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Original Research

Self-reported sleep quality and perceived stress among students: A simulated cross-sectional analysis#

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#DEMONSTRATION MANUSCRIPT — ALL STUDY DATA ARE SIMULATED

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ABSTRACT

Sleep quality and psychological stress may interact with learning conditions, social support, and daily routines among university students. This demonstration article presents a cross-sectional analysis of 300 entirely simulated student records. In the synthetic dataset, 42.0% were classified as having poor sleep quality and 36.7% reported high perceived stress; poor sleep was more frequent among students with high stress and late-night screen use. The findings are illustrative only and do not describe actual students. The paper demonstrates how student-health research can report measures, descriptive results, limitations, and practical implications without overstating cross-sectional associations.

1. Introduction

Sleep supports attention, memory consolidation, emotional regulation, and physical health. University students may experience irregular schedules, academic demands, social transitions, and nighttime device use that affect sleep timing and perceived restfulness. Research has documented sleep problems among college populations, although prevalence estimates vary with instruments, settings, and sampling methods (Hershner & Chervin, 2014; Lund et al., 2010). Perceived stress is the appraisal that demands exceed available coping resources. Stress and sleep may influence each other: worry can delay sleep onset, while insufficient or disrupted sleep may make everyday demands feel harder to manage. The Pittsburgh Sleep Quality Index (PSQI) and Perceived Stress Scale (PSS) are widely used instruments, but interpretation requires attention to scoring, cultural adaptation, and validation (Buysse et al., 1989; Cohen et al., 1983). This demonstration study shows how a cross-sectional student survey might examine the distribution of sleep quality and stress, and whether sleep quality differs across stress and nighttime screen-use groups. All numerical values are synthetic and should not be treated as evidence about any real institution.

2. Materials and Methods

A hypothetical cross-sectional survey was represented by 300 synthetic student records. No real participants were recruited. Variables included age band, year of study, self-reported nighttime screen use, a PSQI-like sleep score, and a PSS-like stress score. For demonstration, a sleep score above 5 was classified as poor sleep, following the commonly used PSQI threshold (Buysse et al., 1989); high stress was defined using an illustrative cut-point on a PSS-like score and is not a clinical diagnosis. Nighttime screen use was defined as device use during the hour before intended sleep on at least five nights per week. Frequencies and percentages were summarised, and group comparisons were used descriptively. Because the data were simulated, no p-values are reported as inferen-

Table 1. Characteristics of the synthetic student sample.

Characteristic	Synthetic sample (n=300)
Age 18–20 years	112 (37.3%)
Age 21–24 years	151 (50.3%)
Age ≥25 years	37 (12.3%)
Frequent nighttime screen use	174 (58.0%)
High perceived stress	110 (36.7%)

Table 2. Illustrative poor-sleep proportions by selected characteristics.

Group	Poor sleep, n/N	Poor sleep (%)
High perceived stress	68/110	61.8
Lower/moderate perceived stress	58/190	30.5
Frequent nighttime screen use	88/174	50.6
No frequent nighttime screen use	38/126	30.2

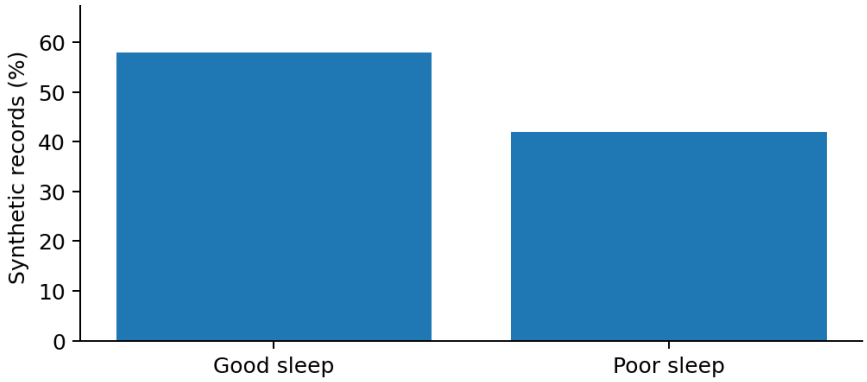


Figure 2. Characteristics of the synthetic student sample (Note. All plotted values are synthetic and for demonstration only).

tial evidence and no causal claims are made. A real study would need informed consent, ethics approval, validated local-language instruments, a sampling frame, and a plan to address confounding, non-response, and possible common-method bias.

3. Results

Among the 300 synthetic records, 126 (42.0%) were classified as having poor sleep quality, 110 (36.7%) as having high perceived stress, and 174 (58.0%) as reporting frequent nighttime screen use. Poor sleep was present in 61.8% of the high-stress group compared with 30.0% of the remaining records. It was also more frequent among those reporting frequent nighttime screen use than among those who did not. These are constructed patterns used to demonstrate presentation of results; they do not estimate prevalence or association in a real student population. Table 1 describes the synthetic sample and Table 2 summarizes sleep quality by stress and screen-use categories. Figure 1 presents the distribution of sleep classification, while Figure 2 compares poor-sleep proportions across selected groups. The pattern illustrates how tables and figures can complement one another without repeating every value in the text.

4. Discussion

The simulated results illustrate a plausible relationship between perceived stress and sleep quality, consistent with the broader literature on student sleep and mental well-being (Hershner & Chervin, 2014; Lund et al., 2010). However, cross-sectional data cannot determine directionality. Stress may disrupt sleep, sleep disruption may increase perceived stress, or both may reflect workload, financial strain, health conditions, living environment, or other factors. Self-report measures can also introduce recall and reporting bias. Universities can consider low-barrier supports such as sleep-health education, access to counseling, workload planning, and quiet, safe sleeping environments. Digital-device advice should avoid simplistic claims that screens alone explain sleep problems; timing, content, light exposure, individual sensitivity, and competing stressors may all matter. Screening programs should provide pathways to care rather than label students based on a single score.The main limitation is that every observation is synthetic. The paper therefore demonstrates methods and structure

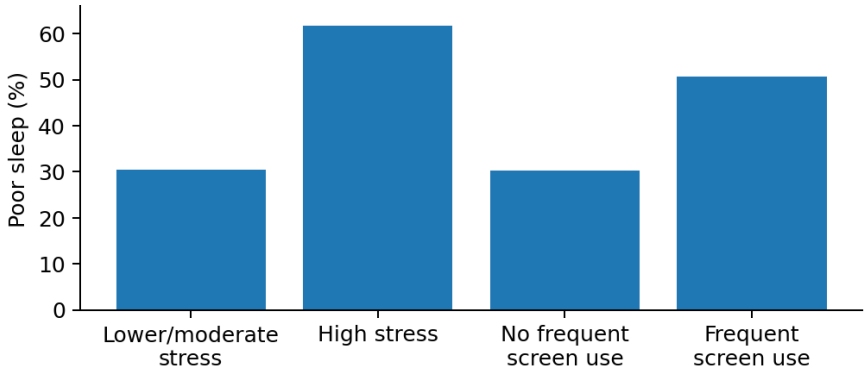


Figure 2. Illustrative poor-sleep proportions by selected characteristics (Note. All plotted values are synthetic and for demonstration only).

rather than providing new empirical evidence. Future research should use validated instruments, representative sampling across faculties and year groups, and longitudinal designs to examine temporal relationships. Where feasible, self-report could be complemented by sleep diaries or actigraphy, while protecting student privacy.

5. Conclusion

This demonstration shows a transparent way to report student sleep and stress measures. The synthetic patterns support no real-world prevalence claim; actual research should use validated measures, ethical oversight, and designs capable of examining temporal relationships.

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