Malaysian Journal of Social Sciences and Humanities (MJSSH) (e-ISSN : 2504-8562)
2026, Volume 11, Issue 6, e004054
DOI: https://doi.org/10.47405/mjssh.v11i6.4054

RESEARCH ARTICLE

Sleep Quality and Mental Well-Being Among Malaysian University Students

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KEYWORDS:
Sleep quality
Mental health
Malaysian university students
PSQI
DASS-21

CITATION:
Azza, A. S. A., & Faqryza, M. A. L. (2026). Sleep Quality and Mental Well-Being Among Malaysian University Students. *Malaysian Journal of Social Sciences and Humanities (MJSSH), 11*(6), e00xxxx.

ABSTRACT

Sleep quality is increasingly recognized as a critical determinant of holistic psychological well-being, particularly among university students navigating complex academic, social, and lifestyle stressors. Moving beyond traditional clinical pathology frameworks, this study examines sleep as a foundational resource for mental resilience. Specifically, this research aimed to assess sleep quality and mental health levels among Malaysian university students, examine the correlation between these variables, and compare mental health outcomes between good and poor sleepers. Utilizing a quantitative cross-sectional design, data were gathered from 270 undergraduate students across Malaysian universities using the Pittsburgh Sleep Quality Index (PSQI) and the Depression, Anxiety and Stress Scale (DASS-21). Data analysis was executed via descriptive statistics, Pearson correlation, and independent samples t-tests. The descriptive results revealed that the majority of respondents maintained good sleep quality. However, inferential analyses demonstrated significant, strong negative correlations between sleep quality and depression ($r = -0.676$, $p < .001$), anxiety ($r = -0.444$, $p < .001$), and stress ($r = -0.500$, $p < .001$). Furthermore, independent samples t-tests indicated that students with poor sleep quality exhibited significantly elevated levels of depression, anxiety, and stress compared to their good-sleeping peers ($p < .001$). These findings highlight that institutionalizing sleep hygiene initiatives is vital to fostering student resilience and psychological flourishing within higher education ecosystems.

Contribution/Originality: This study contributes to the existing literature by addressing a critical gap regarding the link between Malaysian students' sleep hygiene and mental health. The use of validated instruments such as the PSQI and DASS-21 also strengthens the study's methodological reliability and provides a standardized baseline for subsequent research within the Malaysian context.

1. Introduction

Sleep represents a fundamental biological imperative vital for preserving physical health and psychological equilibrium. Moving beyond a reductive view of health as the mere absence of disease, the World Health Organization (2022) advocates for high-quality sleep as a global public health priority that is integral to optimizing cognitive performance and long-term vitality. In the context of higher education, sleep functions not only as a biological requirement but as a primary driver of student well-being, academic efficacy, and overall quality of life (Chautrakarn et al., 2024).

From a biopsychosocial lens, sleep quality is a multifaceted outcome shaped by the dynamic interplay of biological, psychological, and social factors. The Biopsychosocial Model (Engel, 1977) provides a robust framework to understand how these elements interact to determine student health. Based on the model, the biological, psychological, and social factors interact as such:

i. Biologically**:** Irregular sleep schedules disrupt endogenous circadian rhythms and neuroendocrine balance.
ii. Psychologically**:** Persistent stress and anxiety undermine a student's capacity to achieve restorative sleep and achieve psychological flourishing.
iii. Socially**:** Lifestyle behaviors, such as nocturnal digital screen exposure and heavy academic workloads, compound sleep disturbances (Perrault et al., 2024; Castiglione-Fontanellaz et al., 2023).

This integrative paradigm highlights the bidirectional dependency between sleep and mental health, wherein disturbances in one domain trigger or exacerbate pathologies in the other.

Chronic sleep deficiency is structurally linked to emotional dysregulation, cognitive deficits, and heightened vulnerability to psychological distress (Freeman et al., 2020; Kim et al., 2021). Mechanistically, insufficient or fragmented sleep alters neurobiological functioning, diminishing prefrontal cortex regulation and elevating amygdala reactivity, which intensifies symptoms of depression, anxiety, and stress. Empirical studies reveal that sleep-deprived individuals exhibit diminished emotional resilience and compromised coping mechanisms, leaving them highly susceptible to psychological disorders (Antúnez et al., 2024; Ahmed Abdullah et al., 2025).

Globally, literature on higher education demographics documents a high prevalence of sleep disturbances. For instance, Hershner and Chervin (2014) reported that over 60% of college students in the United States suffer from inadequate sleep. Parallel trends are observed in Qatar and Thailand, where poor sleep quality affects 70% and 68% of the student population, respectively (Raja Mahamade Ali et al., 2023; Chautrakarn et al., 2024). These metrics emphasize that sleep disturbances represent a pervasive, cross-cultural challenge in higher education. In Malaysia, however, empirical investigations targeting the structural interplay between sleep profiles and mental health remain sparse. While localized studies have begun exploring this domain, they remain constrained by a narrow focus on academic metrics or rely on small, institution-specific samples (Azlina Daud et al., 2023). This literature gap underscores the urgent need for systematic, broad-scale research detailing the sleep-mental health link among Malaysian undergraduates.

University students represent an exceptionally vulnerable cohort. The transition into

early adulthood, paired with heightened autonomy, rigorous academic demands, and changing social dynamics, frequently destabilizes the sleep cycle (Alghamdi & Alomri, 2025). When left unaddressed, these irregular sleep behaviors weaken psychological well-being, often manifesting as chronic depressive, anxious, or stressed states (Gautam et al., 2024).

Rather than viewing mental health as a static condition, this study conceptualizes it as a dynamic state of psychological functioning where high-quality sleep acts as a critical buffer against three core dimensions of distress: depression, anxiety, and stress. By unpacking these distinct domains, this research seeks to clarify how variations in the sleep structure govern specific facets of psychological functioning. Such evidence is crucial for designing targeted, evidence-based interventions and optimizing mental health management strategies across Malaysian universities.

1.1. Research Objectives

This study addresses three primary research objectives:

i. To assess the levels of sleep quality and mental health (depression, anxiety, and stress) among Malaysian university students.
ii. To examine the relationship between sleep quality and specific mental health outcomes (depression, anxiety, and stress) within this population.
iii. To compare the mental health outcomes between university students who report good sleep quality and those who experience poor sleep quality.

2. Literature Review

2.1. Sleep Quality

Sleep quality is defined as an individual's subjective and objective evaluation of their sleep experience, determined by sleep continuity, timing, efficiency, and its restorative value (Nelson et al., 2021). In academic research, Buysse et al. (1989) provide the benchmark conceptualization, framing sleep quality as a multidimensional construct that reflects both the depth of rest and its capacity to restore daily functioning. To operationalize this complex variable, the Pittsburgh Sleep Quality Index (PSQI) evaluates seven distinct domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction (Buysse et al., 1989). Together, these domains offer a comprehensive diagnostic look at how sleep quality supports or hinders daily adaptive capabilities.

Each domain isolates a specific vulnerability in the sleep structure. Sleep latency tracks the time required to transition from wakefulness to sleep, where prolonged latency signals sleep onset difficulties. Sleep duration calculates total physiological rest, whereas habitual sleep efficiency measures the actual proportion of nocturnal time spent asleep while in bed. Sleep disturbances capture nocturnal awakenings triggered by physical discomfort or environmental factors. Crucially, non-restorative sleep (waking up unrefreshed despite adequate duration) is strongly linked to persistent daytime fatigue and compromised cognitive capacity (Ahmed Abdullah et al., 2025). Finally, daytime dysfunction captures the emotional and cognitive toll of sleep deprivation, including impaired concentration and heightened irritability. These indicators are highly relevant to university students, whose lifestyles, marked by heavy academic loads, irregular schedules, and late-night digital device usage, predispose them to prolonged sleep

latency, truncated sleep duration, and severe daytime dysfunction (Hershner & Chervin, 2014; Raja Mahamade Ali et al., 2023).

2.2. Mental Health

Mental health encompasses an individual's emotional, psychological, and social well-being, directly shaping cognitive processing, affective responses, and behavioral choices in daily life (American Psychological Association, 2022). Optimal mental health enables individuals to navigate stress effectively, cultivate meaningful social connections, and maintain adaptive equilibrium. Conversely, psychological distress undermines coping capacities, causing functional impairments across academic, professional, and interpersonal spheres.

For empirical precision, this study operationalizes mental health through three distinct states: depression, anxiety, and stress. These dimensions are measured using the Depression, Anxiety, and Stress Scale (DASS-21) (Lovibond & Lovibond, 1995). Within this framework:

i. Depression is characterized by anhedonia, low mood, and pervasive hopelessness.
ii. Anxiety is characterized by chronic worry, autonomic arousal, and fear responses.
iii. Stress manifests as persistent tension, low frustration tolerance, and cognitive overload.

Using these subscales provides an operational framework tailored to capture the specific emotional difficulties faced by young adults in Malaysian higher education.

Recent global data shows an alarming rise in psychological distress among university populations. Undergraduates balance an intense mix of academic pressures, financial strains, identity development, and social expectations (Gautam et al., 2024). In Malaysia, empirical findings mirror these trends, revealing high rates of depression, anxiety, and stress among undergraduates facing competitive academic environments and lacking adequate coping resources (Azlina Daud et al., 2023). When sleep disturbances occur alongside these pressures, they compound psychological symptoms by disrupting emotional regulation and lowering resilience. Using the DASS-21 to measure these states allows this study to precisely evaluate student well-being and provide evidence-based insights.

2.3. Relationship between Sleep Quality and Mental Health among University Students

A growing body of research consistently demonstrates a robust, bidirectional association between sleep quality and psychological well-being, especially among young adults in university. Poor sleep compromises the neurological systems responsible for emotional regulation, executive functioning, and stress recovery, leaving individuals highly vulnerable to mental health challenges (Freeman et al., 2020). Empirical studies consistently demonstrate that fragmented sleep, delayed sleep latency, and non-restorative sleep correlate with increased depression, anxiety, and stress (Antúnez et al., 2024; Chautrakarn et al., 2024).

The relationship between sleep quality and depression is well-established. University students with poor sleep quality consistently exhibit higher depression scores, suggesting that sleep deprivation reinforces negative cognitive biases and emotional

exhaustion (Azlina Daud et al., 2023; Antúnez et al., 2024). Similarly, sleep deficiencies heighten anxiety symptoms by increasing physiological arousal and sensitivity to environmental stressors. Neurobiologically, sleep deprivation overactivates the brain's threat-detection networks, including the amygdala, which increases worry, restlessness, and psychological tension (Freeman et al., 2020). Furthermore, poor sleep impairs cortisol regulation, which reduces stress tolerance, increases irritability, and impairs cognitive focus during academic tasks (Kim et al., 2021). Consequently, students with poor sleep report greater academic strain and diminished daily functional capacity (Hershner & Chervin, 2014).

Overall, evidence consistently shows that poor sleep quality contributes to negative mental health outcomes across all three dimensions: depression, anxiety, and stress. For university students, who often juggle demanding academic responsibilities and social pressures, inadequate sleep may significantly impair emotional well-being and overall functioning (Raja Mahamade Ali et al., 2023). These findings reinforce the need to examine how sleep quality relates specifically to mental health among Malaysian university students, as cultural and academic contexts may shape these experiences in unique ways.

2.4. Theoretical Support

This study is guided by the Biopsychosocial Model, a holistic framework developed by Engel (1977), which asserts that health and illness arise from the dynamic interaction of biological, psychological, and social factors. This framework provides a comprehensive understanding of the relationship between sleep quality and mental health, especially in populations experiencing multiple academic and developmental demands, such as university students.

The biological component in this study refers to the physiological processes of sleep, circadian rhythms, and the body's need for physical restoration. Disruptions in neurotransmitters such as serotonin and dopamine, which play key roles in regulating mood, alertness, and emotional stability, may contribute to symptoms of depression and anxiety. Chronic sleep disturbances can also affect the hypothalamic-pituitary-adrenal (HPA) axis, leading to heightened stress reactivity and physiological arousal (Moussa-Chamari et al., 2024). The psychological component involves the internal mental states of the students, specifically their levels of depression, anxiety, and stress. Cognitive distortions or dysfunctional beliefs about sleep, such as worrying excessively about not being able to fall asleep, can further intensify psychological distress (Karsan et al., 2024). Finally, the social component encompasses external pressures such as academic workload, cultural expectations, peer relationships, and the university environment (Şahin et al., 2023; Estrada-Araoz et al., 2023). These social demands can disrupt students' sleep patterns by encouraging irregular sleep schedules, extended screen use, and heightened academic pressure.

By adopting this model, the study can better explore how sleep quality is deeply connected to a student's mental state and social surroundings. Overall, the Biopsychosocial Model provides a strong theoretical rationale for this study because it aligns fully with the lived realities of university students, whose sleep and mental health experiences are shaped by behavioural habits, emotional stressors, and social-environmental expectations. The model also supports the study's cross-sectional design,

allowing the examination of how biological, psychological, and social correlates interact at a single point in time (Engel, 1977).

3. Research Methods

This study employed a quantitative cross-sectional research design to examine the relationship between sleep quality and mental health outcomes among university students in Malaysia.

The target population comprised university students in Malaysia, aged between 18 and 26 years. This age group was selected because young adults are often reported to experience both sleep disruptions and emerging mental health challenges due to academic, social, and technological pressures (Alghamdi & Alomri, 2025; Azlina Daud et al., 2023). The minimum sample size was calculated using G*Power (version 3.1), based on the statistical tests planned for this study. Using an independent *t*-test with a medium effect size (0.5), a significance level of .05, and 80% power, the minimum sample size required was 128 participants. This number was sufficient to support the correlation analysis in this study. The estimated total population of Malaysian university students in 2025 is approximately 1.3 million, including students from both public and private universities (Ministry of Higher Education, 2025). A convenience sampling technique was utilized, where participants were recruited through online platforms such as university email lists, WhatsApp groups, and Telegram groups. This non-probability method was appropriate given the time and access limitations, and it allows for rapid data collection from a diverse pool of students.

3.1. Research Instrument

Data were collected using a self-administered online survey divided into three structured sections:

i. Section A: Demographic Profile: This section gathered background data, including gender, age, ethnicity, and academic year, to contextualize the sample relative to Malaysia's diverse student population.
ii. Section B: Pittsburgh Sleep Quality Index (PSQI): This section evaluated sleep quality over the preceding month using the 19-item gold-standard tool by Buysse et al. (1989). These items generate seven component scores (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction), each scored from 0 to 3. Summing these components yields a Global PSQI score (0 to 21), where scores higher than 5 indicate "poor" sleep quality and scores equal to or less than 5 signify "good" sleep quality.
iii. Section C: Depression, Anxiety, and Stress Scale (DASS-21): This section assessed psychological distress using the 21-item scale by Lovibond and Lovibond (1995). It features three 7-item subscales scored on a 4-point Likert scale (0 = *did not apply to me at all*; 3 = *applied to me very much*), with final scores doubled to align with the standard DASS-42 clinical cut-offs. This allowed symptoms to be classified into severity ranges from normal to extremely severe.

3.2. Pilot Study

A pilot study was conducted with 30 university students matching the target criteria to evaluate instrument clarity and internal consistency. Reliability analysis yielded a Cronbach's alpha of 0.781 for the PSQI, while the DASS-21 subscales achieved alphas of 0.892 (depression), 0.814 (anxiety), and 0.855 (stress). All values exceeded the standard 0.70 threshold, confirming strong internal reliability, while feedback showed the items were clear and well-understood.

3.3. Data Analysis

The data collected from the survey were analyzed using the Statistical Package for the Social Sciences (SPSS) version 29.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the demographic profile and assess the levels of sleep quality and mental health among Malaysian university students. To examine the relationship between sleep quality (Global PSQI score) and the dimensions of mental health (depression, anxiety, and stress), Pearson correlation analysis was employed. Additionally, an independent samples *t*-test was conducted to compare mental health outcomes between students categorized as "good" sleepers and "poor" sleepers.

4. Results

Table 1 summarizes the demographic profile of the 270 respondents, including gender, age, and academic level. The sample was predominantly female (*n* = 208; 77.0%) and aged between 21 and 23 years (*n* = 174; 64.4%). Most respondents were in Year 4 of their studies (*n* = 130; 48.2%). These demographic baseline values provide important context for interpreting the study findings, as sleep quality and mental health may vary depending on gender, age, and academic progression.

Table 1: Frequency Distribution of Demographic Characteristics (*N* = 270).

Demographic Factors		Frequency (*f*)	Percentage (%)
Gender	Male	62	23.0
	Female	208	77.0
Age	18-20	35	13.0
	21-23	174	64.4
	24-26	56	20.7
	Others	5	1.9
Academic Level/ Year of Study	Foundation/Diploma	26	9.6
	Year 1	11	4.1
	Year 2	19	7.0
	Year 3	48	17.8
	Year 4	130	48.2
	Postgraduate (Master's)	36	13.3

Table 2 presents the descriptive statistics and frequency distribution of sleep quality among the respondents. The sample mean Global PSQI score was 2.04 (*SD* = 0.54), indicating generally favourable sleep quality among the respondents. The results show that 76.3% (*n* = 206) of students were classified as good sleepers, whereas 23.7% (*n* = 64) experienced poor sleep quality. This suggests that although the majority of students maintain adequate sleep, approximately one-quarter of the sample encounter sleep difficulties significant enough to be classified as poor sleepers.

Table 2: Descriptive Statistics and Frequency Distribution of Sleep Quality (PSQI) (*N* = 270).

Sleep Quality Variable	Mean	*SD*	Frequency *(n)*	Percentage *(%)*
PSQI Global Score	2.04	0.54	–	–
Good Sleep Quality (≤ 5)	–	–	206	76.3
Poor Sleep Quality (> 5)	–	–	64	23.7

Table 3 presents descriptive statistics and severity distributions for the mental health subscales. Among the three subscales, stress scores were the highest (*M* = 14.66, *SD* = 9.18), followed closely by depression (*M* = 14.50, *SD* = 9.52) and anxiety (*M* = 12.27, *SD* = 8.23).

Severity classifications, shown in Table 4, reveal that 35.6% (*n* = 96) of students reported normal levels of depression, while 26.0% (*n* = 70) fell into severe to extremely severe categories, indicating clinically concerning levels. For anxiety, 34.4% (*n* = 93) of students were classified as normal, whereas 32.2% (*n* = 87) experienced severe to extremely severe symptoms. Stress levels were elevated, with only 19.6% (*n* = 53) of students falling within the normal range and 74.4% (*n* = 201) showing moderate to extremely severe stress. These results suggest that a substantial portion of university students experience psychological distress, particularly stress, highlighting the importance of monitoring psychological well-being within this population to facilitate optimal functioning.

Table 3: Descriptive Statistics for Mental Health Variables (DASS-21 Subscales) (*N* = 270).

Mental Health Variable	Items	Level	Frequency (*n*)	Percentage (%)
Depression	3,5,10,13,16, 17,21	Normal	96	35.6
		Mild	75	27.8
		Moderate	29	10.7
		Severe	32	11.9
		Extremely severe	38	14.1
Anxiety	2,4,7,9,15,19, 20	Normal	93	34.4
		Mild	30	11.1
		Moderate	60	22.2
		Severe	44	16.3
		Extremely severe	43	15.9

Stress	1,6,8,11,12,14,18	Normal	53	19.6
		Mild	16	5.9
		Moderate	117	43.3
		Severe	21	7.8
		Extremely severe	63	23.3

Table 4: Group Means of Mental Health Variables by Sleep Quality (N = 270).

Mental Health Variable	Mean	*SD*
Depression	14.50	9.52
Anxiety	12.27	8.23
Stress	14.66	9.18

Note: Depression scores were classified as normal (0–9), mild (10–13), moderate (14–20), severe (21–27), and extremely severe (28+). Anxiety scores were classified as normal (0–7), mild (8–9), moderate (10–14), severe (15–19), and extremely severe (20+). Stress scores were classified as normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and extremely severe (34+).

Pearson correlation coefficients (Table 5) revealed significant negative relationships between continuous PSQI scores and all three mental health dimensions. The strongest correlation was observed between sleep quality and depression (r = -0.676, p < .001), followed by stress (r = -0.500, p < .001) and anxiety (r = -0.444, p < .001). These negative coefficients show that poorer sleep quality consistently tracks with higher psychological distress.

Table 5: Pearson Correlation between Sleep Quality (PSQI) and Mental Health Variables (DASS-21)

Independent Variable	Dependent Variables	*r*	*p*-value
PSQI	Depression	−0.676	< .001
	Anxiety	−0.444	< .001
	Stress	−0.500	< .001

Comparisons of mental health scores between students classified as good and poor sleepers are shown in Table 6. Students with poor sleep quality reported noticeably higher levels of depression, anxiety, and stress compared to those with good sleep. Independent samples t-tests, as shown in Table 7, indicated that these differences were statistically significant for all three mental health dimensions, with depression (t(268) = 15.01, p < .001), anxiety (t(268) = 8.11, p < .001), and stress (t(268) = 9.46, p < .001). Levene's test for equality of variances suggested that equal variances could be assumed for anxiety and stress and were marginally assumed for depression. Overall, these results indicate that students experiencing poor sleep quality have significantly worse mental health outcomes compared to those with good sleep quality.

Table 6: Group Means of Mental Health Variables by Sleep Quality

Mental Health Variable	Sleep Quality	Mean	*SD*
Depression	Good	1.87	1.00
	Poor	4.14	1.21
Anxiety	Good	2.32	1.36
	Poor	3.86	1.25
Stress	Good	2.71	1.16
	Poor	4.31	1.26

Table 7: Independent Samples *t*-test Results Comparing Mental Health Variables by Sleep Quality.

Mental Health Variable	*t*	*df*	*p*-value
Depression	15.01	268	< .001
Anxiety	8.11	268	< .001
Stress	9.46	268	< .001

5. Discussion

The descriptive findings show that a majority of the surveyed Malaysian university students maintained good sleep quality. This finding contrasts with studies from Thailand and Qatar, which reported higher rates of poor sleep quality among undergraduates (Chautrakarn et al., 2024; Raja Mahamade Ali et al., 2023). This difference may stem from the demographic composition of the Malaysian sample. Nearly half of the respondents were final-year undergraduates who may have developed stronger academic coping strategies, time-management skills, and self-regulation over their academic careers. According to Nelson et al. (2021), these adaptive strategies help stabilize sleep schedules despite academic demands.

Additionally, data collection for this study occurred at the beginning of the academic semester, when students typically face lower academic pressure before major assignment deadlines and examinations. This timing effect aligns with Hershner and Chervin (2014), who noted that workload intensity heavily influences student sleep patterns. Maintaining good sleep during these baseline periods can help support psychological resilience (Wang et al., 2023). However, the 23.7% minority experiencing poor sleep remains a concern within Malaysia's competitive higher education environment, where academic expectations are high (Azlina Daud et al., 2023). Even moderate sleep disruption can impair emotional regulation, energy levels, and cognitive function, making student sleep quality an important public health issue (Hershner & Chervin, 2014). This is supported by neurological evidence showing that sleep deprivation can disrupt emotional processing networks, increasing vulnerability to psychological distress (Wang et al., 2024).

The study also revealed substantial psychological distress among the students, with stress emerging as the most prominent concern, followed by depression and anxiety. This pattern aligns with Malaysian research by Azlina Daud et al. (2023), who documented high rates of distress among undergraduates. The high level of stress reflects an exam-oriented educational culture, a strong emphasis on academic achievement, and the role of CGPA outcomes in future employability. Viewed through the Biopsychosocial Model, these systemic academic demands act as social stressors that affect psychological well-being even when biological factors, like sleep, appear stable (Engel, 1977).

International evidence similarly highlights growing mental health concerns among young adults, driven by academic competition and lifestyle pressures (Antúnez et al., 2024; Wang et al., 2023). In Malaysia, these challenges are often intensified by collectivistic cultural expectations, where academic success is closely tied to family pride and social mobility. Consequently, psychological distress among Malaysian students is not merely an individual issue but is closely linked to broader educational and social systems. This finding aligns with the American Psychological Association (2022), which suggests that mental health is a state of well-being that dictates how individuals handle environmental stress. Therefore, the high levels of anxiety and depression observed in this sample highlight a significant vulnerability within the student population that is influenced by both internal and external factors (Azlina Daud et al., 2023).

Related to the second research objective, the results demonstrated significant associations between sleep quality and all three dimensions of mental health: depression, anxiety, and stress. When examined separately, the strongest relationship emerged between sleep quality and depressive symptoms, suggesting that sleep plays a fundamental biological role in mood regulation and emotional stability. This aligns with Freeman et al. (2020), who described sleep as a core biological mechanism underlying affective regulation and vulnerability to depressive disorders. In the Malaysian context, inadequate sleep may impair emotional recovery and increase susceptibility to depressive symptoms, particularly within demanding academic environments that limit opportunities for psychological restoration (Wang et al., 2024).

The relationship between sleep quality and anxiety highlights the role of sleep in regulating physiological arousal and cognitive hypervigilance. Poor sleep disrupts autonomic balance, increasing restlessness, worry, and physiological tension, which are central features of anxiety disorders (Freeman et al., 2020). Among Malaysian university students, anxiety may be further intensified by academic evaluation systems, competitive grading structures, and performance-based scholarship requirements, which interact with biological sleep deficits to heighten psychological vulnerability (Azlina Daud et al., 2023).

Similarly, the association between sleep quality and stress reflects how insufficient sleep weakens stress tolerance and coping capacity. Sleep deprivation reduces emotional resilience and impairs executive functioning, making individuals more reactive to academic demands and daily stressors (Antúnez et al., 2024; Wang et al., 2023). Within the Malaysian educational context, where students often juggle coursework, extracurricular activities, family expectations, and financial concerns, compromised sleep may worsen stress responses, leading to prolonged psychological strain.

Interpreted through the Biopsychosocial Model (Engel, 1977), these findings illustrate how biological disruption (poor sleep) interacts with psychological vulnerability (depression, anxiety, and stress) and social stressors (academic pressure and cultural expectations) to shape mental health outcomes. This multidimensional framework supports the interpretation that sleep quality serves as a foundational biological resource that sustains psychological functioning and buffers against environmental stressors (Perrault et al., 2024). When sleep quality deteriorates, this protective foundation weakens, resulting in heightened vulnerability across all domains of mental health.

With regards to the third research objective, the findings demonstrated that students with poor sleep quality consistently experienced higher levels of depression, anxiety, and stress compared to those with good sleep quality. This mirrors international studies that report poorer psychological outcomes among students with disrupted sleep (Antúnez et al., 2024; Wang et al., 2023; Raja Mahamade Ali et al., 2023). These results reinforce the conceptualization of sleep quality as a critical determinant of psychological resilience in young adults. This is further supported by the neurological evidence provided by Wang et al. (2024), which suggests that poor sleepers experience a reduced ability to regulate emotions due to decreased prefrontal-amygdala connectivity.

From a Malaysian perspective, this disparity is particularly meaningful. Good sleepers may benefit from greater biological recovery, emotional regulation, and cognitive clarity, enabling them to cope more effectively with academic demands and social pressures common in Malaysian higher education institutions (Freeman et al., 2020). Conversely, students experiencing poor sleep may face compounded vulnerability, where biological fatigue impairs emotional regulation and coping capacity, making them more susceptible to academic stressors and psychological distress (Antúnez et al., 2024). As described by Perrault et al. (2024), this interaction between biological vulnerability and social stress creates cumulative risk, which may explain the significantly poorer mental health outcomes observed among poor sleepers. These findings emphasize that sleep quality functions not merely as a lifestyle factor but as a critical biological foundation that shapes psychological well-being and adaptive functioning among Malaysian university students.

6. Conclusion

This study evaluated the relationship between sleep quality and mental health dimensions among Malaysian university students, providing insights into their psychological well-being. While most participants reported good sleep quality, a distinct segment experienced poor sleep, and a substantial portion reported elevated symptoms of stress, depression, and anxiety. The analyses confirmed significant negative relationships between sleep quality and psychological distress, showing clear differences in mental health outcomes between good and poor sleepers. These findings highlight the role of sleep hygiene in supporting undergraduate mental health. Overall, this research contributes to the literature on student well-being and emphasizes the value of incorporating sleep wellness strategies into university mental health frameworks.

Ethics Approval and Consent to Participate

The researchers used the research ethics provided by the Research Ethics Committee of Universiti Teknologi Malaysia. All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants according to the Declaration of Helsinki.

Acknowledgement

Part of this article was built from the insight of Assoc. Prof. Dr. Norashikin Mahmud, to whom we are extremely grateful.

Funding

This study received no funding.

Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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