	Female	48 (26.52)	80 (44.20)	53 (29.28)	181 (60.33)
	BPT	Male	27 (31.76)	27 (31.76)	31 (36.47)	85 (28.33)
	MPT	Female	4 (18.18)	12 (54.55)	6 (27.27)	22 (7.33)
	MPT	Male	2 (16.67)	6 (50.00)	4 (33.33)	12 (4.00)
	Total score		81 (27)	125 (41.667)	94 (31.3)	300 (100)
IPAQ-SF	BPT	Female	127 (70.17)	54 (29.83)	0 (0.00)	181 (60.33)
	BPT	Male	66 (77.65)	16 (18.82)	3 (3.53)	85 (28.33)
	MPT	Female	19 (86.36)	3 (13.64)	0 (0.00)	22 (7.33)
	MPT	Male	11 (91.67)	1 (8.33)	0 (0.00)	12 (4.00)
	Total score		223 (74.33)	74 (24.667)	3 (1)	300 (100)

BPT-Bachelor of physiotherapy, MPT-Master of physiotherapy, SSI-student stress inventory, PSQI- Pittsburgh sleep quality index, SAS-SV- smartphone addiction scale–short version, IPAQ-SF-international physical activity questionnaire short form

Table 4: Spearman correlation analysis among stress, sleep quality, smartphone addiction, and physical activity (n=300).

Variables	r-value	P value	Interpretation
SSI versus PSQI	0.035	0.550	Very weak positive correlation, not statistically significant
SSI versus SAS-SV	0.015	0.793	Very weak positive correlation, not statistically significant
SSI versus IPAQ-SF	0.043	0.461	Very weak positive correlation, not statistically significant
SAS-SV versus PSQI	0.191	0.001**	Very strong positive correlation, statistically significant
SAS-SV versus IPAQ-SF	-0.058	0.318	Very weak negative correlation, not statistically significant
PSQI versus IPAQ-SF	-0.162	0.005*	Strong positive correlation, statistically significant

SSI-Student stress inventory, PSQI- Pittsburgh sleep quality index, SAS-SV- smartphone addiction scale–short version, IPAQ- international physical activity questionnaire. statistically significant (*p<0.05, **p<0.01)

These findings indicate that smartphone addiction and physical activity are significantly associated with sleep quality among physiotherapy students, whereas stress did not show a significant relationship with smartphone addiction, sleep quality, or physical activity in the present study.

DISCUSSION

The present study was conducted to explore the relationship between stress, sleep quality, smartphone usage, and physical activity among physiotherapy students. A total of 300 physiotherapy students participated in the study, comprising both BPT and MPT students. Furthermore, BPT students represented the majority of the study population (266) (88.7%), indicating greater participation from undergraduate students compared to postgraduate (MPT) students.

The findings related to smartphone addiction showed that more than half of the participants 166 (55.3%) demonstrated mild smartphone addiction, while 121 (40.3%) exhibited moderate addiction and 13 (4.3%) showed severe addiction. These findings suggest that smartphone use is highly prevalent among physiotherapy students. Similar findings were reported by Nanecha et al who observed a high prevalence of smartphone addiction among physiotherapy students and reported that excessive smartphone use was associated with adverse health outcomes, particularly poor sleep quality.²⁴

Regarding sleep quality, 144 (48%) of participants demonstrated moderate sleep disturbances, while 53 (17.7%) exhibited severe sleep disturbances. These findings indicate that a considerable proportion of physiotherapy students experience poor sleep quality. The demanding academic curriculum, clinical postings, examinations, and extensive use of electronic devices may contribute to disturbed sleep patterns among students. These findings are consistent with those of Nariya et al and Dharmita et al who reported that stress and academic demands significantly affect sleep quality among physiotherapy students.^{25,26}

The results related to physical activity revealed that 216 (72%) of participants were categorized as having low physical activity levels, while only 3 (1%) demonstrated

high physical activity levels. This finding highlights a sedentary lifestyle among physiotherapy students despite their knowledge of health and exercise. Academic workload, prolonged study hours, and smartphone use may reduce opportunities for regular physical activity. Similar observations were reported by Ghrouz et al who found that reduced physical activity levels were common among college students and were associated with poorer mental health outcomes.²⁷

Assessment of stress levels demonstrated that 144 (48%) of participants experienced moderate stress and 57 (19%) experienced severe stress. These findings indicate that stress is a common concern among physiotherapy students. The demanding academic environment, clinical responsibilities, examinations, and future career concerns may contribute to elevated stress levels. Hasan et al similarly reported that academic stress was the most significant source of psychological morbidity among physiotherapy students.²⁸

The primary objective of the study was to determine the relationship among stress, sleep quality, smartphone addiction, and physical activity. The results showed a statistically significant positive correlation between smartphone addiction and sleep quality scores ($r=0.191$, $p=0.001$). Since higher PSQI scores indicate poorer sleep quality, this finding suggests that greater smartphone addiction is associated with poorer sleep quality among physiotherapy students. Excessive smartphone use, particularly before bedtime, may delay sleep onset, reduce sleep duration, and interfere with normal sleep patterns. This finding is consistent with previous studies by Nanecha et al which reported a significant association between smartphone addiction and poor sleep quality.²⁴

A statistically significant positive correlation was also observed between sleep quality and physical activity ($r=-0.162$, $p=0.005$). This finding indicates that students with higher levels of physical activity tend to have better sleep quality. Regular physical activity may improve sleep by reducing stress, promoting relaxation, and enhancing overall physical health. Similar findings have been reported by Ghrouz et al who highlighted the beneficial effects of physical activity on mental health and well-being.²⁷

However, no statistically significant relationship was observed between stress and sleep quality ($r=0.035$, $p=0.550$), stress and smartphone addiction ($r=0.015$, $p=0.793$), stress and physical activity ($r=0.043$, $p=0.461$), or smartphone addiction and physical activity ($r=-0.058$, $p=0.318$). Although previous studies have reported associations among these variables, the present findings suggest that these relationships may be influenced by other factors such as individual coping strategies, academic schedules, lifestyle habits, social support, and environmental influences. Differences in sample characteristics and assessment tools may also account for the discrepancy between the current findings and previous literature.

Overall, the findings of the present study suggest that smartphone addiction and physical activity are important factors influencing sleep quality among physiotherapy students. While stress was prevalent among participants, it did not demonstrate a significant association with sleep quality, smartphone addiction, or physical activity in this sample. These findings emphasize the importance of promoting healthy smartphone usage habits and encouraging regular physical activity to improve sleep quality and overall well-being among physiotherapy students.

CONCLUSION

The present study found that moderate stress, poor sleep quality, low physical activity, and smartphone addiction were common among physiotherapy students. A significant positive association was observed between smartphone addiction and poor sleep quality, while higher physical activity levels were significantly associated with better sleep quality. No significant relationships were found between stress and the other study variables. These findings suggest that reducing excessive smartphone use and promoting regular physical activity may help improve sleep quality and overall well-being among physiotherapy students.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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