A.T. Still University
FIRST IN WHOLE PERSON HEALTHCARE

The Effect of Sleep Quality on Examination Scores of First Year Osteopathic Medical Students

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Background

Medical students face significant stress and pressure throughout their education and clinical training, which can impact their mental health, particularly sleep quality. Sleep, a fundamental human need, is crucial for physical and mental health, with 7-8 hours being ideal for most adults (1, 6). Insufficient sleep can lead to fatigue, difficulty concentrating, impaired cognitive function, and reduced academic performance (5). Medical students, often engaged in long study sessions, are particularly at risk for disrupted sleep patterns, especially in preclinical years (1).

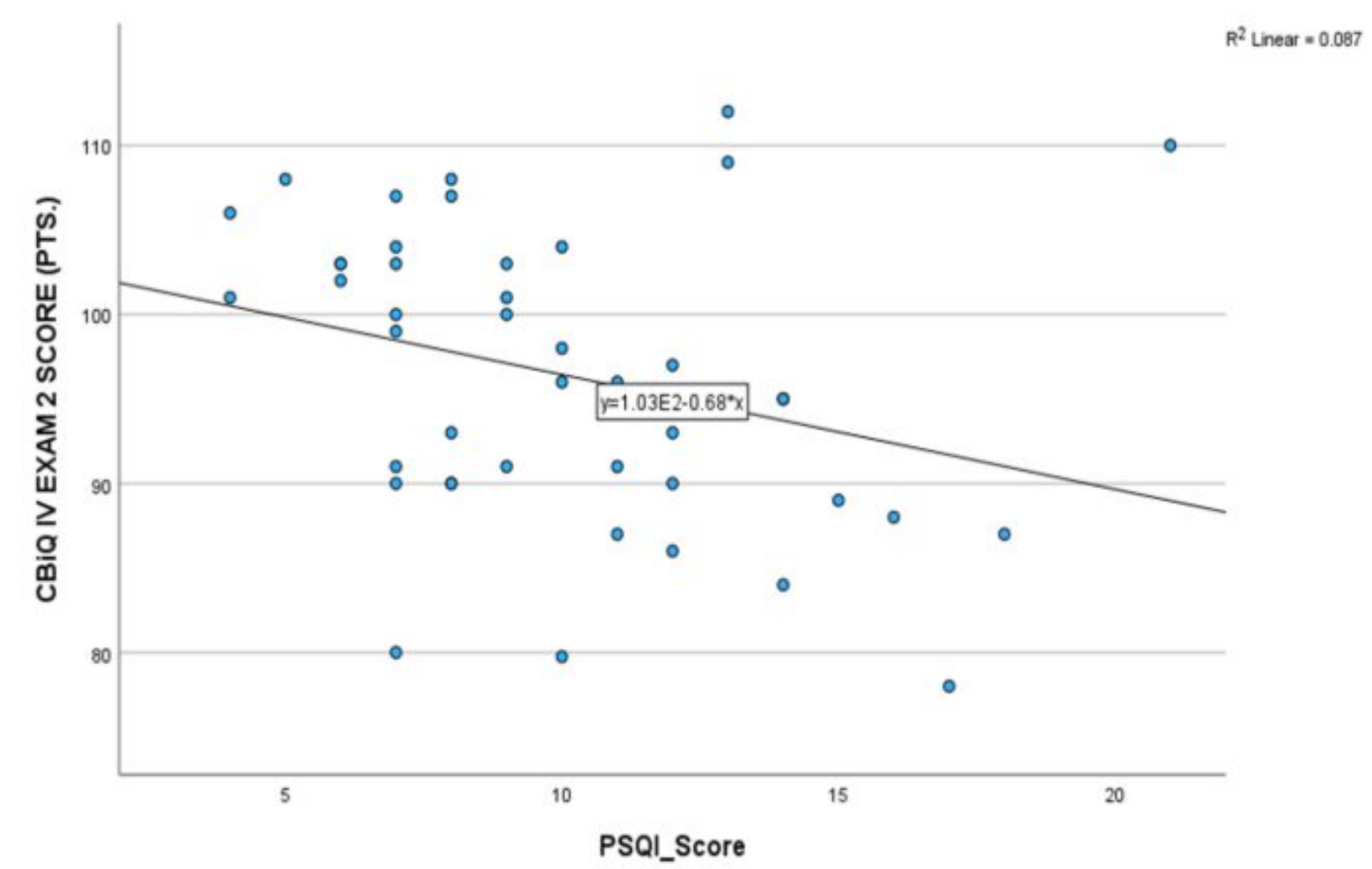
Sleep plays a key role in memory consolidation and cognitive restoration. A meta-analysis of seventy studies confirmed that sleep deprivation impairs cognitive functions like attention and memory (2). Sleep is vital for maintaining working memory capacity, crucial for academic success. During medical school, many students experience poor sleep quality, insufficient sleep, and irregular sleep-wake schedules, all of which harm learning and memory (3, 4). Despite being in a learning-intensive phase, medical students often fail to meet their sleep needs, putting their academic performance and well-being at risk (3).

Objectives

This study aims to explore the prevalence and impact of sleep disturbances on academic performance in this population, and identify psychological and environmental factors that contribute to these sleep issues. Additionally, it seeks to evaluate the effectiveness of targeted sleep interventions, such as sleep education and time management techniques, in improving sleep quality. Addressing these gaps in knowledge is vital for developing strategies that support medical students' mental health and academic success. Improving sleep quality could ultimately enhance students' cognitive function, reduce stress, and promote overall well-being, contributing to healthier, more effective healthcare professionals.

Results

Figure 1: CBIQ IV Exam II Score vs PSQI



The above figure (Figure 1) shows a scatter plot attempting to express the variability in participants' CBIQ IV Exam II scores regarding their PSQIs. A linear regression was then performed and overlaid on the scatter plot (R^2=0.087). Subsequently, a two-tailed T-test was performed (p=0.013).

Methods

This observational, cross-sectional survey was conducted at A.T. Still University - School of Osteopathic Medicine in Arizona (ATSU-SOMA) to assess the relationship between sleep habits and academic performance. The study focused on the second exam of the fourth block, which took place on May 23, 2024. The survey remained open for seven days, concluding on May 31, 2024. Participants included 46 students from the 2027 cohort class. The exam scores were verified and participants de-identified by a FERPA adhering faculty member not directly involved with the project.

Data were collected using the Pittsburgh Sleep Quality Index (PSQI), administered through a Qualtrics survey. In addition to the PSQI, students responded to supplementary questions about their beliefs and perceptions about sleep. All participants provided informed consent, and the study received approval from the Institutional Review Board (IRB). The survey also included evaluating students' academic performance based on their exam results.The data was analyzed using an r2 for linear reg and the p-value was computed through a two-tailed T-test. Descriptive statistics were generated for each question to summarize student responses and identify trends or patterns.

Discussion

Addressing sleep deprivation among medical students may require strategies beyond improving sleep quality or duration. Further research should explore the long-term consequences of poor sleep behaviors on overall academic performance and mental health while investigating other contributing factors such as stress management, time management, and lifestyle interventions. Since the results contradicted the hypothesis which was initially made, further studies need to be conducted in terms of controlling and manipulating other variables such as personal academic goals, whether or not the lack of sleep was a result of studying more, and the amount of previous knowledge that each person had on the exam's subject. Additionally, there is significant intraspecific variation with the differences of sleep needs from person to person. Qualitative studies could provide deeper insights into the subjective experiences of medical students regarding their sleep and academic performance. While maintaining sufficient sleep is fundamental for cognitive function, this study highlights the diverse array of other factors that play important roles in academic achievement. Further research is essential to understand how medical education and clinical demands affect sleep and how these sleep patterns impact long-term educational outcomes and student well-being.

Analysis

With a higher PSQI value correlating to a lower quality of sleep, it is crucial to establish that the greater the sleep quality, the worse the exam score. Following our statistical analysis, our linear regression indicated a negative correlation between the CBIQ IV Exam II score and PSQI. Our supported the initial hypothesis that poorer sleep effectiveness was associated with decreased exam performance. The results of the two-tailed T-test showed that the variation in CBIQ IV Exam II scores inversely correlated with PSQI, reaching statistical significance (p = 0.013).

Citations

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