

# The Relationship Between Sleep Pattern & Academic Performances among Nursing Students at a Higher Educational Institute

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## Abstract

**Background:** The combination of severe academic coursework and clinical training causes stress in student nurses, which impairs their academic performance and interferes with their sleep. This study investigates the relationship between sleep pattern and academic performance among nursing students at a higher education institute.

**Methods:** Using a quantitative cross-sectional design, a structured questionnaire was distributed to 80 nursing students in their third and fourth years. A Chi-square test was used to assess the relationship between sleep patterns and academic performance.

**Results:** A statistically significant correlation between academic achievement and sleep quality. Also, students with poor or fair sleep have higher CGPAs, and students with good sleep have a range of academic performance from high to low. A statistically significant relationship between workload levels and sleep quality was found.

**Conclusion:** Findings showed that poor sleep is common among nursing students, often due to academic and clinical pressures. The high-achieving students often reported poor sleep, and a significant link was found between workload and sleep quality.

**Limitations:** small sample size from one institution and self-reported data may introduce bias.

**Keywords:** Academic Performance, Clinical Rotations, Nursing Students, Sleep Quality, Sleep Pattern, Workload

## 1. Introduction

Sleep is an essential biological process composed of two primary phases: non-rapid eye movement (NREM) and rapid eye movement (REM) sleep. A complete sleep cycle, combining both NREM and REM phases, lasts approximately 90 minutes and occurs four to six times per night. These stages play vital roles in cellular recovery, cognitive processing, and emotional regulation. REM sleep is marked by heightened brain activity and muscle atonia, which prevents physical movement during dreaming, mimicking wakefulness in neural activity while maintaining external calmness [1]. The importance of sleep extends to memory, which undergoes encoding, consolidation, and retrieval. Encoding occurs during wakefulness, but consolidation—a critical process where short-term memories are transformed into long-term storage—primarily occurs during slow-wave sleep (SWS) and REM. SWS supports declarative memory (facts and knowledge), while REM sleep enhances procedural memory (skills and habits). Replay of neural patterns during sleep strengthens synaptic connections between

the hippocampus and neocortex, ensuring better memory retention and cognitive performance [2].

Sleep fragmentation, which involves multiple awakenings throughout the night, is particularly detrimental to memory consolidation. A study by Delwiche et al. demonstrated that fragmented sleep leads to fatigue and diminished executive function, notably in inhibitory control, although certain memory domains may remain unaffected due to compensatory mechanisms [3]. Similarly, research by Dahat et al. emphasized that deep and uninterrupted sleep significantly improves memory retention across declarative and procedural domains [4]. Nursing students often experience chronic sleep debt due to rigorous academic demands, clinical rotations, and irregular schedules. Guadiana and Okashima found that such sleep deprivation correlates with reduced concentration, academic difficulties, and impaired patient care [5]. Attempts to recover lost sleep over weekends commonly known as "social jet lag" fail to reverse the physiological and

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cognitive impacts of weekday sleep loss [5]. Compounded by night shift rotations, students face circadian rhythm disruptions that compromise their sleep quality, energy levels, and academic engagement [6,7].

Night shift work is a major disruptor of circadian rhythms, which regulate sleep and wake cycles. Nursing interns exposed to rotating shifts often show maladaptive sleep responses, including difficulty falling asleep, poor sleep quality, and excessive daytime fatigue. Studies by Wu et al. and Alfonsi et al. confirm that this misalignment leads to cognitive decline and increases the risk of clinical errors, highlighting a significant public health concern for both students and patients [6,7]. Efforts to improve sleep hygiene, such as structured sleep education programs, have shown promising results. Kaur et al. conducted a quasi-experimental study among nursing students and found that participants who engaged in daily sleep hygiene sessions reported significantly better sleep quality and psychological well-being [8]. These findings underscore the importance of institutional interventions and health education to support nursing students' academic success and overall wellness.

### 1.1. Aim of the Study

The aim of this study was to investigate what correlation exists between sleep patterns and academic performances of the nursing students at a higher educational institution.

### 1.2. Research Questions

Three questions were formulated as follow; what are the sleep patterns of nursing students; What is the relationship between sleep habits and academic performance, and in what way does workload affect sleep patterns and academic success.

## 2. Methods

This study adopted a quantitative cross-sectional design, allowing for the examination of relationships between variables at a single point in time. This approach was appropriate for assessing the associations among sleep habits, academic performance, and workload among nursing students, without manipulating variables or following participants longitudinally. Convenience sampling was used to select participants from the one higher educational institute, focusing on third- and fourth-year Bachelor of Science in Nursing (BSN) students actively engaged in both theoretical and clinical coursework. These students were considered ideal subjects due to their exposure to academically and physically demanding schedules. The estimated ideal sample size was 109, based on standard formulas for cross-sectional studies with a 95% confidence level and 5% margin of error. However, anticipating non-responses, the researchers aimed to recruit 150 participants. Ultimately, 83 students responded, with 3 excluded based on pre-defined criteria, resulting in a final sample of 80 students.

The study took place within one higher educational institute in the UAE, targeting BSN students involved in clinical rotations and a minimum of 12 academic credits. Inclusion criteria required participants to be in their third or fourth year, currently enrolled in clinical coursework, and capable of giving informed consent.

Students in earlier years or not currently active in coursework or clinical practice were excluded. These selection criteria ensured the study sample accurately represented the population most affected by academic and clinical workload. Data collection was carried out using a structured questionnaire adapted from Gallego-Gómez et al., which had been previously validated to assess the relationship between sleep habits and academic performance in university students [9]. The instrument comprised four sections: demographics, sleep patterns, academic performance, and workload. It utilized multiple Likert-type scales and fixed-choice responses. Sleep data included duration, quality, bedtime, and disruptions; academic performance was assessed via GPA and perceived impact of sleep on academic outcomes; workload was measured in terms of study hours, clinical hours, commute times, and fatigue.

The data collection process spanned two weeks and was conducted through an online self-administered questionnaire distributed via institutional email and WhatsApp groups commonly used by nursing students. This mode of delivery was selected for its convenience and ability to reach a broad range of participants while minimizing disruptions to their academic and clinical schedules. Clear instructions were provided alongside the questionnaire, and students were encouraged to complete it at their own pace. The online format also ensured anonymity and reduced response bias, particularly on sensitive questions regarding academic stress or sleep quality. Reminders were sent periodically to increase the response rate, and responses were monitored to ensure completeness and adherence to inclusion criteria before being analyzed.

Ethical considerations were addressed through voluntary participation, informed consent, anonymity, and confidentiality. The study posed minimal risk, and participants were assured that no identifying information would be disclosed. The Institutional Review Board (IRB) at the University reviewed and approved the study protocol. Participants were also informed that findings would be presented in aggregate form, preserving privacy and ethical integrity. Data analysis was performed using PSPP, a free statistical software akin to SPSS. Descriptive statistics such as frequencies and percentages summarized the demographic and categorical data. The Chi-square test of independence was used to examine associations between non-numerical variables like sleep pattern categories and academic performance. A significance level of  $p < 0.05$  was used to determine statistically meaningful relationships, enabling clear interpretation of inter-variable dynamics.

## 3. Results

The majority of participants (72.5%) were between the ages of 21-23, making this the largest age group in our study. In contrast, the smallest group consisted of students aged 24 and above, comprising only 2.5% of the sample. This distribution suggests that most nursing students in our study were in their early twenties, with relatively few older students. In terms of gender, females formed the majority at 72.5%, whereas males represented 27.5%. With regards to the academic year, most students were in their

fourth year (71.3%), while third-year students made up 28.7%. Additionally, a significant portion of students (85.0%) reported that they were not working, while only 15.1% were employed Table 1.

Variable	N	%
<b>Age</b>		
18-20	20	25.0%
21-23	58	72.5%
24 and above	2	2.5%
<b>Gender</b>		
Male	22	27.5%
Female	58	72.5%
<b>Academic Year</b>		
Third year	23	28.7%
Fourth year	57	71.3%
<b>Working</b>		
Yes	12	15.1%
No	68	85.0%

**Table 1: Demographic Data of Nursing Students Sample (N=80)**

The sleep patterns of participants reveal a clear inclination toward irregular schedules and late-night routines. Nearly half (45.0%) of the students reported difficulty maintaining a consistent sleep-wake cycle, with 60.0% admitting to occasionally losing an entire night of sleep. Most participants (58.8%) typically went to bed between 11:00 PM and 1:00 AM on weekdays, while only 20.0% slept earlier, suggesting that late nights are the norm. To mitigate sleep loss, 57.5% sometimes took short naps during the day or while on vacation. Academic and work responsibilities heavily influenced these patterns, with 42.5% sometimes staying up late for study or work, and 41.3% delaying sleep to improve academic performance. Additionally, 35.0% preferred studying for exams at night. Bedtime routines varied, with 47.5% engaging in reading

or work before sleep, while 55.0% never listened to music. Watching television before bed was somewhat common (43.8%), and late-night social activities were also prevalent, with 61.3% occasionally going out despite early obligations the next day. The distribution of sleep quality among students, categorized into Poor Sleep, Fair Sleep, and Good Sleep. A majority of students (72.5%) experience fair sleep, while 25% report poor sleep, indicating that sleep disturbances are a common issue. Only 2.50% of students classify their sleep as good, suggesting that very few students achieve optimal rest. These findings highlight the potential impact of academic and clinical demands on students' sleep quality, which may, in turn, affect their overall well-being and performance (Figure).



**Figure:** The Impact of Academic and Clinical Demands on Students' Sleep Quality

Regarding the academic performances, the majority of students (70.0%) have a high cumulative GPA (CGPA) in the range of 3.5 to 4. This indicates that a significant portion of the sample performs exceptionally well academically. An additional 20.0% of students fall within the 3.0 to 3.4 range, meaning that nearly 90% of the students have a CGPA of 3.0 or higher, demonstrating strong academic standing overall. A smaller percentage (6.3%) of students have a CGPA between 2.5 and 2.9, indicating that only a few students are in the lower academic performance range. Lastly, only 3.8% of students have a CGPA below 2.5, showing that very few students are struggling significantly with their grades. Overall, the data suggests that the majority of students maintain good academic performance, with only a small fraction facing challenges in their studies. Results related to workload among nursing students highlights the demanding nature of their academic and clinical responsibilities and their impact on sleep and performance. Half of the students (50.0%) reported studying less than 10 hours weekly, while clinical placements occupied 24–36 hours for 93.8% of them. Over half (51.2%) often felt overwhelmed by academic demands, and 45.0% rated their time management skills as average. Academic workload notably influenced sleep, with 48.8% indicating it somewhat affected their sleep and 35.0% saying it significantly disrupted it. Additionally, 46.3% of students reported commuting 1–2 hours daily, leading to disrupted sleep schedules for 58.8% and less sleep for 32.5%. Fatigue from long

commutes affected clinical performance, with 53.8% sometimes and 27.5% often experiencing performance issues. Notably, 60.0% believed shorter commutes would improve their sleep and clinical effectiveness, underscoring the need for better time management strategies and reduced commuting burdens.

The relationship between academic performance (CGPA) and sleep quality reveals noteworthy trends. Among students with poor sleep, 70.0% achieved a CGPA between 3.5 and 4.0, indicating that many high-performing students report low sleep quality, possibly due to increased academic pressure or stress (Table 2). An additional 25.0% of this group fall within the 3.0–3.4 range, and only 5.0% fall between 2.5–2.9, with none scoring below 2.5. Similarly, among those with fair sleep, 70.7% also achieved CGPAs between 3.5 and 4.0, though this group was more evenly distributed across other CGPA ranges. In contrast, students reporting good sleep were few and split evenly between the highest (3.5–4.0) and lowest (below 2.5) CGPA categories, with no representation in the mid ranges. This suggests that while some students can balance good sleep and academic success, others with good sleep may underperform due to factors unrelated to rest. The chi-square value of 13.19 and p-value of 0.040 confirm a statistically significant relationship between sleep quality and CGPA, implying that poorer sleep may be more common among high achievers, likely reflecting the demands of maintaining academic excellence.

Academic Score	Poor Sleep		Fair Sleep		Good Sleep		Chi-square test	P-value
	N	%	N	%	N	%		
3.5 – 4	14	70.0%	41	70.7%	1	50.0%	13.19	0.040
3 – 3.4	5	25.0%	11	19.0%	0	0%		
2.5 – 2.9	1	5.0%	4	6.9%	0	0%		
Below 2.5	0	0%	2	3.4%	1	50.0%		
Total	20	100%	58	100%	2	100%		

**Table 2: Relationship Between Academic Scores (CGPA) and Sleep Quality among the Sample**

#### 4. Discussion

An important element for a good quality of life is sleep. Sleep is an excellent indicator to determine the health status of an individual. Entering university can change a student's life in various dimensions, including sleeping habits. For a long time in medical literature, it has been evident that irregular sleeping patterns have caused a negative impact on the student's life and academic performances. This study explored the relationship between sleeping patterns and academic performances among nursing students at a higher educational institute, the findings from this study reflects the scope and themes introduced, providing an overall description of how sleep quality, academic demands, and performance intersect within this population.

A study conducted in 2023 named “The Impact of Sleep Deprivation in Nurses on Psychomotor Skills, Memory, and Medical Errors”, found that among the sample, 81% of the nurses were continuing shift works with a mean of 4.3 hours of sleep only, while the rest of the nurses survived on 6.4 hours of sleep, suggesting that both

the group of nurses were sleep deprived [10]. Similarly, our study focused on nursing students had a similar trend and is aligned with our first objective by successfully characterizing the sleeping habits of nursing students. Most nursing students were sleep deprived and had irregular sleeping patterns, with a large number of students going to bed only between 11:00 PM – 1:00 AM, frequently due to academic responsibilities. Only 2.5% reported good sleep quality, while 72.5% experienced fair sleep, and 25% experienced poor sleep. Studies show that getting no sleep at all or even just losing some sleep can seriously hinder the ability to remember things and make it much harder to learn and retain new information [11]. But, many students tend to sacrifice their sleep and implement a disrupted sleeping schedule to achieve academic success. A statistically significant relationship was observed between sleep quality and academic performance ( $p = 0.040$ ), aligning with our second objective of analyzing the relationship between sleep and academic success. Interestingly, higher academic performance (CGPA 3.5–4) was most common among students with poor or fair sleep, suggesting that top-performing students may sacrifice

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sleep in pursuit of academic success.

Nursing education as known, is a blend of knowledge and skills, requiring extensive training. Students enrolled in this course face various course demands and higher levels of burnouts. A study conducted in 2025 among undergraduate nursing students found that – 94% of the students among the sample experienced an average burnout level, while only 6% experienced a low burnout level. Similarly, high emotional exhaustion among these students was common, comprising 76.3% of them. Factors causing such high rates point at the exhausting workload implicated on the students [12]. Our study also analyzed how workload in their educational institute was affecting academic performances and sleeping patterns, aligning with the third objective of the study. The objective is only partially supported despite a statistically significant relationship between workload levels and sleep quality ( $p = 0.019$ ), since the finding that good sleep occurred only among students with intense workload challenges conventional assumptions. This may indicate that a subset of students under high pressure develop effective coping strategies or time management skills that preserve sleep quality.

Our study results remain consistent with previous studies that irregular sleep and academic workloads can have negative impacts on the sleeping pattern of a university student. Literatures have shown that stress, late-night study habits and disrupted schedules are often seen among students with poor sleep [13]. However, our results observed that although students with poor or fair sleep had disrupted sleep patterns, they scored higher grades academically compared to the ones with good sleep, which differs from some studies suggesting that better sleep leads to better performance. This paradox may have arisen due to the willingness by the high-performing students to compromise sleep or use short-term compensatory habits such as caffeine or napping to achieve academic success. One unique finding from our study highlighted that students that had intense workloads somehow had good sleep which contradicts common findings and highlights a need for further investigation. However, the findings may also have reflected differences among an individual's resilience, planning, or even support systems that help them manage their workload effectively and efficiently, while also managing to achieve a good quality sleep.

#### 4.1. Limitations of the Study

The study however presents several limitations that need to be noted. Firstly, the data collection solely relied on self-reported responses in the questionnaire, which suggests that responses could have been biased or inaccuracies may have arisen due to misjudgement by the participants or a desire to respond in socially acceptable ways. Furthermore, the precision of the data may have been affected due to the reliance on subjective measures only for sleep patterns, workload, and academic performance. Secondly, the results of the study depended on a relatively small sample size of 80 nursing students who were from a single institution, this

limited the generalizability of our findings to a broader population. Finally, the study also did not account for other factors that may influence a student's sleeping patterns such as mental health status, dietary habits, physical activities, or familial responsibilities, all of which may impact sleep and academic outcomes.

#### 4.2. Recommendations

Several recommendations can be made, based on the results of this study. For academic institutions and nursing educators, it highlights the need to incorporate sleep hygiene awareness programs among students as teaching them the importance of regular sleep patterns and sleep hygiene techniques can have significant impact on the students' well-being and academic performances. Furthermore, the study recommends institutions to review and evaluate clinical and academic schedules to manage and reduce late-night study demands and to support healthier sleep routines. Providing workshops related to time management and training can also enhance students' abilities to manage responsibilities effectively. As for nursing students, the study recommends them to adopt good sleep hygiene practices such as the avoidance of screen time before bed, minimizing or avoiding caffeine intake in the evening, and taking short naps when needed. From a policy perspective, reduction of commuting time to clinical placements may ease the burden on students, allowing them for a better sleep duration, and reduces fatigue. Stakeholders should bring this into consideration and develop a student-centred academic planning that promotes both academic success and student well-being.

#### 5. Conclusion

The current study investigated the relationship between sleep patterns, academic performances, and workload among nursing students. The study findings revealed that inconsistent and poor sleep was a common issue among nursing students, and this is often linked to pressures arising from academic coursework's and the clinical rotations. Interestingly, poor or fair sleep was reported by students with higher academic outcomes, highlighting that academic excellence may sometimes come at a cost of adequate rest. Furthermore, a statistically significant relationship was established between workload and quality of sleep, highlighting the effects academic and clinical demands may have on the students' sleep health. While the study had limitations, it still provides valuable insights for academic institutions suggesting the need for better student support through well-planned scheduling, time management education, and awareness of healthy sleep habits. Overall, the study also shows the importance of addressing quality of sleep as a crucial component of academic success and student health in nursing education.

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