The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 7, 2025

TOO TIRED TO THINK STRAIGHT: THE IMPACT OF SLEEP DEPRIVATION ON DECISION-MAKING AND RISK-TAKING IN HEALTH SCIENCE STUDENTS

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DOI: https://doi.org/10.5281/zenodo.16140815

Keywords
Sleep deprivation, decision-making, risk-taking, nursing students, health science, cognitive performance.

Article History
Received: 18 April, 2025
Accepted: 22 June, 2025
Published: 19 July, 2025

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Abstract

Background:
Sleep deprivation is a growing concern among health science students, particularly nursing students, due to their demanding academic and clinical schedules. Poor sleep quality and reduced sleep duration have been linked to impaired decision-making and increased risk-taking behavior two critical aspects that can influence patient safety and healthcare outcomes.

Aim:
This study aimed to assess the impact of sleep duration on decision-making ability and risk-taking tendencies among nursing students enrolled in different colleges in Swat.

Methods:
A cross-sectional study design was employed, involving 260 nursing students from multiple colleges in Swat. The sample was selected using a proportionate sampling technique, and the sample size was calculated using the Raosoft calculator based on a population of 800. Data were collected through a structured questionnaire that assessed sleep duration, decision-making performance, and risk-taking behavior. Ethical approval was obtained from the Institutional Review Board of Zalan College of Nursing, Swat. Data were analyzed using SPSS version 25, with descriptive statistics and ANOVA tests applied.

Results:
The findings indicated that students who reported sleeping ≥7 hours had significantly better decision-making scores (M = 7.42, SD = 1.25) and lower risk-taking scores (M = 4.26, SD = 1.43) compared to those sleeping 5–6 hours or less than 5 hours. The differences were statistically significant (p = 0.014 for decision-making, p = 0.031 for risk-taking).

Conclusion:
Adequate sleep duration positively influences decision-making and reduces risk-taking behavior in nursing students. Promoting sleep hygiene is essential for academic and clinical performance in healthcare education.

INTRODUCTION

Sleeping is a basic biological phenomenon which is vital towards cognitive activities, emotional balance and body wellness. Sleep deprivation is an ailment that occurs due to either poor quality or insufficient amount of sleep, whether in males or females and whether acute or chronic (Mukherjee, et al., 2024). Decision-making is the process of analyzing the information and choosing the most applicable way of action, and risk-taking is the tendency to participate in the actions that have uncertain results and can have both favorable and undesirable outcomes (Almondes, et al., 2021). Students pursuing the health sciences, such as those enrolled in nursing, medicine, and allied health majors, are especially at risk of losing sleep because of academic demands, clinical requirements, and odd hours. It is crucial to know the cognitive and behavioral reaction of such students due to sleep deprivation that not only impacts their schooling achievement but also their future patient safety (Banerjee, et al., 2025).

The rate of sleep deprivation among university students is very high all over the world. Literature indicates that more than 60 % of health science students suffer sleep deprivation, and most of them commonly take less than 6 hours every night. A study in countries including the United States, Pakistan and South Korea has also portrayed that the percentage of time spent in studying, emotional pressures, night shifts during the clinical attachments contribute towards sleep deprivation and poor-quality sleep (Yin et al., 2025). The repercussions are not insignificant; habitual sleep debts interfere with attentive sensibilities, learning, memory consolidation and judgment. This is especially worrying among health science students who are largely expected to make life and death decisions in the clinical front within short periods (Zahid, et al., 2025).

Loss of sleep changes the way the prefrontal cortex decides and struggles to control impulses because this region of the brain deals with decision-making. When caught in the trap of sleep deficiency, people become more impulsive in choice, positively biased in risk assessments, and demonstrate bad decision-making (Zhang et al., 2023). In the case of students of health sciences, such a condition can reveal itself through making unsuitable clinical choices, the lack of empathy, and the greater probability of making medical errors during procedures. What makes the situation even worse, sleep-deprived persons become more likely to recklessly drive, eat unhealthily, and abuse drugs (Hussain et al., 2025).

Academic setting also contributes to lack of sleep. There is the ragged sleep pattern caused by tight deadlines, high course loads, non-conventional class schedules, and examination pressure (Hussain et al., 2025). It disrupts the normal circadian rhythm of clinical rotations as they normally start at early hours of the day and may include night duties. To cope many students are turning to stimulants such as caffeine or energy drinks, although this can make them feel alert in the short-term, it also disrupts their sleeping patterns in the long-term. This constitutes a vicious cycle, such that one sleeps poorly, which is the cause of cognitive decline, which becomes the factor that causes lower academic performance, thus forcing students to sleep less (Jansen & Narayan, 2024).

The relationship connecting risky decisions making with sleep deprivation has been evidenced with a variety of experimental research work. Patients experiencing sleep restriction, as a whole, perform worse when engaged in the activities that demand extended concentration and making complex according to the rules, and utilitarian thought and morality (Dirisala, et al., 2025). Such mental impairments in the field of healthcare where the decisions made are likely to be life and death can be very costly. Therefore, sleep-deprived learners can perform poorly in school as well as endanger patient safety in their clinical practice (Agyapong-Opoku, Agyapong-Opoku, & Agyapong, 2025).

Irrespective of the existing body of literature there is a paucity of research in the South Asian setting

regarding the specific impact of sleep deprivation on decision-making and risk-taking among health science students. The differences in cultural expectations, gender roles, social norms, and structures of academic activity may produce impacts on the sleeping pattern and behavior (Soni, et al., 2024). Thus, it requires a contextual study to determine the precise trends, reasons, and outcomes of a loss of sleep in health science students of this area (Smithies et al., 2021).

This study aims to fill that gap by assessing the impact of sleep deprivation on decision-making and risk-taking among health science students. By exploring both the extent of sleep deprivation and its behavioral outcomes, this research will inform policymakers, educators, and healthcare institutions about the urgent need to implement sleep hygiene education and wellness programs. Promoting adequate sleep is not merely a personal health concern—it is a public safety and educational priority.

Methodology

A cross-sectional study was carried out using a descriptive design aimed at determining how sleeping deprivation affects decision-making and risk-taking in health science students. The research was conducted in different colleges of nursing in Pakistan in Swat. These establishments encompassed both privately funded colleges and state colleges, so that a wide spread affinity of scholastic environments and student lives was represented.

The population to be targeted was about 800 health science students pursuing nursing programs. The volume of the sample was determined by using Raosoft online sample size calculator and for a 95 % confidence level, 5 % margin of error and 50 % distribution of the responses, this calculates the necessary sample size to be 260 participants at least. To recruit the willing participants who would satisfy the inclusion criteria, a non-probability convenience sampling technique was used. Ethical approval of the study was granted by the Institutional Review Board (IRB) of Zalan College of Nursing, Swat. All participants were made aware of the purpose of the research, and written informed consent was collected before data collection. Confidentiality and anonymity were maintained throughout the research process.

Data Collection Procedure

A structured, self-administered questionnaire was used to collect data. The tool was designed on the foundations of literature review and expert opinion and contained three parts: the demographic data, the pattern of sleep deprivation, and questions concerning the level of decision-making and risk-taking behavior. It was pretested on a few focus students (n = 20) to ascertain the conceptual clarity, reliability and validity and then implemented on a full scale.

Data were collected over a period of four weeks. The college administrations had granted permission to distribute the questionnaires during the scheduled classes within the classroom. There was enough time given to the participants to fill the forms without academic pressure. Questionnaires which were properly filled were manually examined to ensure completion before data entry.

Data Analysis Procedure

Data thus obtained were analyzed using Statistical Package for Social Sciences (SPSS), version 26. Demographic and sleep pattern variables were summarized with descriptive statistics in the form of frequency, percentage, mean, and standard deviation. Independent sample t-tests and inferential statistics were used to analyze the difference between students possessing different degrees of sleep deprivation in decision-making and risk-taking behaviors. This was a p-value that was less than 0.05 taken to be statistically significant.

Results and Analysis

The average age of participants was 22.53 years (±2.18), with the majority being male (88.5%). Most students were in their 3rd year of study (36.5%), and the mean year of study was 2.96 (±0.81). A significant portion (78.8%) was currently on clinical placement. This sample reflects a young, predominantly male group with substantial clinical exposure [Table 1]

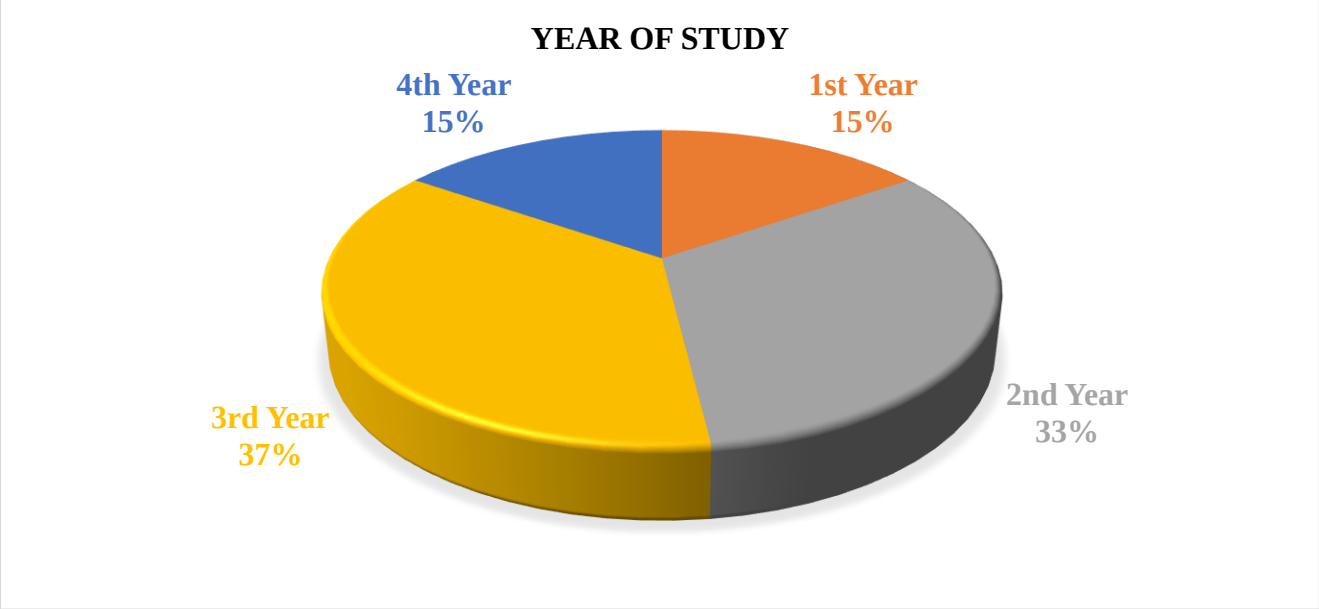
Table 1: Demographic Characteristics of Participants (n = 260)

Variable	Frequency (n)	Percentage (%)	Mean ± SD
Age (in years)	–	–	22.53 ± 2.18
Gender			
Female	30	11.5%	
Male	230	88.5%	
Year of Study			2.96 ± 0.81
1st Year	40	15.4%	
2nd Year	85	32.7%	
3rd Year	95	36.5%	
4th Year	40	15.4%	
Currently on Clinical Placement			
Yes	205	78.8%	
No	55	21.2%	

Year of Study of the Participants

The data shows that the majority of participants were in their 3rd year of study (36.5%), followed by 2nd year students (32.7%). Both 1st and 4th year students were equally represented, each making up 15.4% of the sample. This distribution indicates a higher participation from mid-level students. The balanced representation ensures diverse academic exposure levels among respondents [Figure 1].

Figure 1: Year of Study of the Participants



Impact of Sleep Deprivation on Decision-Making and Risk-Taking

The data shows a clear trend where reduced sleep duration is associated with poorer decision-making and increased risk-taking. Well-rested students (≥7 hours) had the highest decision-making scores (7.42 ± 1.25) and the lowest risk-taking scores (4.26 ± 1.43). In contrast, sleep-deprived students (<5 hours) showed the lowest decision-making scores (5.73 ± 1.41) and the highest risk-taking scores (5.86 ± 1.78). The differences in both decision-making and risk-taking across sleep groups were statistically significant ($p = 0.014$ and $p = 0.031$, respectively), indicating a

meaningful impact of sleep on cognitive and behavioral outcomes [Table 2].

Table 2: Impact of Sleep Deprivation on Decision-Making and Risk-Taking (n = 260)

Sleep Duration Group	n	Mean Decision-Making Score ± SD	Mean Risk-Taking Score ± SD	p-value (Decision)	p-value (Risk-Taking)
≥ 7 hours (Well-rested)	98	7.42 ± 1.25	4.26 ± 1.43		
5–6 hours (Moderate Sleep)	112	6.28 ± 1.36	5.13 ± 1.51	0.014	0.031
< 5 hours (Sleep-Deprived)	50	5.73 ± 1.41	5.86 ± 1.78		

Discussion

The results of the current study pose a profound correlation between sleep length and decision-making as well as risk-taking tendencies in health science students. The students with seven hours or more of night sleep showed improved decision-making skills and reduced urge to take risks compared to the same students who slept less. This finding proves to be in line with the generally held belief that sleep is vital in ensuring good cognition and self-management (Smithies et al., 2021). It is also consistent with the cognitive-energetic theory, according to which sleep deprivation has adverse effects on executive functioning and, especially, in performance involving attention and judgment (Sullan, et al., 2021).

These findings are similar to those of Jeon et al. (2021), who discovered that sleep deprivation causes damage to the prefrontal cortex, resulting into lower quality of decision making. Equally, Lo et al. (2012) revealed that subjects in cross-limitation sleep condition were more impulsive and a risk-taker in model task performances. The existing paper supports these data by presenting evidence collected in the population of students who undergo intense academic and clinical training, therefore highlighting the practical impact of sleep loss in high-stakes situations like a healthcare educational context.

Conversely, some studies present more nuanced results. As an example, Telzer et al. (2013), found reduced cognitive performance with sleep deprivation, but it was moderate in strength; so, the effect size could possibly be task-specific or based on individual strategies of coping with sleep deprivation. Although statistical significance was found in our study on the reduction in decision-making and the presence of risk-taking depending on sleep groups, we cannot completely exclude the hypothesis that some of the individuals in our sample also had factors of resilience; e.g., they were highly motivated or have adaptive skills, which temporarily block impairing effects of insomnia (Decker, et al., 2022).

A study on medical students carried out by Andersen et al. (2023) also concluded that inadequate sleep has negative effects on academic performance and performance in clinical situations especially in judgment under pressure. This conforms to our findings, whereby health science students who are taxed by both academic and clinical pressure can be at risk of the psychological processes of the sleep-deprived individual. Moreover, the predisposition to engage more in risk-taking activities when people have shorter sleep duration aligns with the observations made by Telzer et al. (2013), who found out that adolescents with sleep deficit had greater activation in parts of the brain responsive to rewards when tasked with decision-making on risk activities (Bobba, et al., 2023).

Another issue is to think about the cultural and context-related influence in such results. To take a specific example, students in South Asian contexts, such as the context of the study, are known to have work overloads, family demands and lengthy commutes which therefore lead to diminished sleep. This contrasts with research studies that have been done in the west where there is a stronger sleep hygiene education and institutional support systems. Thus, our results can be compared with international literature; however, perhaps, our sample of people

may be subjected to additional socio-environmental stressors (Shirdel, et al., 2025).

Despite these limitations, the study provides compelling evidence that inadequate sleep is associated with impaired decision-making and elevated risk-taking behaviors among health science students. These outcomes are particularly concerning in a clinical context, where poor decisions can have serious implications for patient safety. The findings underscore the importance of promoting healthy sleep behaviors through institutional policies, student counseling, and curriculum interventions aimed at stress and time management. Ultimately, safeguarding the cognitive functioning of future healthcare professionals begins with recognizing the foundational role of sleep in their academic and clinical success.

Conclusion

This entailed the examination of the effects a period of sleep category had on making decision and risk-taking attitude of subjects who were students enrolled in health sciences in colleges in Swat district. This was proven to be the case when concerning the efficacy of their decision making as well as the comparative risks underlying the fact that students who slept well (average of 7 hours or more per day) made better judgments as compared to those who slept moderately/badly. The results have placed more significance on the need of sleep in the ability to maintain academic and clinical performance concerning the cognitive functions. The figures show that the issue of sleep deprivation may become a potentially hazardous risk to the career development coupled with patient safety responsibilities of healthcare workers of tomorrow. Therefore, there is need to have sleep hygiene augmentation as key component of academic and clinical preparedness among students.

Recommendations

1. **Integrate Sleep Education into Curriculum**
   Nursing colleges should incorporate modules on sleep hygiene, time management, and stress reduction within the academic curriculum to enhance students' understanding of sleep's impact on cognitive and clinical performance.

2. **Conduct Regular Awareness Campaigns**
   Organize regular seminars and workshops focused on the consequences of sleep deprivation and promote strategies to ensure better sleep practices among students.

3. **Establish Institutional Support Systems**
   Colleges should provide counseling and mental health services that address academic stress, anxiety, and sleep-related concerns to help students maintain better emotional and physical well-being.

4. **Encourage Balanced Academic Scheduling**
   Faculty and administrators should ensure that academic timetables, assignments, and clinical rotations allow students sufficient time for rest and recovery.

5. **Promote a Healthy Campus Environment**
   Dormitories and hostile environments should be regulated to minimize noise and late-night disturbances, creating a conducive environment for restorative sleep.

6. **Further Research and Monitoring**
   Future studies should adopt longitudinal or interventional designs to explore causal relationships and include diverse student populations, while also evaluating additional variables such as stress levels, caffeine use, and screen time before sleep.

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