Factors Affecting Sleep Quality among Nursing Students at the Faculty of Nursing at King Abdulaziz University: A Cross-Sectional Study

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Received July 9, 2024, accepted August 29, 2024, published January 1, 2025.

ABSTRACT

Context: Sleep is a basic human requirement. Sleep quality varies from one person to another due to multiple factors, including environmental, biological, psychological, and social factors.

Aim: This study aims to assess factors affecting sleep quality among nursing students at the Faculty of Nursing at King Abdulaziz University.

Methods: A cross-sectional descriptive design was used. This study was conducted at the Faculty of Nursing, King Abdulaziz University (KAU), using a convenience sample of 217 nursing students. The Pittsburgh Sleep Quality Index (PSQI) and a questionnaire assessing factors affecting sleep quality were utilized.

Results: The average nursing student's total score of PSQI was 5.04±3.63, which was affected by several statistically significant factors such as academic year (p=0.002), gender (p=0.005), snoring while sleeping (p=0.018), noisy bedroom (p=0.038), uncomfortable bed or pillow (p=0.004), uncomfortable room lighting while sleeping (p=0.022), financial stress (p=0.000), social pressure (p=0.000), psychological stress (p=0.000), study loads and heavy homework (p=0.000), living away from family member (p=0.000). Smoking late in the day (p=0.000), taking a long nap during the day (p=0.000), thinking of the next day's engagements before bed (p=0.000), using bed for non-sleep related activities (p=0.004), studying or working intensively until late at night (p=0.000), eating fatty foods before bed (p=0.041), and no consistent bedtime routine (p=0.000) were among the statically significant factors that affect the sleep of nursing students at Faculty of Nursing, King Abdulaziz University.

Conclusion: The sleep quality of nursing students was low, and it is influenced by demographic, biological, environmental, psychosocial, and behavioral factors. The study recommends educating nursing students about the effects of poor sleep and sleep-enhancing strategies, in conjunction with academic counseling to improve study skills, stress management, and time management, thereby fostering a healthier academic environment.

Keywords: Factors, nursing students, sleep quality

Citation: *Khalil, A. H., Bamaylah, A. A., Alzahrani, A. M., Sabtan, A.A., & Alshikhi, A. A. (2025).* Factors affecting sleep quality among nursing students at the Faculty of Nursing at King Abdulaziz University: A cross-sectional study. *Evidence-Based Nursing Research*, 7*(4),* 28-38. http://doi.org/10.47104/ebnrojs3.v7i4.413

1. Introduction

Sleep is a dynamic function characterized by complex brain activities that control precise mechanisms beyond the absence of wakefulness or rest *(Lo et al., 2017).* Within the framework of Motivation Theory, specifically Maslow's Hierarchy of needs, sleep is considered a fundamental human need, alongside essentials like food and breathing, highlighting its priority for human health *(Yildirim et al., 2020).* An individual's natural, restful sleep pattern has a significant impact on both physical and mental well-being.

Sleep quality depends on both physiological and psychological factors, including subjective perceptions of sleep depth and relaxation, as well as measurable aspects such as latency, duration, and frequency of nighttime awakenings *(Yildirim et al., 2020).* Sleep is regulated by homeostasis and circadian rhythms, typically resulting in eight hours of nighttime sleep and 16 hours of daytime alertness *(Berhanu et al., 2018).* Research identifies multiple factors affecting sleep quality, including biological elements such as weight, diet, smoking, alcohol consumption, and chronic conditions like hypertension and diabetes *(Sadoughi et al., 2018)*.

Psychological contributors, including anxiety, stress, and mood issues, are common challenges among students due to workload pressures *(Lo et al., 2017).* Social and environmental factors also play a role in sleep quality. Several factors, including income, family responsibilities,

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social interactions, marital status, home noise, room temperature, and lighting conditions, all influence sleep *(Yildirim et al., 2020; Lo et al., 2017).* The popularity of caffeinated energy drinks and coffee, often used to maintain alertness, has emerged as an extrinsic factor affecting sleep *(Yilmaz et al., 2017; Ibrahim et al., 2017).* Conflicting findings exist regarding the impact of age and gender on sleep quality, with some studies suggesting that these factors do not have a significant effect *(Yilmaz et al., 2017).* However, a study by *Gallego-Gómez et al. (2021)* found that nursing students under 25 exhibit poorer sleep habits and have more difficulty adjusting sleep patterns on weekends and holidays, preferring late nights. Additionally, living conditions, such as living alone or with family, impact sleep quality, although some studies disagree *(Yildirim et al., 2020).*

2. Significance of the study

Sleep is directly related to health and quality of life; it is a basic human need to maintain biopsychosocial and cultural functioning *(Barros et al., 2019; Yildirim et al., 2020).* Poor sleep quality is considered one of the most significant public health issues. Poor sleep quality rates are increasing in developing countries and modern societies *(Ibrahim et al., 2017).* Overall, the prevalence of poor sleep quality was alarming among medical students, with some participants reporting the use of medication to help them fall asleep. Most medical students had less than the recommended hours of sleep, and their habitual sleep efficiency was the most impaired *(Nsengimana et al., 2023).*

Nursing apprentices may struggle with sleep due to the program's intense nature, which requires significant time and effort *(Yildirim et al., 2020).* In addition, nursing students experienced more stress than their peers due to workload, clinical applications including shifts, chronic illness, and the stress of working with cases such as death, team communication problems, and lack of knowledge and skills *(Yildirim et al., 2020).*

Students who do not get enough sleep can face various physical, social, and psychological problems. Therefore, it is crucial to demonstrate student sleep quality and its influencing factors. A lack of sleep lowers quality of life since it causes health issues and impairs mental and physical functioning. As every nation has distinct routines and habits that impact sleep, this study contributes to the body of knowledge by validating or refuting the elements that were shown to affect sleep in prior studies and by highlighting factors that were previously overlooked.

Few studies have investigated the factors that affect sleep quality. Most studies were conducted in the United States and Asia, including Saudi Arabia, Iran, and South Korea, while some were also conducted in Europe, specifically in Turkey and Spain. As for the research gaps, studies on the quality of sleep did not discuss the following factors, including uncomfortable bed or pillow, eating fatty foods before bed, presence of insects in the bedroom and sleep apnea, these factors are not less important than the factors mentioned in previous studies, so the impact of these factors on sleep quality will be examined in this research

3. Aim of the study

This study aims to assess the factors affecting sleep quality among nursing students at King Abdulaziz University's (KAU) Faculty of Nursing. The aim of the study will be achieved through the following objectives:

- Assessing sleep quality among nursing students at the Faculty of Nursing, KAU.
- Assess factors affecting sleep quality among nursing students.

3.1. Research questions

This study aims to address the following research questions.

- What is the sleep quality among nursing students at the Faculty of Nursing, KAU?
- What factors affect sleep quality among nursing students at the Faculty of Nursing?

4. Subjects & Methods

4.1. Research Design

A descriptive cross-sectional study was utilized to conduct this study. Cross-sectional studies are observational research classified as descriptive rather than causal or association studies, which means that the cause of a certain condition cannot be ascertained using them. Researchers do not manipulate factors; instead, they collect data about a population *(Wang & Cheng, 2020).*

4.2. Study setting

This study was conducted at the Faculty of Nursing - KAU. The College of Nursing is one of the health colleges affiliated with King Abdulaziz University in Jeddah, located on the university's medical campus. It is characterized by its large number of students, with an estimated 498 students. The reason for choosing this setting is the ease of access for researchers to the target sample, which allows for the recruitment of the largest number of participants.

4.3. Subjects

A convenience sample of 217 nursing students was recruited for this study. The sample size was calculated using Epi Info based on the following data: The total number of students in all batches is 498, including male and female students from the second, third, and fourth years, as the first year is a preparatory year focusing on general courses outside the nursing college. Confidence level 95%.

4.4. Tools of data collection

The data was collected via an online Google form by using the following two tools:

4.4.1. The Pittsburgh Sleep Quality Index (PSQI)

The Pittsburgh Sleep Quality Index (PSQI) is a 19-item self-report scale developed by *Buysse et al. (1989)* to assess sleep quality and disorders over the previous month. The Arabic version of the questionnaire was adapted from *Suleiman et al. (2010).* It consists of a combination of open-

ended questions (four questions) and Likert-type scaled questions (seven questions).

The scale questions consist of 7 dimensions (Subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction). Students were asked to indicate how frequently they have experienced certain sleep difficulties over the past month and to rate their overall sleep quality.

Scoring system

The first four open-ended questions in the Pittsburgh Sleep Quality Index (PSQI) are used to gather specific data on sleep patterns but are not directly scored. Instead, they provide the raw data for calculating scores in specific components:

1. "During the past month, what time have you usually gone to bed at night?". Used to calculate sleep efficiency and as a reference for assessing sleep latency.
2. "During the past month, how long (in minutes) has it usually taken you to fall asleep each night?". Directly contributes to scoring Sleep Latency, where:
   - ≤15 minutes = 0
   - 16–30 minutes = 1
   - 31–60 minutes = 2
   - 60 minutes = 3
3. "During the past month, what time have you usually gotten up in the morning?". Combined with the response to bedtime to calculate sleep duration.
4. "During the past month, how many hours of actual sleep did you get at night?" (This may be different from the number of hours spent in bed), it directly used to score sleep duration, where:
   - ≥7 hours = 0
   - 6–7 hours = 1
   - 5–6 hours = 2
   - <5 hours = 3

These open-ended questions provide crucial input for the calculated components, but do not independently contribute to the 0–3 scores of the components. Instead, their responses are converted into categorical scores as outlined above.

Regarding the next seven Likert scale questions, each component has a point range of 0 to 3. Total scores range from 0 to 21. Means and standard deviations were calculated. A total PSQI score <5 indicates good sleep, while a score of >5 indicates poor sleep quality. The Arabic version of PSQI was tested for validity and reliability. The internal consistency reliability for the Global PSQI shows borderline acceptability (Cronbach's Alpha = 0.65). Convergent validity is supported by the global PSQI, which correlates strongly with the Insomnia Severity Index (r= 0.76).

4.4.2. Factors Affecting Sleep Quality Assessment Questionnaire

Researchers developed this tool after reviewing the related literature *(Yilmaz et al., 2017).* It contains a total of 33 questions that may affect sleep quality. It involves five domains: First, demographic factors such as age, gender, academic year, and residence (Four questions); second, biological factors (Five questions) such as the presence of diabetes, sleep apnea, and feeling pain. Third encompasses the environmental factors (Seven questions) such as noisy bedroom, presence of insects in the bedroom, and uncomfortable bed or pillow; fourth, psychosocial factors (six questions) such as financial stress, social stress (e.g., family problem), and psychological stress (for example, anxiety, depression, etc.); fifth, behavioral factors (11 questions) such as drinking caffeinated beverages, smoking late in the day, and doing intense physical exercises before going to bed.

Scoring system

The questionnaire consisted of closed-ended questions with two or three responses, either "Yes or NO" for biological factors, and "Always, sometimes, and never" for the environmental, psychosocial, and behavioral factors. The frequency and percentage for each of these responses were calculated. The questionnaire was tested for validity and reliability. Cronbach's Alpha for biological factors is 0.640, environmental factors is 0.681, psychological and social factors is 0.658, and behavioral factors is 0.735, with a total reliability for the scale of 0.816, indicating high reliability.

4.5. Procedures

A jury of five experts, including faculty members from various nursing specialties, revised the study questionnaires for face and content validity. The tools were revised for content accuracy, representativeness, comprehensiveness, appropriateness, and clarity. In response to the jury members' comments and suggestions, some modifications, including paraphrasing, were made to certain statements.

Ethical approval was obtained from the Faculty of Nursing, KAU. Participants' confidentiality and anonymity were protected. Before filling out the questionnaire, online consent to participate in the study was obtained. Students were informed that participation in the study is not mandatory, and the data will not be used for any other purpose.

A pilot study was conducted with 22 students (10% of the sample) to test the applicability and clarity of the tools, as well as the feasibility of the research process. No modifications were made after the pilot study.

After obtaining ethical approval from the Faculty of Nursing at KAU, questionnaires were prepared in a Google Form. The link was then distributed via Telegram and WhatsApp groups to all students at the Faculty of Nursing at KAU. The purpose of the study was stated at the start of the questionnaires. Additionally, students were informed that completing the questionnaires would constitute their agreement to participate in the study. The link was redistributed many times to remind the students to participate. Data collection continued until the calculated sample size was reached. The instruments required between 5 and 10 minutes for completion. The questions were answered completely with no drop-off.

4.6. Data analysis

Descriptive statistics were used in this study to present the variables under investigation. The data were analyzed using the Statistical Package for the Social Sciences (SPSS)

program, version 24, to calculate the frequency, percentage, mean, and standard deviation, and to present the participants' demographic data, sleep quality, and its affecting factors. An independent sample t-test was used to compare the means of two groups, male and female, and the Analysis of Variance (ANOVA) test was used to compare the means of more than two groups. Multiple regression analysis was conducted to examine the relationship between the PQSI as the dependent variable and biological, environmental, psychological and social, and behavioral factors as predictors (independent variables) to investigate the factors influencing sleep quality. A p-value of ≤0.05 was considered statistically significant, while a p-value >0.05 was considered statistically nonsignificant.

5. Results

Table 1 shows that 34.1% of the study participants were in their second year, 35% in their third year, and 30.9% in their fourth year. Regarding gender, 64.1% of the study participants were females, and 35.9% were males. Regarding residence, 72.8 % live in the town center, 24.9% in the Outskirts of the city, and 2.3% in a village. The study participants' ages ranged from 18 to 25 years, with a mean of 21.00 and a standard deviation of 1.28.

Table 2 shows that the overall quality index was 5.04±3.63, indicating poor sleep quality in the majority of components (>5). The poorest component was sleep disturbance, with a mean of mean1.01±0.71, followed by subjective sleep quality, with a mean of 1±1.01, and sleep duration, with a mean of 0.89±1.10. The best sleep quality was associated with the use of sleep medication, with a mean of 0.17±0.52.

Table 3 presents the descriptive statistics of biological factors affecting sleep quality. Specifically, 3.2% of the study participants had diabetes mellitus, 4.1% had sleep apnea, 7.4% reported experiencing pain, 5.1% were taking medications that could affect sleep, and 7.8% snored while sleeping.

Table 4 examines the environmental factors influencing sleep quality, revealing that most study participants (64.1%) reported always sleeping with electronic devices, such as mobile phones or tablets, near their bed. Almost 58% of them reported an often-inappropriate room temperature during sleep, followed by noisy bedroom, at 55.3%.

Table 5 presents the psychosocial factors affecting sleep quality. It is clear from the table that study loads and heavy homework were the most highly reported factors by the study participants, with a mean of 1±0.06, with 53% reported the response "often," and 24% reported the response "always." Followed by psychological stress with a mean of 0.80±0.61, 59% responded "often," 11% "Always." Followed by financial stress with a mean of 0.67±0.61, 52% responded "Often," 7% "Always," had financial stress.

Then, social pressures, e.g., family problems, with a mean of 0.62±0.59, were reported as "often" by 51%, "Always" by 6%. Then, living away from family members with a mean of 0.29±0.582. The majority of them answered "never," which represents 76%, while 17% answered "often," and 6% answered "always." While the least reported factor was sleeping in a different and unusual place or residence, with a mean of 0.28 ± 0.52, 76% answered "Never," 21% "Often," and 3% "Always."

Table 6 shows the most commonly reported behavioral factor was "using social media before bed" with a mean of 1.56±0.636 (64% gave the response "always" and 28% gave the response "often"), followed by "drinking caffeinated beverages such as coffee or energy drinks late in the day" with mean 1.04±0.713 (27% gave the response "always" and 49% gave the response "often"), then followed by "not following a consistent bedtime routine every day" with mean 0.98±0.79 (30% gave the response "always" and 38% gave the response "often"). While the least reported behavior was "smoking late in the day," with a mean of 0.27±0.595 (81% gave the response ‘never’).

Table 7 examines the demographic factors that affect sleep quality. The results in Table 7 show that there is a statistically significant difference in sleep quality across academic years (F = 6.640, p-value = 0.002), with an increase in the overall mean sleep quality score among fourth-year students. Additionally, there is a statistically significant difference in sleep quality by gender (t = 2.858, p-value = 0.005), with an increase in the overall mean sleep quality score among male students. At the same time, there is no significant difference in sleep quality in relation to age and residence (r=0.10, p-value=0.143 & F=2.789, F=2.789, p-value =0.064, respectively).

Table 8 presents the biological factors that affect sleep quality. The results reveal that sleep quality is affected by the presence of snoring during sleep (t=2.384, p-value=0.018), with an increase in the overall mean sleep quality score among students who snore (7.03). There is no statistically significant difference in sleep quality associated with the presence of diabetes, sleep apnea, pain, or the use of medications that may affect sleep (p>0.05).

In relation to the environmental factors affecting sleep quality, the results in Table 9 shows a statistically significant difference in sleep quality with the frequency of sleeping in a noisy bedroom (F=3.328, p-value =0.038), sleeping in an uncomfortable bed or pillow (F =5.805, p-value =0.004), and sleeping in a room with uncomfortable lighting (F=3.866, p-value =0.002). There is no statistically significant difference in the overall mean sleep quality score between the presence of insects in the bedroom, such as mosquitoes and flies, and inappropriate room temperature, or sleeping with electronic devices like mobile phones, tablets, or iPads near their beds.

Concerning the psychosocial factors affecting sleep quality, table 10 shows statistically significant differences in the overall mean of sleep quality scores with presence of financial stress (F=17.80, p-value=0.000), social pressures, e.g., family problems (F=12.427, p-value=0.000), psychological stress (i.e., anxiety, depression (F =13.242, p-value = 0.000), study loads and heavy homework (F=13.434, p-value = 0.000), and living away from family members for studying (F =3.294, p-value=0.039).

Table 11 shows relation between sleep quality and different behaviors, as is clear from Table 11, which reveals statistically significant differences between mean scores of smoking late in the day (F=7.193, p-value=0.000), taking a

long nap during the day (F =8.203, p-value = 0.000), thinking of the next day's engagements before bed (F=14.313, p-value=0.000), using bed for non-sleep-related activities such as eating, phone calls (F=5.730, p-value =0.004), studying or working intensively until late at night (F=17.026, p-value=0.000), eating fatty foods before bed (F =3.243, p-value =0.041), or not following a consistent bedtime routine every day (F=31.721, p-value=0.000). There is no statistically significant difference in the PSQI score concerning drinking caffeinated beverages late in the day, engaging in intense physical exercise before bed, using social media before bed, or watching TV before bed, where the p-value is greater than 0.05.

Table 12 shows a significant effect of psychosocial factors on the overall mean of sleep quality score (t= 4.963, p-value <0.001), when the psychosocial factors increase by 1 unit the PQSI scores increase by 0.394 (β=0.394), followed by behavioral factors (t=2.341, p-value=0.02) when the behavioral factors increase by 1 unit the overall mean of sleep quality scores increase by 0.187 (β=0.187). However, the effects of biological factors and environmental factors were not significant (p-value > 0.05).

Table (1): Frequency and percentage distribution of students' demographic Characteristics (n=217).

Variables	N	%
Academic years		
Second year	74	34.1
Third year	76	35
Fourth-year	67	30.9
Gender		
Male	78	35.9
Female	139	64.1
Residence		
Town center	158	72.8
Outskirts of the city	54	24.9
In a village	5	2.3
Age	**Minimum Maximum**	**Mean±SD**
	18 25	21.00±1.28

Table (1): Students' nurses' sleep quality index

Components	Mean±SD
Subjective sleep quality	1.00±1.01
Sleep latency	0.76±0.86
Sleep duration	0.89±1.10
Sleep efficiency	0.44±0.90
Sleep disturbance	1.01±0.71
Use sleep medication	0.17±0.52
Daytime dysfunction	0.77±0.88
Total score	5.04±3.63

Table (3): Frequency and percentage distribution of biological factors among study participants (n=217).

Biological factors	Yes		No	
	No	%	No.	%
Presence of diabetes mellitus	7	3.2	210	98.8
Occurrence of sleep apnea	9	4.1	208	95.9
Feeling pain	16	7.4	201	92.6
Taking medications affecting sleep	11	5.1	206	94.9
Snoring while sleeping	17	7.8	200	92.2

Table (4): Frequency and percentage distribution of environmental factors among study participants (n=217).

Environmental factors	Never		Often		Always		Mean±SD
	No.	%	No.	%	No.	%	
Noisy bedroom	96	44.2	120	55.3	1	0.5	0.56±0.506
The presence of insects in the bedroom	104	47.9	77	35.5	36	16.6	0.69±0.741
Uncomfortable bed or pillow	126	58.1	83	38.2	8	3.7	0.46±0.569
Uncomfortable room lighting during sleeping	127	58.5	84	38.7	6	2.8	0.44±0.551
Inappropriate room temperature during sleeping	89	41.01	126	58.1	2	0.9	0.6±0.51
Sleeping with electronic devices near the bed	20	9.2	58	26.7	139	64.1	1.55±0.659

Table (5): Frequency and percentage distribution of psychosocial factors among study participants (n=217).

Psychosocial factors	Never		Often		Always		Mean±SD
	No.	%	No.	%	No.	%	
Financial stress	88	41	113	52	16	7	0.67±0.609
Social pressures, e.g., family problems	95	44	110	51	12	6	0.62±0.59
Psychological stress	66	30	128	59	23	11	0.8±0.61
Study loads and heavy homework	52	24	114	53	51	24	1±0.691
Living away from family members	167	77	36	17	14	6	0.29±0.582
Sleeping in a different and unusual place or residence	164	76	46	21	7	3	0.28±0.516

Table (2): Frequency and percentage distribution of behavioral factors among study participants (n=217).

Behavioral factors	Never		Often		Always		Mean±SD
	No.	%	No.	%	No.	%	
Drink caffeinated beverages late in the day	51	24	107	49	59	27	1.04±0.713
Smoking late in the day	176	81	24	11	17	8	0.27±0.595
Doing intense physical exercises before going to bed	140	65	68	31	9	4	0.4±0.569
Taking a long nap during the day	85	39	114	53	18	8	0.69±0.617
Thinking of the next day's engagements before bed	51	24	122	56	44	20	0.97±0.662
Using the bed for non-sleep-related activities	60	28	116	53	41	19	0.91±0.678
Studying or working intensively until late at night	49	23	132	61	36	17	0.94±0.624
Eating fatty foods before bed	69	32	134	62	14	6	0.75±0.565
Using social media before bed	17	8	61	28	139	64	1.56±0.636
Watching TV before bed	88	41	77	35	52	24	0.83±0.788
Inconsistent bedtime routine	70	32	82	38	65	30	0.98±0.79

Table (7): Demographic factors affecting sleep quality.

Demographic factors	Mean	Test	Test value	P-value
Age		Pearson Correlation (r)	0.10	0.143
Academic year				
Second year	4.09			
Third year	4.89	ANOVA (F)	6.640	0.002
Fourth-year	6.25			
Gender				
Male	5.96	Independent samples T-test (t)	2.858	0.005
Female	4.52			
Residence				
Town center	4.69			
Outskirts of the city	5.94	ANOVA (F)	2.789	0.064
In a village	6.4			

Table (8): Biological factors affecting sleep quality.

Biological factors	Mean	Independent samples T-test (t)	P-value
Presence of diabetes mellitus			
Yes	4.57	0.344	0.731
No	5.05		
Occurrence of Sleep Apnea			
Yes	6.83	1.522	0.130
No	4.96		
Feeling pain			
Yes	6.59	1.792	0.074
No	4.91		
Taking medications affecting sleep			
Yes	6.86	1.721	0.087
No	4.94		
Snoring while sleeping			
Yes	7.03	2.384	0.018
No	4.87		

Table (9): Environmental factors affecting sleep quality.

Environmental factors	Mean	ANOVA test (F)	P value
Noisy bedroom			
Never	4.39		
Often	5.58	3.328	0.038
Always	2		
The presence of insects in the bedroom			
Never	4.96		
Often	5.66	2.824	0.062
Always	3.94		
Uncomfortable bed or pillow			
Never	4.35		
Often	5.92	5.805	0.004
Always	6.69		
Uncomfortable room lighting			
Never	4.66		
Often	5.36	3.866	0.022
Always	8.5		
Inappropriate room temperature			
Never	4.63		
Often	5.33	0.977	0.378
Always	4.75		
Sleeping with an electronic device near the bed			
Never	3.82		
Often	5.23	1.248	0.289
Always	5.13		

Table (10): Psychosocial factors affecting sleep quality.

Psychological factors	Mean	ANOVA test (F)	P-value
Financial stress			
Never	3.42		
Often	6	17.80	0.000
Always	7.16		
Social pressures			
Never	3.79		
Often	5.84	12.427	0.000
Always	7.58		
Psychological stress			
Never	3.5		
Often	5.38	13.242	0.000
Always	7.52		
Study loads and heavy homework			
Never	3.36		
Often	4.99	13.434	0.000
Always	6.86		
Live away from family members			
Never	4.75		
Often	5.58	3.294	0.039
Always	7.11		
Sleeping in a different and unusual place or residence			
Never	4.88		
Often	5.71	1.110	0.322
Always	4.21		

Table (11): Behavioral factors affecting sleep quality.

Behavioral factors	Mean	ANOVA test (F)	P-value
Drinking caffeinated beverages or energy drinks late in the day			
Never	5.32		
Often	5.28	1.471	0.232
Always	4.35		
Smoking late in the day			
Never	4.6		
Often	6.67	7.193	0.000
Always	7.24		
Doing intense physical exercises before going to bed			
Never	4.7		
Often	5.7	1.745	0.177
Always	5.22		
Taking a long nap during the day			
Never	3.91		
Often	5.6	8.203	0.000
Always	6.83		
Thinking of the next day's engagements before bed			
Never	3.6		
Often	4.82	14.313	0.000
Always	7.3		
Using the bed for non-sleep-related activities			
Never	4.27		
Often	4.86	5.730	0.004
Always	6.65		
Studying or working intensively until late at night			
Never	3.7		
Often	4.75	17.026	0.000
Always	7.89		
Eating fatty foods before bed			
Never	4.37		
Often	5.18	3.243	0.041
Always	6.93		
Using social media before bed			
Never	3.82		
Often	5.02	1.083	0.340
Always	5.19		
Watching TV before bed			
Never	5.15		
Often	5.39	1.405	0.248
Always	4.33		
Inconsistent bedtime routine			
Never	2.89		
Often	5.09	31.721	0.000
Always	7.28		

Table (12): Regression coefficients for factors affecting sleep quality.

Factors	Beta	t-statistics	p-value
Biological factors	0.021	0.322	0.747
Environmental factors	0.143	1.926	0.055
Psychosocial factors	0.394	4.963	0.000
Behavioral factors	0.187	2.341	0.02

6. Discussion

Nursing students often experience sleep difficulties due to the demanding and time-intensive nature of their academic programs. Inadequate sleep can lead to a range of physical, social, and psychological challenges. For this reason, it is essential to assess students' sleep quality and identify the factors that influence it *(Yilmaz et al., 2017)*. The current study investigated the factors affecting sleep quality among KAU nursing students.

The demographic profile of the participants shows a nearly equal representation across academic years, which adds strength to the generalizability of the findings within the Faculty of Nursing. The predominance of female students is consistent with the gender distribution commonly observed in nursing education, where females tend to represent the majority of enrollees. The fact that most students resided in the town center may have implications for their lifestyle patterns, access to resources, and daily routines, which in turn could influence sleep quality. Additionally, the mean age of 21±1.28 years reflects the typical age range of undergraduate nursing students, a developmental stage often characterized by transitional challenges, increased academic workload, and social pressures, all of which may contribute to sleep-related issues.

According to the results of this study, the sleep quality was significantly poorer among fourth-year students than among third-year students. This finding may be due to the stress of the final year and the need to graduate with a high GPA. These findings contradict those of *Yılmaz et al. (2017)*, who stated that there is no relationship between sleep quality and class level.

The finding that male nursing students demonstrated significantly poorer sleep quality is noteworthy, especially given that females comprised the majority of the sample. This result may reflect gender-based differences in coping mechanisms, lifestyle behaviors, or academic stress management. These findings can be explained that male students may be more prone to irregular sleep patterns, higher engagement in late-night activities, or reduced use of adaptive stress-relief strategies, all of which could negatively impact sleep quality. Additionally, cultural and social expectations placed on male students might contribute to higher levels of stress or reduced prioritization of adequate rest. These results highlight the importance of tailoring interventions to address gender-specific factors when developing programs to promote healthy sleep among nursing students. A study conducted by *El Hadad et al. (2025)* reported similar findings, as 73.5% of Lebanese university students had poor sleep quality (PSQI > 5), with a mean Global PSQI score of 8.20±3.95. It also showed that female gender increased the odds of poor sleep by 2.71 (p = 0.035), which contradicts our study findings.

Our results indicate that poor sleep quality among nursing students is a significant issue. A possible explanation for this finding is that nursing students have a lot on their plates and may need some late-night study hours to meet all their deadlines. This finding aligns with those found in a study by *Yildirim et al. (2020)*, which examined nursing students and revealed an average total score for the sleep quality index of 6.64±2.73, indicating poor sleep quality.

Regarding the biological factors that may affect sleep quality among nursing students, the study reveals that snoring while sleeping and experiencing pain were among the biological factors that may impact sleep, with nearly equal percentages. Snoring while sleeping was a statistically significant factor associated with poor sleep quality. This finding is explained by the fact that people who snore can wake themselves up frequently throughout the night, sometimes without realizing it. This awakening can negatively impact sleep quality, particularly among individuals who are heavy snorers. This finding is consistent with *Berhanu et al. (2018),* who found that loud snoring or gasping sounds during sleep inhibit the sleep-wake cycle.

The present study highlights the important role of environmental factors in shaping nursing students' sleep quality. Consistent with existing evidence, environmental stressors such as noise, inappropriate room temperature, and uncomfortable sleeping conditions exert both physiological and psychological effects that can disrupt restorative sleep. The finding that nearly two-thirds of students reported keeping electronic devices near their beds is particularly concerning, as exposure to blue light and the tendency for late-night device use have been linked to delayed sleep onset and reduced sleep efficiency. Similarly, more than half of the participants identified inappropriate room temperature and frequent noise as contributors to poor sleep, underscoring the sensitivity of sleep quality to environmental regulation.

Moreover, the statistically significant associations observed between poor sleep quality and factors such as bedroom noise, uncomfortable beds or pillows, and uncomfortable lighting emphasize the multifactorial nature of sleep disturbances. These findings suggest that, beyond academic stressors, modifiable environmental conditions represent a crucial target for interventions aimed at enhancing sleep hygiene. The literature supports the positive relationship between poor sleep and increased noise, as found in the study by *Yildirim et al. (2020).*

A recent study in Saudi Arabia found that healthcare students who are addicted to electronic devices report significantly poorer sleep quality *(Qanash et al., 2021).* Another study on undergraduate students observed that bedtime mobile phone use and general screen time are strongly associated with worse sleep quality *(Cabral et al., 2021),* which is a non-significant factor in this study.

There is consistent evidence that environmental disturbances (noise, lighting, temperature) disrupt sleep through both physiological means (e.g., disrupting circadian rhythms, increasing arousal) and psychological discomfort that delay sleep onset and increase awakenings *(Lund et al., 2021).*

The findings suggest that psychosocial factors significantly influence students' sleep quality. The constant exposure to heavy study load and homework, combined with frequent experiences of psychological stress, financial concerns, and social pressure, reflects the demanding nature of nursing education. The statistically significant association between these stressors and poor sleep quality underscores

the importance of addressing mental health and stress management in academic settings to support students' overall well-being and academic performance.

Additionally, many university students work in an income-generating job at some point during their educational career, which can often extend into late hours and outside of school hours. Students often work at night to fulfill their school-related responsibilities, which can indirectly affect their sleep quality. Besides, many students in this study are living away from their families, which in turn lack of supportive psychological measures given by the presence of nearby family, which may lead to increased levels of anxiety, and consequently sleep problems and decreased sleep quality.

This finding is supported by a study of *Yeo et al. (2020)* that focused on the relationship between time spent on homework overnight and symptoms of depression in adolescents in Singapore. Results revealed that adolescents who spent more time on homework/studying in a competitive academic setting sleep less. This finding may be due to the heavy lecture and reading schedules, as well as the huge assignments associated with nursing studies, which may be blamed for a lack of rest and poor sleep quality.

The literature indicates that economic status and income-related concerns can influence sleep quality *(Yılmaz et al., 2017).* Additionally, these findings are supported by those of *Yildirim et al. (2020)*, who found that students living with their families have higher family support and better sleep quality than those living away from them. Also, they found that psychological and social aspects, such as mental distress and stress, the sense of loneliness, and increased levels of anxiety, can all have an impact on the quality of one's sleep.

The study highlights several behavioral patterns that negatively affect sleep quality among nursing students. Frequent use of social media before bedtime, inconsistent sleep routines, and late-day caffeine consumption were common. At the same time, activities such as watching TV or worrying about the next day's tasks were also prevalent. Importantly, behaviors such as smoking late in the day, taking long daytime naps, thinking of the next day's engagements before bed, using the bed for non-sleeping activities, studying intensively late at night, consuming fatty foods before bed, and inconsistent bedtime routines showed significant associations with poor sleep quality. These findings highlight the crucial role of healthy lifestyle habits and proper sleep hygiene in promoting better sleep among students.

These findings are supported by the study of *Nuñez et al. (2021),* who reported that smoking is associated with increased insomnia severity and shorter sleep duration, particularly nightly smoking. Moreover, *St-Onge et al. (2016)* suggest that dietary patterns that favor high-calorie intakes are associated with increased time to fall asleep at night and a higher incidence of rapid eye movement. In contrast, high fiber intakes promote better sleep quality. Similarly, these results are consistent with those reported in the studies by *Ibrahim et al. (2017)* and *Lo et al. (2017)*, which also revealed a relationship between sleep quality and behavioral factors.

The overall findings of this study demonstrate that psychosocial, and behavioral factors collectively have a significant impact on sleep quality among nursing students. This finding highlights the multifaceted nature of sleep disturbances, where academic and social stressors, and personal lifestyle habits interact to influence sleep patterns. Recognizing these combined effects underscores the need for comprehensive interventions that address not only individual behaviors but also academic demands and living conditions to promote healthier sleep, and consequently, better well-being and academic performance.

This finding is supported by the study of *Delfmann et al. (2024)*, who indicated that parental support, a substantial source of psychosocial support, might positively influence adolescent sleep health. Also, *Bajamal et al. (2025)* in Saudi Arabia reported that nursing students' poor sleep quality was strongly linked to academic stress and irregular sleep habits. Such consistency across different settings underscores the global importance of addressing sleep health through multifactorial interventions that combine stress management, and lifestyle modifications.

7. Conclusion

The current study results elicited a poor sleep quality level among study participants. The primary factors influencing sleep quality encompass biological, environmental, psychosocial, and behavioral factors. The most significant demographic factors were the academic class and gender. The most significant biological factor was snoring during the sleep. The most significant environmental factors are noisy bedrooms, an uncomfortable bed or pillow, and uncomfortable room lighting. The psychosocial factors include financial stress, social pressures, psychological stress, study loads and heavy homework, and living away from family members. The most significant behavioral factors were smoking late in the day, taking a long nap during the day, thinking of the next day's engagements before bed, using the bed for non-sleep-related activities, studying or working intensively until late at night, eating fatty foods before bed, and not following a consistent bedtime routine every day. The most significant factors revealed by the regression analysis were psychological and behavioral factors

8. Recommendations

Based on the study results, it is recommended that nursing students be educated about the consequences of poor sleep and the importance of proper sleep-enhancing measures. Faculty academic counseling units should focus on students' study skills and help them cope with their stressful studying environment to promote academic success. Additionally, the importance of sleep, stress management, and time management is crucial for university students.

Educating students about optimizing their sleep environment—such as minimizing noise, regulating lighting

and temperature, and limiting device use before bedtime—may therefore serve as a practical strategy to enhance both sleep quality and overall well-being.

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