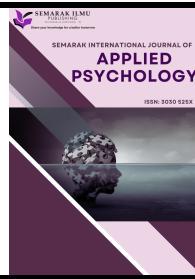




SEMARAK ILMU
PUBLISHING
202103268146(03316878-P)

Semarak International Journal of Applied Psychology

Journal homepage:
<https://semarakilmu.my/index.php/sijap/index>
ISSN: 3030-525X



Unlocking Academic and Mental Wellness: An Innovative Analysis of Sleep Patterns among USIM Students

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ARTICLE INFO

Article history:

Received 16 July 2025

Received in revised form 31 August 2025

Accepted 5 September 2025

Available online 10 September 2025

ABSTRACT

Good sleep habits are essential for students to maintain stable mental health and achieve academic success. This study investigates the impact of sleep patterns on mental health and academic achievement among students at Universiti Sains Islam Malaysia (USIM). Using the Pittsburgh Sleep Quality Index (PSQI) to evaluate sleep quality and the Strengths and Difficulties Questionnaire (SDQ) to assess mental health status, the study also considers students' academic performance based on their Cumulative Grade Point Average (CGPA). Data were collected from 385 students and analysed using descriptive statistics and Multivariate Analysis of Variance (MANOVA). The results reveal a significant correlation between sleep quality, mental health, and academic performance. Students classified as "good sleepers" not only demonstrated higher CGPA scores but also reported fewer emotional symptoms and behavioural issues compared to "bad sleepers." Emotional symptoms and hyperactivity emerged as the most prevalent mental health challenges, while prosocial behaviours were relatively low among the participants. These findings highlight the critical role of sleep in supporting both academic and psychological well-being. The study offers innovative insights that can inform the development of student wellness programs and early intervention strategies that target sleep habits as a foundation for improving mental health and academic outcomes in higher education.

Keywords:

Sleep patterns; mental health; academic achievement; sleep quality; student wellbeing; higher education; innovation

1. Introduction

Sleep is an essential biological function that regulates cognitive, emotional, and physical well-being. Healthy sleep is defined by obtaining sufficient rest, at suitable times, and without any interruptions [1]. Research consistently shows that the average adult requires 7 to 9 hours of sleep each night, while teenagers need approximately 9.5 hours, and infants up to 16 hours per day to support their rapid growth and development [2]. Upon transitioning into college life, students encounter various new challenges, including taking personal responsibility, adapting to new

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schedules, navigating an unfamiliar environment, fulfilling social obligations, and managing academic stress [3]. For these reasons, the majority of students feel forced to change their sleeping schedules [4]. In general, college students had shorter total of sleep, greater sleep latency, and later bed and wake time [5]. Additionally, college students have reported experiencing poor sleep quality and excessive daytime sleepiness [6].

Among university students, sleep disturbances are particularly common due to factors such as academic pressure, irregular schedules, and social demands. Reis *et al.*, [7] noted that university years represent a critical period of vulnerability for developing sleep problems, with many students experiencing insufficient sleep, poor-quality sleep, or sleep onset insomnia.

Milojevich and Lukowski [8] emphasized that even students with generally healthy sleep habits are not immune to the negative effects of occasional sleep disruptions, which can lead to increased psychological distress, including symptoms of anxiety and depression. Additionally, Gomes *et al.*, [9] highlighted that direct relationship between sleep quality and academic performance, showing that students with longer sleep durations tend to achieve higher grade-points averages. They also found that poor sleep was strongly linked to higher levels of psychological distress, including anxiety and depression, demonstrating the importance of good sleep for mental well-being.

Globally, research underscores the impact of inadequate sleep on academic outcomes. Baert *et al.*, [10] demonstrated that better sleep quality, as measured by the Pittsburgh Sleep Quality Index (PSQI), correlated with higher academic marks in university students. They found that a one standard deviation improvement in sleep quality was associated with a 4.85% increase in course marks. Similarly, Orchard *et al.*, [11] explored the prospective links between sleep patterns, anxiety and depression among adolescents, revealing that poor sleep quality not only worsen the mental health conditions, but also predicted future emotional and academic difficulties.

In a study conducted with college students by Kelly *et al.*, [12], a positive correlation was found between the amount of sleep and academic achievement. The results showed that students who got 8 or more hours of sleep each night had an average GPA of 3.24, while those who only slept for 7 hours had a lower average GPA of 2.74.

1.1 Sleep and Its Importance

According to National Institute of Neurological Disorders and Stroke (NINDS), sleep plays a crucial role in the daily life, occupying about one-third of the time. Getting sufficient, high-quality sleep at the right time is just as vital for survival as food and water. Adequate sleep is essential for cognitive function, mood regulation, mental well-being, as well as for maintaining cardiovascular, cerebrovascular, and metabolic health [13].

Sleep is a fundamental physiological process essential for human health and well-being. Although the specific benefits of sleep have not been fully measured or quantified across various populations, it is widely acknowledged that adequate sleep plays a critical role in maintaining overall health. The absence of sufficient sleep, or sleep deprivation, has been linked to a range of serious health consequences, highlighting the importance of prioritizing restful and consistent sleep for optimal physical and mental functioning [14].

The quality of sleep is determined by both its quantitative and qualitative components. The quantitative aspect measures the duration of sleep, indicating how long a person sleeps. Meanwhile, the qualitative aspects are a subjective evaluation, focusing on the depth of sleep and the sense of restfulness a person feels upon waking. Together, these components provide a comprehensive understanding of overall sleep quality.

1.2 Sleep Habits among University Students

Among university students, poor sleep habits are pervasive due to academic pressures, social obligations, and lifestyle changes. These factors contribute to insufficient sleep, poor sleep quality, and the resultant health consequences [15]. University students often report inadequate sleep duration. For instance, Korean students slept on average of 6.7 hours per night, with 30.2% experiencing insufficient sleep [5,16]. These findings were aligned with earlier studies showing that university students generally get less than the recommended 7-9 hours of sleep per night, which is critical for optimal health and functioning.

Other than that, another article by Zhou *et al.*, [17] found that 40-60% of American college students experience sleep problems, with a third reporting shortened sleep durations. Similarly, studies in Luxembourg and Germany found that a third of students suffered from daytime sleepiness. In China, 20.3% of students reported sleep complaints, and 23.36% suffered from insomnia.

Factors influencing sleep quality in this population include stress, self-control, bedtime habits, and neighbourhood environments. High stress levels and low self-control are associated with poor sleep quality, while positive bedtime habits and favourable neighbourhood environments can mitigate these effects [18]. Furthermore, studies have examined the effects of sleep deprivation on college students, noting that inadequate sleep can impair cognitive function, mood, and overall health. These findings underscore the necessity for interventions promoting healthy sleep habits within university settings [19].

1.3 Impact of Poor sleep on Mental Health

Poor sleep quality has been linked in several studies to higher rates of mental health issues like stress, anxiety, and depression in a number of studies. A study by Gilbert and Weaver [20] found that university students who reported poor sleep were significantly more likely to experience symptoms of depression and anxiety. In this study, students with inadequate sleep were at a higher risk of developing psychological distress, which may further disrupt sleep, leading to a vicious cycle.

Similarly, a study by Lund *et al.*, [21] identified a strong correlation between poor sleep quality and high levels of stress and depression in university students. This research suggested that poor sleep exacerbates mental health symptoms by reducing the ability to cope with daily stressors and emotional challenges. Meanwhile research by Sadeh *et al.*, [22] said that insomnia is one of the most common sleep disorders among college students, contributing significantly to psychological distress. A meta-analysis highlighted those students with insomnia symptoms reported higher levels of anxiety and depression. The inability to fall asleep or stay asleep leads to heightened emotional reactivity, irritability, and an overall decline in mental health.

Lastly, sleep and mental health are correlated in both directions. Not only does inadequate sleep exacerbate mental health problems, but mental health problems like anxiety and depression can also interfere with sleep patterns. This can be proved by a study by Harvey *et al.*, [23]. It has found that individuals with depression often experience insomnia, and insomnia itself may be a predictor of future depressive episodes. This implies that treating sleep issues may be a crucial tactic in the management and prevention of mental health conditions.

1.4 Impact of Poor Sleep on Academic Achievement

Numerous studies have shown that students' performance is significantly impacted by inadequate sleep, confirming the well-established link between sleep and academic achievement.

Cognitive functions including memory consolidation, problem-solving and concentration depend on sleep, and these functions are critical for learning and academic achievement [24]. Inadequate sleep, on the other hand, impairs these cognitive functions, leading to diminished academic outcomes.

Several studies have found a strong association between insufficient sleep and lower academic performance. A study by Gilbert & Weaver [20] found that students who reported poor sleep quality or shorter sleep durations had lower GPAs and were more likely to experience academic difficulties. A number of large-scale studies have shown that students who consistently sleep less than 7 hours per night or experience poor sleep quality are at significantly higher risk for lower exam grades, reduced GPA, and diminished classroom performance. For example, pharmacy students who slept less than 7 hours the night before exams scored lower than those with more sleep [25]. Likewise, general undergraduates and medical students demonstrated strong links between sleep quality, sleep sufficiency, and academic outcomes. This trend is consistent across academic disciplines, suggesting that the negative effects of sleep deprivation are pervasive and not limited to specific fields of study.

Additionally, sleep deprivation has been shown to increase the likelihood of cognitive fatigue, resulting in decreased focus and attentiveness during lectures or study sessions [26]. These cognitive impairments are crucial barriers to academic achievement, as they hinder students' ability to comprehend and retain course material effectively. An indirect connection between sleep and academic performance revealed that students with more consistent sleep-wake routines (shorter time to fall asleep, fewer nighttime awakenings, and greater consistency) tended to report higher GPAs with these sleep measures accounting for nearly 25% of the variance in academic performance [27]. On the other hand, students with lower grades reported experiencing greater daytime sleepiness, which also linked to shorter night-time sleep durations [28].

This study aims to investigate the intricate relationship between poor sleep habits, mental health risks, and academic achievement among students at Universiti Sains Islam Malaysia (USIM). With a focus on innovation, the research seeks not only to explore how sleep patterns impact mental health and academic performance, but also to offer fresh insights into student well-being through the use of validated assessment tools and analytical approaches. Specifically, the objectives of the study are: (a) to explore the impact of sleep patterns on mental health and academic achievement among USIM students, and (b) to evaluate the mental health status within this student population in a comprehensive and data-driven manner. By integrating these innovative approaches, the study contributes to the growing body of literature that advocates for embedding sleep health into academic policies and student support systems, ultimately aiming to enhance both academic outcomes and psychological resilience in higher education.

2. Methodology

2.1 Hypotheses

Based on the study's objectives and literature review, the following hypotheses have been formulated to guide the investigation:

Hypothesis 1:

- Null hypothesis (H0): Poor sleep quality does not significantly predict higher mental health risks or lower academic achievement among USIM students.
- Alternative hypothesis (H1): Poor sleep quality significantly predicts higher mental health risks and lower academic achievement among USIM students.

Hypothesis 2:

- Null hypothesis (H0): Short sleep duration is not associated with higher mental health risks or lower academic achievement among USIM students.
- Alternative hypothesis (H1): Short sleep duration is associated with higher mental health risks and lower academic achievement among USIM students.

These hypotheses will be tested to determine the extent to which sleep quality and duration influence mental health outcomes and academic performance in the target population.

2.2 Research Design

The research design for this study will outline the methodology for data collection and the specific instruments used to analyse the collected data. Cross-sectional data will be gathered by randomly distributing questionnaires to a sample of USIM students. The reliability of the study will be evaluated using Cronbach's alpha to ensure the consistency of the measurement instruments. The focus of the study will be to examine the relationships between sleep patterns (measured by PSQI), mental health (measured by the SDQ), and academic achievement (measured by CGPA) in order to understand how sleep affects these outcomes.

2.3 Data Collection Procedure

Data collection is a crucial aspect of conducting research, as incomplete or inadequate data collection can lead to invalid results and conclusions. To ensure consistent and reliable findings, this study utilizes questionnaires to gather primary data. The questionnaire will be distributed through an online platform, such as Google Forms, to facilitate easy access for respondents and efficient tracking of responses. This method allows for the identification of common issues related to sleep patterns, mental health, and academic achievement, based on the data collected from participants.

2.4 Population

In research, the term population refers to the complete group of individuals or entities that are the focus of a study and from which data are collected to draw conclusions. For this study, the population will specifically consist of students currently enrolled at Universiti Sains Islam Malaysia (USIM).

2.5 Sampling

Sampling is the method of selecting a sufficient number of individuals or elements from a larger population to form a representative subset. This sample is then studied in detail to gain insights into the characteristics, attributes, or behaviors of the entire population, enabling researchers to draw meaningful conclusions without examining every member of the population. According to the Chancellery Department of USIM, the total student population at the university including Tamhidi, undergraduate, and postgraduate students is 14,004. Since the population for this study is very large and there is no compete list of individuals to use as a reference, the sample size was calculated using Cochran's method as in Eq. (1).

$$n_0 = \frac{z^2(p)(1-p)}{e^2} \quad (1)$$

Where:

- n_0 represents the required sample size.
- z is the z-value (standard score) corresponding to the desired confidence level (e.g., $z = 1.96$ for a 95% confidence level).
- e denotes the acceptable margin of error or sampling error.
- p is the estimated proportion of the population possessing a particular attribute or characteristic of interest.

Based on Cochran's formula, the required sample size for this study is between 384 and 385 people. To ensure accurate results, the questionnaire will be shared through online platforms such as WhatsApp, Instagram, TikTok, Telegram, and others, until responses are received from at least 384 participants.

2.6 Research Instrument

For this research, a questionnaire was developed to gather the required information. It includes questions about the respondents' demographics profile and other topics relevant to the study. For the academic achievement, a cumulative grade point average (CGPA) was used to measure student's academic achievement, representing the average of their grades across all courses taken during their academic program.

In order to assess the sleep patterns, Pittsburgh Sleep Quality Index (PSQI) were used to evaluate the different dimensions of sleep and provides an overall score that reflects the individual's sleep quality [29]. The PSQI consists of 19 items, which are grouped into 7 component scores that cover the following aspects of sleep: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medications and daytime dysfunction. Each of the seven components was scored from 0 to 3, where 0 represents no problem, and 3 represents a significant problem. These component scores are then summed to give a global PSQI score, ranging from 0 to 21. A global PSQI score greater than 5 generally indicates poor sleep quality, while lower than 5 suggests good sleep quality.

Meanwhile to assess the mental health risk, Strengths and Difficulties Questionnaire (SDQ) was used to assess the mental health and emotional well-being of adolescents. It consists of 25 items divided into 5 subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviour. Each item is rated on a 3-point scale, and the scores are summed to create subscale scores, with a total difficulties score reflecting overall mental health difficulties.

The questionnaire is structured into multiple sections, each focusing on different aspects:

- i. Section A: Demographic Profile including their CGPA for the last semester
- ii. Section B: Sleep Quality for the past month
- iii. Section C: Sleep Disturbance for the past month
- iv. Section D: Partner's or Roommate section
- v. Section E: Mental Health Risk Assessment

2.7 Data Analysis

Various methodologies were used to analyse the data for this study. The first objective of the study was achieved through Statistical Package for the Social Sciences (SPSS). Reliability tests were performed to evaluate the statistical accuracy and significance of the collected data. Additionally, correlation and multicollinearity tests, along with an ordered probit model, were utilized to meet the

study objectives. The analysis was conducted using SPSS to examine the data and determine the significance of the variables. All the gathered information was entered into SPSS, followed by interpretation and analysis of the resulting outputs.

2.8 Pilot Study

According to Arain *et.al.*, [30], a pilot study is a small-scale feasibility study conducted to evaluate and refine various aspects of the methods intended for a larger, more comprehensive, or confirmatory investigation. The main goal of a pilot study is not to solve specific research questions but to ensure researchers do not start a large study without fully understanding the methods. Essentially, it helps avoid critical mistakes in a study that could waste significant time and money [31].

A widely accepted rule of thumb, as noted by Cochran [32] suggests using a sample size equivalent to 10 – 20% of the total survey sample or a minimum of 30 – 50 participants. However, the sample size can be adjusted to align with the specific goals and context of the pilot study. Accordingly, between 30 – 50 respondents will complete the online survey, and the planned statistical and analytical methods will undergo thorough review. This process will assess the data's relevance, enabling adjustments to the data collection methods as needed to ensure more effective analysis in the main study.

2.9 Reliability Test

The reliability test assesses the quality and consistency of performance, ensuring that the same results are achieved repeatedly. Internal consistency is evaluated using Cronbach's Alpha, a value ranging from 0 to 1, which reflects how well all items in a test measure the same concept or construct. Before using a test for research of analysis, it is crucial to assess its internal consistency to ensure its validity [33]. Good internal consistency is often defined as having a Cronbach alpha of 0.7 or above. The ranges and corresponding levels of reliability are based on a study by George and Mallory [34].

2.10 Descriptive Analysis

Descriptive statistics involve analyzing data to help describe, show, or summarize it in a way that makes it easier to spot patterns and draw conclusions. There are two main types of statistics used to describe data such as measures of central tendency which show the middle point of a set of data (e.g. mode, median and mean), and measures of spread, which describe how much the data varies (e.g. variance and standard deviation). Descriptive statistics can be presented through tables, graphs, and written explanations. Understanding these statistics is important for better understanding and interpreting data.

This study employed descriptive analysis to achieve its objective, which is to examine the extent of poor sleep habits among USIM students in relation to mental health risks and academic performance. The data gathered from participants through the PSQI and SDQ questionnaires, along with CGPA records, were analyzed using Microsoft Excel. Furthermore, the demographic profile of the respondents, such as gender, age, and other relevant factors, were analyzed using descriptive analysis.

2.11 Multivariate Analysis of Variance (MANOVA)

Multivariate Analysis of Variance (MANOVA) is a widely used multivariate statistical analysis method in social science research. As described by Fish [35], MANOVA is essentially an extension of Analysis of Variance (ANOVA) designed to handle cases involving two or more dependent variables. Similarly, Stevens [36] emphasizes that MANOVA is essentially ANOVA expanded mathematically to accommodate multiple dependent variables. This method is particularly useful in scenarios where analyzing multiple dependent variables is equivalent across different levels of the independent variable(s).

One of the key advantages of MANOVA is its ability to consider the interrelationships among dependent variables, providing a more comprehensive analysis than ANOVA. It also reduces the risk of Type I errors that could arise from performing multiple ANOVAs. However, it requires several assumptions to be met, including multivariate normality of the dependent variables, homogeneity of variance-covariance matrices, and independence of observations. The equation for this study is as in Eq. (2).

$$Y = x\beta + E \quad (2)$$

Where:

- Y = Matrix of dependent variables

$$Y = \begin{bmatrix} \text{Mental Health (SDQ)} \\ \text{Academic Achievement (CGPA)} \end{bmatrix}$$

- x = Vector of independent variables (Sleep Patterns using PSQI scores)
- β = coefficients that estimate the impact of PSQI scores on SDQ and CGPA
- E = Matrix of residuals

3. Results

3.1 Reliability Test

SPSS software was used to assess the reliability of the survey questions through a pilot study with the first 30 respondents. Cronbach's alpha, the most commonly used to test for measuring internal consistency was applied. The pilot study is essential to ensure that the research questions align with the study's objectives, are clear to participants, and avoid ambiguity that could lead to confusing responses. However, because the demographic characteristics of the participants, CGPA and PSQI were measured using continuous, ordinal and nominal scales, they were excluded from the reliability test.

The results of a reliability analysis for the Strengths and Difficulties Questionnaire (SDQ) were presented in Table 1. The Cronbach's alpha value for the SDQ is 0.675, indicating a moderate level of internal consistency among the items. While this value does not exceed the commonly accepted threshold of 0.7 for strong reliability, it still reflects a reasonable level of consistency for the set of items. Therefore, it can be concluded that the SDQ, as used in this study, is generally reliable in assessing the mental health of participants, with 67.5% of the items aligning with the underlying constructs being measured.

Table 1

Reliability analysis for the Strengths and Difficulties Questionnaire (SDQ)

Variables	Cronbach's alpha	No of items
Strength and Difficulties Questionnaire (SDQ)	0.675	25

This Cronbach's alpha value suggests that the SDQ items adequately represent the mental health dimensions they are designed to measure, though further refinement could improve consistency.

3.2 Descriptive Statistic

3.2.1 Demographic Profile of the Respondents

Table 2

The results of the survey

Measure	Item	Frequency	Percentage (%)
Age group	Male	72	81.3
	Female	313	18.7
	Total	385	100
	18 – 20 years old	84	21.8
	21 – 23 years old	271	70.4
Faculty	24 – 26 years old	29	7.5
	28 years old	1	0.3
	Total	385	100
	Tamhidi	17	4.4
	Fakulti Sains dan Teknologi	174	45.2
	Fakulti Kejuruteraan dan Alam Bina	39	10.1
Current Academic level in USIM	Fakulti Pengajian Quran dan Sunnah	23	6
	Fakulti Pengajian Bahasa Utama	21	5.5
	Fakulti Syariah dan Undang-undang	43	11.2
	Fakulti Ekonomi dan Muamalat	35	9.1
	Institute of Fatwa and Halal	6	1.5
	Fakulti Kepimpinan dan Pengurusan	27	7
	Total	385	100
	Tamhidi	24	6.2
	Undergraduate	346	89.9
	Postgraduate	15	3.9
CGPA for the last semester	Total	385	100
	< 2.50	7	1.8
	2.50 – 2.99	50	13
	3.00 – 3.49	183	47.5
	> 3.50	145	37.7

The results of the survey as shown in Table 2 revealed that most respondents were female, constituting 81.3% of the sample, while 18.7% were male. Regarding the age distribution, most

participants were in the 21-23 years old age group, making up 70.4% of the respondents. A small portion (7.5%) were aged between 24-26 years old, and only 0.3% were aged 28 years or older.

For the faculty distribution, most respondents were from the Faculty of Science and Technology (FST), making up 45.2% of the total respondents. This was followed by participants from the Faculty of Medicine and Health Sciences (FKAB), which accounted for 10.1%, and the Faculty of Applied Social Sciences (FPQS), representing 5.5%. The remaining respondents were from a variety of other faculties, including FPBU (5.5%), FSU (11.2%), FEM (9.1%), IFFAH (1.5%), and FKP (7.0%).

In terms of academic level, the majority of respondents were undergraduate students (89.9%), while 9.9% were pursuing postgraduate studies. As for the CGPA, a large proportion (47.5%) of respondents reported a CGPA between 3.00 and 3.49, followed by 37.7% who had a CGPA greater than 3.50.

3.2.2 Strengths and Difficulties Questionnaire (SDQ)

The descriptive statistics for the mental health subscales of the Strengths and Difficulties Questionnaire (SDQ) as in Table 3, showed that emotional symptoms have the highest mean score (9.831), indicating that emotional difficulties are the most prevalent mental health issue among USIM students. Hyperactivity follows with a mean of 10.3636, suggesting that behavioral problems are also significant, but with less variability compared to emotional symptoms. Conduct problems have a mean of 6.650, reflecting moderate levels of behavioral issues among the students, while peer problems show a mean of 7.8286, indicating that difficulties with peers are present at moderate levels as well. Lastly, prosocial behaviors have the lowest mean of 2.7273, suggesting that positive social behaviors are less frequently observed in the sample, with considerable variability. These findings highlight that emotional and behavioral difficulties are more common among the students, with prosocial behavior being relatively lower.

Table 3

The descriptive statistics for the mental health subscales of the Strengths and Difficulties Questionnaire (SDQ)

	N	Minimum	Maximum	Mean	Standard Deviation	Variance
Emotional Symptoms	385	5.00	15.00	9.8130	2.61632	6.845
Conduct Problem	385	4.00	12.00	6.5506	1.69809	2.883
Hyperactivity	385	5.00	15.00	10.3636	1.76857	3.128
Peer Problem	385	4.00	12.00	7.8286	1.47433	2.174
Pro Social	385	.00	10.00	2.7273	1.98848	3.954
Valid N (listwise)	385					

3.3 Multivariate Analysis of Variance (MANOVA)

Based on Table 4, the descriptive statistics for CGPA and SDQ which describe the mental health difficulties across two groups, Bad Sleeper and Good Sleeper, provide insights into the relationship between sleep quality, academic achievement, and mental health challenges faced by students. Good Sleeper have a higher mean CGPA (3.3826) compared to Bad Sleeper (3.1370), with less variability in their scores. The overall CGPA is 3.2104, indicating moderate variation in academic achievement. For SDQ, Bad Sleeper reports more mental health challenge (38.7148) than Good Sleeper (35.3826), with similar variability in both groups. The total mean for SDQ is 37.7195. These

findings suggest that better sleep quality is linked to better academic achievement and fewer mental health difficulties, highlighting the importance of sleep for both academic and mental wellbeing.

Table 4
 The descriptive statistics for CGPA and SDQ

		GLOBAL PSQI SCORE	Mean	Standard Deviation	N
CGPA	Bad Sleeper	3.1370	0.74157	270	
	Good Sleeper	3.3826	0.68291	115	
	Total	3.2104	0.73236	385	
SDQ	Bad Sleeper	38.7148	5.65194	270	
	Good Sleeper	35.3826	5.56395	115	
	Total	37.7195	5.82239	385	

The multivariate test as shown in Table 5 indicates that both the intercept and PSQI have significant effects on the dependent variables in the study. The intercept is highly significant ($p < 0.0001$) and explains a very large portion of the variance in the dependent variables, with a Partial Eta Squared of 0.983, indicating a very strong effect. This suggests that baseline factors (not related to sleep quality) contribute most of the variability in the data. The observed power of 1.000 further supports that the test is highly powered to detect this effect. On the other hand, PSQI also has a statistically significant impact ($p < 0.0001$) on the dependent variables, but its effect size is relatively smaller, with a Partial Eta Squared of 0.084, meaning sleep quality accounts for 8.4% of the variance. Despite the modest effect size, the observed power of 1.000 suggests that the test is highly reliable in detecting this effect. Therefore, it is true that sleep patterns do have an impact on mental health and academic achievement, but the effect is moderate.

Table 5
 Multivariate test

Effect		Value	F	Hypothesis df	Error df	Significance level	Partial Eta Squared	Noncent. Parameter	Observed Power
Intercept	Pillai's Trace	0.983	11179.541	2.000	382	0.000	.983	22359.082	1.000
	Wilks' Lambda	0.017	11179.541	2.000	382	.000	.983	22359.082	1.000
	Hotelling's Trace	58.532	11179.541	2.000	382	.000	.983	22359.082	1.000
	Roy's Largest Root	58.532	11179.541	2.000	382	.000	.983	22359.082	1.000
PSQI	Pillai's Trace	0.084	17.419	2.000	382	<.001	.084	34.838	1.000
	Wilks' Lambda	0.916	17.419	2.000	382	<.001	.084	34.838	1.000
	Hotelling's Trace	0.091	17.419	2.000	382	<.001	.084	34.838	1.000
	Roy's Largest Root	0.091	17.419	2.000	382	<.001	.084	34.838	1.000

Table 6

Hypothesis

Hypothesis	Analysis
H_0 : Poor sleep quality does not significantly predict higher mental health risks or lower academic achievement among USIM students.	H_0 rejected
H_α : Poor sleep quality significantly predicts higher mental health risks and lower academic achievement among USIM students.	H_α accepted
H_0 : Short sleep duration is not associated with higher mental health risks or lower academic achievement among USIM students.	H_0 rejected
H_α : Short sleep duration is associated with higher mental health risks and lower academic achievement among USIM students.	H_α accepted

These hypotheses in Table 6 are strongly supported by previous studies that establish a clear link between sleep patterns, mental well-being, and academic performance. According to Baert *et al.*, [10], it has found that better sleep quality correlated with improved academic performance, showing that a one standard deviation improvement in sleep quality led to a 4.85% increase in course marks. Similarly, Kelly *et al.*, [12] found that students who slept for at least 8 hours had higher GPAs (3.24) compared to those who slept for only 7 hours (2.74), reinforcing the notion that sleep duration directly impacts academic performance.

Beyond academic performance, sleep quality is also closely linked to mental health. Milojevich and Luvowski [8] highlighted that even students with generally healthy sleep habits are susceptible to psychological distress when experiencing occasional sleep disruptions. Gomes *et al.*, [9] found that poor sleep was strongly associated with increased anxiety and depression, emphasizing the critical role of sleep in emotional regulation.

4. Conclusions

The first objective was to examine the impact of sleep patterns on mental health and academic achievement. Findings from MANOVA confirmed that students with better sleep quality had significantly higher CGPA scores and fewer mental health difficulties. Descriptive data revealed that “bad sleepers” had lower academic performance (mean CGPA = 3.1370) and more mental health challenges (mean SDQ score = 38.7148), compared to “good sleepers” (mean CGPA = 3.3826, SDQ = 35.3826).

The second objective focused on evaluating the mental health status of USIM students. Emotional symptoms and hyperactivity were the most prevalent difficulties, while prosocial behavior was notably low. These trends highlight key areas of concern for student support services.

This study offers innovative insights by integrating sleep behaviour analysis with academic outcomes and psychological well-being using quantitative data from validated tools. It unlocks a new understanding of how sleep can serve as a strategic entry point for enhancing both academic performance and mental health in higher education settings.

Given these findings, there is significant potential for universities to develop targeted interventions such as sleep education programs, wellness workshops, or early mental health screening that address sleep-related challenges as part of a holistic student success strategy.

Future research could explore the implementation of digital sleep tracking tools or personalized academic wellness plans to further leverage these insights into impactful, student-centered innovations.

Acknowledgement

This research was not funded by any grant.

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