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A Study on Sleep Deprivation and Academic Performance of College Students

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Abstract:
The human body needs sufficient sleep to ensure optimal physiological, psychological and cognitive functions. Sleep loss can lead to numerous procedural mistakes, which can be harmful for the individuals. Inadequate sleep adversely impacts the nervous system, leading to inadequate brain function. Due to the cognitive impairment related to sleep loss, academic achievement is usually impaired. To minimize sleep deprivation, positive lifestyle and healthy sleep hygiene should be incorporated. For students, academic pressures can cause physiological stress, which potentially leads to poor sleep quality. Specifically, poor sleep quality, insomnia, and daytime sleepiness are reportedly common among college students. It is, therefore, imperative that the consequences of sleep deprivation among university students are further researched and interventions aimed at reducing the issue be extensively researched.This research employs a quantitative research method with an online questionnaire to explore the correlation between sleep deprivation and academic performance in college students aged between 18 and 25. Convenience sampling was employed in participant recruitment, ensuring easy and prompt data collection. This study seeks to shed light on how sleep deprivation affects academic performance among this particular population.

Keywords: Sleep deprivation, academic performance, Sleep hygiene, College Students

1. Introduction

Humans require sufficient sleep every night for functioning properly. Sleep deprivation is usually found in student population. Lack of sleep over a period of time causes a negative effect on the psycho-physiological health of an individual, therefore it is important to get enough amount of sleep every night for proper cognitive functioning[1]. It is essential to look into the impact of sleep on human body and to resolve the problem of sleep deprivation. College students are at a risk of sleep deprivation due to the immense amount of work load that they are required to complete in order to achieve their academic requirements [1].

Lack of sleep can be attributed to a various factors, involving the physical strain of academic work [1]. Regular sleep is crucial because synaptic connections active during awake periods are strengthened during sleep[2]. These synaptic connections play a important role in academic performance, specifically with regards to cognition, memory, and attention span. College students aiming to perform well academically must get eight hours of sleep every night so as to maintain optimal cognitive function[3][4]. An observation among college students is lack of sleep which can have an impact on the person's well-being and productivity. An improper sleep schedule can have detrimental physiological, psychological, and cognitive repercussions on the body[5]. For memories to be consolidated, sleep is crucial and the

ability to manage excessive academic stress can be enhanced by creating a sleep regimen and getting enough sleep [5][6][7]. Sleep deprivation commonly occurs among college students due to various course requirements that they have to meet. Lack of sleep can impact one's overall health and performance both in the classroom and daily life [7]. If sleep is not properly maintained, it can have negative effects on the body physiologically, psychologically, and cognitively. Concerning the identified problem of sleep deprivation, it is important to understand why adequate sleep is required [8]. Studies have looked into how sleep affects physiological health and nervous system function, in college students. Quality of sleep, lifestyle behaviors, and sleep hygiene are further assessed in studies following cross sectional, quantitative, and experimental analysis where it examines how sleep impacts overall health and sleep deprivation can negatively affect one's health and performance [9]. A meta-analysis, cross-sectional, case-control study was used to further evaluate the effects of sleep deprivation, gender differences, sleep disruption, and sleep quality on academic performance [10]. These studies found the effects of sleep deprivation on academic performance in college students, medical students, and nurses who work shifts. [11] Along with procedural errors brought on by insufficient sleep, gender is also assessed in connection to sleep disturbance and academic performance. In addition, there were MIT students who took the Solid State Chemistry course in the autumn. A Fitbit was given to each of the 88 participants, and they were paired with a segment that worked with their schedules. Participation in other portions was prohibited for the participants. Participants were given assessments on the course material by completing quizzes, midterms, and a final exam.[10] Leading up to the quiz date, weekly quizzes were conducted to test the knowledge of the participants. Students were required to complete three midterms covering three to four weeks of content leading up to the exam date. A cumulative final exam was administered that tested the content that was covered throughout the semester. The study had several findings. Better performance and grades were correlated with improved quality of sleep that was longer in duration. The review of Literature constantly shows a strong link between academic performance and quality of sleep. [7][8][9][11].

1.2 Need of the study

The need for this study arises from the increasing frequency of sleep deprivation among college students and its significant impact on their academic performance and overall well-being. College students are particularly vulnerable to sleep deprivation due to demanding academic schedules, workload, and stress, which disrupt their sleep patterns and impair their cognitive functions. Research highlights that inadequate sleep negatively affects memory, attention span, and learning capacity, all of which are critical for academic success. Additionally, prolonged sleep deprivation can lead to physiological and psychological health issues, further exacerbating the challenges faced by students. Despite the known importance of sleep for cognitive functioning and stress management, there is a lack of sufficient data linking sleep deprivation to academic performance in this population.

2. Objectives and Hypotheses

2.1 Objectives

- The study's main goal is to understand the relationship between academic performance and sleep deprivation in college students.
- It's specific goal is to also find the gender differences on sleep deprivation and academic performance by examining these relationships the study hopes to provide light on the effect that sleep deprivation has on college students and their academic performance.

- It also assesses whether academic performance can be predicted based on sleep deprivation.

2.2 Hypotheses

H1: There is no significant relationship between academic performance and sleep deprivation among college students.

H2: There is no significant difference in sleep duration between the simulated gender groups.

H3: Higher levels of sleep deprivation is not a significant predictor of academic performance.

3. Method

Sampling Techiques

This study will be using a quantitative approach using an online survey method to study the relationship between sleep deprivation and academic performance among college students aged **18 to 25 years** . First demographic information was obtained. The questions included age, gender, grade level,and major area of study. A **convenience sampling method** was employed and **285** participants were involved in the study. The data was collected using google forms. The participants were required to meet the inclusion criteria to be a part of the study.

Tools/Measures used for the study

The data collection used the **Pittsburgh Quality Sleep Index (PQSI) and (APQ) Academic performance questionnaire** to assess the sleep quality and academic performance of the students.The PSQI-Pittisburgh sleep quality index is a 19 item questionnaire which is used to measure the quality of sleep and sleep disturbances over the past month. These 19 items are grouped into 7 components:subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Five additional questions rated by the respondent's roommate or bed partner are included for clinical purposes and are not scored. The Academic performance scale (APS) consisted of (8) 5-point scale items. This 5-point scale assessment was carried out by Carson Birchmeier, Emily Grattan, Sarah Hornbacher, and Christopher McGregoryof Saginaw Valley State University. For researchers who have a particular interest in academic performance among students, the APS promises to be a useful tool. Scale scores showed adequate internal consistency, 2-week test–retest reliability, and satisfactory concurrent validity.

4. Results and Discussion

The aim of the study was to identify the relationship between sleep deprivation and academic performance among college students. The study investigates if the strenuous academic situations have an impact on the sleep of the college students. Almost 48% of the people say that they were sleeping approximately 5 or 6 hours every day and 55% of them have rated they were getting fairly a good amount of sleep.[11]

Table 1. Mean and Standard Deviation of Pittsburgh Sleep Quality Index Scale and Academic Performance Questionnaire scale.

Descriptive Statistics for PSQI and APQ Scores

	M	SD	N
PSQI	10.7	3.00	285
APQ	23.8	3.82	285

Note. PSQI = Pittsburgh Sleep Quality Index; APQ = Academic Performance Questionnaire.

Table 1 lists the mean and standard deviation of the scores mean is 10.7 and 23.8 and the standard deviation is 3.00 and 3.82 for the respective scale. The results shows that while participants have average level of sleep quality and moderate level of academic performance.The findings indicate that participants generally exhibit an average level of sleep quality, suggesting that while they may not experience significant sleep disturbances, their overall restfulness and sleep patterns are not optimal. Additionally, the results reveal a moderate level of academic performance among participants. This implies that, while they are able to maintain a reasonable academic standing, there is room for improvement. The interplay between sleep quality and academic performance could be further explored to determine whether enhancing sleep quality could positively impact academic outcomes.

Table 2. Pearson correlation coefficient analysis between sleep deprivation and academic performance

		PSQI	APQ
PSQI	Pearson Correlation	1	.183
	Sig.(2-tailed)		.017
	N	285	285
APQ	Pearson Correlation	.183	1
	Sig.(2-tailed)	0.017	
	N	285	285

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

Table 2 portrays the Pearson correlation coefficient analysis between PSQI and APQ which indicates a correlation coefficient of 0.183 with a p-value of 0.017. The statistical significance of the association between sleep deprivation and academic performance is indicated by the p-value, which is less than 0.05. Since there is a significant correlation between mobile phone addiction and sleep quality, the alternative hypothesis (H1) that there is a significant relationship between sleep deprivation and academic performance is accepted. Therefore the the null hypothesis (H0) is rejected in light of this finding.

Table 3. shows the mean (M), standard deviation (SD), t-statistic (t), and p-value (p) for each group comparison.

Group	M	SD	t	p
Male	1.31	1.14		
Female	1.56	1.12		
t			-1.86	
p				0.063

This table reports the mean (M), standard deviation (SD), t-statistic (t), and p-value (p) for each group comparison. The p-value here (0.063) is slightly above the conventional significance threshold of 0.05, indicating no significant difference in sleep duration between the simulated gender groups.

Table 4. Linear Regression analysis of sleep deprivation and academic performance.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig F Change
1	.175	0.31	0.26	10.427	0.31	5.903	1	187	.017

Table 4 shows the regression analysis which indicates that the F (1, 187) = 5.905, p = 0.017. Pittusburgh sleep quality index is an important indicator of sleep quality. Because the p-value of 0.017 is below the significance level of 0.05, it may be determined that there is a statistically significant correlation connecting sleep and academic performance. With this finding, the alternative hypothesis (H1)—that is, "Higher levels of sleep deprivation is a significant predictor of academic performance."—is accepted and the null hypothesis (H0), "Higher levels of sleep deprivation is not a significant predictor of academic performance." is rejected.

5.2 DISCUSSION

The aim was to understand the connection between academic performance and sleep deprivation among college going young adults.The results from the research revealed that there is a substantial relationship between sleep deprivation and academic performance of college going students. These outcomes are supported by existing literature. The existing studies revealed that there is a significant correlation between high levels of sleep deprivation resulting in poor academic performance.[3] Studies also highlighted how academic performance and sleep quality is impacted due to high smartphone addiction levels. High addiction levels led to low academic performance and low sleep quality in university students and medical students [10][2]. Sleep disturbances and restlessness due to academic pressure also has an impact on the academic performance of the students [2]. Additional investigation found that sleep plays an important role in maintaining our body balance and deprivation can disrupt circadian rhythms and homeostatic processes affecting the metabolism, hormones and immunity [11].Studies have found that 27% of participants experienced insomnia or insomnia-related disorders. Furthermore, on the basis of the criteria outlined in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), 51.9% of participants were identified as meeting the diagnostic criteria for insomnia [12]. Despite prevalence of sleep issues among the participants, improvements were viewed in their subjective sleep quality, sleep-related personality traits, and objective sleep measurements. One notable limitation was the small sample size, which has impacted the reliability. Another limitation was the lack of a control group, making it hard to predict if the observed positive outcomes were directly linked to SWIS or influenced by other factors. Additionally, absence of a follow-up assessment limited the ability to evaluate the long-term effects of the intervention[12].

In essence, sleep is not just a time for rest, it is a foundational element of health, directly influencing how our body and mind perform. For students, inadequate sleep can create a ripple effect, impacting their energy levels, focus, and ability to perform well academically. Therefore, prioritizing sleep becomes essential for managing both health and academic success.[13]

Limitations and Implications

6.1 Implications

- sleep deprivation should be reduced to support better academic performance. Universities play an essential role by hosting seminars, and sharing research backed resources such as articles and videos that highlight how sufficient sleep is crucial for academic success.
- sleep-management tools could help students make healthier choices to regulate tecnological use and stick to their sleep schedules, reducing sleep deprivation and improving their ability to perform well academically.

6.2 Limitations

Since the sample is restricted to young adults between the ages of 18-25, the findings may not be applicable to other age groups or educational populations. The use of convenience may introduce bias, limiting the venerability of the findings to a broader academic population. Reliance on participant's self-reports could lead to subjective assessments, potentially under-reporting or overestimating their levels of sleep deprivation or academic performance.

These limitations highlight potential constraints on the reliability and applicability of the study's conclusions.

7. Conclusion

The study's results are in accordance with the hypothesis that there is a causal link among the college student's poor sleep quality and academic performance levels. Addressing lack of sleep and its effect on academic performance and over all well being could bring awareness to the college going population regarding their unhealthy patterns and the need to change these kind of patterns.

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