

Clinical Stress and Sleep Disturbances as Determinants of Academic Achievement in Undergraduate Nursing Students

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ABSTRACT

Background: Nursing students in their undergraduate years often face academic and clinical challenges that can lead to psychological stress, sleep disturbances and poor academic performance. These factors can contribute to diminished students' well-being and learning.

Objective: To determine the association between clinical stress, sleep quality, and academic performance among undergraduate nursing students.

Methods: A cross-sectional analytical study was conducted at the Institute of Nursing & Institute of Allied Health Sciences, Wah Medical College, POF Hospital, Wah Cantt, Pakistan from July 2025 to January 2026. Non probability consecutive sampling was used to include 93 undergraduate nursing students. A variety of demographic, clinical stress, sleep quality, and academic performance data was gathered. Clinical stress level was defined as low, moderate or high and sleep quality was measured by the Pittsburgh Sleep Quality Index. Academic performance was measured by recent examination results or other academic records. The analysis of the data was performed in SPSS version 25.0. Where appropriate, chi square testing, correlation analysis and multiple linear regression were performed and the p value < 0.05 was considered as statistically significant.

Results: The mean age of participants was 21.42 ± 1.73 years. Moderate clinical stress was observed in 44 (47.3%) students, while 28 (30.1%) experienced high stress. Poor sleep quality was present in 58 (62.4%) participants. The proportion of poor sleep quality increased from 33.3% among students with low clinical stress to 59.1% among those with moderate stress and 89.3% among those with high stress. Clinical stress was positively correlated with poorer sleep quality ($r = 0.52$, $p < 0.001$) and negatively correlated with academic performance ($r = -0.41$, $p < 0.001$). Poorer sleep quality was also associated with lower academic performance ($r = -0.38$, $p < 0.001$).

Conclusion: Clinical stress and poor sleep quality were common among undergraduate nursing students and were significantly associated with lower academic performance. Strategies aimed at reducing clinical stress and improving sleep habits may support better educational outcomes and student well-being.

Keywords: Clinical stress, sleep quality, academic performance, nursing students, undergraduate education, PSQI

INTRODUCTION

Nursing education demands the development of a theoretical understanding as well as clinical skills. Nursing undergraduates are required to attend class, do their work, study for exams and perform supervised clinical practice (1, 2). The clinical setting can be challenging as students see real patients, learn new procedures, communicate with unfamiliar patients, and are responsible for safe patient care. These duties can be psychologically demanding to students while they are still studying (3, 4).

Clinical stress is the emotional and psychological strain that students feel while doing clinical learning activities (5, 6). This stress can be attributed to a variety of reasons such as fear of errors, lack in confidence in performing procedures, dealing with healthcare professionals, worry about assessment, high volumes of clinical workloads, and dealing with patients who are critically ill. Stress is necessary to help preparation and motivation, but long-term or high stress can make it difficult to concentrate, make decisions, feel confident and learn (7).

Nursing students' physical and cognitive performance is also affected by sleep. Good sleep is essential for concentration, memory consolidation, emotional control and problem-solving. Insufficient and/or disturbed sleep is possible for nursing students as a result of academic workload, early clinical rotations, examination preparation, shift related schedules, and psychological stress. Students may experience daytime fatigue, decreased awareness and alertness, difficulty concentrating and/or diminished involvement with classroom and clinical activities due to poor sleep quality (8).

Academic performance may therefore be influenced by the combined effects of clinical stress and sleep disturbance. Persistent stress may make it challenging for students to focus in class, remember the material, or study well for tests. Likewise, poor or fragmented sleep could affect memory, attention and learning effectiveness. If clinical stress and inadequate sleep are present, their interaction could have an additional impact on students' academic performance and educational experience (9, 10).

Understanding the relationship among these factors is important because nursing students represent the future healthcare workforce, and their academic and clinical preparation directly contributes to professional competence. Identifying students who are vulnerable to high stress and poor sleep may allow educational institutions to develop targeted support measures, including counseling, stress-management interventions, improved clinical scheduling, and sleep-health education. Therefore, the present study was conducted to determine the association between clinical stress, sleep quality, and academic performance among undergraduate nursing students, with particular emphasis on whether increasing clinical stress and poorer sleep quality were related to reduced academic achievement.

METHODOLOGY

This cross-sectional analytical study was conducted at the Institute of Nursing & Institute of Allied Health Sciences, Wah Medical College, POF Hospital, Wah Cantt, Pakistan from July 2025 to January 2026. This study aimed to identify the relationship between clinical stress, sleep quality and academic achievement of undergraduate nursing students. The total number of the students in the study was 93 undergraduate students of nursing. To be eligible for the study, students had to be enrolled in the undergraduate nursing program and engaged in academic and clinical instruction at that time.

Participants were recruited using a non-probability consecutive sampling technique. This included undergraduate nursing students of both sexes who were willing to participate and gave informed consent. Students who were on "long-term" academic, medical leave or who had incomplete academic records or those

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who returned incomplete questionnaires were not included in the final analysis. Where appropriate, students whose circumstances made it more difficult to assess clinical experience during the study period were also excluded.

The data for this study were obtained from a structured questionnaire containing demographic, academic, clinical, stress-related and sleep-related information. Demographic variables were age, sex, academic year and residential status. Average duration of sleep, weekly clinical duty hours, and academic characteristics were also recorded. A structured stress assessment scale designed for the nursing students was used for clinical stress measurement. The total stress score was determined using the scoring system of the instrument and then categorized as low, moderate and high clinical stress.

The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality. Several different domains of sleep are assessed with the PSQI: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The component scores were combined to obtain a global PSQI score. The higher the score, the worse the sleep quality and the participants were divided into good and poor sleep quality groups based on the suggested cut-off point for the scale. The academic performance was evaluated using the latest academic score (the most recent semester examination percentage or academic information verified from a student's academic record). Academic performance was categorized as good, average and poor based on the academic criteria specified in the study.

Data collection was carried out after explaining the purpose of the study to eligible participants. Questionnaires were given in an appropriate classroom setting in an anonymous format. The forms were completed independently with instructions to the participants and missing information was identified at the time of data collection. Names of the participants were not recorded and confidentiality was ensured by using identification codes. There was no compulsion to participate and students were told that their decision not to participate or to withdraw would not impact on their academic status.

The data were entered and analyzed using IBM SPSS Statistics 25.0. Where applicable, quantitative variables (age, clinical stress score, PSQI score, sleep duration, clinical duty hours and academic score) were summarized as mean $\pm$ standard deviation. Categorical variables were described in terms of frequencies and percentages. Chi-square test or Fisher's exact test, if applicable, was used to compare the association of clinical stress categories with sleep quality and academic-performance categories. The Pearson's correlation coefficient was used to evaluate the correlation between clinical stress score, PSQI score and academic performance, while Spearman correlation coefficient was used, in the absence of normally distributed variables. Multiple linear regression was used to evaluate the independent relationship of clinical stress and sleep quality with academic performance while adjusting for relevant demographic and academic factors. A p-value of <0.05 was taken to indicate a statistical significance.

RESULTS

In total, 93 undergraduate nursing students participated in the study. The mean age of the participants was 21.42 ± 1.73 years with the age range from 18 to 25 years. Most participants were female (76, 81.7%), while 17 (18.3%) were male. The students included those from all four academic years with the highest percentage being third year (27, 29.0%). Hostel students constituted over 50% of the students (50, 53.8%). Reported mean sleep time was 6.21 ± 1.14 h/night and the mean hours of clinical duty/week were 23.67 ± 5.32 h.

Clinical stress was found to occur in the participants. The mean clinical stress score was 28.46 ± 7.31 . In 44 students (47.3%), moderate clinical stress was identified and in 28 students (30.1%), high clinical stress was identified. 22.6% of students (21) were identified as having low stress. The mean sleep-quality score

was 7.18 ± 3.04 . Of the children, 58 (62.4%) were classified as having poor sleep quality and 35 (37.6%) good sleep quality, based on the sleep-quality classification.

Table 1: Demographic and Academic Characteristics of Undergraduate Nursing Students (n = 93)

Characteristics	Frequency (%) / Mean $\pm$ SD
Age, years	21.42 $\pm$ 1.73
Gender	Male 17 (18.3) Female 76 (81.7)
Academic year	First year 21 (22.6) Second year 23 (24.7) Third year 27 (29.0) Fourth year 22 (23.7)
Residence	Hostel 50 (53.8) Day scholar 43 (46.2)
Sleep duration, hours/night	6.21 $\pm$ 1.14
Clinical duty, hours/week	23.67 $\pm$ 5.32
Academic performance, %	72.84 $\pm$ 8.16

Table 2: Clinical Stress and Sleep Quality among Participants

Variable	Frequency (%) / Mean $\pm$ SD
Clinical stress score	28.46 $\pm$ 7.31
Clinical stress level	Low 21 (22.6) Moderate 44 (47.3) High 28 (30.1)
Sleep-quality score	7.18 $\pm$ 3.04
Sleep quality	Good 35 (37.6) Poor 58 (62.4)

The mean academic score of the students was $72.84 \pm 8.16\%$. Academic performance was categorized as good in 31 students (33.3%), average in 42 (45.2%), and poor in 20 (21.5%). Students who were stressed clinically in high level showed relatively lower academic achievement when compared with those who were stressed to low and moderate level.

Table 3: Academic Performance of Undergraduate Nursing Students

Academic performance	n (%)
Good	31 (33.3)
Average	42 (45.2)
Poor	20 (21.5)
Mean academic score, %	72.84 $\pm$ 8.16

The clinical stress level was found to be significantly related to sleep quality ($p < 0.001$). More than 89.3% of students who had high clinical stress had poor sleep quality whereas only 33.3% of students who had low clinical stress had poor sleep quality. There was a steady rise in the percentage of students with poor sleep in the low, moderate, and high stress groups. Academic performance was also significantly related to clinical stress ($p = 0.002$). Students with high stress were more likely to experience poor academic performance and students at low levels of clinical stress were most likely to experience good academic performance.

Table 4: Association of Clinical Stress with Sleep Quality and Academic Performance

Clinical stress level	Good sleep n (%)	Poor sleep n (%)	Good academic performance n (%)	Average n (%)	Poor n (%)
Low (n=21)	14 (66.7)	7 (33.3)	12 (57.1)	8 (38.1)	1 (4.8)
Moderate (n=44)	18 (40.9)	26 (59.1)	15 (34.1)	22 (50.0)	7 (15.9)
High (n=28)	3 (10.7)	25 (89.3)	4 (14.3)	12 (42.9)	12 (42.9)
p-value	<0.001		0.002		

The Pearson correlation coefficient revealed a moderate positive correlation between clinical stress score and sleep-quality score ($r = 0.52$, $p < 0.001$), suggesting that the higher the clinical stress score, the poorer the sleep quality score. There was a negative correlation between clinical stress and academic performance ($r = -0.41$, $p < 0.001$). More similarly, the academic scores were also negatively correlated with poorer sleep quality ($r = -0.38$, $p < 0.001$).

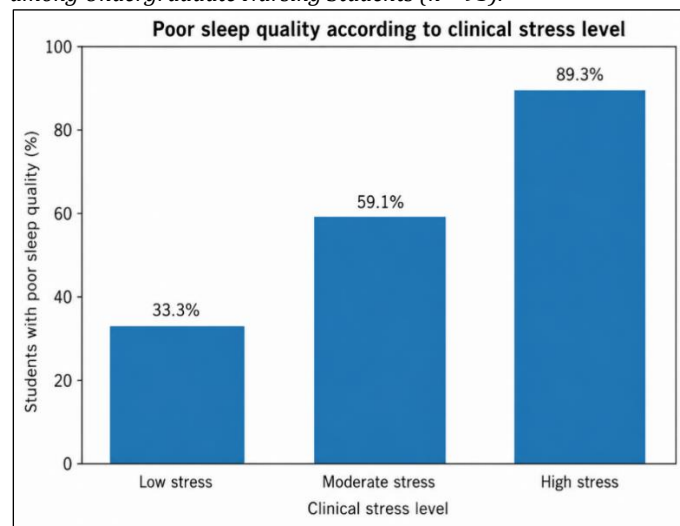
Table 5: Correlation between Clinical Stress, Sleep Quality, and Academic Performance

Variables	Correlation coefficient (r)	p-value
Clinical stress score vs. sleep-quality score	0.52	<0.001
Clinical stress score vs. academic performance	-0.41	<0.001
Sleep-quality score vs. academic performance	-0.38	<0.001

When controlling for each other, clinical stress score and poor sleep quality were still significant independent predictors of the academic performance of the students in multiple linear regression analysis. Increases in clinical stress score were independently associated with decreases in academic score ($\beta = -0.31$, $p = 0.003$), and increases in sleep-quality score were found to be independently associated with decreased academic performance ($\beta = -0.26$, $p = 0.011$). The overall regression model was statistically significant with an adjusted R^2 value of 0.27 ($p < 0.001$) that accounted for about 27% of the variance in academic performance.

Overall, the findings demonstrated that undergraduate nursing students experiencing greater clinical stress were more likely to report poor sleep quality and lower academic achievement. Poorer sleep quality was also independently associated with reduced academic performance, suggesting an interconnected relationship between clinical stress, sleep disturbance, and academic outcomes.

Figure 1: Poor Sleep Quality according to Clinical Stress Level among Undergraduate Nursing Students ($n = 93$).



The proportion of students with poor sleep quality increased progressively from 33.3% among those with low clinical stress to 59.1% with moderate stress and 89.3% with high clinical stress.

DISCUSSION

The present study evaluated the relationship between clinical stress, sleep quality, and academic performance among undergraduate nursing students. The findings demonstrated that clinical stress was common in the study population, with nearly half of the students experiencing moderate stress and approximately one-third reporting high stress. Poor sleep quality was also frequently observed, affecting more than three-fifths of the participants. Importantly, increasing clinical stress was accompanied by progressively poorer sleep quality and lower

academic achievement. These findings highlight the closely connected nature of psychological strain, sleep disturbance, and academic functioning among nursing students who must simultaneously manage theoretical learning and demanding clinical responsibilities (11, 12).

There was a clear relationship between clinical stress and sleep quality. Students with low stress had a sleep quality of 33.3% whereas students with moderate and high clinical stress had a sleep quality of 59.1% and 89.3% respectively. Students with low stress, moderate stress and high clinical stress had poor sleep quality of 33.3%, 59.1% and 89.3% respectively. Correlation analysis also revealed a moderate positive correlation between the clinical stress scores and PSQI scores, suggesting that an increase in clinical stress is associated with an increase in PSQI scores, or worse sleep quality. Stress for students in nursing can be related to patient care duties, potential for clinical mistakes, new clinical settings, deadlines, interactions with health care providers, assessment pressure. Mental stimulation and stress from these responsibilities may lead to delayed sleep onset, night time awakenings and daytime fatigue. Poor sleep, in turn, can decrease emotional support, and increase susceptibility to clinical stress, leading to a potentially reinforcing stress-sleep relationship (13, 14).

Academic performance was also significantly related to clinical stress. High clinical stress was more likely to occur in the poor academic performance group while low clinical stress was more common in the good academic performance group. The negative correlation between stress scores and academic outcomes indicates there may be a negative impact on students' academic outcomes when their stress levels are higher. While moderate stress can motivate students and help them to prepare, chronic or high levels of stress can distract students, create memory problems, affect concentration, decision making and motivation. The impact of these effects is more significant in nursing education where students are expected to develop theoretical knowledge and have the opportunity to practice clinical skills, interact with patients and colleagues, and show competence in practice while supervised (15, 16).

Academic performance was also independently related to sleep quality. Students with poorer sleep also tended to have lower academic scores, and this was still significant when clinical stress was taken into account in the regression analysis. Getting sleep is essential for consolidating, maintaining focus on, solving, and comprehending new information. Students enrolled in nursing programs who do not get enough sleep or sleep in a disjointed manner may find it challenging to focus on their lectures, clinical rotations, and exams. The daytime tiredness can also further decrease engagement in class and in the clinical setting. The results therefore indicate that the quality of sleep should not be viewed as a mere lifestyle phenomenon, but rather as a crucial component in educational performance and student well-being (17-20).

The regression findings indicated that clinical stress and poor sleep quality contributed independently to lower academic performance, with the model explaining a meaningful proportion of the variation in academic scores. The results have significant implications that should be taken into account by nursing homes. Stress management programs, using peer support, education on healthy sleep, and academic counseling can help alleviate unnecessary psychological and academic stress, as well as clinical scheduling improvements and regular assessment of student stress. However, there are some limitations in the study. The cross-sectional design does not provide a cause and effect relationship and the relatively small sample in a single setting may limit generalizability. The main outcome measures of stress and sleep quality were self-reported measures, which might be subject to recall or response bias. Further multicenter longitudinal studies with larger samples and objective sleep assessment could help to determine the direction of these relationships and to see if these interventions that impact stress and sleep can improve academic and clinical outcomes.

CONCLUSION

Clinical stress and poor sleep quality were common among undergraduate nursing students and were significantly associated with academic performance. Higher clinical stress was associated with poorer sleep quality, while both increased stress and deteriorating sleep were related to lower academic achievement. Students with high clinical stress showed the greatest prevalence of poor sleep and were more likely to demonstrate unfavorable academic outcomes. These findings emphasize the need for nursing institutions to incorporate stress-management support, appropriate clinical scheduling, student counseling, and sleep-health education into undergraduate training. Addressing these factors may improve students' well-being, learning capacity, and academic performance.

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Authors' Contribution

NZ: Concept & study design, data collection and drafting of the manuscript.
SK: Data entry, statistical analysis, interpretation of the results.
HK: Manuscript editing and critical revision of the manuscript.
All authors approved the final version of the manuscript to be published.

Conflict of Interest

The authors declared no conflict of interest.

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Data Availability

Data is available with authors and can be provided on request

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