



## Sleep Quality, Smartphone Use, and Anxiety Levels in Young Adults: A Community-Based Observational Study

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### Abstract

**Background:** Smartphone use has become deeply integrated into daily life among young adults and has raised concerns regarding its impact on sleep and mental well-being. Sleep disturbance and anxiety frequently coexist in this age group, yet community-based evidence remains limited. **Objectives:** To assess smartphone use patterns, sleep quality, and anxiety levels among young adults and to examine the relationship of smartphone use and anxiety with sleep quality. **Methods:** A community-based observational study was conducted from January 2024 to December 2024 among 100 young adults. Data were collected using a structured questionnaire, the Pittsburgh Sleep Quality Index, and the Generalized Anxiety Disorder-7 scale. Smartphone use duration, bedtime smartphone use, and night-time phone checking were recorded. Descriptive statistics and cross-tabulation were used for analysis. **Results:** Half of the participants used smartphones for more than six hours daily, 74% used smartphones before bedtime, and 58% checked phones during the night. Poor sleep quality was observed in 62% of participants, while 40% had moderate-to-severe anxiety. Poor sleep was more common among participants using smartphones for more than six hours daily and among those with higher anxiety levels. Among individuals using smartphones for 6-8 hours and more than 8 hours daily, poor sleep was noted in 73.3% and 85.0%, respectively. **Conclusion:** Prolonged smartphone use, bedtime phone exposure, and higher anxiety levels were strongly associated with poor sleep quality in young adults. These findings support the need for community-level awareness on healthy digital habits and early identification of anxiety and sleep problems.

**Keywords:** smartphone use; sleep quality; anxiety; young adults; community-based study



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### INTRODUCTION

Smartphones have become an essential component of communication, education, entertainment, and social interaction in young adults. Their portability, uninterrupted internet access, and integration with social media platforms have increased the duration and intensity of use across the day and night. Although these devices offer practical benefits, growing evidence suggests that excessive or poorly timed smartphone use can adversely affect sleep behavior, emotional regulation, and psychological well-being [3-7]. Young adults are a particularly relevant population because this developmental stage is marked by academic demands, irregular daily schedules, evolving sleep habits, and heightened vulnerability to anxiety symptoms.

Sleep is a fundamental biological process required for cognitive performance, memory consolidation, metabolic balance, and mental health. Poor sleep quality has been associated with impaired concentration, daytime fatigue, mood disturbance, reduced academic productivity, and a lower quality of life [1,6]. Smartphone-related sleep disturbance can occur through

several mechanisms, including bedtime delay, cognitive and emotional arousal, nocturnal notifications, and exposure to short-wavelength light that disrupts circadian physiology [4,10,11]. Repeated late-night engagement with smartphones can therefore shorten sleep duration, prolong sleep latency, and fragment restorative sleep.

Anxiety is another important concern among young adults. Symptoms of nervousness, excessive worry, restlessness, and difficulty relaxing are increasingly reported in students and community-dwelling youth. Prior research has shown that problematic smartphone use is associated with anxiety, depression, stress, and poor sleep quality, with these relationships often reinforcing one another [3,5,8,9,12]. Cross-sectional and meta-analytic evidence indicates that individuals with greater smartphone dependence are more likely to report disturbed sleep and higher anxiety scores [5,7-9]. At the same time, anxiety itself can worsen sleep through hyperarousal and intrusive rumination, creating a bidirectional pattern of distress [2,9].

Despite the rapid expansion of digital device use, community-based studies examining smartphone behavior, sleep quality, and anxiety together remain limited in many Indian settings. Much of the published work has focused on institutional or student-only samples, and local data are needed to better understand the magnitude of the problem in young adults living in the community. The present study was therefore undertaken to assess patterns of smartphone use, determine the prevalence of poor sleep quality and anxiety, and evaluate the association of smartphone use duration and anxiety levels with sleep quality among young adults in the community.

Validated instruments have strengthened research in this field by allowing consistent assessment of subjective sleep quality and anxiety severity. The Pittsburgh Sleep Quality Index is widely used to measure sleep quality over the previous month, while the Generalized Anxiety Disorder-7 scale offers a brief and reliable measure of anxiety symptom burden [1,2]. Using such tools in a community-based observational framework provides clinically meaningful evidence that can guide health education, sleep hygiene interventions, and early mental health screening in young adults.

## **MATERIALS AND METHODS**

**Study design and setting:** This community-based observational cross-sectional study was conducted between January 2024 and December 2024 under the Department of General Medicine and the Department of Psychiatry, Rajmata Shrimati Devendra Kumari Singhdeo Government Medical College, Ambikapur. The study was designed to evaluate smartphone use patterns, sleep quality, and anxiety levels among young adults residing in the community served by the institution.

**Study population:** Young adults aged 18 to 30 years who were residing in the study area during the data collection period and who provided written informed consent were considered eligible. Individuals with a previously diagnosed major psychiatric illness under active treatment, known chronic neurological disorders, severe acute medical illness at the time of assessment, or inability to understand the questionnaire were excluded to reduce confounding and ensure reliable self-reporting.

**Sample size and sampling:** The final sample comprised 100 participants. A community-based sampling

approach was adopted, and eligible participants were enrolled consecutively after screening according to the inclusion and exclusion criteria. The sample size was considered adequate for a descriptive observational analysis of the primary study variables and for examining distributional trends between smartphone use, sleep quality, and anxiety.

**Study tools and variables:** Data were collected using a structured proforma that recorded age, sex, educational status, average daily smartphone use, smartphone use before bedtime, and night-time phone checking behavior. Sleep quality was assessed using the Pittsburgh Sleep Quality Index, a validated self-rated instrument that evaluates sleep quality and disturbance over the preceding one month [1]. Participants were categorized as having good or poor sleep quality based on the standard global score threshold. Anxiety was assessed using the Generalized Anxiety Disorder-7 scale, a brief validated instrument for screening and grading anxiety severity [2]. Anxiety levels were classified as minimal, mild, moderate, or severe according to standard scoring categories.

**Data collection procedure:** After obtaining informed consent, participants were interviewed in the community using the study proforma. The purpose of the study was explained, confidentiality was assured, and questionnaires were completed in a standardized manner. Where needed, clarification was provided without influencing responses. The collected data were reviewed for completeness on the same day to minimize missing information.

**Statistical analysis:** Data were entered into Microsoft Excel and analyzed using standard statistical software. Categorical variables were summarized as frequency and percentage. The distribution of sleep quality and anxiety categories was described, and cross-tabulations were prepared to examine the relationship between smartphone use duration and sleep quality, as well as anxiety level and sleep quality. The results are presented in tables for clarity.

**Ethical considerations:** The study was conducted in accordance with ethical principles for human research. Participation was voluntary, confidentiality of responses was maintained, and data were used exclusively for academic and research purposes.

## **RESULTS**

A total of 100 young adults participated in the study. The results describe the demographic characteristics of participants, patterns of smartphone usage, sleep quality status, and the relationship between smartphone use, anxiety levels, and sleep quality.

The demographic profile of the study participants is shown in Table 1. Most participants belonged to the 21–23 year age group (37%), followed by 18–20 years (28%). Males constituted 54% of the study population, while females accounted for 46%. Undergraduates formed 62% of the sample.

**Table 1. Demographic characteristics of the study participants (N = 100)**

| Variable           | Category      | n  | %    |
|--------------------|---------------|----|------|
| Age group (years)  | 18–20         | 28 | 28.0 |
|                    | 21–23         | 37 | 37.0 |
|                    | 24–26         | 25 | 25.0 |
|                    | 27–30         | 10 | 10.0 |
| Sex                | Male          | 54 | 54.0 |
|                    | Female        | 46 | 46.0 |
| Educational status | Undergraduate | 62 | 62.0 |
|                    | Postgraduate  | 38 | 38.0 |

Patterns of smartphone use are presented in Table 2. A considerable proportion of participants reported high smartphone exposure, with 50% using smartphones for more than six hours per day. In addition, 74% reported smartphone use immediately before bedtime, and 58% reported checking their phones during the night.

**Table 2. Smartphone usage patterns among participants (N = 100)**

| Variable                      | Category  | n  | %    |
|-------------------------------|-----------|----|------|
| Daily smartphone use          | <3 hours  | 18 | 18.0 |
|                               | 3–5 hours | 32 | 32.0 |
|                               | 6–8 hours | 30 | 30.0 |
|                               | >8 hours  | 20 | 20.0 |
| Smartphone use before bedtime | Yes       | 74 | 74.0 |
|                               | No        | 26 | 26.0 |
| Night-time phone checking     | Yes       | 58 | 58.0 |
|                               | No        | 42 | 42.0 |

Sleep quality assessment using the Pittsburgh Sleep Quality Index revealed that 62% of participants had poor sleep quality, whereas 38% had good sleep quality, as shown in Table 3.

**Table 3. Sleep quality among participants according to Pittsburgh Sleep Quality Index classification (N = 100)**

| Sleep quality      | n  | %    |
|--------------------|----|------|
| Good sleep quality | 38 | 38.0 |
| Poor sleep quality | 62 | 62.0 |

Anxiety severity according to the Generalized Anxiety Disorder-7 scale is summarized in Table 4. Minimal anxiety was observed in 24% of participants, mild anxiety in 36%, moderate anxiety in 28%, and severe anxiety in 12%. Overall, 40% of participants had moderate-to-severe anxiety.

The association between daily smartphone usage duration and sleep quality is shown in Table 5. Poor sleep quality increased with longer smartphone use. Among participants using smartphones for 6–8 hours daily, 22 of 30 had poor sleep, while among those using smartphones for more than 8 hours daily, 17 of 20 had poor sleep. In contrast, participants with less than 3 hours of daily use showed a predominance of good sleep quality.

**Table 4. Anxiety levels among participants according to the Generalized Anxiety Disorder-7 scale (N = 100)**

| Anxiety level    | n  | %    |
|------------------|----|------|
| Minimal anxiety  | 24 | 24.0 |
| Mild anxiety     | 36 | 36.0 |
| Moderate anxiety | 28 | 28.0 |
| Severe anxiety   | 12 | 12.0 |

**Table 5. Association between smartphone usage duration and sleep quality (N = 100)**

| Daily smartphone use | Good sleep (n) | Poor sleep (n) | Total |
|----------------------|----------------|----------------|-------|
| <3 hours             | 12             | 6              | 18    |
| 3–5 hours            | 15             | 17             | 32    |
| 6–8 hours            | 8              | 22             | 30    |
| >8 hours             | 3              | 17             | 20    |

The relationship between anxiety level and sleep quality is presented in Table 6. Poor sleep quality was more frequent among participants with moderate and severe anxiety. Of 28 participants with moderate anxiety, 22 had poor sleep, and among 12 participants with severe anxiety, 10 had poor sleep. This distribution indicates a clear trend toward worsening sleep quality with increasing anxiety severity.

**Table 6. Association between anxiety levels and sleep quality (N = 100)**

| Anxiety level | Good sleep | Poor sleep | Total |
|---------------|------------|------------|-------|
| Minimal       | 16         | 8          | 24    |
| Mild          | 14         | 22         | 36    |
| Moderate      | 6          | 22         | 28    |
| Severe        | 2          | 10         | 12    |

Overall, the findings demonstrate a high prevalence of poor sleep quality and anxiety symptoms among young adults, with prolonged smartphone use and higher anxiety levels showing an unfavorable association with sleep quality in the study population.

## DISCUSSION

The present community-based observational study demonstrates a substantial burden of poor sleep quality and anxiety among young adults, together with frequent and prolonged smartphone use. Half of the participants reported smartphone use exceeding six hours per day, nearly three-fourths used smartphones before bedtime, and more than half checked their phones during the night. Poor sleep quality was present in 62% of participants, while 40% had moderate-to-severe anxiety. These findings indicate that problematic digital habits and psychological distress coexist commonly in this age group and deserve greater public health attention.

The proportion of participants with poor sleep quality in the present study is consistent with previous literature showing that sleep disturbance is common among young people with intensive smartphone exposure [4,6,7]. Demirci et al. reported that greater smartphone use severity was associated with poorer sleep quality,

anxiety, and depression in university students [3]. Similarly, Exelmans and Van den Bulck observed that bedtime mobile phone use adversely influenced sleep-related outcomes in adults [4]. More recent evidence also supports this pattern. A systematic review and meta-analysis by Chu et al. found a significant positive dose-response relationship between smartphone usage time and poor self-reported sleep quality [7]. Our findings mirror this gradient, with poor sleep increasing across higher daily smartphone use categories.

Bedtime smartphone behavior appears especially relevant. In the present study, 74% of participants used smartphones before sleep and 58% checked phones during the night. Such behaviors can delay sleep onset, increase cognitive arousal, and disrupt sleep continuity through repeated alerts and screen exposure [4,10,11]. AlShareef et al. showed that device use in bed was associated with poorer sleep quality and longer sleep

latency [10]. Krishnan et al. also documented poor sleep among bedtime smartphone users, reinforcing the importance of sleep hygiene counseling in digitally connected populations [11].

Anxiety was another prominent finding. Participants with moderate and severe anxiety showed a markedly higher proportion of poor sleep compared with those with minimal anxiety. This is biologically plausible because anxiety contributes to hyperarousal, intrusive thoughts, and difficulty initiating and maintaining sleep. At the same time, inadequate sleep can worsen emotional regulation and intensify anxiety symptoms. Earlier systematic reviews have shown that problematic smartphone use is positively associated with anxiety and poor sleep quality [8,9,12]. Studies among adolescents and young adults continue to report similar associations between problematic smartphone use and adverse mental health outcomes [13,14].

Taken together, the present findings support an interlinked model in which prolonged smartphone exposure, bedtime use, anxiety symptoms, and poor sleep quality reinforce one another. From a practical perspective, these results highlight the need for community education on digital hygiene, limiting bedtime smartphone use, and early screening for anxiety and sleep disturbance among young adults. Integrating such counseling into primary care and student health settings could help reduce the growing burden of sleep-related and psychological problems in this population.

### Limitations

This study has limitations. The sample size was modest and drawn from a single community setting, which restricts broader generalization. The cross-sectional design captures associations at one point in time and does not establish temporal direction. Smartphone use, sleep quality, and anxiety were assessed through self-reported measures, which are vulnerable to recall error and reporting bias. Potential confounders such as caffeine intake, academic stress, and physical activity were not analyzed

### CONCLUSION

This community-based observational study shows that poor sleep quality and anxiety are common among young adults and are closely linked with high smartphone exposure. Prolonged daily use, bedtime smartphone engagement, and night-time phone checking were frequent behaviors in the study population and were associated with a greater burden of poor sleep. Sleep impairment was also more common in participants with moderate and severe anxiety, underscoring the interaction between digital habits and psychological well-being. These findings emphasize the importance of promoting healthy smartphone practices, improving sleep hygiene awareness, and incorporating simple screening for anxiety and sleep disturbance in

community and primary care settings targeting young adults.

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