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Original Article

Associations between Mental Health, Academic Performance, and Sleep Quality in Physical Therapy Students: A Cross-Sectional Study

Shafaq Altaf[1,2], Kazem Malmir[1]*, Seyed Mohsen Mir[1], Gholam Raza Olyaei[1], Aadil Omar[1,3], Jaweria Syed[2]

[1]School of Rehabilitation Sciences, Tehran University of Medical Sciences, Iran.
[2]Shifa Tameer-e-Millat University, Islamabad, Pakistan.
[3]Islamabad College of Physiotherapy, Margalla Institute of Health Sciences, Pakistan.
Corresponding Author: Kazem Malmir; Email: kmalmir@tums.ac.ir

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ABSTRACT

Background: Sleep quality significantly impacts both mental and physical health and is a critical factor in academic performance among young adults. Emerging evidence suggests a complex interaction between sleep patterns, mental health status, and educational outcomes in this demographic.

Objective: This study aimed to investigate the correlations between sleep disturbance, academic performance, and mental health within a population of young adults.

Methods: A cross-sectional observational study was conducted with 236 participants from the Doctor of Physical Therapy program at Shifa Tameer-e-Millat University, Islamabad, during the Spring semester of 2019. Data were collected via the Pittsburgh Sleep Quality Index (PSQI), the Morningness-Eveningness Questionnaire (MEQ), and the Depression Anxiety Stress Scale (DASS), with academic performance measured by GPA. Statistical analysis was performed using Pearson's correlation coefficient in SPSS version 25.

Results: A significant negative correlation was found between depression and GPA ($r = -0.139$; $p = 0.033^*$), while stress and academic performance showed a positive but non-significant correlation. Sleep quality correlated positively with both depression ($r = 0.183$; $p = 0.005^{**}$) and anxiety ($r = 0.147$; $p = 0.024^*$). However, no significant correlation was found between sleep patterns and any of the mental health variables.

Conclusion: The findings demonstrate a clear negative impact of depression on academic achievement in young adults and suggest that poor sleep quality may be associated with higher levels of depression and anxiety. These results emphasize the importance of addressing sleep and mental health issues to improve academic outcomes.

Keywords: Sleep Quality, Academic Performance, Mental Health, Depression, Anxiety, Stress, Young Adults, Pittsburgh Sleep Quality Index, Morningness-Eveningness Questionnaire, Depression Anxiety Stress Scale, Cross-Sectional Study, Pearson's Correlation.

INTRODUCTION

Sleep's integral contribution to both physical and mental health, alongside its significant influence on learning ability, productivity, and performance, underscores the complexity of the sleep-wake cycle. This cycle is governed by the circadian rhythm, which regulates wakefulness at specific times, and the homeostatic sleep drive, a process that promotes sleep based on the duration of wakefulness, and diminishes with sleep (1,2). The prevalence of daytime sleepiness, affecting approximately one in five adults, highlights challenges in maintaining alertness, often compounded by difficulties in initiating and maintaining sleep, where individuals may take longer than half an hour to fall asleep for more than three nights a week, coupled with morning tiredness (3,4). Particularly vulnerable are college students, especially those enrolled in full-time programs, who face academic pressures and increased workloads, resulting in reduced sleep times averaging 6.6 hours per night, well below the recommended eight to nine hours for optimal functioning (5-7).

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Adequate sleep is crucial for memory consolidation, and its absence severely impacts academic performance. Furthermore, good quality sleep enhances study motivation, suggesting a direct link between sleep, academic achievement, and the propensity to engage in learning activities (8,9). The pursuit of professional degrees places immense pressure on students, leading to the development of poor sleep habits. This can initiate a cycle of declining academic performance and further sleep difficulties, a cycle many students may not recognize or feel capable of changing, particularly in an era marked by the pervasive presence of entertainment technologies and social media, which contribute to inconsistent sleep schedules and increased fatigue (10-12). This lifestyle can lead to diminished mental and emotional resilience, with even minor sleep deprivation over time chipping away at an individual's happiness, enthusiasm, and potentially leading to symptoms of clinical depression, impacting not only personal mental health but also interpersonal relationships and overall well-being (13-15).

Research, including a study conducted in Saudi Arabia, has shown that poor sleep quality is significantly associated with depression, anxiety, and stress, underscoring the need for further investigation into this relationship, especially in developing countries like Pakistan where mental health issues are often stigmatized (16). This study aims to elucidate the extent to which poor mental health may hinder academic achievement by examining the associations between sleep quality, patterns, and mental health status among undergraduate students. Enhancing our understanding of these relationships can provide a stronger foundation for advice and treatment, addressing a crucial aspect of student well-being that has been overlooked, particularly in the context of developing nations.

MATERIAL AND METHODS

This study was designed as a cross-sectional observational analysis, conducted at Shifa Tameer-e-Millat University, Islamabad, during the Spring semester from March to June 2019. Prior to commencing data collection, approval was secured from the Institutional Review Board under reference number IRB # 038-528-2019, ensuring adherence to ethical standards (17). Informed, written consent was obtained from all participating students, in alignment with the Declaration of Helsinki of 1975, reaffirming the ethical framework guiding the research process.

The participant pool consisted of 236 young, healthy adults, enrolled in the Doctor of Physical Therapy (DPT) program, aged between 18 to 24 years. The study specifically excluded married students, those with diagnosed psychological conditions, and those under the influence of sedatives to maintain a homogenous sample reflective of the targeted demographic. A non-probability convenient sampling technique was employed, predicated on the Raosoft calculator, to determine a sample size of 189 participants. This calculation was based on a 95% confidence interval and a 5% margin of error, against a backdrop of a total population of 370 students enrolled in the DPT program (17).

Data collection was facilitated through the administration of validated and reliable questionnaires. The Pittsburgh Sleep Quality Index (PSQI) was utilized to evaluate participants' sleep quality, comprising 19 items that explore seven domains related to sleep patterns: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. The PSQI scores range from 1 to 4, with scores greater than 4 indicative of poor sleep quality (18). Additionally, the Morningness-Eveningness Questionnaire (MEQ), consisting of 19 questions, was self-administered to assess participants' sleep-wake behavior and schedules, with scores ranging from 16 to 86. Scores between 16 and 41 suggest a preference for eveningness, while scores between 59 and 86 indicate a preference for morningness (19). The Depression Anxiety Stress Scale (DASS) was also employed to assess the three components of depression, anxiety, and stress, as implied by its title (20). Academic performance was evaluated through the mean grade point average (GPA) of students, based on their terminal exam results.

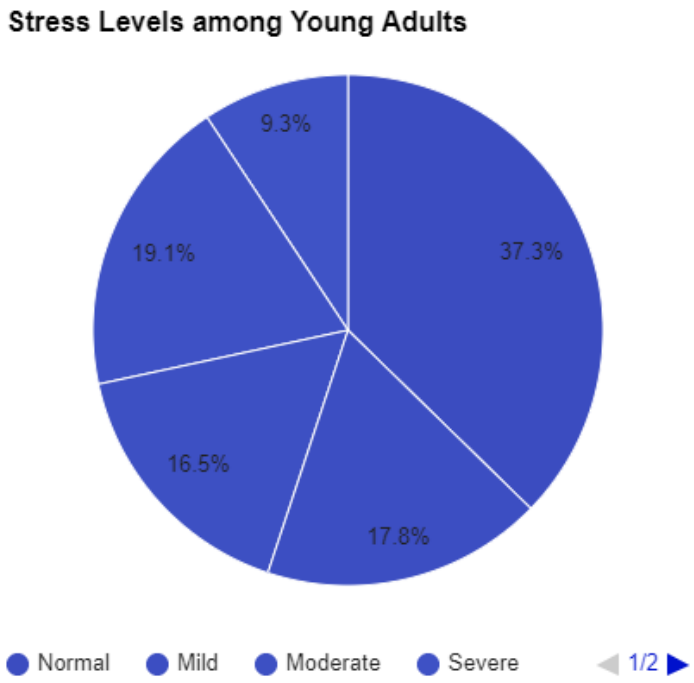
Participants were briefed on the objectives and procedures of the study, and written consent was acquired, with assurances provided regarding the confidentiality of their responses. The collected data were subjected to statistical analysis using the Statistical Package for the Social Sciences (SPSS) version 25. The distribution of the data was assessed as normal, permitting the application of Pearson's correlation coefficient to examine the relationships between sleep quality, sleep patterns, mental health status, and academic achievement. Significance was attributed to values less than 0.05, in line with conventional statistical thresholds for determining meaningful associations.

RESULTS

In the investigation into the mental status of young adults, a distinct correlation was observed with various aspects of their lifestyles, notably sleep quality, sleep patterns, and academic performance, as presented in Table 1. A negative correlation was noted between depression and academic performance ($r = -0.139$), with statistical significance ($p = 0.033^*$), suggesting that higher levels of depression are associated with lower GPAs. In terms of sleep quality, measured by the Pittsburgh Sleep Quality Index, depression exhibited a positive correlation ($r = 0.183$), with a notably significant p-value ($p = 0.005^{**}$), indicating that poor sleep quality may be

related to higher levels of depression. Conversely, no significant correlation was found between depression and sleep pattern, as assessed by the Morningness-Eveningness Questionnaire (r =-0.026, p = 0.691).

Anxiety, another component of mental status, was inversely correlated with academic performance, albeit not significantly (r =-0.048, p = 0.464). However, the correlation between anxiety and sleep quality was positive and significant (r = 0.147, p = 0.024*), aligning with the notion that anxiety may be exacerbated by or result in poor sleep quality. The sleep pattern did not show a significant correlation with anxiety (r =-0.084, p = 0.199).



Stress levels demonstrated a slightly positive, yet not statistically significant, correlation with academic performance (r = 0.029, p = 0.656), suggesting that the relationship between stress and GPA is not as pronounced. However, stress showed a positive and highly significant correlation with sleep quality (r = 0.243, p = 0.001**), the strongest correlation among the three mental health statuses evaluated with respect to sleep quality. Sleep patterns showed no significant association with stress (r =-0.074, p = 0.259).

Table 1. Correlation of Mental Status with Sleep Quality, Sleep Pattern, and Academic Performance

Mental Status	Academic Performance (GPA)		Sleep Quality (PSQI)		Sleep Pattern (MEQ)	
	r	p-value	r	p-value	r	p-value
Depression	-0.139	0.033*	0.183	0.005**	-0.026	0.691
Anxiety	-0.048	0.464	0.147	0.024*	-0.084	0.199
Stress	0.029	0.656	0.243	0.001**	-0.074	0.259
Abbreviations: GPA, grade point average; PSQI, Pittsburgh Sleep Quality Index; MEQ, Morningness- Eveningness Questionnaire.						

The distribution of stress levels among young adults, depicted in Figure 1, reveals a prominent portion of the population with normal stress levels (37.3%), while mild stress levels are seen in 17.8% of the population. The percentage of those with moderate stress is slightly lower at 16.5%, and a smaller yet considerable percentage experiences severe stress (19.1%). Notably, a minority of the population falls under the category of extremely severe stress levels (9.3%).

DISCUSSION

The basis of this investigation was to elucidate the relationship between sleep disturbances, academic performance, and mental health among a cohort of young adults. In delving into these dynamics, it was discerned that depression negatively impacted academic achievement, with elevated levels of depression corresponding to a decline in GPA. This association was significant and reinforces the notion that mental health is inextricably linked to academic success (21). While stress did not exhibit a significant correlation with academic performance in this context, a deviation from findings in broader undergraduate populations as reported

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by Elias et al. (2011), it may be postulated that the specific stressors inherent to medical fields could yield different impacts on academic outcomes (22).

In terms of sleep, a pivotal connection between sleep quality and mental health was identified, particularly with depression and anxiety. This discovery is in concert with Short MA et al.'s findings, which delineated poor sleep quality as a potential harbinger of depression among adolescents and suggested that evening chronotypes, or those more active in the evening, may be more vulnerable to depressive states (23). While our findings mirrored the link between sleep quality and depression, the association between sleep patterns and depression was not substantial. This divergence indicates that it is the quality, rather than the chronotype or pattern of sleep, that bears a more direct relationship with mental health outcomes.

The study further explored the interrelation between eveningness and psychological distress but did not establish a statistically significant connection. This partially aligns with prior research suggesting that eveningness is related to increased daytime sleepiness and psychological distress, although these findings have been varied and sometimes contradictory (24,25).

Notably, this study was not without its constraints. The exclusive enrollment of participants from a singular academic program could have engendered a skewed gender representation, thus potentially limiting the generalizability of the results. Additionally, the use of self-reported measures introduces the possibility of recall bias, an inherent limitation in survey-based research.

For future inquiries, diversifying the participant base to include students from various academic disciplines and multiple institutions could enhance the validity and applicability of the findings. Such expansion would mitigate the limitations associated with a narrow focus and permit a broader examination of the intricate relationships between sleep, mental health, and academic performance.

CONCLUSION

In conclusion, this research underscores the integral role mental health plays in the academic achievement of young adults. The nuanced correlations identified between sleep quality, sleep patterns, and mental health factors, albeit not uniformly significant, highlight the multifaceted nature of these relationships. The insights gained bolster the advocacy for comprehensive wellness programs within educational settings, tailored to address the nuanced needs of students. There is an implicit recommendation for education policymakers to foreground mental health, extending support through counseling services, adaptable scheduling, and sensitization initiatives. Integrating mental health education into academic curricula could serve to dismantle stigmas and cultivate a supportive learning environment, ultimately fostering a more holistic approach to student development.

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