



SLEEP QUALITY AND CLINICAL ROTATIONS: UNVEILING THE IMPACT ON FINAL-YEAR NURSING STUDENTS

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Received: 17 February 2025 • Accepted: 21 October 2025 • Published: 31 October 2025

Abstract

Sleep disturbances are common among students and may be exacerbated by shift work. Nursing students encounter shift patterns during clinical rotations, which can affect sleep quality. This study evaluated sleep quality among fourth-year nursing students at IIUM Kuantan, described the intensity of their clinical rotations and examined the association between rotation intensity and sleep quality. This descriptive cross-sectional study was conducted among 136 fourth-year nursing students at IIUM Kuantan. Data were collected using the Pittsburgh Sleep Quality Index (PSQI) and a validated questionnaire measuring clinical rotation intensity. Analyses were performed using SPSS; Fisher's exact test was used to examine the association between sleep quality and clinical rotation intensity. A p -value < 0.05 was considered statistically significant. Of the 136 participants, 33 (24.3%) reported good sleep quality and 103 (75.7%) reported poor sleep quality. Clinical rotation intensity was reported as low by 1 participant (0.7%), moderate by 93 participants (68.4%) and high by 42 participants (30.9%). Fisher's exact test indicated no significant association between sleep quality and clinical rotation intensity ($p = 0.559$). In conclusion, poor sleep quality was common among the participating nursing students but was not significantly associated with clinical rotation intensity in this sample. Further studies with larger, multi-centre samples and objective sleep measures are recommended to explore this relationship more comprehensively.

Keywords: Sleep Quality; Clinical Rotation; Shift Work; Nursing Students

Cite as: Ariffin S. M., Sahar M.F., & Muhamad, S. (2025). Sleep Quality and Clinical Rotations: Unveiling the Impact on Final-Year Nursing Students. *Asian People Journal*, 8(2), 102-111.

INTRODUCTION

Sleep is a fundamental physiological process essential for maintaining physical health, cognitive performance, and emotional regulation. During sleep, critical functions such as memory consolidation, hormonal regulation, and tissue repair occur, supporting optimal daily functioning (Marta et al., 2017). Sleep quality is commonly assessed by the ease of initiating and maintaining sleep, sleep duration, and daytime functioning (Zhao, Lu & Yi, 2023). Poor sleep quality has been associated with impaired attention, mood disturbances, and decreased psychomotor performance, which are particularly concerning in healthcare settings where safety and precision are crucial.

Globally, poor sleep quality has been widely documented among nursing students and healthcare professionals. Studies have shown that shift work, long clinical hours, and academic stress contribute to sleep disturbances in this population (de Menezes Júnior et al., 2023; Xiong, Huang & Zhu, 2021). Clinical placements are a core component of nursing education, enabling students to integrate theoretical knowledge with clinical practice. However, the demands of clinical rotations, including night shifts, irregular working hours, and heavy workloads, can disrupt circadian rhythms and negatively impact sleep patterns (Huang, Tian & Zeng, 2021).

In the Asian context, several studies have highlighted the impact of shift work and clinical training on sleep quality. For instance, Zhang et al. (2016) reported that Chinese nurses with previous or current shift work exposure were significantly more likely to experience poor sleep quality. Similarly, Alameri et al. (2024) found high levels of sleep disturbances among nurses working in high-acuity clinical settings in Saudi Arabia, emphasising the pervasive influence of shift schedules in the region. These studies underscore the importance of examining sleep health in educational and clinical environments with intensive training demands.

In Malaysia, however, there remains a lack of empirical evidence on sleep quality among nursing students and its relationship with clinical rotation intensity. While Malaysian nursing curricula similarly incorporate shift-based clinical placements, few studies have systematically explored how these rotations influence students' sleep health. Addressing this gap is essential for informing educational policies and support systems tailored to local training contexts. Therefore, this study aims to describe the sleep quality and clinical rotation intensity among fourth-year nursing students at IIUM Kuantan and to examine the association between these two factors.

LITERATURE REVIEW

A basic biological function, sleep is necessary for preserving general health and assisting the body's self-regulation systems. Adequate sleep, typically around eight hours per day, is widely recognised as crucial for students (Khan et al., 2016). For nursing students in particular, sufficient rest is not simply a matter of comfort; it is a prerequisite for sustaining attention, emotional regulation, and effective learning. "Sleep is essential for memory consolidation, where memories are reorganized to become more resistant to interference, thereby ensuring improvements in performance," as Saat et al. (2020) point out. In other words, sleep enables students to retain and apply knowledge more effectively, a skill that is indispensable in nursing education. Despite its clear importance, poor sleep quality remains a widespread issue among young adults, particularly those pursuing higher education. University life is often accompanied by academic pressure, irregular schedules, and lifestyle changes, all of which can disrupt healthy sleep

patterns. A study conducted among Lebanese university students revealed that the majority scored poorly on the Pittsburgh Sleep Quality Index (PSQI), indicating significant difficulties in achieving restorative sleep (Khan et al., 2016). Similar concerns have been documented in Malaysia, where the prevalence of poor sleep quality among university students ranges from 33.3% to 70.6% (Saat et al., 2020). These figures highlight that sleep problems among students are not isolated incidents but reflect a broader trend that warrants attention.

Within this context, it becomes particularly important to examine how clinical training influences students' sleep. Nursing students face unique challenges due to the demands of their clinical rotations, which require them to adjust to the rhythms and responsibilities of real-world healthcare settings. Emerging evidence also suggests gender differences in sleep quality. For example, a study conducted in Chile during the pandemic found that 23.5% of male physical education students reported good sleep quality—1.9 times higher than their female counterparts ($p = 0.031$) (Merellano-Navarro et al., 2022). This difference points to potential biological, psychological, or social factors that may affect sleep patterns differently across genders.

A vital component of nursing education, clinical rotations give students practical experience that helps them connect theory to practice. However, these rotations often involve irregular working hours, which can disrupt students' natural sleep–wake cycles. Yazdi et al. (2014) reported that shift workers frequently experience reduced sleep quality, increased fatigue during night shifts, and daytime insomnia. In a similar vein, D'ettorre et al. (2020) discovered that working night shifts disrupts the circadian rhythm of the body, resulting in increased daytime sleepiness and chronic sleep disturbance. Nursing students' learning, well-being, and general performance can be greatly impacted by these disruptions, as they must juggle rigorous clinical schedules with academic obligations.

The consequences of poor sleep extend beyond personal discomfort—they can directly affect the quality and safety of patient care. Sleep-deprived individuals are more prone to errors, reduced concentration, and slower reaction times. A study of nurses in Taiwan revealed that 96% of female nurses experienced poor sleep quality, and those working longer hours made significantly more medication errors than their peers with shorter shifts (Hsu et al., 2021). Researchers have also drawn attention to specific shift patterns, such as “quick returns,” where the interval between shifts is short. Nurses working over 30 quick return shifts per year were found to be 2.53 times more likely to report poor sleep quality, while those on extended shifts of 12.5 hours or more faced a 2.4 times higher risk (Wangsan et al., 2022). Moreover, large-scale surveys show that more than 40% of night-shift nurses report symptoms consistent with shift work disorder, including excessive drowsiness, insomnia, and difficulty sleeping (Huang et al., 2021).

Taken together, these findings illustrate the critical role of sleep in safeguarding both student wellbeing and patient safety. For nursing students, achieving sufficient and good-quality sleep—around eight hours daily is essential for sustaining concentration, memory consolidation, and clinical decision-making. Yet, evidence consistently indicates that poor sleep quality is highly prevalent among university

students, with additional variations observed between genders. Clinical rotations, while fundamental to nursing education, often disrupt sleep patterns due to irregular hours and demanding responsibilities. This disruption not only compromises students' health and academic performance but also heightens the risk of errors in clinical settings. Addressing sleep quality among nursing students is therefore not a peripheral issue; it is central to nurturing competent, safe, and resilient future nurses.

METHODOLOGY

Study design

A descriptive cross-sectional design was employed to investigate the relationship between sleep quality and clinical rotation intensity among fourth-year nursing students at IIUM Kuantan. Cross-sectional studies are widely used in health and nursing research to explore prevalence and relationships between variables within a defined population at a single point in time (Setia, 2016).

Population, sampling, and sample size

The study population comprised fourth-year nursing students who had completed three-shift clinical postings during the data collection period. Purposive sampling was used to ensure that participants met specific inclusion criteria relevant to the study objectives, a technique commonly applied in health sciences research when studying defined subgroups (Etikan, Musa, & Alkassim, 2016). The sample size was determined using the Raosoft online sample size calculator, with parameters set at a 95% confidence level, 5% margin of error, a response distribution of 50%, and a population size of 153. This produced a minimum required sample size of 110 participants. The final number of respondents was 136 (123% of the minimum target), which is adequate for descriptive cross-sectional studies of this nature (Bujang et al., 2024). Inclusion criteria were: (1) fourth-year nursing students exposed to three-shift clinical postings during the study period; (2) proficiency in English; and (3) willingness to participate. Students absent during data collection were excluded.

Instruments

The Pittsburgh Sleep Quality Index (PSQI) was used to measure the quality of the sleep. More than 34,000 peer-reviewed publications have referenced the PSQI, which was created by Dr. Daniel Buysse and associates at the University of Pittsburgh (Buysse et al., 1989). Clinical rotation intensity was assessed using a nine-item questionnaire developed for this study, comprising closed-ended items evaluating workload, shift frequency and perceived clinical intensity. The questionnaire items were informed by previous literature examining the association between clinical workload, shift patterns and sleep quality (Alameri et al., 2024; Xiong et al., 2021) and further refined through input from the supervisory team.

Demographic information was collected in a short form. The combined instrument (all three parts) underwent a pilot test with 15 participants, yielding a Cronbach's alpha of 0.705, indicating acceptable internal consistency. According to Allen (2024), the pilot study is not conducted for the purpose of inference; therefore, a power calculation is not required. However, the number of pilot participants depends on the specific objectives of the pilot test (Bujang et al., 2024).

The instruments for this study were divided into three:

Part A: Demographic data: This part consists of one question; the participants need to choose one answer from the question.

Part B: Clinical rotation intensity consists of 9 closed-ended questions. The participants need to choose one answer from each question and answer all the questions.

Part C: The Pittsburgh Sleep Quality Index consists of 17 Likert scale questions adapted from Pittsburgh Sleep Quality Index questionnaires. Participants need to choose one best answer.

Data collection procedure

Data were collected via an online questionnaire (Google Forms). Approximately, 2 months of data collection for this study. The purpose of the study and informed consent information were provided at the start of the form. Responses were saved anonymously and securely. The flow as below:

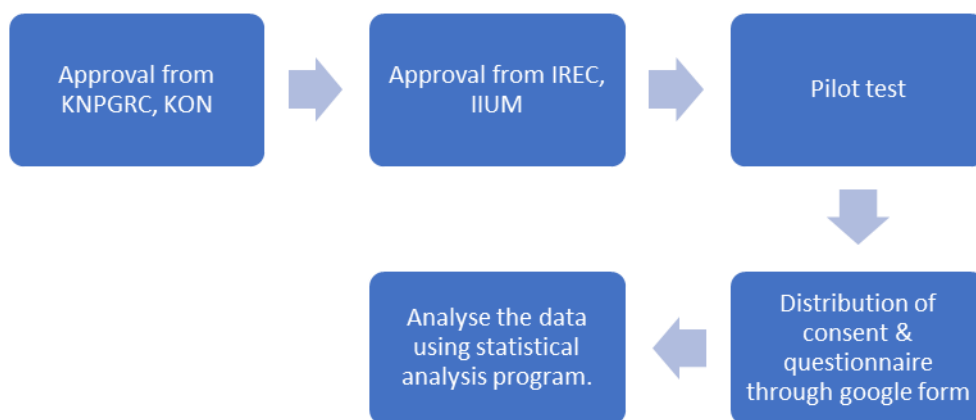


Figure 1: Flow of Data Collection

Data analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarise participants' characteristics, sleep quality, and clinical rotation intensity. Fisher's exact test was employed to examine associations between categorical variables, which is suitable for small or unevenly distributed categorical data (Kim, 2017). A significance threshold of $p < 0.05$ was applied.

Ethical considerations

Approval to conduct the study was obtained from the Kulliyyah of Nursing Postgraduate Research Centre (KNPGRG) and the IIUM Research Ethics Committee (IREC) (ID No: IREC 2024-105). Participation was voluntary; participants provided informed consent, and confidentiality was preserved throughout the study.

RESULT AND DISCUSSION

Participants

A total of 136 fourth-year nursing students participated in this study, with a mean age of 21.8 years (SD = 0.6). The majority were female (89.7%, $n = 122$), while 10.3% ($n = 14$) were male (Table 1).

Table 1: Demographic Data of Participants (n=136)

Gender	n	%	Mean $\pm$ SD
Male	14	10.3	21.8 $\pm$ 0.6
Female	122	89.7	

Sleep quality

Based on the PSQI, 33 participants (24.3%) were classified as having good sleep quality while 103 (75.7%) were classified as having poor sleep quality (Table 2).

Table 2: Sleep Quality Level (n=136)

Sleep Quality	n	%
Good	33	24.3
Poor	103	75.7

Clinical rotation intensity

Clinical rotation intensity was reported as low by 1 participant (0.7%), moderate by 93 participants (68.4%) and high by 42 participants (30.9%) (Table 3).

Table 3: Clinical Rotation Intensity Level (n=136)

Clinical rotation intensity	n	%
Low	1	0.7
Moderate	93	68.4
High	42	30.9

Association between sleep quality and clinical rotation intensity

The association between sleep quality and clinical rotation intensity was examined using Fisher's Exact Test because some expected cell counts were below five. The analysis indicated no statistically significant association between these variables (Fisher's Exact Test, $p = 0.559$). For reference, the contingency table has 1 degree of freedom (Table 4).

Table 4: Association between Sleep Quality and Clinical Rotation (n=136)

Variable	n	Clinical rotation intensity (low/moderate) (%)	Clinical rotation intensity (high) (%)	Fisher's Exact Test (df)	P- value
Sleep Quality (Good)	33	23 (69.7)	10 (30.3)	0.346 (df = 1)*	0.559
Sleep quality (Poor)	103	71 (68.9)	32 (31.1)		

* Fisher's Exact Test was used due to small, expected cell counts. The 2 $\times$ 2 table has 1 degree of freedom.

Discussion

This study found a high prevalence of poor sleep quality (75.7%) among fourth-year nursing students at IIUM Kuantan. This rate is broadly consistent with prior studies demonstrating substantial sleep problems among healthcare students and shift workers (de Menezes Júnior et al., 2023; Xiong, Huang & Zhu, 2021). Several factors may contribute to poor sleep quality in this population, including academic workload, clinical responsibilities, exposure to night shifts and psychosocial stressors (Yu et al., 2025). Specifically, high-stress environments and

demanding clinical schedules common in nursing education can significantly disrupt sleep patterns and overall well-being (Benjamin et al., 2024). For instance, psychological distress, encompassing anxiety and stress stemming from academic pressures and clinical demands, has been identified as a critical determinant of impaired sleep quality among nursing students (Benjamin et al., 2024; Ocansey et al., 2024).

Although a substantial proportion of students reported moderate to high clinical rotation intensity, no significant association was detected between rotation intensity and sleep quality in this sample ($p = 0.559$). Several plausible explanations may account for this finding. First, most of the students experienced moderate rotation intensity, which may have allowed them to adapt physiologically and psychologically to shift demands over time. Adaptation to moderate workloads could buffer the adverse effects of irregular schedules, leading to non-significant differences in sleep outcomes. Second, the cross-sectional design limits causal inference, and temporal changes in sleep patterns could not be assessed. Third, the self-reported measure of rotation intensity may not have captured the complexity of scheduling patterns (e.g., sequence of night shifts, quick returns) that more directly affect sleep. Additionally, the single-institution sample may have reduced variability, limiting statistical power to detect modest effects.

When compared to other Asian and regional studies, the absence of an association contrasts with findings from China and Saudi Arabia, where higher rotation intensity and frequent night shifts were significantly related to poorer sleep outcomes (Zhang et al., 2016; Alameri et al., 2024). In those contexts, more intensive or prolonged shift work schedules may have exceeded students' adaptive capacity, leading to sleep disruption. Differences in institutional scheduling practices, clinical exposure patterns, and support systems may explain these contrasting findings.

It is also important to consider potential confounding factors that were not controlled for in this study. Variables such as stress levels, coping strategies, individual resilience, chronotype, and academic pressure could influence sleep quality independently of rotation intensity. For example, students with effective coping mechanisms may maintain sleep quality despite demanding rotations, while those experiencing high academic stress may have poorer sleep regardless of clinical exposure (Almalki et al., 2025). Future studies should incorporate these variables to provide a more comprehensive understanding of the determinants of sleep quality in this population.

This study adds to the limited Malaysian literature on sleep quality among nursing students and highlights the high prevalence of sleep problems in this group. The findings support the need for preventive interventions, such as education on sleep hygiene, scheduling practices that reduce consecutive night shifts where possible, and provision of mental health resources for students undergoing intensive clinical training. (Belingheri et al., 2022). Future research should consider multi-centre designs, larger sample sizes and objective sleep measures (e.g., actigraphy) to clarify the relationship between clinical rotation characteristics and sleep quality, while also controlling for relevant confounders (Almalki et al., 2025).

CONCLUSION

This study highlights that most participating nursing students have poor sleep quality and experience moderate levels of clinical rotation intensity. Although no significant association was found between these two variables ($p = 0.559$), the findings provide valuable insights into the students' sleep health and clinical training experiences.

These results have several implications for policy and practice. Firstly, nursing schools and clinical training institutions can use this evidence to review and optimise clinical placement schedules, aiming to minimise unnecessary fatigue for example, by ensuring adequate rest periods between rotations. Secondly, integrating structured sleep hygiene education and stress management strategies into the nursing curriculum could help students develop healthier sleep habits early in their training. From a broader institutional perspective, the findings can inform student support policies, such as the provision of mental health services, peer support programmes, and counselling targeted at managing stress during clinical postings. At the policy level, the results support the need for national nursing education standards to consider work–rest balance and psychological well-being as part of clinical education frameworks. By linking sleep quality to educational and clinical practice outcomes, this study lays the groundwork for interventions that could enhance both student well-being and patient safety.

Limitations of this study include the single-centre design, reliance on self-reported measures, and the cross-sectional nature of the data, which limits causal inference. The sample size, although greater than the initially estimated minimum, may still limit statistical power to detect small effects. The absence of objective sleep measures (for example, actigraphy) is also a limitation. Further research using larger, multi-site samples and objective sleep assessments is recommended to examine this relationship more definitively.

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