



Association of Problematic Smartphone Use with Sleep Quality and Hygiene: A Study in University Students

Problemlı Akıllı Telefon Kullanımının Uyku Kalitesi ve Uyku Hijyeni ile İlişkisi: Üniversite Öğrencileri Üzerine Bir Çalışma

Seher Karahan¹, Ezgi Ağadayı¹, Yasemin Alagöz²

¹Sivas Cumhuriyet University Faculty of Medicine, Department of Medical Education, Sivas, Türkiye

²Sivas Numune Hospital, Clinic of Family Medicine, Sivas, Türkiye

Abstract

Objective: The university period is a time characterized by significant lifestyle and psychological changes, during which smartphone use is widespread and often excessive. The aim of this study was to examine the relationship between smartphone addiction, sleep quality, and sleep hygiene.

Materials and Methods: This descriptive cross-sectional study was conducted with 408 students. Data were collected through face-to-face surveys, including a sociodemographic form, the Smartphone Addiction Scale (SAS)-Short Form, the Pittsburgh Sleep Quality Index, and the Sleep Hygiene Index (SHI).

Results: The mean age was 20.7 ± 1.9 years; 48.5% were male. According to SAS, 34.3% had smartphone addiction. Poor sleep quality was observed in 81.9% overall and 91.4% among those with addiction. SHI scores were significantly higher in addicted students.

Conclusion: Smartphone addiction is prevalent and negatively affects sleep quality and hygiene. Poor sleep hygiene is associated with low sleep quality. Promoting healthy screen use and sleep habits is essential to support student well-being.

Keywords: Students, smartphone, internet addiction disorder, sleep, sleep hygiene

Öz

Amaç: Üniversite dönemi, yaşam tarzı ve psikolojik değişimlerin yoğun yaşandığı bir süreç olup akıllı telefon kullanımının yaygın ve çoğu zaman aşırı olduğu bir dönemdir. Bu çalışmanın amacı, akıllı telefon bağımlılığı ile uyku kalitesi ve uyku hijyeni arasındaki ilişkiyi incelemektir.

Gereç ve Yöntem: Bu tanımlayıcı kesitsel çalışma, 408 üniversite öğrencisiyle yürütülmüştür. Veriler, yüzyüze uygulanan anketler aracılığıyla toplanmıştır. Anket formları; sosyodemografik özellikler, Akıllı Telefon Bağımlılığı Ölçeği (ATBÖ)-Kısa Versiyonu, Pittsburgh Uyku Kalitesi İndeksi ve Uyku Hijyeni İndeksi (UHI)'ni içermektedir.

Bulgular: Katılımcıların yaş ortalaması 20,7 ± 1,9 yıldır ve %48,5'i erkektir. ATBÖ sonuçlarına göre öğrencilerin %34,3'ünde akıllı telefon bağımlılığı saptanmıştır. Genel olarak katılımcıların %81,9'unda, akıllı telefon bağımlılığı olan grupta ise %91,4'ünde kötü uyku kalitesi görülmüştür. UHI puanları akıllı telefon bağımlılığı olan öğrencilerde anlamlı düzeyde daha yüksektir.

Sonuç: Akıllı telefon bağımlılığı yaygın olup, uyku kalitesi ve hijyenini olumsuz etkilemektedir. Kötü uyku hijyeni, düşük uyku kalitesiyle ilişkilidir. Öğrencilerin sağlığını desteklemek için sağlıklı ekran kullanımı ve uyku alışkanlıklarının teşvik edilmesi önemlidir.

Anahtar Kelimeler: Öğrenciler, akıllı telefon, internet bağımlılığı, bozukluğu, uyku, uyku hijyeni

Introduction

In recent years, smartphones have become one of the most prominent technological tools in the daily lives of university students (1). Functioning similarly to computers, these devices support a wide range of activities such as social interaction,

entertainment, and access to information by providing constant internet access (2). The rapid development of technology and the widespread availability of smartphones have led to a global increase in their use (3). The multifunctional nature of smartphones contributes to their widespread adoption among university students (4). However, excessive participation in

Address for Correspondence/Yazışma Adresi: Yasemin Alagöz, Sivas Numune Hospital, Clinic of Family Medicine, Sivas, Türkiye

E-mail: alagozyasemin01@gmail.com **ORCID-ID:** <https://orcid.org/0000-0003-0711-7837>

Received/Geliş Tarihi: 14.11.2025 **Accepted/Kabul Tarihi:** 03.04.2026 **Epub:** 30.07.2026

Cite this article as: Karahan S, Ağadayı E, Alagöz Y. Association of problematic smartphone use with sleep quality and hygiene: a study in university students. J Turk Sleep Med. [Epub Ahead of Print]



Copyright© 2026 The Author(s). Published by Galenos Publishing House on behalf of Turkish Sleep Medicine Society.
This is an open access article under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND) International License.

social media and gaming applications has been shown to be associated with an increased risk of addiction (5).

Smartphone addiction (SA), although not officially recognized as a clinical disorder, has attracted significant attention in research. Problematic smartphone usage is classified as a behavioral addiction, and validated scales have been developed to identify the presence of SA using specific score thresholds (2,6-8). Evidence suggests that SA can negatively affect not only academic performance but also physical and mental health indicators such as neck-shoulder pain, depression/anxiety, and sleep (9,10). Given the growing concern about this issue, it is crucial to examine the underlying causes and mechanisms of SA among university students (10).

Sleep is a fundamental requirement for overall health and quality of life (11), and maintaining good sleep quality is important for individuals of all ages (12). Insufficient or poor-quality sleep can negatively affect both mental and physical well-being (11). Although various factors can impair sleep quality, smartphone use is increasingly recognized as a significant contributor that adversely affects sleep primarily by prolonging nighttime wakefulness and disrupting natural sleep patterns (12).

In adults, high-quality sleep is generally defined by the ability to fall asleep within a reasonable period, maintain uninterrupted deep sleep during the night, and resume sleep quickly following nocturnal awakenings (12). Sleep hygiene is a fundamental determinant of sleep health, encompassing daily habits, behavioral routines, and environmental conditions that promote restorative sleep and enhance overall sleep quality (13,14). Ensuring proper sleep quality and adherence to good sleep hygiene practices is crucial for general health and is particularly important for university students. Sleep can be negatively impacted by various environmental factors, including noise, lighting, and room temperature, as well as lifestyle behaviors such as caffeine and alcohol consumption, tobacco use, irregular sleep schedules, and low physical activity levels. The use of electronic devices before bedtime is particularly disruptive, as it interferes with circadian rhythms and alters normal sleep-wake cycles (14). Previous studies demonstrate that increased smartphone use is associated with poorer sleep outcomes, and that disturbed sleep is one of the primary consequences of problematic or addictive smartphone use (9,12,15,16).

Based on the context outlined above, the present study investigated how SA is related to sleep quality and sleep hygiene among university students. The study sought to answer the following questions: What is the prevalence of SA among university students? What factors are associated with SA? How is SA related to sleep quality and sleep hygiene?

Materials and Methods

Study Design

This research was conducted as a descriptive cross-sectional study.

All procedures performed in this study involving human participants were in accordance with the ethical standards

of the institutional and/or national research committee and with the 1975 Helsinki Declaration, as revised in 2000. Ethical approval for the study was obtained from the Sivas Cumhuriyet University Scientific Research and Publication Ethics Committee for Social and Human Sciences (approval number: 47, date: 06.01.2022).

Population and Sample

The study population comprised 27,000 students enrolled in faculties located on the main campus of Sivas Cumhuriyet University. Using a 95% confidence level and a 5% margin of error, the minimum required sample size was calculated as 379 participants, assuming an unknown prevalence. To reach students, a survey stand was established in the university cafeteria, where student density is highest, and the questionnaires were administered in person by the research team.

Data Collection Tool

Before beginning data collection, participants were fully informed about the study, and only those who provided written consent were included. The questionnaire consisted of a total of 60 items. The first 26 items gathered demographic information (e.g., age, gender, place of residence) and sleep-related habits. The remaining 34 items included the Smartphone Addiction Scale-Short Form (SAS-SF), the Pittsburgh Sleep Quality Index (PSQI), and the Sleep Hygiene Index (SHI).

Smartphone Addiction Scale-Short Form

The SAS-SF, developed by Kwon et al. (17) to evaluate the risk of SA among adolescents, consists of 10 items rated on a six-point Likert scale ranging from 1 to 6. Total scores can range from 10 to 60, with higher scores indicating a greater risk of SA. The scale is unidimensional and does not include any subscales. In the original Korean sample, cut-off values were set at 31 for males and 33 for females. The scale demonstrated strong internal consistency and concurrent validity, with a Cronbach's alpha of 0.91. The Turkish version of the SAS-SF was validated and adapted by Noyan et al. (18).

Pittsburgh Sleep Quality Index

The PSQI, developed by Buysse et al. (19), is designed to assess sleep quality over the preceding month. The Turkish version was validated by Ağargün et al. (20). The instrument includes 24 items, 19 of which are self-reported, while 5 are answered by a spouse or roommate and are not included in the scoring. The PSQI evaluates seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored from 0 to 3, resulting in a global score ranging from 0 to 21. Scores of ≤ 5 indicate good sleep quality, whereas scores > 5 denote poor sleep quality. The scale demonstrated good internal consistency, with a reported Cronbach's alpha of 0.80.

Sleep Hygiene Index

The SHI, which was adapted into Turkish by Özdemir et al. (21), comprises 13 items rated on a five-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always). Higher

scores indicate poorer sleep hygiene practices. The items were developed based on the insufficient sleep hygiene criteria outlined in the International Classification of Sleep Disorders. The SHI demonstrated acceptable reliability, with a Cronbach's alpha of 0.70.

Statistical Analysis

Data were analyzed using SPSS for Windows, version 25. The normality of continuous variables was assessed with the Shapiro-Wilk test. Descriptive analyses were conducted first, with categorical variables reported as frequencies and percentages, and continuous variables summarized as mean $\pm$ standard deviation. A p-value of <0.05 was considered statistically significant, with a 95% confidence interval. Inferential statistical tests included chi-square tests, Spearman correlation, independent-samples t-tests, and one-way ANOVA followed by Tukey test for post-hoc pairwise comparisons.

Results

Participant Demographics

A total of 408 students participated voluntarily in the study. The average age of the participants was 20.7 ± 1.9 years (range: 16–25), with 48.5% ($n = 198$) identifying as male and 51.5% ($n = 210$) as female. Of the students participating in the study, 55.7% ($n = 227$) were studying health sciences, 25.6% ($n = 104$) were studying social sciences, 14.5% ($n = 59$) were studying natural sciences and engineering, and the remainder were studying in other departments. A chronic health condition was reported by 12.7% of the participants ($n = 52$). Most students (72.8%, $n = 297$) were living away from their families. Regarding lifestyle factors, 33.3% ($n = 136$) were smokers and 29.4% ($n = 120$) reported alcohol consumption. The descriptive characteristics of the participants are presented in Table 1.

Smartphone Usage Characteristics and SAS-SF Scores

Regarding smartphone use, 49% ($n = 200$) primarily used their devices for social media, 36% ($n = 147$) for communication, 12.5% ($n = 51$) for general internet access, and 2.5% ($n = 10$) for gaming. Daily smartphone use was reported as less than 1 hour by 1.7% ($n = 7$), 1–4 hours by 45.6% ($n = 186$), 4–8 hours by 44.9% ($n = 183$), and more than 8 hours by 7.8% ($n = 32$). The mean SAS-SF score was 28.6 ± 11.8 (range: 10–60), and based on the SAS-SF cut-off points, 34.3% of students ($n = 140$) were classified as having SA. Those without chronic illnesses had significantly higher average SAS-SF scores than those with chronic illnesses ($p < 0.001$). The mean SAS-SF score was significantly higher for smokers than for non-smokers ($p = 0.037$). There was no significant difference in mean SAS-SF score according to participants' gender, place of residence, or alcohol use ($p > 0.05$). The majority of students (58.8%) went to bed after 1:00 a.m. Those who went to bed between 10:00 p.m. and 12:00 a.m. had a significantly higher mean SAS-SF score than those who went to bed after 1:00 a.m. ($p < 0.05$). Demographic characteristics and average SAS-SF score comparisons are shown in Table 1.

Table 1. Sociodemographic characteristics of the participants and their comparison with the SAS-SF average score.

	n/%	Mean ± SD	p
Gender			
Female	210 (51.5)	28.6 ± 12.5	0.538
Male	198 (48.5)	29.0 ± 11.3	
Place of residence			
With family	111 (27.2)	28.9 ± 11.4	0.719
Away from family	297 (72.8)	28.4 ± 12.1	
Chronic disease			
Yes	52 (12.7)	19.5 ± 8.3	<0.001
No	356 (87.3)	29.9 ± 11.8	
Smoking			
Yes	136 (33.3)	30.3 ± 13.1	0.037
No	272 (66.7)	27.7 ± 11.2	
Alcohol consumption			
Yes	120 (29.4)	28.1 ± 14.4	0.608
No	288 (70.6)	28.8 ± 10.8	
Bedtime			
10:00 p.m.–12:00 a.m.	63 (15.4)	32.6 ± 11.5	0.014 ^a
12:00–1:00 a.m.	105 (25.7)	27.7 ± 10.5	
After 1:00 a.m.	240 (58.8)	27.9 ± 12.4	
Primary purpose of smartphone use			
Communication	147 (36)	24.7 ± 14.4	<0.001 ^b
Social media	200 (49)	31.9 ± 12.8	
Gaming	10 (2.5)	31.2 ± 8.8	
Internet access	51 (12.5)	26.3 ± 9.1	

n: Number of participants, SD: Standard deviation, SAS-SF: Smartphone Addiction Scale–Short Form, Post-hoc analyses were significant ($p < 0.05$) for: ^a. 10:00 p.m.–12:00 a.m. .vs. 12:00–1:00 a.m., ^b. Communication vs. social media.

Sleep Quality and Sleep Hygiene Scores

The mean PSQI score was 7.6 ± 3.9 (range: 2–21). PSQI scores indicate sleep quality, with values ≤ 5 representing “good sleep” and scores > 5 indicating “poor sleep.” In this study, 81.9% of participants ($n = 334$) were classified as having poor sleep quality.

The distribution of sleep quality according to demographic and behavioral factors is presented in Table 2. The prevalence of poor sleep quality was greater among female students than males and higher among smokers compared to non-smokers. Additionally, poor sleep quality differed according to wake-up time ($p = 0.001$), with post-hoc analyses revealing a significantly higher prevalence among students waking after 12:00 pm (97.1%) compared to those waking before 10:00 am (81.9%) and those waking between 10:00 am and 12:00 pm (70.3%) ($p < 0.05$ for both). In contrast, no statistically significant association was found between the use of electronic devices before bedtime and sleep quality ($p = 0.072$), with a high prevalence of poor sleep quality observed in both groups. Comparisons of gender, lifestyle factors, and SAS-SF and SHI scores according to sleep quality are shown in Table 2.

Table 2. Factors associated with sleep quality in university students.

	Good sleep quality (PSQI < 5)	Poor sleep quality (PSQI ≥ 5)	p
Gender	n (%)	n (%)	
Female	29 (13.8%)	181 (86.2%)	0.021
Male	45 (22.7%)	153 (77.3%)	
Age	20.6 ± 1.8	20.4 ± 1.7	0.704
Smoking			
Yes	17 (12.5%)	119 (87.5%)	0.041
No	57 (21.0%)	215 (79.0%)	
Alcohol consumption			
Yes	15 (12.5%)	51 (91.1%)	0.050
No	59 (20.5%)	229 (79.5%)	
Bedroom occupancy			
One person	43 (22.6%)	147 (77.4%)	0.081
Two people	11 (12.8%)	75 (87.2%)	
Three or more people	20 (15.2%)	112 (84.8%)	
Eating before bedtime			
Yes	54 (20.8%)	205 (79.2%)	0.056
No	20 (13.4%)	129 (86.6%)	
Consumption of caffeinated beverages after 6:00 pm			
Yes	16 (13.6%)	102 (86.4%)	0.657
Sometimes	14 (18.2%)	63 (81.8%)	
No	5 (13.5%)	32 (86.5%)	
Using electronic devices before bedtime			
Yes	74 (18.5%)	326 (81.5%)	0.072
No	0 (0%)	8 (100%)	
Wake-up time			
Before 10:00 a.m.	45 (18.1%)	203 (81.9%)	0.001^{a,b}
10:00 a.m.-12:00 p.m.	27 (29.7%)	64 (70.3%)	
After 12:00 p.m.	2 (2.9%)	67 (97.1%)	
SAS-SF score	26.3 ± 8.7	29.1 ± 12.6	0.026
SHI score	33.3 ± 7.0	37.2 ± 10.4	0.003

PSQI: Pittsburgh Sleep Quality Index, SAS-SF: Smartphone Addiction Scale-Short Form, SHI: Sleep Hygiene Index. Post-hoc analyses were significant (p < 0.05) for: ^a. Before 10:00 AM vs. after 12:00 pm, ^b. 10:00 am-12:00 pm vs. after 12:00 pm.

The mean SHI score among the participants was 36.5 ± 10.5 (range: 15–65). Participants who lived away from their families, smoked, and consumed alcohol had significantly higher average SHI scores compared to others (p < 0.001). Additionally, students who did not wake up feeling rested in the morning and those who slept during the day had significantly higher average SHI scores (p < 0.001). As expected, those who ate and used electronic devices before bed also had significantly higher average SHI scores (p < 0.001), and those who often drank tea or coffee in the evening had significantly higher average SHI scores than those who never or only occasionally drank tea or coffee in the evening (p < 0.05). Table 3 shows a comparison

Table 3. Demographic data of participants and comparison of their sleep-related habits with their mean SHI scores.

	Mean ± SD	p
Gender		
Female	35.9 ± 9.9	0.221
Male	37.1 ± 10.1	
Place of residence		
With family	28.9 ± 6.2	<0.001
Away from family	39.4 ± 9.7	
Smoking		
Yes	43.7 ± 10.9	<0.001
No	32.9 ± 7.3	
Alcohol consumption		
Yes	45.0 ± 10.5	<0.001
No	33.0 ± 7.3	
Sleeping during the day		
Yes	40.6 ± 9.2	<0.001
No	35.0 ± 9.9	
Waking up feeling rested in the morning		
Yes	32.7 ± 7.4	<0.001
No	38.8 ± 10.6	
Eating before bedtime		
Yes	38.4 ± 10.9	<0.001
No	33.3 ± 7.3	
Using electronic devices before bedtime		
Yes	39.0 ± 5.1	<0.001
No	34.5 ± 10.1	
Drinking tea or coffee in the evening		
Yes	37.8 ± 10.8	<0.005 ^{a,b,c}
Sometimes	36.2 ± 9.4	
No	32.7 ± 7.4	

SHI: Sleep Hygiene Index, SD: Standard deviation, Post-hoc analyses were significant (p < 0.05) for: ^a. Yes vs. sometimes, ^b. Yes vs. no, ^c. Sometimes vs. no.

of the participants' mean SHI scores according to demographic data and sleep habits.

Association of SA with Sleep Quality and Sleep Hygiene Scores

Among students with SA, 91.4% experienced poor sleep quality, a prevalence significantly higher than that of non-addicted students (Table 4).

Students identified as having SA exhibited significantly higher SHI scores (37.1 ± 8.7) compared to their non-addicted peers (34.3 ± 7.6; p = 0.012).

Discussion

Smartphones serve as multifunctional tools that meet university students' needs for communication, access to information, social interaction, gaming, and entertainment. Studies show that smartphone use is widespread among university students

Table 4. Comparison of smartphone addiction prevalence according to categorical PSQI scores.

	Good Sleep Quality (PSQI < 5)	Poor Sleep Quality (PSQI ≥ 5)	p
SA	n (%)	n (%)	
Yes	12 (8.6)	128 (91.4)	<0.001
No	61 (23.1)	206 (76.9)	

n: Number of participants, PSQI: Pittsburgh Sleep Quality Index, SA: Smartphone addiction according to the Smartphone Addiction Scale–Short Form

and significantly influences their daily routines (12). Problematic smartphone use can negatively affect both physical and psychological health (3). Reported prevalence rates of SA in different countries range from 38.9% to 67% (3,5,6). The results of our study are consistent with the literature.

Findings regarding gender differences in SA are conflicting. Some studies suggest that female students have higher SA levels, often attributed to more intensive use of social networking platforms (3,10,16). In contrast, other studies report higher SA scores among males (22,23), while several investigations have found no gender-based differences (5,15,24). Similarly, in our study, no significant difference was observed between male and female participants in terms of SAS-SF scores.

There is also evidence in the literature indicating significant associations between the purposes of smartphone use and addiction levels. In one Turkish study, more than half of students reported using smartphones primarily to access social media, and those who did so had higher SAS-SF scores than students who mainly used their phones for studying or communication (24). Likewise, a study conducted in Saudi Arabia found that most participants used smartphones predominantly for social networking platforms (5). Consistent with these findings, the majority of students in our study reported using their smartphones mainly for social media, and this group had significantly higher SAS-SF scores. These results support the view that social media use is one of the major contributors to SA, particularly among young adults.

The literature includes numerous studies examining the relationship between SA and sleep quality, and these studies generally report that individuals with SA experience significantly poorer sleep quality compared to their non-addicted peers (12,15,16,22). However, some studies have found no significant association between these variables (23). In our study, nearly all students diagnosed with SA had poor sleep quality, and this proportion was markedly higher than that observed among students without SA. Our findings are consistent with the literature indicating that SA negatively affects sleep quality. Possible explanations include intensive social media use, prolonged nighttime use of digital devices, and a persistent need to remain online.

Sleep hygiene refers to avoiding behaviors that disrupt sleep, particularly the use of cigarettes, alcohol, or caffeine in the evening and the use of electronic devices before bedtime. Poor sleep hygiene negatively affects daytime alertness and overall daily functioning (11). In our study, the mean SHI score

was 36.5 ± 10.5 . Our findings are consistent with previous studies conducted in Türkiye, although the scores are higher than those reported in international studies (11,25-27). These results suggest that sleep hygiene among students in Türkiye may be poorer compared to international standards. Possible contributing factors include cultural differences, social lifestyle patterns, academic pressure, and living arrangements.

In this study, students with SA had significantly higher SHI scores than their non-addicted peers. Likewise, students who used electronic devices before bedtime also had significantly higher SHI scores. Problematic smartphone use in the evening increases physiological and cognitive arousal, making it more difficult to fall asleep and delaying sleep onset. In addition, blue light emitted from smartphones suppresses melatonin secretion, creating a biological mechanism that disrupts sleep initiation and restorative sleep (22). These findings indicate that SA affects sleep quality not only through behavioral pathways but also via biological mechanisms. Therefore, regulating sleep hygiene practices and screen time is critical for protecting sleep health in young adults.

Numerous studies have demonstrated a strong association between SHI scores and overall sleep quality (25-28). Poor sleep hygiene practices are linked to shorter sleep duration and reduced sleep quality (28). Consistent with these findings, students classified as having poor sleep quality in our study had markedly higher SHI scores than those reporting good sleep quality. When factors associated with sleep hygiene were examined, no significant gender difference was found. Some studies support this finding (11,14,25,29), whereas others report poorer sleep hygiene among males (27,30). Students living with their families had significantly better sleep hygiene. Because sleep hygiene is influenced by environmental factors such as light exposure, noise, external stimuli, and room temperature, having a private and more controlled sleeping environment at home may reduce exposure to these disruptors and contribute to better sleep hygiene (30). Although some studies support this finding (27,30), others report no significant association between place of residence and sleep hygiene (14,29).

Study Limitations

This study has several limitations. First, its cross-sectional design and reliance on self-report questionnaires limit the ability to draw causal inferences. Sleep quality was assessed solely based on participants' subjective reports; incorporating objective measurements could have enhanced the reliability of the findings. In addition, data were collected at a single time point, which may not reflect fluctuations in sleep patterns throughout the academic year, such as during examination periods. Longitudinal and follow-up studies are needed to more accurately capture temporal variations in sleep quality.

Furthermore, certain factors known to affect sleep quality, such as dietary habits, physical activity, and genetic predispositions, were not evaluated. Finally, since the sample was drawn from a single university, the generalizability of the findings to other student populations may be limited.

Conclusion

In conclusion, this study demonstrates that SA is associated with poorer sleep hygiene and sleep quality among university students. The findings indicate that promoting conscious and balanced technology use, along with increasing awareness of sleep hygiene, is essential for maintaining healthy sleep patterns in young adults. Raising awareness among university students about how excessive smartphone use may lead to addiction and reduced sleep duration, organizing educational programs on this topic, and encouraging participation in alternative social and physical activities instead of spending all leisure time on smartphones are important steps. Behavioral strategies such as putting the phone on silent mode and using the “do not disturb” or airplane mode before going to bed may help reduce nighttime screen exposure, shorten sleep onset latency, and contribute to better sleep quality. In this context, individual sleep hygiene habits and self-regulation strategies related to technology use can be considered preventive interventions. Our study contributes to the literature by highlighting the relationship between the commonly observed problems of SA and sleep disturbances among university students and emphasizes the importance of preventive approaches. Future research should evaluate the effectiveness of structured intervention programs targeting SA and examine in greater detail the determining roles of individual characteristics, environmental conditions, and behavioral factors on sleep.

Ethics

Ethics Committee Approval: All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1975 Helsinki Declaration, as revised in 2000. Ethical approval for the study was obtained from the Sivas Cumhuriyet University Scientific Research and Publication Ethics Committee for Social and Human Sciences (approval number: 47, date:06.01.2022).

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Footnotes

Authorship Contributions

Concept: S.K., E.A., Design: S.K., E.A., Data Collection or Processing: S.K., E.A., Analysis or Interpretation: S.K., Y.A., Literature Search: Y.A., Writing: S.K., E.A., Y.A.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

- Schmickler JM, Blaschke S, Robbins R, Mess F. Determinants of sleep quality: a cross-sectional study in university students. *Int J Environ Res Public Health*. 2023;20(3):2019.
- Nikolic A, Bukurov B, Kocic I, et al. Smartphone addiction, sleep quality, depression, anxiety, and stress among medical students. *Front Public Health*. 2023;11:1252371.
- Abuhamdah SMA, Naser AY. Smart phone addiction and its mental health risks among university students in Jordan: a cross-sectional study. *BMC Psychiatry*. 2023;23:812.
- Maayah MF, Nawasreh ZH, Gaowgzeh RAM, et al. Neck pain associated with smartphone usage among university students. *PLoS One*. 2023;18(6):e0285451.
- Alotaibi MS, Fox M, Coman R, Ratan ZA, Hosseinzadeh H. Smartphone addiction prevalence and its association on academic performance, physical health, and mental well-being among university students in Umm Al-Qura University (UQU), Saudi Arabia. *Int J Environ Res Public Health*. 2022;19(6):3710.
- Sohn SY, Krasnoff L, Rees P, Kalk NJ, Carter B. The association between smartphone addiction and sleep: a UK cross-sectional study of young adults. *Front Psychiatry*. 2021;12:629407.
- Bostan C, Kalyon A. Ergenlerde akıllı telefon bağımlılığı ve yaşam doyumu ilişkisi. *Gençlik Araştırmaları Dergisi*. 2024;12(33):92-113.
- Elkin N, Soydan AM. Halk sağlığı perspektifinden çocuklarda teknoloji bağımlılığı ve ekran maruziyeti. *Sürekli Tıp Eğitimi Dergisi*. 2024;33(4):307-315.
- Zhang MX, Wu AM. Effects of smartphone addiction on sleep quality among Chinese university students: the mediating role of self-regulation and bedtime procrastination. *Addict Behav*. 2020;111:106552.
- Liu X, Baharudin SMB. Social anxiety and smartphone addiction in Chinese university students: a moderated mediation model of rumination and gender. *Healthcare (Basel)*. 2025;13(8):862.
- Gümüştakım RŞ, Kuş C, Uzkar M. Daytime sleepiness and sleep hygiene in medical faculty students. *Türk J Sleep Med*. 2020;7(1):52-62.
- Rathakrishnan B, Bikar Singh SS, Kamaluddin MR, et al. Smartphone addiction and sleep quality on academic performance of university students: an exploratory research. *Int J Environ Res Public Health*. 2021;18(16):8291.
- Güneş Z. Uyku sağlığının korunmasında uyku hijyeninin rolü ve stratejileri. *Arşiv Kaynak Tarama Dergisi*. 2018;27(2):188-198.
- Lakshme SV, Sharranesh R, Yong Khang Y, Arvinder-Singh HS. Sleep quality, sleep hygiene practices and their influencing factors among Malaysian university students: a cross-sectional study. *Malays Fam Physician*. 2025;20:22.
- Lane HY, Chang CJ, Huang CL, Chang YH. An investigation into smartphone addiction with personality and sleep quality among university students. *Int J Environ Res Public Health*. 2021;18(14):7588.
- Turgay T, Yılbaş B. Üniversite öğrencilerinde akıllı telefon bağımlılığı ile kas-iskelet sistemi ağrısı, depresyon ve uyku kalitesi arasındaki ilişki. *Bağımlılık Dergisi*. 2022;23(2):153-161.
- Kwon M, Kim DJ, Cho H, Yang S. The smartphone addiction scale: development and validation of a short version for adolescents. *PLoS One*. 2013;8(12):e83558.
- Noyan CO, Darçın AE, Nurmedov S, Yılmaz O, Dilbaz N. Akıllı telefon bağımlılığı ölçeğinin kısa formunun üniversite öğrencilerinde Türkçe geçerlilik ve güvenilirlik çalışması. *Anadolu Psikiyatri Dergisi*. 2015;16(1):73-81. doi:10.5455/apd.176101
- Buyse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989;28(2):193-213.
- Ağargün MY, Kara H, Anlar Ö. Pittsburgh Uyku Kalitesi İndeksi'nin geçerliliği ve güvenilirliği. *Türk Psikiyatri Dergisi*. 1996;7(2):107-115.
- Özdemir PG, Boysan M, Selvi Y, Yıldırım A, Yılmaz E. Psychometric properties of the Turkish version of the Sleep Hygiene Index in clinical and non-clinical samples. *Compr Psychiatry*. 2015;59:135-140.
- Zeyrek I, Tabara MF, Çakan M. Exploring the relationship of smartphone addiction on attention deficit, hyperactivity symptoms,

- and sleep quality among university students: a cross-sectional study. *Brain Behav.* 2024;14(11):e70137.
23. Başkan Ö, Çorum M, Büyükyılmaz G. Üniversite öğrencilerinde akıllı telefon bağımlılığı ile fiziksel aktivite, yorgunluk ve uyku kalitesinin ilişkisinin incelenmesi. *Gümüşhane Univ Sağlık Bilimleri Dergisi.* 2023;12(1):299-305.
 24. Güngör AB, Koçak O. Üniversite öğrencilerinin akıllı telefon bağımlılığı ve akademik erteleme davranışı arasındaki ilişkinin incelenmesi. *Eğitim ve Toplum Araştırmaları Dergisi.* 2020;7(2):397-419.
 25. Ali RM, Zolezzi M, Awaisu A, Eltorki Y. Sleep quality and sleep hygiene behaviours among university students in Qatar. *Int J Gen Med.* 2023;16:2427-2439.
 26. Humphries RK, Bath DM, Burton NW. Dysfunctional beliefs, sleep hygiene and sleep quality in university students. *Health Promot J Austr.* 2022;33(1):162-169.
 27. Odabaşıoğlu ME, Dedeoğlu T, Kasırga Z, Sünbül F. Üniversite öğrencilerinde uyku hijyeni. *Gümüşhane Univ Sağlık Bilimleri Dergisi.* 2017;6(4):204-212.
 28. Kuhn T, Karsan S, Heisz JJ, Middleton LE. The differing relationships between academic discipline, sleep hygiene, and dysfunctional sleep attitudes on sleep quality and duration in Canadian university students. *Front Psychol.* 2024;15:1396579.
 29. Molu B, YıldırımKeskin A, TaşdelenBaş M. Hemşirelik öğrencilerinin kronotipine göre uyku hijyeninin incelenmesi. *J Turk Sleep Med.* 2021;8(2):105-111.
 30. İpekçi NN, Ataman Bor N, Öztürk M. Üniversite son sınıf öğrencilerinin geleceğe yönelik umutsuzlukları ile uyku hijyeni arasındaki ilişkinin değerlendirilmesi: sağlık hizmetleri meslek yüksek okulu örneği. *Sağlık Akademisi Kastamonu.* 2025;10(1):10-26.