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The Impact of Shift Work on Sleep Quality and Academic Performance among Nursing Students: A Cross-Sectional Survey

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Abstract

Background: The circadian rhythm may be disturbed and the sleep quality decreased among nursing students who are trained in fields with shift work. Although nursing students' poor sleep quality has been well documented, the relationship between their academic performance and this condition is controversial.

Aim: The focus of this study was to determine sleep quality among Nursing Students who work in shifts, and its correlation with academic performance.

Methods: Design a quantitative descriptive and cross-sectional design was used. Three hundred and five nursing students were involved in this research.

Tool: Sleep quality was evaluated with the Pittsburgh Sleep Quality Index (PSQI), and academic performance was determined by students self-reporting grade point average (GPA).

Result: The majority of nursing students (89.2%) suffered from poor sleep quality (mean PSQI = 9.11 ± 3.04), most frequently associated with difficulty falling asleep, sleep disturbances and low sleep efficiency. Nevertheless, a significant number still managed to achieve high levels of academic outcomes and sleep quality was not predicted academic performance since it poorly correlated with GPA ($r = -0.048$, $p = 0.410$).

Conclusion: Although the rate of poor sleeps quality was high in the nursing students, it showed no significant relationship with academic performance. Nevertheless, the high prevalence of sleep problems is a cause for concern because these have been shown to impact physical health, cognitive performance, psychological well-being and patient safety.

Recommendation: It is suggested that nursing schools should provide interventions like sleep hygiene counseling, workload strategy and supportive schedule to manage the students during clinical placement. Longitudinal studies with objective sleep measures may be better suited to determining the long-term impact of these shift work related sleep difficulties on academic and clinical performance.

Keywords: Shift Work, Sleep Quality, Academic Performance, Nursing Students, Sleep Disturbances

Introduction

Work shift operations are integral to health care services and have been incorporated into nursing education, especially in clinical placement. Nursing students reportedly need to engage in shifts involving rotation and night activity on their hospital-based placement. Although such clinical exposures are required to develop professional competence, they frequently disturb normal circadian patterns and sleep wake cycles, which can increase the risk of sleep difficulties for nursing students. Sufficient sleep is essential to physical health, emotional well-being, cognitive functioning, and learning **(McCamey, *et al.*, 2025)** [10]. Low quality of sleep has been connected to compromised attention, weakened memory consolidation, slower reaction time and poorer decision making capacities. Although adverse effects in healthy individuals are also worrying, for nursing students they have more potential implications since impaired alertness and cognitive function may affect not only knowledge acquisition but also decision-making and patient safety during clinical training. **(Hyndych, Abassi, & Mader., 2025)** [8].

High prevalence of poor sleep quality has been reported in previous research with university and health care students,

particularly when they are exposed to shift work. Nevertheless, the relationship between sleep quality and academic achievement is uncertain **(Cardoso, *et al*., 2025)** [5]. Although there is evidence that poor sleep is associated with poorer academic performance, other studies have demonstrated a modest or no effect. This discrepancy suggests that academic achievement may be influenced by several interacting factors other than the degree of sleep quality per se, i.e., motivation, coping strategies, workload and/or structured educational support **(Manjareeka, Dasgupta, Kanungo & Das., 2025)** [9].

Although literature about sleep disturbances in health professionals is increasing worldwide, however, no specific studies addressed this issue in nursing students engaged in clinical shift work or night duty, specifically within the Middle East and Saudi Arabia **(Pangaribuan, *et al*., 2025)** [12]. Furthermore, many studies do not appropriately ask the question of whether poor sleep quality results in differences that can be detected in academic achievements and thereby there is a significant gap in the current literature. Relevance of the study Riyadh Elm University is a suitable place to conduct this research as nursing students at this university are put through rigorous academic programmes coupled with organized shifts for clinical rounds. It is important to comprehend sleeping habits and their consequences on academic achievement in order to develop specific educational guidelines as well as student support programs. Insufficient empirical data exist on the sleep quality, and its relationship to academic performance in nursing students is scarce.

Hence, the purpose of this study was to evaluate sleep quality in nursing students exposed to rotating shift patterns as part of their clinical training and explore its association with academic performance at REU. In filling this gap, the study aims to contribute evidence that will inform nursing educators, clinical preceptors and educational policy makers regarding targeted interventions to enhance student well-being, stimulate learning outcomes and underpin safe clinical practice.

Significance of the Study

Rest is a basic requirement of healthcare, cognitive performance and overall physical health especially among nursing students having heavy academic workloads and clinical responsibilities. Inadequate sleep quality can also result in fatigue, lack of attention and alertness, as well as stress, which can affect both learning results and patient safety. The fact that sleep disturbances are common, and it is unclear why such are peoples' experiences, may hinder translation of knowledge into more effective prevention and interventions in health care education programs such as nursing. **(Ullah, *et al*., 2025)** [14]. Additionally, sleep quality and shift work and clinical training are also important to study as nursing students often have irregular schedules that disturb their natural sleeping patterns. Finding mechanisms that influence sleep quality can benefit interventions like sleep-hygiene education, stress management training and optimal scheduling of clinical activities. This could potentially improve student's well-being, minimize possible clinical practice errors and help in the formation of competent individuals, with presence and capacity suitable to deal with stress cataloging these future healthcare professionals **(Datta, Chowdhury, Nila& Rajeuddin, 2025)** [6].

Aim of the study

The purpose of the study is to evaluate how shift work affects nursing students' academic performance and sleep quality.

Research Questions

1. How high is the quality of sleep in nursing students who are having shift work in clinical practice at REU?
2. How many nursing students suffer from fractured sleep quality measured by PSQI?
3. How is the academic achievement of nursing students in Riyadh Elm University?
4. Does sleep quality relate to academic success in undergraduate nursing students with shift work during clinical training?

Materials and Methods

Study Design

A quantitative descriptive cross-sectional study was used to evaluate the quality of sleep and its impact on academic performance of nursing students who underwent shift work during clinical training. This was a design suitable for characterizing sleep patterns and testing correlations between variables at one point in time but not for causal inferences.

Study Setting

The research was performed in the College of Pharmacy, Nursing and Medical Sciences, Riyadh Elm University, Riyadh, Saudi Arabia. This institution provides organized clinical practice for nursing students, thus serving as an appropriate setting to explore the sleep quality of students exposed to shift work.

Sampling Method

A purposive sampling was used to select nursing students who were fit for study inclusion. We chose this approach based on non-probability sampling so as to ensure that the sample representation includes students who were currently attending the College of Pharmacy, Nursing and Medical Sciences, Riyadh Elm University, Riyadh, Saudi Arabia and had experienced shift or rotate clinical schedules by their clinical training. That exposure was necessary to achieve the study aims of measuring sleep quality and academic performance.

Eligible students of all levels (all 1–8 levels) were approached using the official channels of the university. Enrollment was voluntary, and subjects gave informed consent before the data were collected.

Study Sample

The sample was undergraduate nursing students in levels from 1 to 8 at College of Pharmacy, Nursing and Medical Sciences, Riyadh Elm University, Riyadh, Saudi Arabia. Students who were eligible and consented to participate volunteered for the study, there by employing a purposive sampling method in this study.

Sample Size

The sample size was determined following, **(Thompson 2012)** [13] states that the Steven K. Thompson formula with a total population of nursing students of 728, to an expected proportion of 50%, error margin radius greater or equal that expressed by the number from EpiInfo program (0.05) and a

level of confidence at 95%. An additional 20% was added to take into account of potential non response and incomplete data. 305 students participated and completed the questionnaire in four cases in the analysis.

Eligibility Criteria

Inclusion Criteria:

1. Full-time nursing students who registered as College of Pharmacy, Nursing and Medical Sciences, Riyadh Elm University, Riyadh, Saudi Arabia.
2. Applicants of any academic level (levels 1-8).
3. Male and female consenting students
4. Students with previous experience in shift work or rotating clinical schedules during clinical studies

Exclusion Criteria:

1. Students who refused to participate or returned no permission slip
2. Students who were not present at the time of data collection
3. Bridging or part-time students

Tools of data collection:

The data were collected through using a self-administered structured questionnaire which consisted of two parts: the Personal Characteristics Questionnaire and Pittsburgh Sleep Quality Index (PSQI).

Personal Characteristics Questionnaire

The PCQ was created by the investigators after a thorough review of literature related to nursing and medicine. This segment wanted to retain some socio-demographic, academic, lifestyle, and health factors that could be related to sleep quality and academic performance. The age, gender, marital status, academic level, the community they lived in and their residence was included on the questionnaire. The students were also questioned in relation to having chronic diseases, smoking habits and intake of daily caffeine (tea and coffee) as these are factors affecting the sleep pattern. Sleep related habits, which included the number of hours slept per day, daytime sleepiness (which included falling asleep during lectures) and perceived level of energy on waking were also investigated. The majority of the items were provided in categorical or multiple-choice form to assist with ease of answering and creating uniformity across the analysis. This instrument came with contextual information that informed the interpretation of sleep quality results and assisted in pinpointing possible confounders.

Pittsburgh Sleep Quality Index (PSQI)

PSQI, a standardized and widely accepted instrument developed by developed by **Buysse *et al.* (1989)** [4] **and used here in its validated Turkish version by Agargun *et al.*, (1996)** [2]., was used to evaluate the sleep quality. The PSQI is intended to be used for evaluating the subjective sleep quality and disturbances during the preceding month. The PSQI includes 19 self-rated items that are aggregated into seven components, namely; Subjective Sleep Quality – an overall measure of the individual's sleep quality. Sleep Onset – the ability to fall asleep and difficulty initiating sleep. Hours of Sleep -The number of hours that were slept in one night. Habitual SE (percentage of time spent asleep while in bed) Sleep Disturbances – how often sleep is disturbed by reasons like nocturnal awakenings, discomfort, or factors from the room. Medication for Sleep – the use of sleeping medication. Diurnal disturbances inability to stay awake during daylight hours and loss of interest in usual daytime activities. Each item is scored from 0 to 3 with higher scores reflecting worse sleep. The component scores are then combined to form the global PSQI score, ranging from 0 to 21. An overall PSQI score of ≤ 5 is suggestive of good sleep quality; the opposite is true for scores > 5, which indicate poor sleep quality and significant sleep disturbance. Assessment of overall and component specific sleep problems can be identified by the PSQI, which is especially important when evaluating nursing students' sleeping behavior with their exposure to shift work.

Academic Performance Measure (GPA)

Academic achievement was measured with the students' self-report of their grade point average. GPA scores were classified by institution's grading policy in acceptable, good, very good and excellent performances. While self-reported GPA could be prone to reporting bias, it is widely used as a practical measure of academic performance among survey-based education research.

Reliability

The internal consistency of the study instrument was determined using Cronbach's alpha, a coefficient for assessing the reliability of a questionnaire. Cronbach's alpha can vary between 0 and 1, where higher values indicate more reliable and consistent items in the scale. In the current research, internal consistency of Pittsburgh Sleep Quality Index (PSQI) was excellent with a Cronbach's alpha value of 0.89, which meant that the PSQI had high level of reliability for measuring sleep quality among nursing students.

Validity

Expert validity of the questionnaire was confirmed. Content and face validity were achieved by a panel of eleven experts in nursing, medical education and biostatistics critiquing the instrument for clarity, relevance and content appropriateness.

Pilot Study

A pre-test was carried out before the actual data collection to determine whether there is sufficient clarity, usability and comprehensiveness of content of the questionnaire. Pilot phase the pilot group was composed of nearly 10% of the sample. A total of 31 nursing students participated in the pilot study, which was part of a larger sample (n=305). The pilot ensured that the study team could test out the feasibility of the data collection process, as well as to identify any unclear or confusing questions and to get an estimate of the time needed to complete the questionnaire. Based on pilot testing feedback, some slight changes were made to the wording and nuance. Students of the pilot study were not included in the final sample to avoid any possible bias.

Survey Administration

Information was obtained through an online self-administered questionnaire prepared on Google Forms, so that students could access it easily from personal mobile devices or computers. The survey was disseminated via official university email systems and popular student social media sites such as WhatsApp and Facebook. Participation was entirely voluntary and anonymous, and all students had

to be presented with an electronic statement of informed consent before being able to enter the questionnaire. The content of the study, confidentiality, and participants' ability to opt out at any time without any adverse consequences was included in the consent form. It took us about 10–15 minutes to fill out the questionnaire. Automated data collection through Google Forms reduced potential errors associated with manual entry, and we reviewed responses to monitor response completeness and accuracy. Furthermore, the dataset was double checked by two authors to minimize human errors and maintain high quality of data.

Study Preparation

A number of steps were taken pre-data collection to ensure that ethics, transparency and reliability discussed over the following sections were addressed. Approval for the study protocol was obtained from the Institutional Review Board (IRB) of Riyadh Elm University and the faculty nursing were notified to facilitate recruitment and encourage students to participate. After translation into Arabic, the questionnaire was back translated to English for linguistic accuracy and clarity. Ethical considerations including the consent procedure, interaction with patients involved in research as well as data protection were adequately discussed for all member of the research team. A pilot study of 31 students (10% of the final sample) was performed to detect unclear statements [26] and further develop the questionnaire for readability and applicability. Friendly reminders were strategically sent via email and social media in order to increase response rates. The content validity of the instrument was also appraised by 9 experts in nursing, medical education and biostatistics to determine if the tool adequately covered all relevant constructs.

Statistical Analysis

Data of the current study were coded and analyzed by an IBM SPSS Statistics for Windows, Version 28.0 (IBM Corp., Armonk, NY; 2021) package program. It provided descriptive information about the demographic profile of the participants and about the prevalence of sleep quality and academic performance of students. Categorical data were expressed as frequencies and proportions, whereas continuous variables are presented as mean ± SD. Components of sleep quality were explored by using descriptive statistics (means, standard deviations and ranges) for Pittsburgh Sleep Quality Index (PSQI) scores. Correlations between sleep quality and functioning by classroom were evaluated using Pearson's correlation coefficient (r), with $p < 0.05$ considered statistically significant. Cross-tabulations and proportion analyses were also calculated by academic performance categories (good vs. poor sleepers). Two-tailed tests were used to conduct all analyses, and we interpreted results in terms of both statistical significance and practical importance. The integrative use of descriptive and inferential analyses contributed to a holistic picture in studying the relationship between shift work–related sleep quality and academic performance in nursing students.

Ethical considerations

Ethics approval and consent to participate this study adhered to the tenets of the Declaration of Helsinki. Ethical approval was granted from IRB of Riyadh Elm University ethical code number FUGRP/2025/467/1380/1258. Students participated on a voluntary basis and were informed about the purpose of study, types of procedures to be followed as well as their right to withdraw from the study at any point in time without penalty. Anonymity and confidentiality were strictly preserved since no personal identifiable details were recorded. To bypass possible acquiescence the survey was sent via a third party (i.e., a representative from the admissions office) and informed consent was obtained online, in which participants indicated their consent by clicking "continue" on the first page of the web-based questionnaire.

Results

Table 1: Demographic Characteristics of the Nursing Students (n=305)

Items	Indicators	N	%
Gender	Male	52	17.05%
	Female	253	82.95%
Residence	Rural	21	6.89%
	Urban	284	93.11%
Marital Status	Single	225	73.77%
	Married	64	20.98%
	Divorced	14	4.59%
	Widowed	2	0.66%
Last academic achievement	Acceptable	6	1.97%
	Good	60	19.67%
	Very Good	114	37.38%
	Excellent	117	38.36%
PSQI training	Yes	37	12.13%
	No	268	87.87%
Area of Residence	With family	215	70.49%
	In dormitory	39	12.79%
	Alone at home	27	8.85%
	Sharing a flat	24	7.87%
Preexistence of Chronic Diseases	Yes	28	9.18%
	No	277	90.82%
Smoking habits	Smoking	34	11.15%
	Non smoking	271	88.85%
Snoozing during the Lecture Hours	Yes	32	10.49%
	No	88	28.85%
	Sometimes	185	60.66%
Waking Up Energetic	Yes	72	23.61%
	No	78	25.57%
	Sometimes	155	50.82%
Total Sleeping Hours	Less than 4 hours	24	7.87%
	4-5 hours	92	30.16%
	6-7 hours	129	42.3%
	8-9 hours	52	17.05%
	9 hours and above	8	2.62%
	0-3 cups	241	79. 02%
	4-7 cups	54	17.70%
Tea Consumption	8 cups and above	28	9.18%
	0-1 cups	149	48.85%
Coffee consumption	2-3 cups	93	30.49%
	4 cups and above	63	20.66%

Table 1: Demographic Characteristics of Nursing Students:

Three hundred and five nursing students were recruited in the study. Most participants were female (n = 253, 82.95%) and lived in urban areas (n = 284, 93.11%). Majority of

students were single, (n = 225, 73.77%) followed by married n = 64, (20.98%), divorced n = 14, (4.59) and widowed n = 2(0.66%). In terms of academic performance, 38.36% (n = 117) had excellent GPA, 37.38% (n = 114) very good GPA, 19.67 %; n=60) good GPA and only about 1.97% (6) have acceptable GPA. Only 12.13% (n = 37) informed that they had been trained in PSQI. The majority of participants lived at home with their families (n = 215, 70.49%), while fewer students resided in dorms (n = 39, 12.79%), alone at home (n = 27, 8.85%) or shared flats (n = 24, 7.87%). Only few pieces of students have preexisting chronic diseases (n = 28, 9.18%), less papers are non-smoking (n = 271, 88.85%). Sleep behaviorwise, the majority of students slept 6–7 h/night (n = 129, 42.30%), followed by those who slept 4- and 5-.76%, n = 92), or either-and eight to nine-hours (n = 52,17.05%), while only a few students reported receiving less than four hours (seven point eight seven %, n =24)or more than nine hours of sleep per night (two point six two %, n=8). global average tea consumption was 0–3 cups per day (79.02%, n = 241), and the global average coffee consumption was 0–1 cups per day (48.85%, n = 149) (Table 1).

Table 2: Overall Sleep Quality of the Nursing Students (n=305)

Sleep Quality Category	Global PSQI Score	N	%
Poor Sleepers	> 5	272	89.18%
Good Sleepers	< 5	33	10.82%
Total		**305**	**100.00%**

* Global PSQI Score= 9.11 ± 3.04 Indicates significant clinical sleep disturbance (Threshold is > 5)

Table 2: Nursing Students' Overall Sleep Quality

According to the table, most nursing students (n = 272, 89.18%) were categorized as poor sleepers (PSQI > 5), which suggests clinically significant disturbances in sleep quality, and only 33 students (10.82%) enjoyed good sleep quality (PSQI ≤ 5). The average global PSQI score of 9.11 ± 3.04 exceeds the clinical threshold of 5, confirming that poor sleep quality is very prevalent in those nursing students with a strong emphasis on general concern for career participants to be physically, mentally and cognitively healthy exposed to shift work.

Table 3: Pittsburgh Sleep Quality Index Component Summary (n=305)

Items	Name	Mean Score	Standard Deviation
C1	Subjective Sleep Quality	0.90	0.76
C2	Sleep Latency	1.84	0.82
C3	Sleep Duration	0.69	1.02
C4	Habitual Sleep Efficiency	1.49	1.41
C5	Sleep Disturbances	1.74	0.61
C6	Use of Sleeping Medication	1.19	1.10
C7	Daytime Dysfunction	1.39	0.74
Global	Global PSQI Score	9.11	3.04

Table 3: Summary of Pittsburgh Sleep Quality Index Components

The seven components of the PSQI are shown in Table 3, which suggest that three main parts (sleep latency, 1.84 ± 0.82; sleep disturbances, 1.74 ± 0.61; habitual sleep efficiency, 1.49 ± 1.41) are responsible for poor sleep quality (difficult falling asleep and frequent nighttime awakenings and unproductive), respectively (Table III). The lowest mean scores were attained in the subscales with subjective sleep quality (0.90 ± 0.76) and sleep duration (0.69 ± 1.02), suggesting that even dimensions scoring poorly can contribute to the overall level of sleep disturbance among this latter population.

Table 4: Academic performance of the Nursing Students (n=305)

GPA Category	Frequency	Percentage (%)	Interpretation
Excellent	117	38.36%	Highest performance
Very Good	114	37.38%	High performance
Good	68	22.29%	Average performance
Acceptable	6	1.97%	Minimum passing

Table 4: Academic Performance of Student Nurses

This table shows that the academic performance of nursing students was generally high, 117 (38.36%) got excellent GPA, 114(37.38%) good and 68(22.29) fair whereas very few students who had acceptable level GCA i.e., 6 (1.97 %). This suggests that 3-out-of-4 students continued to do very well in terms of academic achievement despite a high prevalence of poor sleep quality.

Table 5: Proportions of Academic performance and quality of Sleep among Nursing Students

GPA Category	Good Sleepers (PSQI ≤5)	Poor Sleepers (PSQI >5)	Total
Excellent	15	102	117
Very Good	11	103	114
Good	9	59	68
Acceptable	0	6	6
Total	**35**	**270**	**305**

Table 5: The Rates of Academic Performance and Sleep Quality

Table 5 summarizes sleep quality according to GPA category, where poor sleepers were observed in all academic years. Of those with an excellent GPA, 102 were poor sleepers and 15 were good sleepers; among the very good GPA category, 103 were poor sleepers and 11 were good sleepers; for the good GPA category, 59 had a poor and nine students had optimal recovery pattern; all acceptable GPA students (n = 6) was classified as a poort, ghost writing services majority of the sample met criteria for not sleeping well based on PSQI global score. This suggests that high-performing students have a relatively poor sleep quality, probably because of other habits and motivation to perform.

Table 6: Association between sleep quality and academic performance among nursing students (n=305)

Variables	Statistical Test	Correlation Coefficient (r)	p-value (Sig.)	Decision rule	Results	Interpretation
sleep quality and academic performance	Pearson *r*	-0.048	0.410	Accept the H_0	Not statistically significant	Very weak negative correlation

Note: *** - p<0.05 significance

Table 6: Relationship of Sleep Quality to Academic Performance:

The correlation between sleep quality and academic achievement is presented in Table 6 (Pearson correlation analysis), suggesting a very weak negative relationship ($r = -0.048$, $p > 0.05$). This suggests that the quality of sleep does not predict GPA in nursing students, and there are other confounding variables such as motivation, learning strategies, or a regular study schedule which can overlap with poor sleep to diminish its potential role in academic success.

Discussion

Sleep is a basic biological process that contributes to cognitive, emotional and general health. Clinical rotations, shift work and academic demands of the education may interfere with normal sleep habits of nursing students which can also cause sleep pattern disturbances in clinical years, affecting physical and mental health. Such awareness would be important for the implementation of strategies that support students' well-being and professional competence **(Zahid, Bibi, Zeb, Anwar, & Hussain, 2025)** [13] **& (Zeek *et al*., 2015)** [18].

This study provides information about sleep quality in most nursing students and its relationship with academic performance. The major contributors to poor sleep were difficulty initiating and maintaining sleep, as well as low sleep efficiency. These results are similar to past research indicating a high prevalence of poor sleep among health care students, particularly exposed to irregular schedules and clinical duties (**Alruwaili & Alasmari., 2025).** The sleep disturbances may be influenced by lifestyle and environmental factors, including caffeine consumption, emotional stress, and academic demand further indicating the complexity of sleep behaviors in this population **(Wallace, *et al*., 2025)** [15].

Though sleep problems were prevalent, most students achieved high academic status. Correlation analysis indicated no significant association between poor sleep quality and academic performance was found, which indicated that bad sleep quality not only predicted unsatisfactory learning status. This corresponds to the results found by **Abdulrahman *et al.* (2024)** [1], where it was reported that sleep quality did not affect academic performance in the university students. This could be due to compensatory means such as high conscientiousness, our students may know how to organize their study or in terms of motivation, they are highly motivated and have a structured rhythm on study while sleep is pressed. Yet, evidence from meta-analysis revealed that sleepiness, sleep duration and quality can impair learning achievements with severity of sleepiness as the main contributor to impairment **(Okano *et al*., 2019)** [11] **& (Zeek *et al*., 2015)** [18].

The results also showed that sleep issues affect students irrespective of their academic success, highlighting the importance of interventions targeting sleep health for high-performing students. Demands of clinical rotations, skill labs and rotating shifts can alter sleep without an immediate effect on the educational performance **(Ariffin *et al*., 2025)** [3]**.** Moreover, cognitive learning style stress-management and psychological resilience are certainly possible mediating factors of the relationship with sleep to academic performance.

Though the relationship between sleep quality and academic performance was not significant, as previously stated, despite descriptively troubling rates of poor sleep which is known to be associated with deficits in cognitive functioning, emotion regulation, and patient safety **(Hershner & Chervin 2014)** [7] Interventions having a focus on the promotion of sleep hygiene, stress management, and good routines should be advocated for nursing students to ensure their overall well-being and clinical readiness.

In conclusion, poor sleep seems highly prevalent in nursing students but does not seem to function as an independent predictor of academic achievement. Nevertheless, the promotion of sleep health is essential for the preservation of cognitive, affective and physical well-being as well as safe and effective clinical practice. Conclusions Prospective longitudinal studies with polysomnography are needed to further clarify the long-term effects of shift work and sleep disturbance on academic and clinical outcomes.

Need for Future Research

In any of these studies, future research should employ longitudinal methods to analyze the change over time in both sleep quality and academic achievement so as to clarify causal relations. Objective measurements of sleep such as actigraphy or polysomnography could be used in addition to self-report tools like the PSQI to improve accuracy. Furthermore, investigating the impact of shift work on other outcomes such as clinical performance, psychological well-being and cognitive function will assist in developing broader interventions to support nursing students' health and academic progression. Comparative studies between different universities or countries may also help determine contextual factors relating to sleep and performance.

Limitations of the Study

This work has several limitations, although some efforts have been made to minimize them. The cross-sectional nature of the design not allows causal inference but participants with various educational levels were selected in order to increase the representativeness of the sample. Sleep quality was assessed using a self-reported questionnaire, which could be subject to recall and social desirability bias; these disadvantages were reduced by the fact that no participants' names were listed on the questionnaire and it required personal completion, ensuring privacy/stranger respondents may provide honest answers. The data were collected online, possibly affecting participation and reliability; however, reminders were sent out with clear instructions and the responses carefully checked for completion and consistency. This was conducted in a single university, therefore generalizability may be limited; this limitation has been handled by including both genders and all levels of participants. Potential confounders including mental health, workload, and coping strategies were considered for adjustment and demographic and life-style factors (e.g. caffeine consumption, chronic illness or smoking) were collected to partially control their potential impact.

Conclusion

This study revealed a relatively high prevalence of poor sleep quality among nursing students during shift work-based clinical practices, with difficulty in falling asleep, sleep disturbances, and reduced sleep efficiency as the

major factors contributing to it. However, despite these sleep problems, most students achieved well academically and good quality sleep did not significantly predict academic performance. However, the prevalent sleep impairments are concerning in their potentially adverse effects on cognition, emotional well-being and patient safety. Hence, sleep hygiene education, stress management and optimized clinical scheduling are proposed as interventions in aid of students' well-being and preparedness.

Recommendations

According to the study results, interventions should be provided regarding sleep quality among nursing students, including sleep hygiene education, stress management programs and regulations for a shift schedule in clinical practice. Academic advisors and clinical supervisors should promote balanced study practice and offer support for students with poor sleep. Perhaps in the future, curricula may include teaching on the importance of sleep to health and patient safety. Future studies should explore the impact of long-term sleep deficits in academic and clinical performance as well as strategies for managing sleep disturbances in nursing education.

Consent for Publication

Not applicable. No personal identification images and no personal/clinical information appear in this article which could compromise anonymity. Therefore, we did not need to obtain written informed consent for publication.

Data Availability

The data used in the present study are not available to others in order to protect the privacy of the participants. However, they are available from the corresponding author upon reasonable request.

Declaration of Interests

Conflicts of interest the authors have no financial or even relevant non-financial interests in the material presented here.

Conflict of Interest Statement

The authors have no conflicts of interest for this study.

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