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COMPARATIVE ANALYSIS OF SLEEP QUALITY, STRESS LEVEL AND ACADEMIC PERFORMANCE IN HOSTEL LIVING PHYSIOTHERAPY STUDENTS

A Cross-Sectional Study

[1]Dr. Rutuja Kowale (PT), [2]Sakshi Deepak Khandagale, [3]Dr. Chandra Iyar (PT)

[1]Professor (Guide), [2]Intern, [3]Professor
Department of Physiotherapy,
[1,2]TMV's Jayantrao Tilak College of Physiotherapy, Tilak Maharashtra Vidyapeeth, Pune, India

Abstract : **Background:** Sleep quality and stress can strongly affect students' health and grades. Physiotherapy students face heavy academic workloads, clinical training and examinations, and living in a hostel may further disturb daily routines. **Aim:** To examine the relationship between sleep quality, perceived stress and academic performance among hostel-living physiotherapy students. **Methods:** This cross-sectional survey was conducted over six months among 217 hostel-living physiotherapy students aged 18–25 years. Data were collected through a Google Form using the Pittsburgh Sleep Quality Index (PSQI), the Perceived Stress Scale (PSS-10) and the Academic Performance Scale (APS), and analysed with Spearman's correlation and multiple linear regression. **Results:** Poor sleep quality was found in 64.06% of students, moderate stress in 83.87% and good academic performance in 55.76% (mean APS score 29.37, SD 4.81). Poorer sleep quality correlated with higher stress ($\rho = 0.422$), and both poorer sleep and higher stress correlated with lower academic performance ($\rho = -0.312$ and $\rho = -0.379$; all $p < 0.001$). Together, sleep quality and stress explained 17.3% of the variance in academic performance; stress ($\beta = -0.330$, $p < 0.001$) had a stronger association than sleep quality ($\beta = -0.149$, $p = 0.031$). **Conclusion:** Many hostel-living physiotherapy students have poor sleep and moderate stress, and both are associated with lower academic performance. Because the design was cross-sectional, causation cannot be inferred. Support for sleep habits, stress coping and student well-being is recommended.

IndexTerms **-** Sleep quality, perceived stress, academic performance, hostel-living students, physiotherapy students, PSQI, PSS-10.

I. INTRODUCTION

Sleep is a key part of how the body works. It supports physical health, mental well-being and brain function, including memory, concentration, learning and emotional balance. Good sleep is not only a matter of duration; it also depends on how well a person sleeps, how often they wake and how they feel during the day. Poor sleep can cause daytime tiredness, poor concentration, forgetfulness and difficulty with everyday tasks, especially academic ones. University students often have sleep problems because of irregular daily routines, heavy workloads, long hours of study and changing lifestyles. Shrestha et al. found that poor sleep among medical students was linked with high stress, long study hours and heavy use of electronic devices [1, 2, 3, 4].

Students of healthcare courses such as physiotherapy face many challenges that can affect sleep and mental health. Physiotherapy training combines theory (anatomy, physiology, biomechanics, exercise therapy and related subjects) with practical and clinical experience. Lectures, practical sessions, clinical placements, case presentations, assignments and examinations can raise academic pressure, disturb sleep schedules and affect mental health [5, 6, 7]. Good sleep is particularly important for these students because learning depends on attention, memory and cognitive function, and disturbed sleep can make it harder to grasp difficult concepts, retain information and perform practical skills. The Pittsburgh Sleep Quality Index (PSQI), introduced by Buysse et al., is a standard tool for measuring sleep quality and sleep problems, and Mollayeva et al. found it useful for screening sleep dysfunction in different groups [8, 9].

Stress is another major influence on student health. It is the reaction of body and mind to demands that feel overwhelming, and students may experience it because of coursework, examinations, clinical duties, time management and personal expectations. Yogeshwaran and Vipinnath reported that stress and poor sleep were closely linked among physiotherapy students engaged in clinical postings, suggesting that heavy academic and clinical workloads contribute to sleep problems [5].

Living in a hostel is part of university life for many students who move away from home to study. It offers independence, friendships and peer support, but also brings lifestyle challenges. Noise, shared rooms, limited privacy, irregular meal times, late-night conversations, electronic device use and changed routines can disturb sleep, and adjusting to a new place without family support can add to stress. Priyanka et al. compared day scholars and hostel students and found differences in sleep quality and academic performance between the groups, and Rashid et al. found that sleep quality, anxiety and academic performance were related among hostel and non-hostel students [10, 11].

Academic performance reflects how well students learn and apply their skills, and it is influenced by learning ability, motivation,

concentration, study habits, sleep and mental health. Singh et al. reported that depression, anxiety, stress, sleep quality and academic performance are interrelated in medical students, and a study at Rawalpindi Medical University found that poor sleep and low physical activity were associated with worse academic performance in fourth-year medical students [2, 7, 12, 13, 14]. Stress and sleep also influence each other: stress can make it harder to fall and stay asleep, while insufficient sleep can reduce the ability to cope with stress, creating a cycle that may affect concentration and academic work. Wani found that delayed sleep onset, broken sleep and daytime tiredness were common among medical and paramedical students, including physiotherapy students [5, 6, 15].

Although sleep quality, stress and academic performance have been studied in medical, nursing and university students, evidence on hostel-living physiotherapy students, particularly in India, is limited. Physiotherapy programmes involve heavy clinical postings, practical examinations and frequent assessments, and the hostel environment may add further pressures. Examining the three variables together may give a clearer picture of how they relate in this group. This study therefore aimed to compare and analyse the relationship between sleep quality, stress level and academic performance among hostel-living physiotherapy students. Its objectives were (1) to assess sleep quality using the PSQI, (2) to assess perceived stress using the Perceived Stress Scale (PSS-10), (3) to examine academic performance using the Academic Performance Scale (APS), and (4) to determine the impact of sleep quality and stress on academic performance [8, 16].

II. MATERIALS AND METHODS

A. *Study design and setting*

A cross-sectional, survey-based study was conducted in physiotherapy colleges over a period of six months. Ethical clearance was obtained from the institutional ethics committee, and the purpose of the study was explained to the participants, who gave informed consent before completing the scales. Data were collected using a Google Form.

B. *Participants*

A total of 217 hostel-living physiotherapy students were recruited. Students aged 18–25 years, currently residing in a hostel for at least six months, and enrolled in a full-time physiotherapy course (male and female) were included. Students with mixed accommodation (hostel and home), chronic medical conditions affecting sleep or stress, diagnosed sleep disorders (for example, sleep apnoea) or serious psychiatric illness under treatment, or those taking sleep medication, systemic steroids or psychoactive drugs were excluded.

C. *Outcome measures*

Sleep quality was measured with the PSQI [8], which has 19 self-rated items grouped into seven components (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction), each scored 0–3, giving a global score of 0–21. A global score above 5 indicates poor sleep quality. Reported internal consistency is about 0.83 (Cronbach's α) in the original study, and at the cut-off of 5 the sensitivity and specificity were about 89.6% and 86.5%, respectively [8, 9].

Perceived stress was measured with the 10-item PSS-10 [16, 17]. Each item is scored 0 (never) to 4 (very often); positively worded items (4, 5, 7 and 8) are reverse-scored, and the total ranges from 0 to 40, with higher scores indicating higher perceived stress. Reported Cronbach's α is typically 0.78–0.91. For description, scores were grouped into low (0–13), moderate (14–26) and high (27–40) stress; these bands are not clinical diagnoses.

Academic performance was measured with an 8-item APS. Items are rated from strongly agree (5) to strongly disagree (1), giving a total of 8–40, with higher scores indicating better self-reported academic performance. Scores of 33–40 were classed as excellent, 25–32 as good and 17–24 as moderate performance. Self-reported grades generally correlate strongly with transcript grades, although weaker students tend to over-report [18].

D. *Procedure*

After ethical approval, participants were screened and selected according to the inclusion and exclusion criteria. Participants were told to answer every item honestly. The PSQI covered sleep over the past month, the PSS-10 covered feelings and thoughts over the past month, and the APS was scored according to its scoring instructions. The recorded scores were then prepared for statistical analysis.

E. *Statistical analysis*

Data were summarised as mean (standard deviation), median (interquartile range), range, frequencies and percentages. Normality was tested with the Shapiro–Wilk test. Because all three scores departed from normality, associations were tested with Spearman's rank correlation. Multiple linear regression, with the APS score as the dependent variable and PSQI and PSS-10 scores as predictors, was used to estimate their independent associations with academic performance. Internal consistency of the PSS-10 and APS was assessed with Cronbach's α. All tests were two-tailed, with significance set at $\alpha = 0.05$.

III. RESULTS

A. *Participant characteristics and score distributions*

Of the 217 participants, 182 (83.9%) were female and 35 (16.1%) were male. The mean PSQI score was 7.01 (SD 3.53), above the cut-off of 5 for poor sleep. The mean PSS-10 score was 19.50 (SD 5.25), within the moderate-stress band, and the mean APS score was 29.37 (SD 4.81), within the good-performance band (Table 1).

Table 1: Descriptive statistics of sleep quality, perceived stress and academic performance (N = 217)

Variable	Mean (SD)	Median (IQR)	Minimum–Maximum
Sleep quality (PSQI)	7.01 (3.53)	6.00 (4.00)	1–20
Perceived stress (PSS-10)	19.50 (5.25)	20.00 (6.00)	0–34
Academic performance (APS)	29.37 (4.81)	30.00 (7.00)	16–40

Note. PSQI = Pittsburgh Sleep Quality Index; PSS-10 = Perceived Stress Scale–10; APS = Academic Performance Scale; SD = standard deviation; IQR = interquartile range. Higher PSQI scores indicate poorer sleep, higher PSS-10 scores indicate greater stress and higher APS scores indicate better self-reported academic performance.

Poor sleep quality was found in 139 students (64.06%) and good sleep quality in 78 (35.94%). Most students (182; 83.87%) had moderate perceived stress, 21 (9.68%) had low stress and 14 (6.45%) had high stress. For academic performance, 121 students (55.76%) were in the good category, 57 (26.27%) excellent and 38 (17.51%) moderate; one student (0.46%) scored below 17, a range not covered by the scoring categories (Table 2, Fig. 1).

Table 2: Distribution of sleep quality, perceived stress and academic performance (N = 217)

Variable / category	n	Percentage (%)
Sleep quality (PSQI)		
Good sleep quality (≤5)	78	35.94
Poor sleep quality (>5)	139	64.06
Perceived stress (PSS-10)		
Low stress (0–13)	21	9.68
Moderate stress (14–26)	182	83.87
High stress (27–40)	14	6.45
Academic performance (APS)		
Excellent (33–40)	57	26.27
Good (25–32)	121	55.76
Moderate (17–24)	38	17.51
Below 17	1	0.46

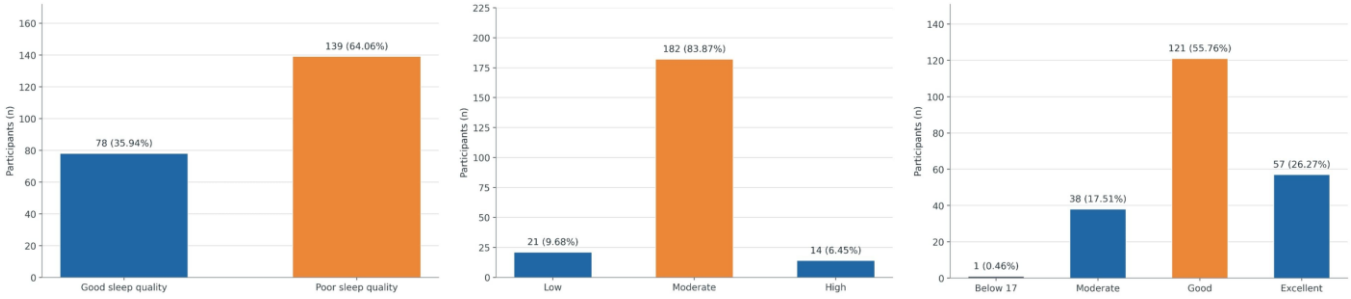


Fig. 1: Distribution of participants by (a) sleep quality, (b) perceived stress level and (c) academic performance category

B. PSQI components

Sleep disturbances had the highest mean component score (1.36), followed by sleep latency (1.28). Use of sleeping medication had the lowest (0.32) (Table 3).

Table 3: Descriptive statistics of PSQI components (N = 217)

PSQI component	Mean (SD)	Median (IQR)
Subjective sleep quality	1.02 (0.77)	1.00 (0.00)
Sleep latency	1.28 (0.94)	1.00 (1.00)
Sleep duration	1.03 (0.76)	1.00 (0.00)
Habitual sleep efficiency	1.01 (1.29)	0.00 (3.00)
Sleep disturbances	1.36 (0.67)	1.00 (1.00)
Use of sleeping medication	0.32 (0.75)	0.00 (0.00)
Daytime dysfunction	1.00 (0.96)	1.00 (2.00)

Note. Each component is scored 0–3; higher scores indicate greater sleep-related difficulty.

C. Normality and correlations

Shapiro–Wilk tests showed that PSQI ($W = 0.957$, $p < 0.001$), PSS-10 ($W = 0.970$, $p < 0.001$) and APS ($W = 0.984$, $p = 0.015$) scores all departed significantly from normality, so Spearman's rank correlation was used. Poorer sleep quality was moderately and positively correlated with higher perceived stress ($\rho = 0.422$, $p < 0.001$). Both poorer sleep quality ($\rho = -0.312$, $p < 0.001$) and higher perceived stress ($\rho = -0.379$, $p < 0.001$) were negatively correlated with academic performance (Table 4, Fig. 2).

Table 4: Spearman's rank correlations between sleep quality, perceived stress and academic performance (N = 217)

Variables	Spearman's ρ	p
Sleep quality (PSQI) and perceived stress (PSS-10)	0.422	<0.001
Sleep quality (PSQI) and academic performance (APS)	−0.312	<0.001
Perceived stress (PSS-10) and academic performance (APS)	−0.379	<0.001

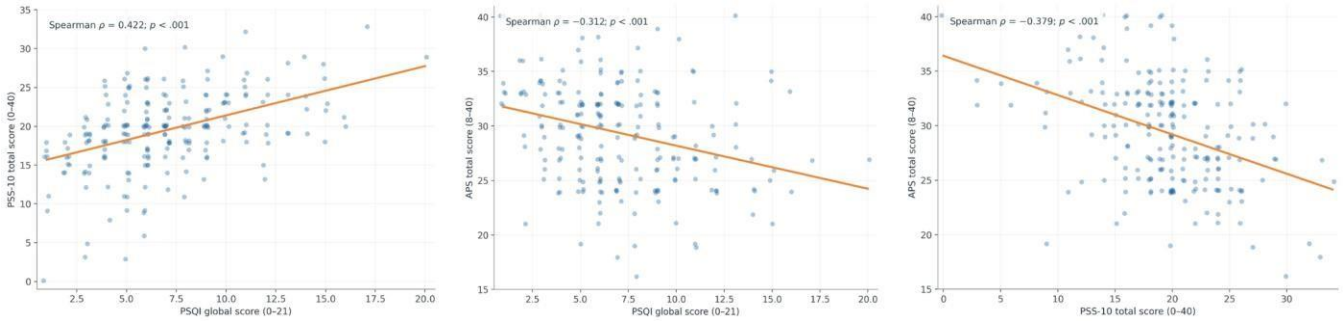


Fig. 2: Scatter plots with fitted lines for (a) PSQI and PSS-10, (b) PSQI and APS, and (c) PSS-10 and APS scores

D. Regression analysis

The regression model was statistically significant ($F(2, 214) = 22.38$, $p < 0.001$) and explained 17.3% of the variance in academic performance ($R^2 = 0.173$; adjusted $R^2 = 0.165$). Poorer sleep quality ($\beta = -0.149$, $p = 0.031$) and higher perceived stress ($\beta = -0.330$, $p < 0.001$) were each independently associated with lower academic performance, and perceived stress showed the stronger standardised association (Table 5).

Table 5: Multiple linear regression of academic performance on sleep quality and perceived stress

Predictor	B	SE	β	t	p	95% CI for B
Constant	36.694	1.158	—	31.693	<0.001	34.412, 38.976
Sleep quality (PSQI)	−0.204	0.094	−0.149	−2.171	0.031	−0.388, −0.019
Perceived stress (PSS-10)	−0.302	0.063	−0.330	−4.802	<0.001	−0.426, −0.178

Note. Dependent variable: APS total score. B = unstandardised coefficient; SE = standard error; β = standardised coefficient; CI = confidence interval. Coefficients are mutually adjusted.

E. Reliability

In this sample, internal consistency was acceptable for the PSS-10 (Cronbach's $\alpha = 0.706$, 10 items) and good for the APS ($\alpha = 0.843$, 8 items).

IV. DISCUSSION

This study examined sleep quality, perceived stress and academic performance in 217 hostel-living physiotherapy students. A large proportion had poor sleep quality and moderate perceived stress, and significant associations were found between all three variables.

A. Sleep quality

Poor sleep quality was found in 64.06% of the students (mean PSQI 7.01 ± 3.53). This is lower than the 76.7% reported in physiotherapy students on clinical postings [5], similar to the 62.7% reported in clinical postgraduate medical students in Kerala [19], and higher than the 44.23% and 31.3% reported in other medical and paramedical samples [1, 6]. Differences in samples, settings and academic schedules may explain the variation. Academic demands such as practicals, clinical postings and examinations, together with hostel factors such as shared accommodation, noise and irregular routines, may have contributed, although these were not measured here [5, 6, 10, 11, 12]. Sleep disturbances and sleep latency were the most affected components, which suggests that waking during the night and difficulty falling asleep are practical targets for intervention.

B. Perceived stress

The mean PSS-10 score was 19.50 ± 5.25 and most students (83.87%) were in the moderate-stress band. Physiotherapy students handle theory, practical examinations, clinical duties, case presentations and research, and adjusting to hostel life may add to this load [5, 15]. The study did not examine the sources of stress, so these explanations remain possible rather than established.

C. Sleep, stress and academic performance

Poorer sleep was moderately correlated with higher stress ($\rho = 0.422$). This is weaker than the correlation of $r = 0.613$ reported in physiotherapy students on clinical postings [5], but in the same direction. Stress can cause cognitive and emotional arousal that hinders falling or staying asleep, while poor sleep can reduce emotional regulation and the ability to cope with academic pressure, so the two may reinforce each other [5, 7].

Poorer sleep ($\rho = -0.312$) and higher stress ($\rho = -0.379$) were both associated with lower academic performance. A similar negative correlation between sleep quality and academic performance ($r = -0.37$) was reported among university students [11], and links between sleep, stress and academic outcomes have been described in medical students [7, 12, 13]. Sleep supports attention, memory consolidation and learning, so sleep disturbance may impair concentration in class, retention of information and examination preparation [2, 3]. In the regression model, stress had the larger standardised effect ($\beta = -0.330$) than sleep quality ($\beta = -0.149$), and together they explained 17.3% of the variance in academic performance; the remaining variance is likely due to other factors such as study habits, attendance, motivation and learning strategies [14].

Because this was a cross-sectional study, the findings show association, not causation. Stress may reduce academic performance, but academic difficulty may also raise stress, and poor sleep may be both a cause and a consequence.

D. Clinical implications

Assessing sleep quality and perceived stress in hostel-living physiotherapy students seems worthwhile, given how common poor sleep and moderate stress were. Physiotherapists and educators can encourage good sleep practices, relaxation techniques, physical activity and healthy lifestyle habits, and institutions can offer stress-management programmes, counselling, and guidance on time management and study techniques. Early identification of poor sleep and high stress may help students receive support sooner, although the effectiveness of such measures in improving sleep, reducing stress and supporting academic performance needs to be tested.

E. Limitations

Only a limited number of variables were examined; screen time, diet, exercise and personal circumstances may also influence sleep, stress and academic performance. The sample included only hostel-living physiotherapy students, so results cannot be generalised to day scholars or other disciplines. The sample was predominantly female (83.9%), all measures were self-reported, and the APS has no validated cut-off points, so its categories are descriptive. The cross-sectional design prevents conclusions about causality.

F. Future scope

Future studies could include more physiotherapy colleges and larger samples, use longitudinal designs to follow changes in sleep quality, stress and academic performance, compare hostel-living students with day scholars, examine factors such as screen time, physical activity, diet and the hostel environment, and test interventions such as sleep hygiene education, stress-management strategies and relaxation exercises.

V. CONCLUSION

Poor sleep quality (64.06%) and moderate perceived stress (83.87%) were common among hostel-living physiotherapy students, and most students (55.76%) reported good academic performance. Poorer sleep quality and higher stress were correlated with each other and with lower academic performance, together explaining 17.3% of its variance, with stress showing the stronger association. These associations do not establish causation. Promoting healthy sleep habits, stress-management skills and student support is important for student well-being and academic success.

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