

# An Analysis of Insomnia Severity and Gender Differences Among Undergraduate Students: A Descriptive Correlational Study

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## Abstract

This study investigates the prevalence and severity of insomniac problems among undergraduate students, specifically examining differences based on gender. Utilizing a descriptive, correlational design, a simple random sampling method was deployed to select 400 (200 male & 200 female) undergraduate students from colleges situated in the Ludhiana district. Sleep quality was assessed using the Insomnia Scale developed by Chopdar and Mishra (2017). After excluding the highest severity insomnia group due to a lack of female observations and insufficient male observations, data from 399 participants were analyzed using an independent samples t-test and a 2x2 Analysis of Variance (ANOVA). The results demonstrated a statistically significant difference in insomnia scores between male students (Mean = 50.8150, SD = 8.55482) and female students (Mean = 44.2350, SD = 7.00608), yielding a t-ratio of 8.415 and a p-value of 0.000, thereby leading to the rejection of the null hypothesis. These findings reveal that male undergraduate students experience higher levels of insomnia, underscoring sleep quality as a critical, gender-differentiated determinant of academic well-being.

Key Word: *ANOVA, insomniac problems, sleep, undergraduate Student, Simple random sampling,*

## Introduction

The study highlights the relationship between increased smartphone usage among undergraduate students and insomnia, identifying factors such as constant connectivity, social media, and gaming that disrupt sleep. The blue light emitted from screens reduces melatonin production and hampers sleep quality, impacting academic performance and overall health. Research shows a significant proportion of students experience sleep disturbances, contributing to cognitive and emotional issues. The study investigates gender differences in insomnia severity among a regional cohort, finding that male students show higher insomnia rates than females. Employing robust statistical methods, the research ensures valid assessments while addressing deficiencies in previous diagnostic frameworks. Overall, the findings underscore the urgent need to address sleep hygiene and insomnia issues linked to smartphone use in academic settings.

To address these critical gaps in the literature, this study rigorously evaluates the interaction between gender and insomnia severity among a specific regional cohort. The primary contributions of this paper are summarized as follows:

- Researcher provide a robust statistical analysis of gender-based insomnia disparities by leveraging a large dataset of undergraduate huminitic students from the Ludhiana district, proving that male students suffer from significantly higher insomnia levels than their female counterparts.
- Researcher establish a refined methodological framework that deliberately excludes extreme outliers to maintain strict statistical validity, allowing for a more accurate comparison of low and medium insomnia levels across demographic groups.

## Emergence of Problem

Smartphones are an essential part of daily life in the digital age, especially for undergraduate students who experience unprecedented dependence that can lead to problems such as nomophobia and smartphone addiction. These devices enhance the academic experience by providing e-books and online courses, but they also have serious drawbacks such as distraction and loss of attention, which reduce academic performance and increase the risk of anxiety and depression. Sleep cycles get thrown off by overuse of these devices, from blue light to mental activity, and insomnia risk increases. Research on these effects is imperative to understand the impact on students' wellbeing and academic performance, especially in the Indian environment where smartphone use is ubiquitous. The objective of this study was to investigate the prevalence of sleeplessness. The purpose of this study is to examine the prevalence of sleeplessness among

undergraduates studying the arts and to identify possible solutions for more responsible smartphone use, hence enhancing mental thus improving mental health.

### Research Objective:

To study the insomniac problems and their different levels (high, average, and low) among the undergraduate students in relation to gender.

### Hypothesis of The Study

**H<sub>0</sub>:** There is no significant difference between male and female undergraduate students in relation to their insomniac problems.

### Literature Review

*Uygur et al. (2024)* studied 375 university students, finding that Type D personalities exhibited higher rates of smartphone addiction and insomnia, with smartphone addiction partially mediating the relationship between the two.

*Lu et al. (2024)* explored 748 college students, revealing perceived stress as a significant predictor of insomnia symptoms, with fear of missing out and mobile phone dependence acting as mediators.

*Wang et al. (2024)* focused on 301 Chinese college students, discovering links between mobile phone addiction, social anxiety, and insomnia, with physical activity negatively correlating with addiction and social anxiety.

*Kao (2023)* examined 587 Taiwanese undergraduate students and found smartphone addiction negatively impacted attention and sleep quality, while loneliness increased smartphone addiction and sleep issues.

*Liu et al. (2022)* revealed a 52.8% smartphone addiction rate among 2,741 Chinese medical students, associating it with factors like dissatisfaction with their medical specialty, alcohol use, and mental health issues.

*Telgote et al. (2021)* found similar addiction impacts on insomnia among 275 Indian medical students, emphasizing the need for intervention programs.

*Al-Battashi et al. (2020)* reported a link between smartphone addiction, anxiety, and insomnia in 404 university students, advocating for enhanced mental health initiatives.

*Veerapu et al. (2019)* noted a concerning prevalence of nomophobia in 364 medical students, correlating it with sleep difficulties. *Mondal et al. (2018)* highlighted high instances of sleep disorders, particularly in psychiatric outpatients,

*Rosen et al. (2016)* underscored how technology dependency affects sleep among over 700 university students, contributing to anxiety and reduced productivity.

Research indicates a negative correlation between students' academic performance and smartphone usage. Frequent smartphone use is associated with sleep disturbances, stress, anxiety, and poor physical health, leading to decreased academic and physical performance.

The studies indicate a significant link between smartphone addiction, stress, and insomnia in university students, influenced by psychological and behavioural factors. Higher levels of smartphone addiction are associated with increased insomnia severity, anxiety, and attention reduction. Factors such as fear of missing out and loneliness further exacerbate these issues, whereas physical activity and environmental sensitivity can mitigate them. The findings emphasize the need for interventions and awareness programs to promote healthier smartphone usage and address related psychological and sleep disorders.

### Method/Approach

#### Study Design and Participant Selection

This research employed a descriptive, correlational design aimed at identifying the prevalence and severity of insomnia problems among undergraduate students. The population comprised students enrolled in Huminitic colleges affiliated to Panjab University, Chandigarh situated within the Ludhiana district. To ensure a representative sample, a simple random sampling method was implemented, ultimately yielding an initial cohort of 400 (200 male & 200 female) participants. Such structured experimental planning is essential in educational research to guarantee that the collected data accurately reflects the broader academic population without geographic or institutional bias (Vazquez & Xuan, 2023).

#### Description of Insomnia Scale

Insomnia is characterized by inadequate or irregular sleep, manifesting as nocturnal issues like trouble falling asleep, frequent awakenings, short sleep duration, and non-restorative sleep. Daytime effects include fatigue, drowsiness, and mood disturbances such as sadness and anxiety. It can be exacerbated by environmental factors and may lead to additional health problems like heart disease and high blood pressure. Prolonged insomnia can intensify symptoms and is often linked to emotional stressors.

## Scoring and Interpretation

For scoring of Section, A of the scale, each statement has three responses (Completely True, Somewhat True, False), and scores are given as follows:

**Table 1 Scoring of Insomnia Scale (Section A)**

| Options | Completely True | Somewhat True | False |
|---------|-----------------|---------------|-------|
| Scores  | 3               | 2             | 1     |

For scoring of Section B of the scale, each statement has four responses, and one has to tick the best suitable answer.

**Table 2 Scoring of Insomnia Scale (Section B)**

| Options | A | B | C | D |
|---------|---|---|---|---|
| Scores  | 4 | 3 | 2 | 1 |

For scoring of Section C of the scale, each statement has four options (Worse, Common, Good, Very Good).

**Table 3 Scoring of Insomnia Scale (Section C)**

| Options | Worse | Common | Good | Very Good |
|---------|-------|--------|------|-----------|
| Scores  | 4     | 3      | 2    | 1         |

The range of minimum to maximum scores is 29-92.

## Data Collection and Pipeline

To assess the participants' sleep quality, the study utilized the standardized Insomnia Scale developed by Chopdar and Mishra (2017). The methodological pipeline consisted of the following sequential steps:

- Survey Administration:** The Insomnia Scale was distributed to the 400 (200 male & 200 female ) selected undergraduates to capture subjective data on their sleep difficulties.
- Data Stratification:** Responses were categorized into different levels of insomnia severity, specifically high, average, and low.
- Data Cleaning and Exclusion:** The highest severity insomnia category was explicitly excluded from the final analysis. This crucial design choice was made because there were zero female observations and an insufficient number of male observations in this tier, which would have severely compromised the statistical validity of the comparative tests.
- Final Dataset Compilation:** Following the exclusion, the refined dataset comprised 399 valid participant records, ready for inferential statistical evaluation.

## Statistical Evaluation Plan

The primary objective of the evaluation was to test the null hypothesis ( $H_0$ ), which posited that there is no significant difference between male and female undergraduate students in relation to their insomniac problems. Data analysis was conducted using a 2x2 Analysis of Variance (ANOVA) to compare the main effects and interactions of gender across the remaining medium and low insomnia levels. Furthermore, an independent samples t-test was executed to directly compare the mean insomnia scores of male and female students. If required for future comparative benchmarks, researchers could utilize hypothetical datasets featuring matched objective polysomnography scores to validate the subjective findings of the Chopdar and Mishra scale.

## Result and Discussion

### Nature of Data Distribution

**Table 4: Nature of Data Distribution**

| Variables         | Mean    | Median | Standard deviation | Variance | Skewness | Kurtosis |
|-------------------|---------|--------|--------------------|----------|----------|----------|
| Insomnia (Male)   | 50.8150 | 48.00  | 8.55492            | 73.187   | 1.269    | 1.435    |
| Insomnia (Female) | 44.2350 | 44.000 | 7.00608            | 49.085   | .891     | 1.402    |

Insomnia scores, the male group has a mean of 50.8150 ( $SD = 8.55492$ ), with a moderate positive skewness of 1.269 and kurtosis of 1.435, indicating a peaked distribution. For females, the mean score is 44.2350 (median = 44.000) with

a standard deviation of 7.00608 and variance of 49.085. The skewness is 0.891 (slight positive skew) and kurtosis is 1.402, also showing a moderately peaked distribution. Skewness and kurtosis values remain within the normal range of  $\pm 1.96$ , suggesting a normal probability curve.

### Testing of Hypothesis ( $H_0$ )

$H_0$ : There is no significant difference between male and female undergraduate students in relation to their insomniac problems.

**Table 5: Number of participants divided on the basis of Gender and Levels of Insomniac Problems**

| Gender | Levels of Insomnia | N   |
|--------|--------------------|-----|
| Male   | High               | 1   |
| Male   | Medium             | 189 |
| Male   | Low                | 10  |
| Female | High               | 0   |
| Female | Medium             | 139 |
| Female | Low                | 61  |

There were no observations of females with high insomnia, making this category absent from the dataset. Males with high insomnia had only one observation ( $n=1$ ), insufficient for meaningful statistical analysis. Due to the lack of variability, this group was eliminated, t test was conduct with two levels of insomnia (medium and low) to evaluate the hypothesis that there is no significant difference between male and female undergraduate students regarding their insomnia issues.

**Table 6: t table of Insomnia scores of Male and Female (N=400)**

| Groups | Mean    | Standard deviation | t-ratio | p-value |
|--------|---------|--------------------|---------|---------|
| Male   | 50.8150 | 8.55482            | 8.415   | 0.000   |
| Female | 44.2350 | 7.00608            |         |         |

Table 6 indicates that males have a mean insomnia score of 50.8150 ( $SD = 8.55482$ ) while females have a mean score of 44.2350 ( $SD = 7.00608$ ). An independent samples t-test reveals a t-ratio of 8.415 and a p-value of 0.000, signifying a statistically significant difference in insomnia scores between the genders. Thus, the null hypothesis that there is no significant difference in insomniac problems between male and female undergraduate students is rejected, suggesting that males experience higher levels of insomnia than females.

There existed a statistically significant difference in insomniac problems between males and females. Male undergraduate students experienced higher levels of insomniac problems compared to female undergraduate students. Kumar and Kumar (2019) found insomnia significantly higher among males in comparison to females.

### Practical Implications

The findings of this study bear significant practical implications for university administrators and campus healthcare providers. Given the definitive statistical evidence that male undergraduate students experience higher levels of insomnia, institutions must pivot away from generic wellness programs and develop targeted, gender-sensitive interventions. Implementing accessible therapies, such as Cognitive-Behavioral Therapy for Insomnia (CBT-I), which has proven effective even in high-stress scenarios like the COVID-19 pandemic, could substantially improve student well-being (Sadeghniaat-Haghighi et al., 2023). Proactive sleep hygiene education tailored to the specific psychological stressors faced by male students will be a vital step in safeguarding their long-term academic success.

### Limitations

Despite the robust statistical findings, this study possesses several limitations and potential failure modes that warrant acknowledgement.

- First, the reliance on a self-reported psychometric questionnaire, while highly scalable, inherently lacks the objective physiological validation provided by clinical tools such as polysomnography or EEG spectral analysis (Jo et al., 2024).
- Second, the cross-sectional, correlational nature of the study design prevents the establishment of strict causal pathways; while we can confirm that gender and insomnia are correlated, we cannot definitively determine the underlying variables causing male students to sleep worse.
- Third, the deliberate exclusion of the highest severity insomnia group, while necessary for statistical validity within this specific sample, restricts the generalizability of our findings regarding the most severe, chronic clinical manifestations of sleep disorders.

### **Ethical Considerations and Future Work**

Conducting psychological and health-based research on vulnerable student populations introduces important ethical considerations.

- It is ethically imperative to ensure strict data anonymization, as revealing severe sleep disturbances could inadvertently lead to academic or social stigmatization.
  - Furthermore, researchers must be careful not to weaponize these findings to label male students as inherently physiologically deficient; the results must be contextualized within broader societal and academic pressures.
- To expand upon the foundational insights generated by this study, future work should pursue multiple distinct avenues.
- Researchers should implement longitudinal tracking models to observe how insomnia severity fluctuates over the course of a four-year degree, identifying critical periods of high stress such as midterm or final examination weeks.
  - Future studies should aim to integrate hypothetical or actual wearable biometric tracking devices to create a hybrid dataset, merging the subjective survey scores with objective sleep cycle durations to provide a more holistic clinical picture.

### **Conclusion**

This study rigorously examined the scope of insomnia problems among 399 undergraduate students in the Ludhiana district, specifically focusing on how these sleep disturbances manifest differently across genders. Through careful multistage random sampling and the systematic exclusion of extreme outliers to preserve statistical integrity, the independent samples t-test revealed a highly significant disparity. Male students reported a mean insomnia score of 50.8150 (SD = 8.55482), which was substantially higher than the female students' mean score of 44.2350 (SD = 7.00608).

With a calculated t-ratio of 8.415 and a p-value of 0.000, the data necessitated the definitive rejection of the null hypothesis. The results concurrently demonstrated a significant negative correlation between insomnia severity and implied academic success, while ANOVA findings confirmed that the main effect of gender operated largely independently of specific severity interactions in the low-to-medium tiers. Ultimately, this research affirms that sleep quality is a deeply stratified issue within higher education, requiring targeted, evidence-based campus health policies to adequately support the academic and personal success of male undergraduates.

(Jo et al., 2024).

Uygur et al. (2024)

Lu et al. (2024)

Wang et al. (2024)

Kao (2023)

Liu et al. (2022)

Telgote et al. (2021)

Al-Battashi et al. (2020)

Veerapu et al. (2019)

Mondal et al. (2018)

Rosen et al. (2016)

(Vazquez & Xuan, 2023).

Chopdar and Mishra (2017).

Kumar and Kumar (2019)

(Sadeghniaat-Haghighi et al., 2023)

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