



{ MUDIMA }



## The Relationship Between Academic Stress and Sleep Quality

Agus Yudawijaya<sup>1\*</sup>, Grace Lyra<sup>2</sup>, Patria Adri Wibhawa<sup>3</sup>

Universitas Kristen Indonesia

**Corresponding Author:** Agus Yudawijaya; [agus.yudawijaya@uki.ac.id](mailto:agus.yudawijaya@uki.ac.id)

### ARTICLE INFO

**Keywords:** Academic Stress, Sleep Quality, Medical Students, PASS, PSQI

*Received* : 4 July 2026

*Revised* : 26 August 2026

*Accepted* : 27 September 2026

©2026 Yudawijaya, Lyra, Wibhawa :

This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International License](#).

[Creative Commons Attribution 4.0 International License](#)



### ABSTRACT

Academic demands may disturb medical students' sleep, but the pattern can vary across cohorts. This study tested the relationship between perceived academic stress and sleep quality in 2022-cohort medical students at Universitas Kristen Indonesia. A cross-sectional analytic survey included 71 purposively selected respondents. The Perception of Academic Stress Scale measured academic stress, and the Pittsburgh Sleep Quality Index measured sleep quality. Categorical data were examined with the chi-square test. Low and high academic stress were recorded in 50.7% and 49.3% of participants, respectively, while 64.8% had poor sleep. Sleep-quality distribution differed significantly between stress categories ( $p=0.020$ ). However, poor sleep was more frequent in the low-stress group (77.8%) than in the high-stress group (51.4%), so the finding does not support a simple increase in poor sleep with higher stress. Sleep-related behavior, environmental conditions, coping, and median-based categorization may have influenced the pattern. Institution-wide sleep education, counseling, workload review, and assessment of additional determinants are recommended.

### INTRODUCTION

Sleep performs essential roles in bodily restoration, affect regulation, immune defense, memory formation, and mental performance. Most young adults, including university students, need about seven to nine hours of nightly rest for healthy daily functioning. Sleeping for less than seven hours can weaken attention and cognition and raise health risks. Duration alone, however, does not define sleep quality. The time needed to fall asleep, continuity, efficiency, nocturnal disruption, and functioning during the day are also relevant. A person may therefore sleep for an adequate number of hours yet still experience unsatisfactory sleep.

The demands of medical training place students at particular risk of disturbed sleep. Lectures, tutorials, laboratory work, clinical-skills sessions, examinations, and independent tasks often compete for the same limited time. This workload can shorten sleep, destabilize bedtime routines, and intensify

psychological strain. Research has generally found worse sleep among medical students than among students in other fields. Across countries, estimates of poor sleep in medical students commonly fall between 60% and 80%, although the proportion differs by stage of training, educational system, sample characteristics, and assessment method.

Academic stress is one plausible contributor to these sleep difficulties. It arises when students judge academic requirements as greater than the time, ability, or coping resources available to them. Examinations, competition, family expectations, workload, concerns about grades, and career uncertainty can all create pressure. Students beginning medical education must adjust to dense material and unfamiliar learning arrangements. Those at later stages confront clinical preparation, research duties, and professional competency targets. Consequently, the sources and effects of stress may

differ across stages of study and may shape sleep in different ways.

A biological pathway also connects academic strain with sleep. Sustained stress activates the hypothalamic-pituitary-adrenal system and promotes cortisol release. When activation persists, circadian timing and physiological calm may be disrupted, making sleep onset and sleep maintenance more difficult. In the opposite direction, insufficient or fragmented sleep can impair attention, learning, recall, emotional regulation, and academic performance. Stress and sleep may therefore reinforce one another: pressure disrupts rest, while inadequate rest weakens the capacity to handle academic demands.

Academic pressure is only one influence on sleep. Bedtime screen exposure, caffeine intake, inconsistent schedules, low physical activity, noise, light, and room temperature can also impair rest. Students also differ in how they appraise stress and apply coping strategies. For that reason, the stress-sleep relationship should be interpreted within the behavioral, educational, and institutional setting in which students live and study.

Although sleep among medical students has been studied internationally, evidence from Indonesian medical schools remains comparatively limited, particularly for the Faculty of Medicine at Universitas Kristen Indonesia. This study addresses that gap in the 2022 cohort by applying two established measures. The Perception of Academic Stress Scale captures perceived academic demands and related pressures, whereas the Pittsburgh Sleep Quality Index assesses several aspects of subjective sleep. Using both instruments enables a cohort-specific evaluation of whether students' perceived academic strain is associated with their reported sleep condition.

The study therefore sought to describe levels of academic stress and sleep quality and to test their association among 2022 medical students at the Faculty of Medicine, Universitas Kristen Indonesia. The results may guide academic assistance, counseling, stress-management initiatives, and sleep-health education for this population.

## **METHODS**

### **Research Design and Setting**

A quantitative analytic observational approach with a cross-sectional design was applied. Academic stress served as the exposure variable and sleep quality as the outcome, with both measured during the same survey period. Participants were medical students in the 2022 cohort of the Faculty of Medicine, Universitas Kristen Indonesia. The structured questionnaire was administered online through Google Forms in February 2026.

### **Population and Sample**

The target population comprised active students in the university's 2022 medical cohort. Calculation with the Slovin formula yielded a minimum requirement of 61 participants. Purposive sampling was then used to recruit students who met the specified criteria. Seventy-one completed questionnaires qualified for the final dataset.

Eligible participants had to be active members of the 2022 medical cohort, provide informed consent, and answer every questionnaire item. Students from other cohorts, those with a physician-diagnosed sleep disorder, and respondents with incomplete submissions were not included.

### **Research Instruments**

Perceived academic stress was evaluated with the Perception of Academic Stress Scale, which covers perceived pressure, workload, examinations, expectations, and other learning-related stressors. The sample median of 56 was used as the cut-off. Scores up to and including 56 were assigned to the low-stress category, whereas scores above 56 were assigned to the high-stress category.

The Pittsburgh Sleep Quality Index was used to measure sleep quality across seven domains: subjective quality, latency, duration, habitual efficiency, sleep disturbance, sleeping-medication use, and daytime dysfunction. Domain scores were summed into a global score. Values of 0-5 represented good sleep, and values greater than 5 represented poor sleep.

### **Data Collection**

The online form contained the consent statement followed by the Perception of Academic Stress Scale and the Pittsburgh Sleep Quality Index. The survey link was sent only to potentially eligible

students. Before responding, students received an explanation of the purpose, procedures, possible benefits, voluntary nature of participation, and protection of personal information.

Consent was recorded on the opening page before access to the study questions. Participants then completed both instruments. Each submission was checked against the eligibility requirements and for missing answers, and only complete records from eligible students entered the analysis.

### Data Processing

Data preparation involved review, coding, entry, and cleaning. The review stage checked whether responses were complete and internally consistent. Numerical codes were then assigned in accordance with the scoring rules for both instruments. After entry into the Statistical Package for the Social Sciences, the dataset was screened for entry mistakes, duplicates, missing values, and contradictory records.

### Data Analysis and Hypothesis Testing

Univariate analysis summarized each principal variable. Because both variables were categorical, results were reported as counts and percentages.

Academic stress was grouped as low or high, while sleep quality was grouped as good or poor.

The bivariate analysis assessed whether the academic-stress categories differed in their distribution of sleep quality. Counts and percentages were arranged in a cross-tabulation, and the chi-square test was selected because the exposure and outcome were categorical. Fisher's exact test was designated as the alternative if chi-square assumptions were violated, especially when an expected cell count was below five. A p-value under 0.05 indicated statistical significance.

## RESULTS AND DISCUSSION

### Distribution of Academic Stress

The analysis covered 71 students enrolled in the 2022 medical cohort at Universitas Kristen Indonesia. Every included participant supplied complete responses to both PASS and PSQI.

PASS scores were split at the sample median of 56. Values no greater than 56 formed the low-stress group, and higher values formed the high-stress group. Table 1 summarizes the resulting distribution

Tabel 1 Distribution of Academic Stress

| Academic stress | Frequency (n) | Percentage (%) |
|-----------------|---------------|----------------|
| Low             | 36            | 50.7           |
| High            | 35            | 49.3           |
| Total           | 71            | 100.0          |

Thirty-six participants (50.7%) were placed in the low-stress category and 35 (49.3%) in the high-stress category. The near-even division reflects the median-based classification and shows that perceived academic pressure was substantial for almost half of the sample.

Medical education combines class meetings, practical work, clinical-skills activities, assessments, assignments, and self-directed learning. Managing these obligations requires effective control of time, emotions, and study priorities. Perceived stress can

still vary among students exposed to similar demands because workload appraisal, coping resources, social support, preparation, and personal expectations differ.

### Distribution of Sleep Quality

PSQI global scores of 0-5 were interpreted as good sleep, while scores above 5 were interpreted as poor sleep. Table 2 displays the frequency of each category.

Tabel 2 Distribution of Sleep Quality

| Sleep quality | Frequency (n) | Percentage (%) |
|---------------|---------------|----------------|
| Good          | 25            | 35.2           |
| Poor          | 46            | 64.8           |
| Total         | 71            | 100.0          |

Poor sleep was identified in 46 respondents (64.8%), compared with 25 respondents (35.2%) who had good sleep. Thus, nearly two thirds of this medical-student sample reported clinically relevant difficulty across the PSQI dimensions.

Several features of medical study may contribute to this result, including dense schedules, examinations, assignment deadlines, variable bedtimes, and studying late at night. The PSQI captures more than the number of hours slept. It also incorporates latency, efficiency, disruption during the night, use of sleep medication, and impairment during the day. Adequate duration can therefore coexist with poor overall sleep quality.

The predominance of poor sleep is broadly consistent with findings from other medical-student populations. Medical curricula require large amounts of information to be processed within short periods, which can encourage students to sacrifice rest to finish their work. Screen exposure, caffeine use, and unstable sleep-wake routines may compound this effect.

#### Association Between Academic Stress and Sleep Quality

The relationship between the two categorical variables was tested with chi-square analysis. Their joint distribution is shown in Table 3.

Tabel 3 Association Between Academic Stress and Sleep Quality

| Academic stress | Good sleep, n (%) | Poor sleep, n (%) | Total, n (%) |
|-----------------|-------------------|-------------------|--------------|
| Low             | 8 (22.2)          | 28 (77.8)         | 36 (100.0)   |
| High            | 17 (48.6)         | 18 (51.4)         | 35 (100.0)   |
| Total           | 25 (35.2)         | 46 (64.8)         | 71 (100.0)   |

The chi-square test returned  $p=0.020$ , which is below the pre-specified 0.05 threshold. The null hypothesis of no association was therefore rejected, indicating that sleep-quality distribution differed significantly between the academic-stress categories.

The cross-tabulation, however, shows an unexpected direction. Poor sleep affected 77.8% of the low-stress group but 51.4% of the high-stress group. The test establishes a difference between categories, yet it does not show a monotonic increase in poor sleep with higher stress in this sample. The result must not be taken to mean that low stress

produces poor sleep or that high stress offers protection.

#### Academic Stress and the Physiological Regulation of Sleep

One theoretical explanation for a stress-sleep link involves hypothalamic-pituitary-adrenal activity. Stress-related cortisol release raises physiological alertness. If this arousal continues into the night, it can delay sleep, increase awakenings, and reduce restoration. Repeated psychological activation may also disturb circadian regulation.

Inadequate rest can then diminish concentration, memory formation, emotional control, and academic functioning. These consequences may reduce a student's ability to organize and meet study obligations. The relationship may therefore be bidirectional: academic strain can impair sleep, and impaired sleep can weaken coping and heighten sensitivity to further pressure.

Despite the plausibility of this mechanism, the observed categories did not form a simple dose-response pattern. Students in the low-stress group more often reported poor sleep than those in the high-stress group. This divergence points to influences on sleep that were not captured by the dichotomized academic-stress measure.

### **Possible Explanations for the Observed Pattern**

Several explanations deserve consideration. Bedtime use of phones and computers can delay sleep through light exposure and continued mental engagement. Students may use these devices for study, communication, or leisure even when they perceive little academic pressure. Such behavior could worsen PSQI scores independently of the reported stress category.

Irregular timing offers another explanation. Frequently changing sleep and wake times may disturb circadian organization, lower sleep efficiency, and cause daytime drowsiness. These effects are possible in both stress groups and need not depend on students' appraisal of academic demands.

Other potential contributors include caffeine, insufficient exercise, late social activity, bedroom noise, temperature, lighting, physical discomfort, and psychological symptoms. The study did not measure these factors in sufficient detail to determine their contribution to the unexpected pattern.

PASS reflects respondents' own appraisal, which may not correspond perfectly to objective demand. Some students may label their stress as low after adapting to pressure, minimizing symptoms, or relying on avoidant coping. Students who acknowledge greater stress may, conversely, use

more deliberate scheduling and healthier sleep practices.

Dichotomizing scores at the sample median may also have shaped the result. This procedure created two groups of nearly equal size but discarded information contained in the original score range. Participants located just above and below 56 were assigned to different groups even though their perceived stress may have been very similar.

### **Comparison with Previous Findings**

Most earlier studies report that heavier academic stress accompanies worse sleep among medical students. Repeated assessments, competition, workload, and performance concerns can maintain psychological tension at night. This evidence is compatible with biological accounts involving higher cortisol, circadian disruption, and sustained arousal.

The present analysis similarly identified a statistically significant association, but the category pattern ran in the opposite direction from the usual expectation. Cohort-specific behavior, differing coping practices, unmeasured determinants of sleep, and use of the median cut-off may account for the discrepancy.

A significant p-value alone does not describe the direction, magnitude, or causal basis of an association. Chi-square analysis detects unequal categorical distributions. Interpretation therefore requires attention to the cell percentages, study design, measurement decisions, and relevant contextual factors.

### **Implications of the Findings**

With poor sleep affecting almost two thirds of participants, institutional support is warranted across the cohort rather than only for students who identify themselves as highly stressed. A low PASS category should not be assumed to indicate healthy sleep because behavioral, environmental, and psychological influences may remain present.

Practical responses could include instruction on sleep hygiene, time planning, moderate caffeine use, and reducing screen exposure near bedtime.

Accessible counseling and early screening could help identify persistent sleep problems and difficulties in coping. The faculty should also periodically examine the timing of assignments and assessments to avoid preventable concentration of academic demands.

### Study Limitations

The cross-sectional measurement prevents conclusions about temporal order or causation. Stress and sleep were recorded once, although both may fluctuate across different phases of a semester.

Online self-administration makes the findings dependent on participants' comprehension, recall, and candor, and researchers could not observe the completion process directly. Important sleep-related variables were also not measured comprehensively, including caffeine, screen behavior, exercise, mental health, bedroom conditions, and the intensity of practical or clinical activity.

Participants came from a single cohort at one institution, which limits transferability to other medical-student groups. Subsequent research should recruit broader samples, analyze continuous scores when suitable, adjust for plausible confounders, and follow students over time to capture changes in both stress and sleep.

### CONCLUSION

Poor sleep was frequent among the 71 students in the 2022 medical cohort at Universitas Kristen Indonesia. Forty-six participants (64.8%) had poor PSQI status and 25 (35.2%) had good status. Median splitting of PASS scores placed 36 students (50.7%) in the low-stress group and 35 (49.3%) in the high-stress group.

Sleep quality differed significantly by academic-stress category (chi-square  $p=0.020$ ), but the percentages did not match the expected gradient. Poor sleep affected 77.8% of those classified as having low stress and 51.4% of those classified as having high stress. This pattern suggests that academic stress alone is insufficient to account for sleep status. Sleep timing, device exposure, caffeine,

living conditions, lifestyle, and coping may have contributed.

These data demonstrate association, not causation, because exposure and outcome were measured at the same time. They provide no basis for claiming that low stress worsens sleep or that high stress improves it.

The Faculty of Medicine should combine sleep-health education with stress-management support, counseling, and periodic detection of sleep problems. Reviewing workload and examination calendars may help prevent excessive clustering. Students should be encouraged to keep consistent sleep times, plan study periods, avoid caffeine and screens close to bedtime, and seek professional help for persistent symptoms.

Further studies should cover several cohorts and institutions and explicitly measure caffeine intake, exercise, screen exposure, mental health, environmental conditions, and coping. Longitudinal designs and analyses that preserve continuous PASS and PSQI values would better clarify how the relationship develops and how strong it is.

### REFERENCES

- Akerstedt T, et al. Refreshing sleep and sleep continuity determine perceived sleep quality. *Sleep*. 2016
- Almojali AI, Almalki SA, Allothman AS, Masuadi EM, Alaqeel MK. The prevalence and association of stress with sleep quality among medical students. *J Epidemiol Glob Health*. 2017;7(3):169–174.
- Azad MC, Fraser K, Rumana N, Abdullah AF, Shahana N, Hanly PJ, Turin TC. Sleep disturbances among medical students: a global perspective. *J Clin Sleep Med*. 2015;11(1):69–74.
- Bedewy D, Gabriel A. Examining perceptions of academic stress and its sources among university students: The Perception of Academic Stress Scale. *Health Psychol Open*. 2015;2(2):2055102915596714. doi:10.1177/2055102915596714

- Buckley TM, Schatzberg AF. On the interactions of the hypothalamic-pituitary-adrenal (HPA) axis and sleep: normal HPA axis activity and circadian rhythm, exemplary sleep disorders. *J Clin Endocrinol Metab.* 2005;90(5):3106–14.
- Buyse,D.J., Reynolds,C.F., Monk,T.H., Berman,S.R., & Kupfer,D.J. (1989). The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. *Psychiatry Research*, 28(2), 193–213.
- Carskadon MA, Dement WC. Normal human sleep: an overview. In: Kryger MH, Roth T, Dement WC, editors. *Principles and Practice of Sleep Medicine*. 6th ed. Philadelphia: Elsevier; 2017. p. 15–24.
- Diekelmann, S., Born, J. Fungsi memori tidur. *Nat Rev Neurosci* 11 , 114–126 (2010). <https://doi.org/10.1038/nrn2762>
- Hall JE. *Guyton and Hall Textbook of Medical Physiology*. 14th ed. Philadelphia: Elsevier; 2021.
- Hershner SD, Chervin RD. Causes and consequences of sleepiness among college students. *Nat Sci Sleep*. 2014;6:73-84.
- Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, DonCarlos L, et al. National Sleep Foundation’s sleep time duration recommendations: methodology and results summary. *Sleep Health*. 2015;1(1):40–3.
- Irish LA, Kline CE, Gunn HE, Buysse DJ, Hall MH. The role of sleep hygiene in promoting public health. *Sleep Med Rev*. 2015;22:23–36.
- Irwin MR. Why sleep is important for health: a psychoneuroimmunology perspective. *Annu Rev Psychol*. 2015 Jan 3;66:143-72. doi: 10.1146/annurev-psych-010213-115205. Epub 2014 Jul 21. PMID: 25061767; PMCID: PMC4961463.
- Jahrami H, Dewald-Kaufmann J, AlAnsari A, Taha M, AlAnsari N. The worldwide prevalence of sleep problems among medical students by problem, country, and COVID-19 status: a systematic review, meta-analysis, and meta-regression of 109 studies involving 59,427 participants. *Curr Sleep Med Rep*. 2023.
- Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. *J Adolesc Health*. 2010;46(2):124–132.
- Manzar MD, BaHammam AS, Hameed UA, Spence DW, Pandi-Perumal SR, Moscovitch A. Measuring subjective sleep quality: a review. *Int J Environ Res Public Health*. 2021;18(3):1082.
- Mao Y, Zhang N, Liu J, Zhu B, He R, Wang X. Sleep quality in medical students: a comprehensive meta-analysis of observational studies. *Sleep Breath*. 2020;24(3):1151-1165.
- Medic G, Wille M, Hemels MEH. Short- and long-term health consequences of sleep disruption. *Nat Sci Sleep*. 2017;9:151-161.
- Nsengimana A, Mugabo E, Niyonsenga J, Hategekimana JC, Biracyaza E, Mutarambirwa R, Ngabo E, Nduwayezu R. Sleep quality among undergraduate medical students in Rwanda: a comparative study. *Sci Rep*. 2023 Jan 6;13(1):265. doi: 10.1038/s41598-023-27573-9. PMID: 36609680; PMCID: PMC9816533.
- Ohayon MM. Clinical and polysomnographic characteristics of insomnia. *Sleep Med Rev*. 2017;31:3-17.

Rao WW, Li W, Qi H, Hong L, Chen C, Li CY, Ng CH, Ungvari GS, Xiang YT. Sleep quality in medical students: a comprehensive meta-analysis of observational studies. *Sleep Breath*. 2020 Sep;24(3):1151-1165. doi: 10.1007/s11325-020-02020-5. Epub 2020 Feb 18. PMID: 32072469.

St-Onge MP, Grandner MA, Brown D, Conroy MB, Jean-Louis G, Coons M, et al. Sleep duration and quality: impact on lifestyle behaviors and cardiometabolic health. *Circulation*. 2016;134(18):e367-e386.

World Federation for Medical Education. Basic Medical Education WFME Global Standards for Quality Improvement. Copenhagen: WFME; 2020.