

Relationship Between Sleep Quality and Perceived Stress among Undergraduates of a Selected Nonstate Sector Higher Education Institute in Sri Lanka

Kushan Anthony^{1*}, Hiranga Wijedasa¹, Chathuri Samarasinghe¹, Sheroshi Gunawardhana¹, Hasun Wanigasinghe¹, Dinith De Silva¹

¹*Faculty of Humanities and Sciences, Sri Lanka Institute of Information Technology, Malabe, 10115, Sri Lanka.*

Corresponding author*: kushan.an@sliit.lk

Abstract

Sleep is a fundamental determinant of health, and good sleep quality is positively linked to overall well-being. Stress, as a physiological response, can adversely affect health when experienced at high or prolonged levels. Due to various reasons, undergraduates often have poor sleep quality and a high level of stress. Therefore, it is important to assess the relationship between sleep quality and perceived stress level among undergraduate students in Sri Lanka. This study was conducted to assess the relationship between perceived stress and sleep quality among undergraduates in a selected non-state sector higher educational institute in the country. A cross-sectional descriptive study was conducted from December 2024 to March 2025. The study targeted undergraduates at the Sri Lanka Institute of Information Technology across all faculties. A total of 106 participants were recruited using a simple random sampling technique. Ethical Clearance was obtained. Validated data collection tools: Pittsburgh Sleep Quality Index (PSQI) and Perceived Stress Scale (PSS) along were shared via email as an anonymized Google Form for data collection. Jamovi (Version 2.6) software was used for data analysis. Perceived Stress levels significantly differed across sleep quality groups [$\chi^2(3) = 12.50, p = .006, \epsilon^2 = 0.119$], with students reporting “fairly bad” sleep showing higher stress compared to those with “very good” sleep ($W = -4.286, p = .013$). Accommodation type appeared to influence sleep quality, with boarding and home residents reporting better sleep, while no significant differences were observed for age or year of study. The study found that higher stress was significantly associated with poorer sleep quality among undergraduates, underscoring the need for further research to inform strategies that promote student well-being.

Keywords: Sleep quality; Perceived stress; Undergraduates; Higher education

Introduction

Sleep is a complex and dynamic state characterized by reduced responsiveness to external stimuli and distinct physiological changes (Tagliazucchi, Behrens & Laufs, 2013). This process is a crucial component of physical and mental well-being. Sleep quality refers to the subjective experience of sleep, including factors such as sleep duration, continuity, depth, and efficiency. Good sleep quality is characterized by falling asleep fast, remaining sleeping the entire night, having restorative sleep, and waking up feeling aware and invigorated (Harvey et al., 2008).

Studies repeatedly demonstrate that the amount of required sleep duration varies with age (Sun & Singh, 2021). Most healthy adults require at least more than six hours of sleep duration each night, while infants

and children need comparatively more hours (Sun & Singh, 2021). The National Sleep Foundation and the American Academy of Sleep Medicine recommend 7-9 hours of sleep for young adults (Hirshkowitz et al., 2015) and 8-10 hours for teenagers (Paruthi et al., 2016). Enough restful sleep is essential for cognitive function, emotional control, and physiological restoration, which are necessary for optimum performance in the academic, social, and personal spheres (Walker, 2019). Lund et al. (2010) found that poor sleep quality is prevalent among undergraduates, with over 60% reporting disturbed sleep. In addition, low-quality sleep, which is defined as frequent awakenings, short sleep durations, and non-restorative sleep, has been associated with a number of negative consequences, such as decreased emotional resilience, impaired cognitive function, and increased vulnerability to both physical and mental health issues (Hirshkowitz et al., 2015). In addition, poor quality of sleep can also negatively affect academic performance, as students who sleep less often achieve lower grades (Raley et al., 2016).

Perceived stress, defined as the degree to which situations in one's life are appraised as stressful, playing a crucial role in shaping individuals' psychological and physiological responses to challenges and demands (Cohen, Kamarck & Mermelstein, 1983). While a certain amount of stress is a natural and adaptive reaction to life's challenges, extremes of stress can negatively impact health (McEwen & Gianaros, 2011).

Students enrolled in a college or university who are seeking their first academic degree typically a bachelor's degree, are known as undergraduates. In recent years scholars, educators, and legislators have garnered increasing attention to undergraduates' well-being. Due to the rigors of academic life, undergraduates often have poor sleep quality, marked by irregular patterns and brief durations. This can be linked to a reduced quality of life when it comes to one's physical and mental health (Carpi, Cianfarani & Vestri, 2022). This is often exacerbated by high levels of stress, which can disrupt the natural sleep-wake cycle (Hu, Ye, & Tan, 2021). Since the adjustment to university life represents a critical turning point in both academic and personal development, it is critical to comprehend the variables affecting students' mental health, cognitive abilities, and general well-being. Among these, perceived stress and the quality of sleep have come to be recognized as important predictors of students' academic life and overall health.

There is a complicated and reciprocal relationship between perceived stress and the quality of one's sleep (Kalmbach, Anderson & Drake, 2018). High levels of stress can have a disadvantageous effect on sleep quality, while poor sleep can raise perceived stress levels. Studies have indicated that people who have trouble sleeping are more prone to feel anxiety, stress, and mood swings. Conversely, insufficient sleep has been connected to several detrimental effects, such as mental health issues, poorer performance in universities, and a lower quality of life (Hershner and Chervin, 2014). Against this backdrop, the well-being of undergraduate students in Sri Lanka is influenced by a complicated web of variables that affect how well they sleep and how stressed they are. Undergraduates from Sri Lanka face particular difficulties navigating their academic and personal growth as they adjust to university life. Poor sleep quality can also be exacerbated by the adjustment to university life, which includes living with peers and adjusting to a new academic schedule (Foulkes, McMillan & Gregory, 2019). Even though research on these topics is expanding worldwide, a significant gap in the literature remains about sleep quality and perceived stress among undergraduate students in Sri Lanka. Only a limited studies have explicitly looked at the association between sleep disruptions and stress perception among Sri Lankan undergraduates. Thus, this study aims to fill the gap by examining the connection between perceived stress and sleep quality among Sri Lankan undergraduates in a selected university.

Sri Lanka Institute of Information Technology (SLIIT) is a leading non-state higher educational institute in Sri Lanka. SLIIT's main campus, located in Malabe, was chosen for this study because it provides a diverse population of students from various socioeconomic backgrounds. The study aims to evaluate the level of perceived stress among undergraduates and assess the quality of sleep among undergraduates using validated tools to explore the relationship between sleep quality and perceived stress among university students. This study offers valuable insights into the correlation and factors that influence sleep quality and perceived stress among Sri Lankan undergraduates, thereby contributing to the advancement of student health and well-being in the higher education sector of the country.

Materials and Methods

This cross-sectional descriptive study was conducted in the SLIIT Malabe campus from November 2024 to January 2025. The study population consists of the first year, second year, third year and fourth year undergraduates of the SLIIT studying in the Faculty of Computing, the Faculty of Engineering, School of Business and Faculty of Humanities & Sciences. Students outside the typical undergraduates' age range (18 below or over 25 years) and those with medical conditions affecting sleep were excluded.

The sample size was calculated using a standard approach for finite populations, following the methodology outlined by Krejcie and Morgan (1970). The initial sample size (n_0) was calculated by using Cochran's formula for estimating a population proportion for a large population (Cochran, 1977), where $z = 1.96$ (the critical value for 5% significance level), $p=0.5$ (a conservative estimate assumed for maximum variability when the true proportion is unknown), and $e = 0.05$ (margin of error):

$$n_0 = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2} = \frac{(1.96)^2 \cdot 0.5 \cdot (1 - 0.5)}{(0.05)^2} = 384.16 \approx 385$$

Since the SLIIT undergraduate population is finite ($N = 16,000$), the sample size was adjusted using the standard finite population correction to determine n , the minimum required sample size (Cochran, 1977).

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}} = \frac{385}{1 + \frac{385 - 1}{16000}} = 375.98 \approx 376$$

As observed in similar educational studies (Khan, Altaf, & Kausar, 2013), the sample size was increased by 5% to account for potential non-response and incomplete data. The final sample size was calculated to be $376(1 + 0.05) = 394.8 \approx 395$.

A simple random sampling technique was employed to select participants from the total undergraduate population. Despite multiple follow-ups, only 106 completed responses were obtained and included in the final data analysis.

Data Collection Tools

The Pittsburgh Sleep Quality Index (PSQI) is used to assess sleep quality. There are seven component values, ranging from 0 (no difficulty) to 3 (severe difficulty). This global score, ranging from 0 to 21, is calculated by adding the component scores. The worst sleep quality is indicated by the highest score. The Perceived Stress Scale (PSS) was used to assess the perceived level of stress. The obtained mark ranged from 0-13, considered as low stress, 14-26 as moderate stress, and 27-40 as high level of perceived stress. The self-administered questionnaire, including validated PSS, PSQI, and a few questions to obtain demographic data, is shared via email. The information sheet was provided in the participant's native language (English, Sinhala, or Tamil). All participants were made aware of the study, and informed written consent was obtained prior to data collection. When a participant does not respond to the consent-providing inquiry, the Google form is configured to prevent submission. Ethical approval is obtained from the Ethics Review Committee of the Faculty of Humanities and Sciences, SLIIT (Ref. No: 2024-7-7)

Results

Jamovi (Version 2.6) and Microsoft Excel software were used to analyse the data. A total of 106 eligible responses were received. Participants ranged in age from 16 to 27 years (Mean = 22.4, SD = 2.3) and represented all four academic years (1st year = 23.4%, 2nd year = 24.3%, 3rd year = 38.3%, and 4th year = 13.1%). The majority were female (63.2%).

More than half of the participants reported having no bed partner or roommate (62.9%), while 22.9% shared a room but not a bed, and only 5.7% reported sharing the same bed. Regarding their place of residence, 52.8% lived at home, 40.6% in boarding places, 4.7% in annexes, and 1.9% with relatives.

The mean Perceived Stress Scale (PSS) score was 22.2 (SD = 5.23), with scores ranging from 5 to 40. In terms of sleep quality, 51.9% described their sleep as fairly good, 26.4% as very good, 17.0% as fairly bad, and 4.7% as very bad. Comparing the mean PSS score with groupings for overall sleep quality during the past month, Figure 1 visually suggests differences between some groups, particularly between the "Fairly bad" and "Very good" & "Fairly good" categories, which was confirmed through nonparametric statistical testing. A Shapiro-Wilk test indicated a significant deviation from normality, $W = 0.950$, $p < .001$, violating the assumption of normality. Therefore, a Kruskal-Wallis H test was conducted, revealing a statistically significant difference in median scores among the four groups, $\chi^2(3) = 12.50$, $p = .006$, with a moderate-to-large effect size, $\varepsilon^2 = 0.119$. Post hoc analysis using the Dwass-Steel-Critchlow-Fligner method showed a significant difference between the "Fairly bad" and "Very good" groups ($W = -4.286$, $p = .013$), and a marginally significant difference between the "Fairly bad" and "Fairly good" groups ($W = -3.624$, $p = .051$), while all other pairwise comparisons were not statistically significant ($p > .05$).

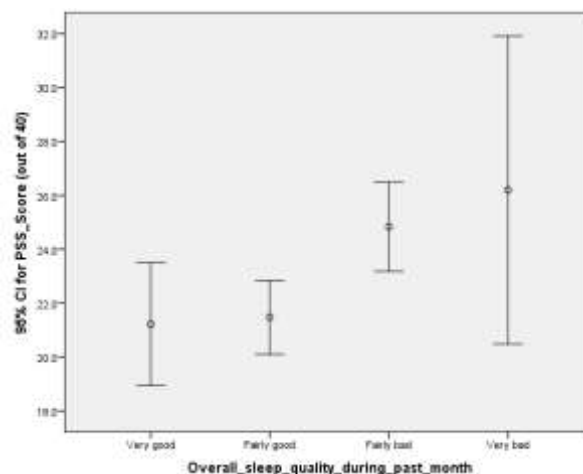


Figure 1: Means plot of the PSS score with 95% confidence intervals for the four overall sleep quality categories

The bar graph (figure 2) illustrates the number of individuals reporting sleep quality as "Very good," "Fairly good," "Fairly bad," and "Very bad" across four accommodation types: Annex, Boarding, Home, and Relatives' house. "Very good" sleep quality was most frequently reported in Boarding and Home settings, while Annex and Relatives' house showed lower counts.

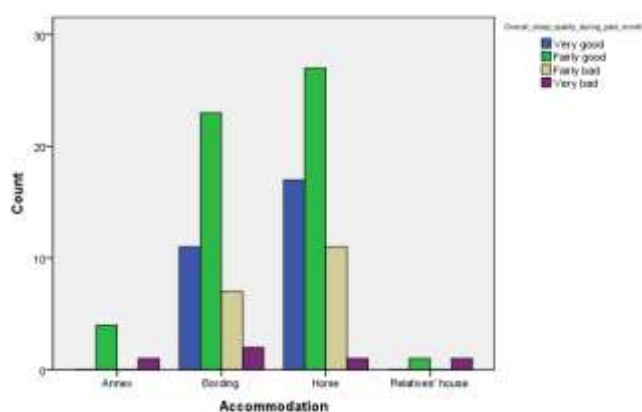


Figure 2: Distribution of overall sleep quality during the past month across different types of accommodation.

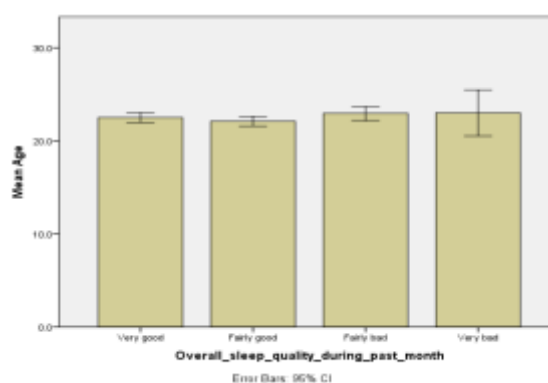


Figure 3: Mean age of individuals based on overall sleep quality during the past month. The bar graph displays the average age for each sleep quality category - "Very good," "Fairly good," "Fairly bad," and "Very bad" - with error bars representing 95% confidence intervals.

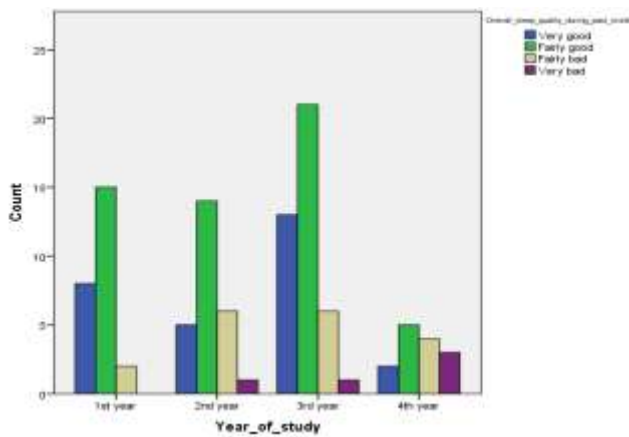


Figure 4: Distribution of overall sleep quality during the past month across different year groups

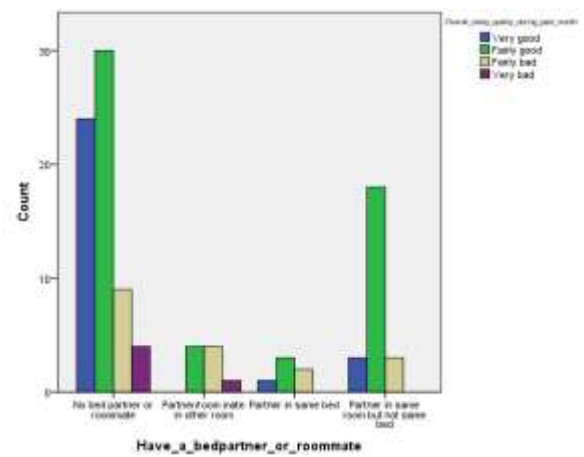


Figure 5: Distribution of overall sleep quality during the past month across different bed/room - sharing arrangements.

As shown in the figure 3, there was no significant difference was found between the age group and overall sleep quality during the previous month. Figure 4 showed that there may be an association between the year of study and perceived sleep quality for the past month. A Pearson's chi-square test was conducted to assess this association, $\chi^2(9, N=106) = 16.02$, $p = 0.066$. However, the assumption of expected cell size was violated ($50\% < 5$, minimum = 0.66). To account for this, a Monte Carlo simulation with 10,000 samples was performed, yielding a marginally lower but still non-significant result, $p = .059$, 99% CI [.052, .065]. No strong evidence of a statistically significant association was found.

According to figure 5, Most participants without a partner or roommate reported good sleep, with over 80% rating it very good or fairly good. Those with a partner in another room mainly reported fairly good (50%) or fairly bad (38%) sleep. For participants sharing the same bed, sleep quality was mixed, with only 14% rating it very good. Meanwhile, among those with a partner in the same room but a separate bed, two-thirds reported fairly good sleep, and the rest were split between very good and fairly bad.

Discussion and Conclusion

The analysis examined demographic, contextual, and psychological factors in relation to self-reported sleep quality. Age showed no significant differences across sleep quality categories, suggesting it was not a key determinant. Accommodation type also mattered: students in boarding houses or at home reported better sleep than those in annexes or with relatives, likely reflecting differences in stability and comfort. The academic year showed a possible association, with chi-square and Monte Carlo tests approaching significance ($p \approx .06$), suggesting that academic demands may play a role. Finally, bed/room-sharing was linked to poorer or more variable sleep, particularly when sharing with a partner, supporting prior evidence that co-sleeping affects sleep continuity. In contrast, stress measured by the PSS was strongly associated with sleep quality. Participants with "Fairly bad" sleep reported significantly higher stress than those with "Very good" or "Fairly good" sleep.

The findings highlight the central role of stress in influencing sleep quality, while demographic and environmental factors showed more limited associations. The comparison of PSS scores across sleep quality groups revealed significant differences, with students who reported "very good" sleep showing lower stress levels compared to those with "fairly bad" sleep. This supports the bidirectional relationship between stress and sleep quality noted in prior research, where stress disrupts sleep regulation and insufficient sleep exacerbates stress responses (Lund et al., 2010; Saleh et al., 2017). The moderate-to-large effect observed in the present study suggests that stress is a meaningful determinant of sleep outcomes in this population, consistent with findings that poor sleep among students contributes to impaired academic performance, decreased concentration, and health complaints (Curcio et al., 2006; Hershner & Chervin, 2014).

In terms of age and year of study, no statistically significant differences in sleep quality were found. This may reflect the relatively narrow age range of undergraduates, where lifestyle and psychosocial stressors play a more prominent role than chronological age (Becker et al., 2015; Misra & Castillo, 2004). The near-significant chi-square association between year of study and sleep quality suggests a possible trend, whereas some studies report that senior students face increasing sleep problems due to clinical or academic demands (Eliasson et al., 2010).

Analysis of accommodation type suggested some variation, with clearer data from students living at home or in hostels, but insufficient cases from annexes and relatives' homes. Previous research highlights how living conditions such as noise, privacy, and peer influences shape sleep behaviour in students (Buboltz, Brown & Soper, 2001; Dusselier et al., 2005). The relationship between bed partner/roommate status and sleep quality was notable. Students without a bed partner or roommate reported the best sleep quality, while those sharing a bed reported more variability and lower proportions of "very good" sleep. This aligns with evidence that bed-sharing can introduce disturbances due to mismatched schedules, movement, or noise (Troxel et al., 2007; Schlarb et al., 2017). Interestingly, those sharing a room but not the same bed generally reported fairly good sleep, suggesting that companionship may provide psychological comfort. Overall, the findings underscore the complex and multifactorial nature of sleep among students. Stress emerged as the most consistent factor linked to poorer sleep, echoing prior work showing that academic stress is a major predictor of sleep problems in higher education (Khan, Altaf, & Kausar, 2013; Santanam & Ramesh, 2019).

This study highlights a significant association between perceived stress and sleep quality among undergraduates, with students reporting "fairly bad" sleep experiencing higher stress compared to those with "very good" sleep. While accommodation type appeared to influence sleep quality, no significant differences were observed in relation to age or the year of study. The use of validated instruments is a strength of this study. Limitations are also noted, such as reliance on self-reported data, small subgroup sizes, and a cross-sectional design. Longitudinal research with larger and more diverse samples could be recommended to clarify how psychosocial, environmental, and interpersonal factors interact to shape stress and sleep quality among student populations, thereby informing targeted strategies to enhance academic performance and the overall well-being of the students.

References

- Buboltz, W. C., Brown, F., & Soper, B. (2001). Sleep habits and patterns of college students: A preliminary study. *Journal of American College Health*, 50(3), 131–135. <https://doi.org/10.1080/07448480109596017>
- Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). *Perceived Stress Scale* [Database record]. APA PsycTests. <https://doi.org/10.1037/t02889-000>
- Curcio, G., Ferrara, M., & De Gennaro, L. (2006). Sleep loss, learning capacity and academic performance. *Sleep Medicine Reviews*, 10(5), 323–337. <https://doi.org/10.1016/j.smr.2005.11.001>
- Dusselier, L., Dunn, B., Wang, Y., Shelley, M. C., & Whalen, D. F. (2005). Personal, health, academic, and environmental predictors of stress for residence hall students. *Journal of American College Health*, 54(1), 15–24. <https://doi.org/10.3200/JACH.54.1.15-24>
- Hershner, S. D., & Chervin, R. D. (2014). Causes and consequences of sleepiness among college students. *Nature and Science of Sleep*, 6, 73–84. <https://doi.org/10.2147/NSS.S62907>
- Khan, M. J., Altaf, S., & Kausar, H. (2013). Effect of perceived academic stress on students' performance. *FWU Journal of Social Sciences*, 7(2), 146–151. <https://www.semanticscholar.org/paper/Effect-of-Perceived-Academic-Stress-on-Students%27-Khan-Altaf/2dd7f75b6077c297425fdfe49c244add63e46027>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610. <https://doi.org/10.1177/001316447003000308>

- Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep patterns and predictors of disturbed sleep in college students. *Journal of Adolescent Health, 46*(2), 124–132. <https://doi.org/10.1016/j.jadohealth.2009.06.016>
- Misra, R., & Castillo, L. G. (2004). Academic stress among college students: Comparison of American and international students. *International Journal of Stress Management, 11*(2), 132–148. <https://doi.org/10.1037/1072-5245.11.2.132>
- Saleh, D., Camart, N., & Romo, L. (2017). Predictors of stress in college students. *Frontiers in Psychology, 8*, 19. <https://doi.org/10.3389/fpsyg.2017.00019>
- Santanam, P., & Ramesh, B. M. (2019). A study of academic stress among college students. *International Journal of Research and Analytical Reviews, 6*(2), 224–228. <https://www.researchgate.net/publication/333100556>
- Schlarb, A. A., Friedrich, A., & Claßen, M. (2017). Sleep problems in university students: An intervention. *Neuropsychiatric Disease and Treatment, 13*, 1989–2001. <https://doi.org/10.2147/NDT.S142067>
- The jamovi project (2024). *jamovi*. (Version 2.6) [Computer Software]. Retrieved from <https://www.jamovi.org>.