

The Mediating Effect of Sleep Quality in the Relationship between Perceived Stress and Burnout among University Students

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ABSTRACT

This study examined the relationship between perceived stress, sleep quality, and burnout among university students, with particular focus on the mediating role of sleep quality within the Job Demands–Resources (JD-R) framework. It was hypothesized that perceived stress and burnout are significantly associated and that sleep quality serves as a critical mechanism linking these variables. Participants in this study were undergraduate students enrolled in a university setting who voluntarily completed standardized self-report measures, including the Perceived Stress Scale (PSS-10), Pittsburgh Sleep Quality Index (PSQI), and Burnout Assessment Tool (BAT). A quantitative, cross-sectional design was employed, and data were analyzed using descriptive statistics, Pearson’s correlation, and

mediation analysis. Results indicated that students experienced moderate levels of perceived stress, sleep disturbances, and burnout, with exhaustion emerging as the most prominent dimension. Findings further revealed that perceived stress was significantly associated with poorer sleep quality, and sleep quality was significantly related to higher burnout levels. However, no statistically significant direct relationship was found between perceived stress and burnout. Mediation analysis demonstrated that sleep quality significantly mediated the relationship between perceived stress and burnout. These findings highlight the critical role of sleep quality as a recovery resource and suggest that interventions targeting sleep improvement may help reduce burnout and enhance student well-being.

Keywords: *perceived stress, sleep quality, burnout, Job Demands–Resources model, recovery processes*

INTRODUCTION

Perceived stress and burnout have been widely recognized as significant concerns affecting students’ mental health and overall functioning. Empirical evidence suggests that higher levels of perceived stress are associated with increased burnout symptoms, reduced well-being, and poorer academic outcomes (Zhang et al., 2025; Kinnunen & Feldt, 2013). However, the relationship between stress and performance is complex, as moderate levels of stress may, in some cases, enhance motivation and engagement, depending on individual and contextual factors.

Burnout among university students has been increasingly reported across different populations, although prevalence rates vary depending on measurement approaches and cultural contexts (Martínez-Rubio et al., 2020; Schaufeli et al., 2002). These findings highlight the importance of identifying protective factors that may help mitigate the negative effects of stress on student well-being. One such factor is sleep quality, which has gained growing attention in recent research. Sleep is a fundamental physiological process essential for cognitive functioning, emotional regulation, and psychological recovery (Medic et al., 2017;

Gardani et al., 2022). Adequate sleep supports memory consolidation and emotional stability, whereas poor sleep quality has been associated with increased psychological distress, impaired functioning, and reduced well-being (Gardani et al., 2022; Nakie et al., 2024).

Among university students, sleep disturbances are commonly reported and are associated with irregular sleep patterns and insufficient rest (Almojali et al., 2017). Poor sleep quality may impair emotional regulation and cognitive functioning, reducing students' ability to cope effectively with academic demands. Furthermore, research indicates that perceived stress is associated with poorer sleep quality, while sleep disturbances may also exacerbate stress levels, suggesting a reciprocal relationship between these variables (Lu et al., 2024; Petak et al., 2025). In addition, poor sleep quality has been linked to higher levels of burnout, particularly emotional exhaustion and reduced academic efficacy (Wang et al., 2020; Zakiei et al., 2025). These findings suggest that sleep quality may serve as an important mechanism through which perceived stress influences burnout outcomes, although it is not the sole explanatory factor.

METHODS

Research Design

This study employed a quantitative, cross-sectional survey design to examine the relationships among perceived stress, sleep quality, and burnout among university students. Data were collected through an online survey administered via Google Forms, allowing efficient data gathering across different academic programs and year levels at North Eastern Mindanao State University – Tandag Campus. Participation was voluntary, and informed consent was obtained from all respondents prior to data collection.

Research Locale

The study involved undergraduate students currently enrolled at North Eastern Mindanao State University – Tandag Campus. Participants were selected using a non-probability voluntary response sampling technique, wherein individuals self-selected into the study based on their willingness to participate. This sampling approach is commonly used in survey-based research (Creswell & Creswell, 2017). Inclusion criteria required that participants be bona fide undergraduate students, provide informed consent, and complete the survey questionnaire in full. A total of 499 responses were initially collected. Following data screening procedures, including checks for missing and inconsistent responses, 465 valid responses were retained for final analysis.

Procedure

Prior to data collection, approval was obtained from the appropriate institutional authorities. The survey was distributed through an online Google Forms link, which was disseminated via academic and digital communication channels to maximize participation. Participants completed an electronic questionnaire consisting of an informed consent form, demographic questions, and standardized instruments, including the Perceived Stress Scale (PSS-10), the Pittsburgh Sleep Quality Index (PSQI), and the Burnout Assessment Tool – Student Version (BAT-S). Participation was anonymous, and respondents were informed that they could withdraw from the study at any time without penalty.

Measures

Perceived Stress. Perceived stress was assessed using the 10-item Perceived Stress Scale (PSS-10) developed by Cohen et al. (1988). The PSS-10 measures the extent to which individuals appraise situations in their lives as stressful and beyond their coping capacity over the past month. Responses are rated on a 5-point Likert scale ranging from 0 (never) to 4 (very often), with several items reverse-scored prior to computing the total score. Higher scores indicate higher levels of perceived stress.

Sleep Quality. Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. (1989). The PSQI assesses sleep quality across seven components, including

sleep duration, sleep latency, sleep disturbances, and daytime dysfunction. The instrument yields a global score ranging from 0 to 21, with higher scores indicating poorer sleep quality. A global score greater than 5 is commonly used to indicate poor sleep quality.

Burnout. Academic burnout was assessed using the Burnout Assessment Tool – Student Version (BAT-S) developed by Schaufeli et al. (2020). The BAT-S conceptualizes burnout as a multidimensional construct consisting of exhaustion, mental distance, cognitive impairment, and emotional impairment. Responses are rated using Likert-type scales, and scores can be computed for each dimension as well as for overall burnout. The instrument has demonstrated acceptable reliability and validity across different populations.

Data Analysis

Prior to statistical analysis, the dataset underwent data screening procedures to ensure accuracy and completeness. Incomplete, inconsistent, and invalid responses were identified and excluded from the analysis. The cleaned dataset was analyzed using jamovi, an open-source statistical software platform (The jamovi project, 2023). Descriptive statistics, including means and standard deviations, were computed to summarize the levels of perceived stress, sleep quality, and burnout among participants. Pearson's product-moment correlation coefficient (Pearson's r) was used to examine the bivariate relationships among the study variables. To test the hypothesized relationships, a regression-based mediation analysis was conducted following the procedures outlined by Hayes (2017). In this model, perceived stress was specified as the independent variable, burnout as the dependent variable, and sleep quality as the mediating variable. Both direct and indirect effects were estimated to assess whether sleep quality mediates the relationship between perceived stress and burnout.

The significance of the indirect effect was evaluated using bootstrapping procedures, which generate confidence intervals based on repeated resampling and provide more robust estimates of mediation effects. Bootstrapped confidence intervals were generated using 5,000 resamples at a 95% confidence level. All statistical analyses were conducted at a 0.05 level of significance.

RESULTS

The sample population consisted of university students who reported moderate levels of burnout, sleep disturbances, and perceived stress. Table 1 presents the descriptive characteristics of burnout among participants. Results indicate that students experienced a moderate level of academic burnout, with an overall mean score of 3.378 (SD = 0.832). Among the dimensions, exhaustion obtained the highest mean ($M = 3.657$, $SD = 0.737$), indicating frequent physical and mental fatigue related to academic demands. This was followed by psychological distress ($M = 3.530$, $SD = 0.840$), suggesting elevated emotional strain. Other dimensions, including cognitive impairment ($M = 3.391$, $SD = 0.868$) and emotional impairment ($M = 3.391$, $SD = 0.868$), also reflected moderate levels, indicating difficulties in concentration and emotional regulation. Meanwhile, mental distance ($M = 3.121$, $SD = 0.772$) and psychosomatic complaints ($M = 3.177$, $SD = 0.908$) suggest gradual disengagement from academic work and the presence of stress-related physical symptoms. Overall, these findings indicate that students are experiencing noticeable but not extreme levels of burnout. Table 2 presents the descriptive statistics of sleep quality indicators. Students exhibited moderate levels of sleep disturbance, with an overall mean score of 2.741 (SD = 1.136). Higher mean scores were observed in legs twitching or jerking during sleep ($M = 3.376$, $SD = 0.977$) and episodes of disorientation or confusion ($M = 3.348$, $SD = 1.020$), suggesting disrupted and restless sleep patterns. Other indicators, including feeling too cold ($M = 3.130$, $SD = 1.179$), experiencing pain ($M = 3.068$, $SD = 0.986$), and difficulty breathing comfortably ($M = 3.043$, $SD = 1.064$), also reflected moderate levels of sleep-related discomfort. In contrast, lower mean scores were observed for feeling too hot ($M = 1.748$, $SD = 1.134$) and the use of sleep medication ($M = 1.758$, $SD = 1.132$), indicating that these experiences were less common. These findings suggest that students experience notable sleep difficulties, particularly related

to physiological disturbances and restlessness. As shown in Table 3, students reported moderate levels of perceived stress, with mean scores ranging from 2.874 to 3.406. The highest mean was observed for the item “felt difficulties were piling up so high that you could not overcome them” ($M = 3.406$, $SD = 1.013$), indicating that students often feel overwhelmed by accumulating demands. This was followed by being upset due to unexpected events ($M = 3.382$, $SD = 1.010$), suggesting difficulty coping with unpredictability. Other items, such as feeling nervous and stressed ($M = 3.259$, $SD = 0.988$) and difficulty coping with responsibilities ($M = 3.265$, $SD = 0.976$), also reflected consistent levels of stress. Lower mean scores were observed for the ability to control irritations ($M = 2.874$, $SD = 1.030$), indicating variability in emotional regulation. Overall, these findings suggest that students experience ongoing but manageable levels of stress.

Correlational Analysis

Pearson’s product–moment correlation coefficients were computed to examine the relationships among perceived stress, sleep quality, and burnout (see Table 5). The results revealed a strong and statistically significant positive association between perceived stress and sleep deficiency ($r = 0.718$, $p < .001$), indicating that higher levels of perceived stress are linked to poorer sleep quality. Sleep deficiency was also found to be significantly and positively associated with burnout ($r = 0.528$, $p < .001$), suggesting that disruptions in sleep are related to increased levels of academic burnout. In contrast, the direct relationship between perceived stress and burnout was not statistically significant ($r = 0.074$, $p = .218$), indicating the absence of a direct linear association between these variables. Taken together, these findings suggest that although perceived stress and burnout are conceptually related, their relationship may not be direct. Instead, the significant associations between perceived stress and sleep quality, as well as between sleep quality and burnout, provide preliminary evidence for the presence of an intervening mechanism. This pattern of results supports the plausibility of a mediation model in which sleep quality functions as a key explanatory variable linking perceived stress to burnout.

Mediation and Regression Analysis

A regression-based mediation analysis was conducted to examine whether sleep quality mediates the relationship between perceived stress and burnout (see Table 7). The results indicated that perceived stress significantly predicted sleep deficiency ($\beta = 0.718$, $t = 29.663$, $p < .001$), suggesting that higher levels of stress are associated with poorer sleep quality. In turn, sleep deficiency significantly predicted burnout ($\beta = 0.528$, $t = 9.622$, $p < .001$), indicating that disrupted sleep contributes to increased burnout levels. However, the direct effect of perceived stress on burnout was not statistically significant ($\beta = 0.074$, $t = 1.232$, $p = .218$), suggesting that perceived stress does not exert a direct influence on burnout when sleep quality is accounted for in the model. Despite this, the total effect of perceived stress on burnout remained statistically significant ($\beta = 0.454$, $t = 11.111$, $p < .001$), indicating that perceived stress is associated with burnout when both direct and indirect pathways are considered. Importantly, the indirect effect of perceived stress on burnout through sleep deficiency was statistically significant ($\beta = 0.379$, $p < .001$), as confirmed through bootstrapping procedures. This finding provides evidence of full mediation, indicating that the relationship between perceived stress and burnout operates primarily through sleep quality. In other words, higher levels of perceived stress contribute to poorer sleep quality, which in turn increases the likelihood of experiencing burnout.

From a theoretical perspective, these results support the proposition within the Job Demands–Resources (JD-R) framework that recovery processes, such as sleep, play a critical role in translating demands into strain outcomes. Specifically, sleep quality functions as a key explanatory mechanism through which academic stress is converted into burnout, highlighting its central role in students’ psychological well-being.

Model Fit and Effect Size

The coefficients of determination (R^2) presented in Table 10 indicate that the model accounted for a substantial proportion of variance in sleep deficiency ($R^2 = 0.516$) and a moderate proportion of variance in burnout ($R^2 = 0.341$). These findings suggest that perceived stress is a strong predictor of sleep-related outcomes, explaining over half of the variance in sleep deficiency. In contrast, burnout appears to be influenced by a combination of factors, with perceived stress and sleep quality jointly contributing to its variance. Effect size estimates (see Table 11) further substantiate these relationships. Perceived stress exerted a very large effect on sleep deficiency ($f^2 = 1.066$), indicating a strong and meaningful influence of stress on sleep-related disturbances. Sleep deficiency, in turn, demonstrated a moderate effect on burnout ($f^2 = 0.204$), suggesting that impaired sleep contributes significantly to the development of burnout symptoms. Conversely, the direct effect of perceived stress on burnout was negligible ($f^2 = 0.004$), reinforcing the absence of a direct pathway and underscoring the mediating role of sleep quality. This pattern of results is consistent with the mediation findings, wherein the influence of perceived stress on burnout operates primarily through sleep deficiency.

These results support the robustness of the proposed model and highlight the critical role of sleep quality as an explanatory mechanism in the stress–burnout relationship. From a theoretical standpoint, the findings align with the Job Demands–Resources (JD-R) framework, emphasizing that insufficient recovery—manifested through poor sleep—serves as a key pathway through which stress translates into burnout.

Table 1. *Burnout Dimensions*

	Mode	Median	Mean	Std. Deviation
Exhaustion	3.520	3.600	3.657	0.737
Mental Distance	3.041	3.000	3.121	0.772
Cognitive Impairment	3.044	3.333	3.391	0.868
Emotional Impairment	3.044	3.333	3.391	0.868
Psychological Distress	3.432	3.600	3.530	0.840
Psychosomatic Complaints	2.957	3.000	3.177	0.908
	3.173	3.311	3.378	0.832

Table 2. *Sleep Quality Index Sleep Deficiency Indicators*

	Mode	Median	Mean	Std. Deviation
a. Cannot get to sleep within 30 minutes	2.997	2.000	2.485	1.188
b. Wake up in the middle of the night or early morning	1.004	2.000	2.331	1.150
c. Have to get up to use the bathroom	3.000	3.000	3.083	1.116
d. Cannot breathe comfortably	3.000	3.000	3.043	1.064
e. Cough or snore loudly	3.000	3.000	3.000	1.137
f. Feel too cold	3.000	3.000	3.130	1.179
g. Feel too hot	1.000	1.000	1.748	1.134
h. Have bad dreams	3.000	3.000	2.729	1.088
i. Have pain	3.000	3.000	3.068	0.986
Long pauses between breaths while asleep	3.000	3.000	2.654	1.135
Legs twitching or jerking while you sleep	3.000	3.000	3.376	0.977
Episodes of disorientation or confusion during sleep	3.000	3.000	3.348	1.020
During the past month, how often have you taken medicine to help you sleep (prescribed or “over the counter”)?	1.000	1.000	1.758	1.132
During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	1.012	3.000	2.618	1.602
	2.430	2.571	2.741	1.136

Table 3. *Perceived Stress Scale Items*

	Mode	Median	Mean	Std. Deviation
been upset because of something that happened unexpectedly?	3.000	3.000	3.382	1.010
felt that you were unable to control the important things in your life?	3.000	3.000	3.237	0.908
felt nervous and "stressed"?	3.000	3.000	3.259	0.988
found that you could not cope with all the things that you had to do?	3.000	3.000	3.265	0.976
been angered because of things that were outside of your control?	3.000	3.000	3.248	1.007
felt difficulties were piling up so high that you could not overcome them?	3.000	3.000	3.406	1.013
felt confident about your ability to handle your personal problems?	3.000	3.000	3.224	0.979
felt that things were going your way?	3.000	3.000	3.233	0.899
been able to control irritations in your life?	3.000	3.000	2.874	1.030
felt that you were on top of things?	3.000	3.000	3.297	1.009
	3.000	3.000	3.243	0.982

Table 4. *Reliability and Convergent Validity of the Measurement Tools*

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Psychosomatic Complaints	0.849	0.865	0.892	0.623
Cognitive Impairment	0.902	0.908	0.928	0.721
Emotional Impairment	0.851	0.876	0.908	0.768
Exhaustion	0.852	0.857	0.900	0.693
Mental Distance	0.837	0.851	0.884	0.604
Psychological Distress	0.781	0.801	0.872	0.695
Sleep Deficiency	0.813	0.822	0.865	0.518
Stress	0.766	0.813	0.850	0.593

Table 5. *Discriminant Validity of Study Variables (Perceived Stress, Sleep Quality, and Burnout)*

	PS	CI	EI	EX	MD	PD	Burnout	Sleep Deficiency	Stress
Psychosomatic Complaints									
Cognitive Impairment	0.602								
Emotional Impairment	0.670	0.761							
Exhaustion	0.606	0.656	0.662						
Mental Distance	0.612	0.802	0.671	0.676					
Psychological Distress	0.791	0.709	0.856	0.766	0.591				
Burnout	0.678	0.478	0.576	0.464	0.471	0.696			
Sleep Deficiency	0.849	0.695	0.780	0.654	0.660	0.838	0.650		
Stress	0.625	0.647	0.726	0.608	0.627	0.772	0.506	0.866	

Table 6. *Multicollinearity Diagnostics of the Structural Model (VIF Values)*

	VIF
Burnout -> Psychosomatic Complaints	1.000
Burnout -> Cognitive Impairment	1.000
Burnout -> Emotional Impairment	1.000
Burnout -> Exhaustion	1.000
Burnout -> Mental Distance	1.000
Burnout -> Psychological Distress	1.000
Sleep Deficiency -> Burnout	2.066
Stress -> Burnout	2.066
Stress -> Sleep Deficiency	1.000

Table 7. *Direct Effects of Perceived Stress and Sleep Quality on Academic Burnout*

Direct Effects	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Sleep Deficiency -> Burnout	0.528	0.529	0.055	9.622	0.000
Stress -> Burnout	0.074	0.073	0.060	1.232	0.218
Stress -> Sleep Deficiency	0.718	0.720	0.024	29.663	0.000

Table 8. *Indirect Effect of Perceived Stress on Burnout Through Sleep Quality*

Indirect Effects	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Stress -> Burnout	0.379	0.381	0.042	9.009	0.000

Table 9. *Total Effect of Perceived Stress on Academic Burnout*

Total Effects	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Stress -> Burnout	0.454	0.454	0.041	11.111	0.000

Table 10. *Coefficient of Determination (R^2) of Burnout and Sleep Quality*

	R-square	R-square adjusted
Psychosomatic Complaints	0.405	0.404
Cognitive Impairment	0.206	0.205
Emotional Impairment	0.294	0.293
Exhaustion	0.185	0.183
Mental Distance	0.193	0.192
Psychological Distress	0.387	0.386
Burnout	0.341	0.338
Sleep Deficiency	0.516	0.515

Table 11. *Effect Sizes (f^2) of Structural Relationships in the Model*

	f-square
Burnout -> Psychosomatic Complaints	0.681
Burnout -> Cognitive Impairment	0.260
Burnout -> Emotional Impairment	0.417
Burnout -> Exhaustion	0.227
Burnout -> Mental Distance	0.240
Burnout -> Psychological Distance	0.632
Sleep Deficiency -> Burnout	0.204

Stress -> Burnout	0.004
Stress -> Sleep Deficiency	

DISCUSSION

The findings of the study, as presented in Tables 1 to 11, provide an empirically grounded response to the research questions and offer support for the Job Demands–Resources (JD–R) model. The results indicate that university students exhibit moderate levels of perceived stress, sleep disturbances, and burnout. As shown in Table 3, perceived stress yielded a mean score of 3.243 (SD = 0.982), suggesting that students experience academic demands as persistently challenging. Similarly, Table 2 indicates moderate sleep disturbances (M = 2.741, SD = 1.116), reflecting disruptions in recovery-related processes. Table 1 further shows that overall burnout is moderate (M = 3.378, SD = 0.832), with exhaustion emerging as the most prominent dimension (M = 3.657), followed by psychological distress (M = 3.530). These findings are consistent with literature indicating that university students commonly experience stress, sleep disturbances, and burnout in relation to academic demands (Zhang et al., 2025; Kinnunen & Feldt, 2013). Within the JD–R framework, these outcomes may reflect the cumulative impact of sustained demands and insufficient recovery processes, which contribute to energy depletion and burnout (Bakker & Demerouti, 2007). To examine the relationships among the variables, correlational and structural analyses (Tables 5, 7, and 8) revealed a differentiated pattern. Specifically, perceived stress did not have a statistically significant direct effect on burnout ($\beta = 0.074$, $p = .218$), suggesting that stress alone may not directly predict burnout outcomes in this sample. However, perceived stress demonstrated a strong and statistically significant effect on sleep deficiency ($\beta = 0.718$, $p < .001$), indicating that higher stress levels are associated with poorer sleep quality. This finding is consistent with research showing that stress is linked to sleep disturbances, including insomnia and impaired sleep quality (Liu et al., 2021; Gardani et al., 2022). Furthermore, sleep deficiency significantly predicted burnout ($\beta = 0.528$, $p < .001$), suggesting that inadequate recovery is associated with increased burnout symptoms. Prior studies have similarly reported that poor sleep quality is related to emotional exhaustion and psychological distress, which are core components of burnout (Wang et al., 2020; Gardani et al., 2022). These findings highlight the role of sleep-related processes in explaining how stress may be associated with burnout outcomes. Mediation analysis (Tables 8 and 9) provides further support for this mechanism. Perceived stress exerted a significant indirect effect on burnout through sleep deficiency ($\beta = 0.379$, $p < .001$), while the total effect remained significant ($\beta = 0.454$, $p < .001$) despite the absence of a direct effect. This pattern is consistent with evidence suggesting that stress-related outcomes may operate through intermediary processes rather than direct pathways (Hayes, 2017; Zhang et al., 2025). The findings therefore provide evidence consistent with full mediation, indicating that the association between perceived stress and burnout operates primarily through sleep-related processes in this sample.

From a theoretical perspective, these findings are consistent with the JD–R model, which posits that burnout develops when demands exceed available resources and recovery processes are insufficient. In the present study, perceived stress represents an academic demand, while sleep-related processes may be understood as part of recovery mechanisms through which stress is associated with burnout. This interpretation is supported by research indicating that recovery processes play a role in linking demands to psychological strain (Kinnunen et al., 2011; Kinnunen & Feldt, 2013). Overall, the findings suggest that the relationship between perceived stress and burnout among university students is not direct but operates primarily through disruptions in sleep quality. These results underscore the importance of addressing both stress and recovery-related processes in efforts to support student well-being and reduce burnout risk.

Implications

The findings of the present study indicate that sleep quality plays a crucial role in the relationship between perceived stress and burnout among university students. Specifically, the results suggest that sleep quality functions as an important intermediary mechanism through which perceived stress contributes to

burnout outcomes. Within the Job Demands–Resources (JD–R) framework (Bakker & Demerouti, 2007), these findings highlight the relevance of recovery-related processes in explaining how academic stress translates into psychological strain. Despite these contributions, several limitations must be acknowledged. The cross-sectional design of the study limits the ability to establish causal relationships among the variables. In addition, the reliance on self-report measures may introduce response biases, such as social desirability and recall bias. Future research may benefit from employing longitudinal designs and incorporating objective measures of sleep to strengthen causal inferences and improve measurement accuracy.

From a practical perspective, the findings underscore the importance of promoting sleep awareness and recovery practices among university students. A holistic approach involving educators, researchers, and healthcare providers may be beneficial in addressing student well-being and reducing burnout risk. Interventions aimed at improving sleep quality may serve as a valuable strategy for mitigating the negative effects of academic stress. Future studies may further explore the effectiveness of sleep-focused interventions and examine how improvements in sleep quality influence burnout and broader indicators of psychological well-being. Additionally, expanding research across diverse university populations may enhance the generalizability of findings and provide a more comprehensive understanding of these relationships.

Statement on Use of AI Tools

AI tools, specifically ChatGPT (OpenAI, GPT-5.1), were used only for language refinement, formatting, and improving clarity of writing. All ideas, analyses, and interpretations remain entirely the researchers' own.

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