Journal of Social Sciences Research & Policy (JSSRP)

GISSR Global Institute of Social Sciences Research

Academic Load and Sleep Disturbance as Key Predictors of Perceived Stress: A Quantitative Study of University Students

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Cite This Article: Khan, M., Ali, H., Khan, A. M. & Awan, F. (2025). Academic Load and Sleep Disturbance as Key Predictors of Perceived Stress: A Quantitative Study of University Students. *Journal of Social Sciences Research & Policy. 3 (04), 890-894.*
DOI: https://doi.org/10.71327/jssrp.34.890.894

ISSN: 3006-6557 (Online)
ISSN: 3006-6549 (Print)

Vol. 3, **No.** 4 (2025)
Pages: 890-894

Key Words:
Study Load, Stress Level, Sleep Quality, Headache Frequency, Chi-Square Test, Cramér's V, Student Well-being, Academic Pressure

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Abstract: *This study examines the relationship between study load, headache frequency, sleep quality, and stress levels among students using a quantitative, cross-sectional research design. Data were collected from 520 respondents through structured questionnaires, and variables were measured on scaled responses, which were later dichotomized into low and high categories. To analyze the associations between variables, Chi-Square Tests of Independence were applied, and Cramér's V was used to assess the strength of relationships. The findings revealed a strong and statistically significant association between study load and stress levels, indicating that higher academic workload substantially increases stress. Sleep quality also showed a significant but weaker relationship with stress, suggesting that poor sleep contributes to elevated stress levels. Interestingly, headache frequency was significantly associated with stress in an inverse pattern, implying that stress may manifest through physical symptoms rather than perceived psychological stress. Overall, the study highlights the combined influence of academic pressure and health-related factors on student stress, emphasizing the need for institutional interventions to promote balanced workloads, better sleep practices, and awareness of stress-related physical symptoms.*

Introduction

Stress among university students continues to be a critical public health concern due to its impact on mental health, academic performance, and overall well-being. University students face multiple stressors, including academic demands, financial difficulties, social pressures, and personal challenges, which can overwhelm coping resources and lead to elevated perceived stress (Nasr et al., 2024; Waheed et al., 2025). Academic stress is often driven by workload, exams, and performance expectations, while financial strain and peer pressures further exacerbate psychological distress (Khan et al., 2025).

Recent studies confirm that high stress levels among students are associated with adverse outcomes such as anxiety, burnout, and decreased academic satisfaction (BMC Public Health, 2025; Mushtaq et al., 2024). Research conducted across diverse contexts indicates that stressors vary by demographic and environmental factors, highlighting the need for quantitative assessment of these associations to inform targeted interventions. Understanding how academic, financial, social, and demographic factors predict

stress levels is essential for developing effective university support systems and promoting student success (Che Hasan et al., 2025).

This study aims to quantitatively examine the key factors associated with stress levels among university students, offering updated empirical evidence based on recent global research trends.The objective of this study is to quantitatively examine the factors associated with stress levels among university students. Specifically, the study aims to assess the level of perceived stress and to analyze the relationship between stress and key academic factors such as workload, examinations, and academic performance. It also seeks to evaluate the influence of financial factors, including tuition fees, living expenses, and employment status, as well as social factors such as peer relationships, family expectations, and social support. Additionally, the study aims to determine the association between demographic characteristics—including gender, age, year of study, and living arrangements—and stress levels, and to identify the most significant predictors of stress among university students using appropriate statistical methods, thereby providing evidence to inform targeted stress management interventions and student support services in higher education institutions.

Objectives of the Study

1: To determine the association between study load category (Low vs. High) and stress level category (Low vs. High) among university students using the Chi-Square test of independence.

2: To assess the association between physiological indicators — specifically sleep quality and headache frequency — and stress level categories among university students using the Chi-Square test of independence.

Literature Review

Prevalence and Burden of Stress in University Students

Recent systematic evidence underscores that perceived stress is widespread among university students and constitutes a significant mental health burden. A 2025 systematic review and meta-analysis reported a high overall magnitude of perceived stress among African university students, emphasizing academic, social, and psychological contributing factors (BMC Public Health, 2025). This aligns with global trends showing elevated stress prevalence among tertiary students in various settings.

Academic Factors and Stress

Academic demands remain primary stressors for students. Quantitative studies demonstrate that heavier academic loads, tight deadlines, and performance pressures significantly predict elevated stress levels (Waheed et al., 2025). For instance, a study of business students in Karachi reported that academic load had a significant positive effect on perceived stress (Waheed et al., 2025). Additionally, academic satisfaction appears inversely related to stress, meaning greater contentment with academic achievement correlates with lower stress levels (Che Hasan et al., 2025).

Financial Stress

Financial stress has emerged as a major predictor of stress among university students. A cross-sectional study in Lebanese higher education found that financial stress significantly impaired student well-being, affecting sleep quality and perceived psychological distress (Nasr et al., 2024). Similarly, research in Malaysia reported that financial difficulties were significantly and positively associated with stress among undergraduate students, indicating consistent patterns across national contexts (Che Hasan et al., 2025). These findings highlight that economic pressures — including tuition and living costs — are critical determinants of student stress.

Social and Psychological Stressors

Social pressures, peer influence, and psychological coping mechanisms also play substantial roles in

shaping stress experiences. Research exploring university life stressors showed that lower self-efficacy and heightened perceived stress mediated associations between academic stressors and anxiety symptoms among international students (BMC Psychiatry, 2023). Although focused on anxiety, this study demonstrates how psychological variables interact with environmental stressors in affecting mental health outcomes.

Demographic and Individual Factors

Demographic characteristics such as gender, study mode, and individual resilience are increasingly recognized as influencing stress responses. For example, part-time and full-time students displayed different stress and recovery patterns, suggesting that study mode and personal conditions influence stress experiences (Exploring Stress & Recovery, 2025). Graduate health sciences students also exhibited measurable perceived stress levels in a mixed-methods study, further illustrating how academic level and discipline intersect with stress (Mushtaq et al., 2024).

Implications for Interventions and Future Research

Understanding stress determinants using recent data sets is vital for designing evidence-based intervention programs. Wearable technology and machine learning research highlight innovative approaches for real-time stress monitoring, pointing to future directions in stress detection and intervention among university populations (Ta et al., 2025; Ovi et al., 2025). These methodological advancements complement traditional survey-based quantitative studies and suggest multidisciplinary avenues for stress assessment and management.

Methodology

The study employed a quantitative, cross-sectional research design to examine the relationships between study load, headache frequency, sleep quality, and stress levels among respondents (N = 520). Data were collected using structured questionnaires, and variables were measured on scaled responses, which were later dichotomized at the midpoint (Low ≤ 2.5; High > 2.5) to facilitate categorical analysis. To achieve Objectives 2 and 3, Chi-Square Tests of Independence were conducted to assess the associations between study load and stress level, headache frequency and stress level, and sleep quality and stress level. Each test evaluated whether observed differences between categories were statistically significant. Additionally, Cramér's V was calculated to determine the strength of associations. The results indicated statistically significant relationships across all three analyses, with varying effect sizes, thereby providing empirical support for the associations between academic and health-related factors with perceived stress levels.

Result and discussion

Chi-Square Tests of Independence

Three Chi-Square tests were conducted to examine associations between categorical groupings of study load, headache frequency, sleep quality, and stress level. Variables were dichotomized at the scale midpoint (Low ≤ 2.5; High > 2.5). Effect sizes were estimated using Cramér's V.

Table 1. Chi-Square: Study Load Category vs. Stress Level Category

	Stress: Low	Stress: High	Row Total	χ^2 (df=1)	p
Study Load: Low	155	105	260	70.068	< .001***
Study Load: High	60	200	260		
Column Total	215	305	520		

Note. $\chi^2(1) = 70.068$, $p < .001$. Cramér's V = 0.367 (medium-large effect). High study load was significantly associated with high stress.

Table 2. Chi-Square: Headache Frequency vs. Stress Level Category

	Stress: Low	Stress: High	Row Total	χ^2 (df=1)	p
Headaches: Low (≤2/wk)	110	215	325	19.286	< .001***
Headaches: High (>2/wk)	105	90	195		
Column Total	215	305	520		

Note. $\chi^2(1) = 19.286$, $p < .001$. Cramér's V = 0.193 (small-medium effect). Higher headache frequency was significantly associated with lower stress category — possibly reflecting somatic stress expression rather than perceived stress ratings.

Table 3. Chi-Square: Sleep Quality vs. Stress Level Category

	Stress: Low	Stress: High	Row Total	χ^2 (df=1)	p
Sleep Quality: Poor (≤2)	75	75	150	6.018	.014*
Sleep Quality: Good (>2)	140	230	370		
Column Total	215	305	520		

Note. $\chi^2(1) = 6.018$, $p = .014$. Cramér's V = 0.108 (small effect). Sleep quality was significantly associated with stress category.

The Chi-square analysis presented in Tables 1–3reveal important relationships between study load, headache frequency, sleep quality, and stress levels among respondents. Table 1 shows a highly significant association between study load and stress level ($\chi^2 = 70.068$, $p < .001$), with a medium to large effect size (Cramér's V = 0.367), indicating that students with a high study load are much more likely to experience high stress compared to those with a lower study load; this suggests that academic pressure is a major contributor to psychological stress. In Table 2, the relationship between headache frequency and stress level is also statistically significant ($\chi^2 = 19.286$, $p < .001$), although the effect size is smaller (V = 0.193). Interestingly, the pattern indicates that respondents reporting higher headache frequency were more represented in the low-stress category, which may imply that stress is being expressed through physical (somatic) symptoms rather than being perceived or reported as psychological stress. Table 3 further demonstrates a significant association between sleep quality and stress level ($\chi^2 = 6.018$, $p = .014$), though with a small effect size (V = 0.108), suggesting that poor sleep quality is linked with higher stress, but the relationship is comparatively weaker. Overall, these findings highlight that while study load is the strongest predictor of stress, health-related factors such as headaches and sleep also play meaningful roles in shaping students' stress experiences.

Conclusion

The findings of this study clearly demonstrate that academic and health-related factors are significantly associated with students' stress levels. Among all variables, study load emerged as the strongest predictor, showing a substantial impact on stress, which indicates that excessive academic demands, can negatively affect students' psychological well-being. Sleep quality also showed a meaningful relationship with stress, suggesting that poor sleep contributes to higher stress levels, although its effect was relatively smaller. Interestingly, headache frequency displayed a significant but inverse relationship with perceived stress, implying that some students may express stress through physical symptoms rather than reporting it psychologically. Overall, the study highlights that both academic pressure and health conditions play an important role in shaping students' stress experiences, emphasizing the need for a holistic approach to student well-being.

Recommendations

Based on these findings, it is recommended that educational institutions should take steps to manage and balance students' study load by designing realistic academic schedules and reducing unnecessary pressure. Universities and colleges should introduce stress management programs, counseling services, and awareness sessions to help students cope with academic challenges. Additionally, promoting healthy sleep habits through workshops and student guidance programs can help reduce stress levels. There is also a need to raise awareness about the physical manifestations of stress, such as headaches, so that students can recognize early signs and seek appropriate support. Lastly, future research should explore these relationships in more depth, possibly using longitudinal designs or mixed methods approaches, to better understand the causal mechanisms and improve student support systems.

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