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The Effect of Sleep Deprivation on Academic Performance and Motivation Among University Students in Peshawar

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Abstract

Sleep deprivation is a common challenge faced by university students, with increasing evidence indicating that inadequate or low-quality sleep can lead to adverse effects on both academic achievement and mental health. This research explores how sleep deprivation impacts academic performance and motivation in university students. Utilizing Self-Determination Theory as a framework, the study adopts a quantitative, cross-sectional approach, utilizing established tools such as the Pittsburgh Sleep Quality Index (PSQI) to evaluate sleep quality, the Academic Motivation Scale (AMS) to gauge motivation levels, and self-reported GPA to represent academic success. Data were collected from a sample of 200 students by using stratified sampling technique. These findings affirm both hypotheses of the study, demonstrating that sleep deprivation adversely affects students' motivation and academic results. The research concludes by emphasizing the necessity of fostering healthy sleep practices and providing academic support to improve student outcomes. Suggestions are made for students, educators, policymakers, and future researchers who wish to tackle the educational and psychological ramifications of sleep deprivation in higher education settings.

Keywords: Sleep Deprivation, Academic Performance, Student Motivation, University Students, Sleep Quality

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INTRODUCTION

The problem of lack of sleep in university students is common and remains a hurdle to cognitive functioning, academic performance, and motivation. University students usually sacrifice sleep for academic reasons, social activities, and screen time, which leads to poor concentration, poor memory retention, and disinterest in learning. Since sleep is a physiological process that is essential for cognitive functioning and other physiological processes, most students neglect to have adequate sleep, which can harm their academic performance and psychological health. A study by Alfonsi et al. (2020) mentions that sleep deprivation is a prevalent problem for university students, which can lead to consequences such as the impairment of cognitive abilities and decision-making and overall poor health. Poor sleep may greatly influence academic achievement, and decreased motivation (Yao & Wang, 2023). Sleep is essential for brain functioning, affecting one's ability to concentrate, solve problems, and learn in general (Akram, 2024). According to AlMashouk et al. (2024), sleep is needed for memory consolidation, with little or no sleep severely hampering a student's ability to retain and use new information. The growing sleep deprivation problem in today's university students is thought to be a result of several combined factors, such as study load, part-time work, and social and tech pressures (Pillion, 2023). Research has shown chronic sleep deprivation to be associated with lower grades, poorer academic performance, and poorer cognitive functioning (Evanger et al., 2024).

Xu et al. (2025) conducted a systematic review that suggests students who chronically experience insufficient sleep show deficits in attention, problem-solving ability, and general academic engagement. Moreover, loss of sleep has been associated with elevated stress levels, stress, and depressive symptoms that further detract from students' motivation and range of academic engagement (Heemskerk et al., 2024). The Self-determination theory (Pope & Wall, 2024) asserts that motivation results from intrinsic and extrinsic factors that are both adversely affected by sleep deprivation. Intrinsic motivation, an important driver of academic persistence and success, is negatively impacted when students remain chronically sleep deprived (Osei & Bjorklund, 2024). In addition, we live in a technological era that brings different challenges towards sleep hygiene for university students. Too much screen time, especially close to bedtime, has been associated with a disruption of the circadian rhythm, resulting in later sleep onset and poorer sleep quality (Pillion, 2023). The blue light from smartphones, tablets, and laptops disrupts the production of melatonin, a hormone that helps the body sleep (Haghani et al., 2024). In addition, greater use of social media before sleep provides mental stimulation that leads to eventual sleep delay (Maduka, 2025). Faced with these challenges, universities and educational policymakers should be mindful of interventions and awareness programs that promote the vital role that sleep plays regarding students' academic performance and overall well-being (Chemagosi, 2024).

Research indicates that sleep deprivation hurts not only academic performance but also emotional regulation and decision-making in students, resulting in time management problems and delays (Alfonsi et al., 2020). Moreover, sleep deprivation has been shown to increase the risk of burnout and disengagement from academic tasks (Abanobi et al., 2025), compounding the problem. Since motivation is important for academic persistence, potentially addressing sleep deprivation through institutional support and personal time management strategies could improve student success. The goal of this study is to illustrate the impact of sleep deprivation on academic performance and motivation. The findings could inform practical recommendations to help universities adopt policies that promote

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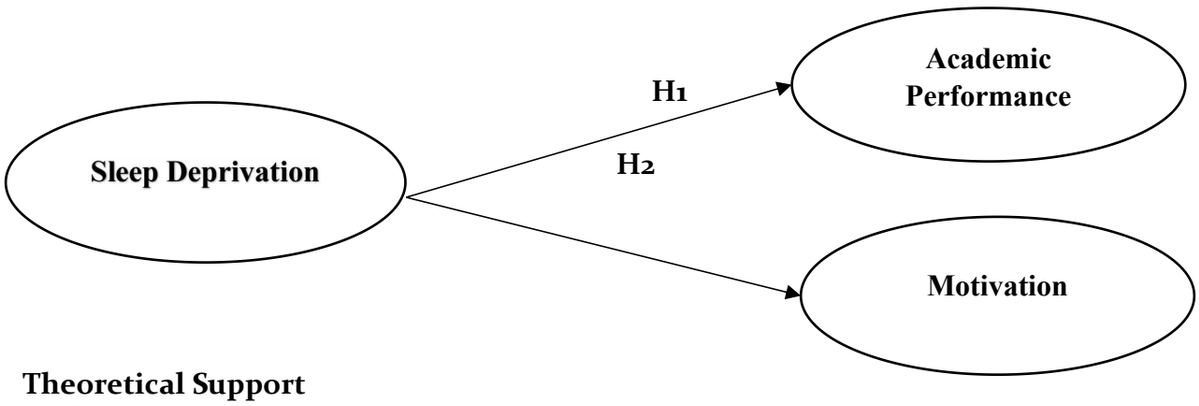
healthier sleep practices among students. By establishing sleep awareness programs to better equip students with lifesaving tools, college campuses can improve academic performance as well as the mental health of students. Although the field of sleep deprivation is well-researched in the domains of cognitive performance, comparatively less work has been done on the effect of sleep deprivation on academic motivation. The loss of sleep is common among university students in order to cope with the challenges of academics, however, this can lead to poor concentration, memories, and poor participation in academics (AlMashouk et al., 2024). However, although sleep deprivation and academic performance are known to be related, little research has been conducted on how sleep deprivation might impact students' intrinsic and extrinsic motivation. As motivation is also essential for learning and academic success, it is important to explore the effect of sleep deprivation on students' willingness to engage in academic tasks. This study seeks to explore how sleep deprivation influences the academic lives of university students, focusing specifically on two core areas: academic performance and motivation. The research aims to answer two central questions: (1) How does sleep deprivation affect academic performance among university students? and (2) What is the relationship between sleep deprivation and student motivation? Correspondingly, the objectives of this study are to examine the relationship between sleep deprivation and academic performance and to assess the impact of sleep deprivation on students' motivation levels. Guided by these questions and objectives, the study is based on the following hypotheses: H1: Sleep deprivation negatively affects academic performance among university students; and H2: Sleep deprivation decreases students' motivation toward academic tasks.

Conceptual Model



Theoretical Support

Self-Determination Theory

Intrinsic and Extrinsic Motivation Theory. Sleep deprivation is associated with lower levels of energy, increased stress, and poorer self-regulation (Gerber et al., 2025), all of which decrease both types of motivation. Consequently, students who are sleep-deprived are less likely to participate in academic endeavors or show persistence in completing learning tasks.

Cognitive Load Theory

This theory assumes that a person's cognitive capacity is limited and that a person can be overwhelmed by excessive mental demands. Sleep deprivation negates cognitive load as it diminishes memory consolidation and attention span and contributes to mental fatigue (Anokha & Kachhi, 2025). As a result, students who do not get enough sleep may find that they cannot efficiently manage new information, thus degrading their academic performance.

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Research Methodology

A quantitative cross-sectional correlational research design was used in the study as it found the relationship among sleep deprivation, academic performance, and motivation. It used a cross-sectional survey method to illustrate the sleep patterns and academic performance of university students at a single point of time. The population of this study includes university undergraduate students of all types of majors who sleep chronically in a less-than-optimal state due to academic workload, leisure activities, and electronic or digital distractions. We used the stratified random sampling procedure to select 200 university students across a variety of fields of study and years of study. Data was collected via questionnaire consisting of demographics, sleep duration (PSQI), academic performance (GPA), and motivation levels (AMS). We used online (Google Forms) and in-person calls to maximize the response to the questionnaire. Data analysis was performed using SPSS Statistics, including descriptive statistics, Pearson's correlation coefficient, and multiple regression analysis to examine the relationship between sleep deprivation, academic performance, and motivation.

Measurement Scales

Pittsburgh Sleep Quality Index (PSQI)

The Pittsburgh Sleep Quality Index is a well-established tool designed to evaluate subjective sleep quality and disturbances over a one-month interval. It consists of 19 self-reported items grouped into seven components; each rated on a 4-point Likert scale. The global score ranges from 0 to 21, with scores above 5 indicating significant sleep difficulties. This index has strong psychometric properties, making it suitable for student research. In this study, the PSQI measured sleep deprivation, focusing on sleep duration and quality as independent variables. The Pittsburgh Sleep Quality Index (PSQI) has demonstrated good internal consistency. The Cronbach's alpha for the global PSQI score typically ranges from 0.70 to 0.83, depending on the sample population. (Buysse et al., 1989).

Academic Performance Scale

Academic performance was measured using Grade Point Average (GPA) as a standardized and quantifiable indicator of academic success. In cases where institutional GPA records were unavailable, participants self-reported their GPA or rated their academic achievement on a 5-point Likert scale from "very poor" to "excellent." Prior research supports the reliability of self-reported GPA, which correlates highly with official records. In this study, academic performance was the primary dependent variable (Credé & Kuncel, 2008).

Academic Motivation Scale

The Academic Motivation Scale is a psychometric instrument based on Self-Determination Theory, consisting of 28 items across seven subscales. For this study, a concise 9-item version was used to assess intrinsic motivation, extrinsic motivation, and amotivation. Responses were rated on a 7-point Likert scale ranging from "Does not correspond at all" to "Corresponds exactly." The AMS has shown acceptable internal consistency and validity, with a Cronbach's alpha of 0.86. Motivation dimensions were analyzed in relation to sleep deprivation levels (Vallerand et al., 1992)

Table 1 Correlations

	PSQI	MOT	ACD
PSQI	1	.156*	.154*
		.027	.029
MOT	.156*	1	.179*
	.027		.011

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ACD	.154*	.179*	1
	.029	.011	

*. Correlation is significant at the 0.05 level (2-tailed).

In Table 1, the correlation table indicates that PSQI (Pittsburgh Sleep Quality Index), MOT (Motivation), and ACD (Academic Performance) are positively correlated. PSQI is significantly associated with both MOT (r =. 156, p =. 027) and ACD (r =. 154, p =. 029), providing some evidence that a slightly higher level of motivation and academic performance is associated with a better sleep quality. Furthermore, MOT has a significant positive correlation with ACD (r =. 179, p =. 011), suggesting that higher motivation is associated with better educational achievement. The relationships are weak, but are statistically significant at the.05 level.

Table 2 Regression Analysis

	Unstandardized Coefficients		**Standardized Coefficients**			**95.0% Confidence Interval for B**		**Collinearity Statistics**	
Model	**B**	**Std. Error**	**Beta**	**T**	**Sig.**	**Lower Bound**	**Upper Bound**	**Tolerance**	**VIF**
1 **(Constant)**	97.360	4.285		22.721	.000	88.910	105.810		
PSQI	.428	.192	.156	2.226	.027	.049	.806	1.000	1.000
2 **(Constant)**	87.167	6.196		14.069	.000	74.949	99.385		
PSQI	.361	.192	.132	1.875	.062	-.019	.740	.976	1.024
ACD	.483	.214	.158	2.257	.025	.061	.904	.976	1.024

Dependent Variable: MOT, ACD

The regression analysis demonstrates that PSQI significantly predicts MOT in Model 1. Positive values of the unstandardized coefficient (B =.428, p =.027), i.e. higher motivation is related on average to better sleep quality. In Model 2 with ACD included, PSQI can be seen as a marginal non-significant when added to ACD (B =.361, p =.062) with ACD as significant predictor for motivation (B =.483, p =.025). This implies that academic achievement independently influences motivation and could be an intermediary that effects the influence of sleep quality. Both predictors have acceptable (VIF =1), which means there are no multicollinearity problem. On the whole, the relationship between sleep quality and academic performance, as well as between sleep quality and motivation is found to be positive, with academic performance (and to a lesser extent, sleep) predicting motivation in the final co-varied model.

Discussion

The objective of this research was to explore how sleep deprivation, as defined by sleep quality, affects the academic performance and motivation of university students. The results corroborated both of the study's proposed hypotheses. Correlation analysis indicated significant positive relationships between sleep quality (measured by PSQI), academic motivation (denoted as MOT), and academic performance (referred to as ACD). Notably, improved sleep quality was found to be positively linked with both heightened motivation and better academic results. This finding is consistent with existing research that emphasizes the vital importance of sleep for cognitive abilities, memory retention, and learning processes (Curcio et al., 2006; Walker, 2017). Additionally, regression analysis established that sleep quality was a significant predictor of academic motivation in the initial model (B = 0.428, p = .027), indicating that students with better sleep tend to exhibit

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greater academic motivation. However, when academic performance was included in the analysis, the effect of sleep quality became marginally non-significant (B = 0.361, p = .062), while academic performance itself appeared as a significant motivator (B = 0.483, p = .025). This suggests that academic performance might partially mediate the connection between sleep quality and motivation. These outcomes align with Self-Determination Theory (Deci & Ryan, 1985), which asserts that both internal and external factors including health, competence, and academic success play a role in optimal functioning and motivation. The established link between motivation and academic performance reinforces earlier findings by Gomes et al. (2011) and Beattie et al. (2016), which indicated that students who are highly motivated tend to achieve superior academic results. Furthermore, the moderate yet significant correlation between sleep quality and academic performance (r = .154) supports the conclusions of Hirshkowitz et al. (2015) and Lo et al. (2016), who found that students suffering from inadequate sleep generally receive lower grades and experience reduced cognitive effectiveness. These findings underscore the interconnectedness of sleep, motivation, and academic success, highlighting that while each factor independently influences student outcomes, their combined effects are even more pronounced.

The results of this study enhance current literature by highlighting the significance of Cognitive Load Theory (Sweller, 1988) and the Two-Process Model of Sleep Regulation (Borbély, 1982). Cognitive Load Theory posits that a lack of sleep heightens cognitive demands, hindering students' ability to absorb and comprehend new material, which subsequently diminishes their academic success. Likewise, the Two-Process Model indicates that inadequate sleep habits interfere with circadian rhythms, resulting in daytime tiredness and decreased motivation, thus aligning with the outcomes of this research.

Conclusion

The research indicates that a lack of sleep adversely impacts university students' academic achievement and motivation. Higher quality sleep correlates with increased motivation and better academic results. Additionally, the study reveals that academic performance acts as an intermediary factor between sleep and motivation, underscoring a complex yet vital relationship for student success. In light of the mounting pressures that university students encounter such as academic responsibilities, social commitments, and technology usage these results emphasize the urgent need to promote good sleep practices within higher education settings. Ensuring students get sufficient and restorative sleep could not only boost their academic performance but also foster both intrinsic and extrinsic motivation for learning.

Recommendations

Students are encouraged to achieve 7 to 9 hours of sleep each night, as suggested by the National Sleep Foundation, and to limit screen time at least an hour before bed to enhance sleep quality. Stress reduction techniques like time management, mindfulness, and regular exercise can improve rest. Educational institutions should introduce sleep education through workshops, revise academic timetables for flexibility, and ensure accessible mental health resources focusing on sleep-related academic stress.

Limitations

The cross-sectional design limits causal conclusions about sleep deprivation's impact on academic achievement and motivation. Self-reported data, including PSQI, AMS, and GPA, may be affected by response biases. The sample from universities in Peshawar restricts generalizability across different populations. Additionally, factors like mental health, diet,

exercise, and screen time were not fully considered, and the abbreviated AMS may have limited insight into all motivational constructs

Future Directions

Longitudinal studies are needed to examine the lasting effects of sleep deprivation on cognition, academics, and careers. Future research should explore factors like anxiety, technology use, and lifestyle on sleep patterns. Experimental studies could assess sleep interventions such as mindfulness and digital detoxes to improve performance and motivation. Cross-cultural comparisons and investigations into diet and exercise effects would provide a broader understanding of student well-being.

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