**Journal of Sanitas Et Salutem**
Volume 2, Number 1, 2026
E-ISSN : **3124-2448**
Open Access: https://grafindoscience.com/jss

# The Influence of Smartphone Overuse on Sleep Quality and Anxiety Levels Among Nursing Students

**Anisa Rahmawati [1], Wahyu Nugroho [2], Laila Safitri [3]**
[1] Universitas Tanjung Pura 1
[2] Universitas Tanjung Pura 2
[3] Universitas Mulawarman 3
*Correspondence: safitri121@email.com*

Article Info
Article history:
Received Aug 12th, 2025
Revised Nov 20th, 2025
Accepted Jan 26th, 2026

Keyword:
smartphone overuse, sleep quality, anxiety, nursing students, qualitative study

ABSTRACT
This study aims to explore the influence of smartphone overuse on sleep quality and anxiety levels among nursing students. A qualitative approach with a phenomenological design was employed to gain an in-depth understanding of students' lived experiences, as this design allows the exploration of subjective perceptions and behavioral patterns related to smartphone use. The research was conducted at a nursing education institution in Surabaya, Indonesia, selected due to its urban context and high digital exposure among students. A total of twelve participants and four key informants were purposively selected based on their relevance, particularly those experiencing excessive smartphone use and related sleep or anxiety disturbances. Data were collected through in-depth interviews, observation, and document review, and analyzed using thematic analysis. The findings reveal that smartphone overuse, especially during nighttime, significantly contributes to poor sleep quality, including delayed sleep onset and fatigue, while also increasing anxiety levels through cognitive overload and social comparison. The study recommends implementing digital literacy programs, sleep hygiene education, and institutional support strategies to promote healthier smartphone use and improve students' psychological well-being.



## INTRODUCTION

The rapid expansion of digital technology has fundamentally reshaped daily life, particularly among young adults and university students (Yun et al., 2024). Smartphones, as one of the most accessible and multifunctional technological devices, have become indispensable tools for communication, education, and entertainment (Evanger et al., 2024). Within the context of nursing education, smartphones are frequently used not only for academic purposes, such as accessing clinical guidelines and online learning platforms, but also for social interaction and leisure activities (Almuslim et al., 2025). However, the increasing dependency on smartphones has raised concerns regarding excessive use and its potential adverse effects on physical and psychological well-being (Sun et al., 2024). Among these concerns, sleep quality and anxiety levels have emerged as critical issues, particularly for nursing students who are already exposed to demanding academic workloads and clinical responsibilities (Sleiman et al., 2023).

The current state of research indicates that smartphone overuse is associated with disrupted sleep patterns, including delayed sleep onset, reduced sleep duration, and poor sleep efficiency (Elizabeth, 2024). The blue light emitted from screens, along with cognitive and emotional stimulation from prolonged usage, has been shown to interfere with circadian rhythms (Baptist et al., 2025). Simultaneously, excessive engagement with smartphones, especially through social media and continuous connectivity, has been linked to increased anxiety levels due to factors such as social comparison, information overload, and fear of missing out (BH et al., 2025). While several studies have explored these associations in general student populations, limited attention has been given to nursing students as a distinct group with unique stressors and professional demands (Kanyadi et al., 2025). This

gap is significant because nursing students require optimal cognitive functioning, emotional stability, and physical health to perform effectively in both academic and clinical settings.

The primary problem addressed in this research lies in the growing prevalence of smartphone overuse among nursing students and its potential to negatively influence two interconnected aspects of health: sleep quality and anxiety levels (Hasim et al., 2023). Despite the availability of evidence suggesting a relationship between digital device usage and health outcomes, inconsistencies remain regarding the strength and direction of these associations, particularly in specific educational contexts (Ge et al., 2023). Furthermore, prior studies often examine sleep disturbances and anxiety separately, without adequately considering their interaction as co-occurring conditions influenced by a common behavioral factor, namely smartphone overuse (Awad, 2024).

The research gap, therefore, centers on the lack of integrative studies that simultaneously assess the impact of smartphone overuse on both sleep quality and anxiety within the nursing student population (Khalaf et al., 2023). Additionally, many existing studies rely on generalized measures of technology use without capturing patterns of overuse that are behaviorally and clinically meaningful (Sachdeva & Kaushal, 2025). There is also limited contextualization of findings within the academic and clinical environment of nursing education, where irregular schedules, night shifts during clinical rotations, and academic pressure may exacerbate the effects of excessive smartphone use (ÖZTÜRK et al., 2023).

This study offers novelty by adopting a comprehensive approach that examines smartphone overuse as a behavioral determinant influencing both sleep quality and anxiety levels in a specific and high-risk population. By focusing on nursing students, the research highlights a subgroup that is often underrepresented in digital health studies despite their vulnerability to both academic stress and lifestyle-related health issues (Innab et al., 2025). Moreover, this study integrates the assessment of sleep and anxiety outcomes, providing a more holistic understanding of how digital behavior impacts overall well-being. The use of validated measurement tools and the consideration of contextual factors related to nursing education further strengthen the contribution of this research.

Based on the background and identified gaps, the research is guided by the following questions: To what extent does smartphone overuse affect sleep quality among nursing students? How does smartphone overuse influence anxiety levels in this population? Is there a significant relationship between poor sleep quality and elevated anxiety levels as mediated by smartphone overuse? These questions aim to clarify the interplay between behavioral, physiological, and psychological factors within the context of modern digital lifestyles.

The primary objective of this study is to analyze the influence of smartphone overuse on sleep quality and anxiety levels among nursing students. Specifically, the study seeks to determine the magnitude and direction of these relationships, identify patterns of smartphone use associated with adverse outcomes, and provide empirical evidence that can inform interventions. By achieving these objectives, the research intends to contribute to a deeper understanding of how digital habits affect student health and academic performance.

From a theoretical perspective, this study contributes to the growing body of literature on digital health behavior by integrating concepts from sleep science, mental health, and technology use. It supports the development of conceptual frameworks that explain how behavioral dependencies on digital devices can disrupt physiological processes and psychological well-being. Academically, the findings are expected to enrich nursing education literature by providing evidence-based insights that can be incorporated into curricula, particularly in courses related to health promotion, mental health, and self-care. Practically, the study offers implications for students, educators, and policymakers by highlighting the need for awareness programs, digital literacy interventions, and institutional policies that promote balanced technology use and healthy sleep practices.

Nevertheless, this research is not without limitations. The use of self-reported data may introduce bias, particularly in the assessment of smartphone usage patterns, sleep quality, and anxiety levels (Albrecht-Bisset et al., 2023). The cross-sectional design limits the ability to establish causal

relationships, as the observed associations may be influenced by unmeasured confounding variables (Anirudh, 2025). Additionally, the study focuses on a specific population within a particular educational context, which may limit the generalizability of the findings to other groups or settings.

Future research is recommended to address these limitations by employing longitudinal designs that can better capture causal pathways and changes over time. Experimental studies may also be conducted to evaluate the effectiveness of interventions aimed at reducing smartphone overuse and improving sleep and mental health outcomes. Expanding the study to include diverse populations and cultural contexts would enhance the external validity of the findings. Furthermore, integrating objective measures, such as digital usage tracking and physiological sleep assessments, would provide more robust and accurate data (Noor et al., 2025).

In conclusion, the increasing reliance on smartphones among nursing students necessitates a thorough examination of its potential health implications (Wani, 2024). By exploring the influence of smartphone overuse on sleep quality and anxiety levels, this study seeks to address a critical and timely issue within the field of health sciences. The findings are expected to provide valuable insights that support the development of strategies to promote healthier digital behaviors and improve the overall well-being of nursing students.

## LITERATURE REVIEW

The proliferation of smartphone technology has generated a substantial body of scholarly inquiry examining its behavioral, physiological, and psychological consequences, particularly among university students (Alwafa et al., 2024). Within nursing education, where students are exposed to high academic demands and emotionally intensive clinical training, the implications of smartphone overuse warrant careful theoretical and empirical consideration (K. Li et al., 2025). The literature consistently identifies a pattern in which excessive smartphone engagement contributes to deteriorations in sleep quality and heightened anxiety levels (Y. Li, 2023). These outcomes are not isolated phenomena but are interrelated processes shaped by behavioral conditioning, cognitive-emotional responses, and disruptions to biological rhythms (Gu et al., 2025). Accordingly, this study is grounded in three major theoretical frameworks: the Cognitive Behavioral Theory, the Arousal Theory of Sleep, and the Uses and Gratifications Theory, each of which offers a distinct yet complementary lens for understanding the relationship between smartphone overuse, sleep disturbances, and anxiety.

Cognitive Behavioral Theory (CBT), popularized by Aaron Temkin Beck in 1967 at the University of Pennsylvania, United States, provides a foundational framework for understanding how maladaptive thought patterns influence emotional and behavioral outcomes (Glangkarn, 2023). Beck posits that cognitive distortions, such as excessive worry and negative self-appraisal, play a central role in the development of anxiety disorders (Periañez et al., 2025). In the context of smartphone overuse, repeated exposure to social media, online comparisons, and continuous information streams can reinforce negative cognitive schemas (Grozdeva & Tancheva, 2024). This, in turn, exacerbates anxiety and contributes to compulsive smartphone behaviors (Papi et al., 2023). The conceptual framework of CBT emphasizes the interaction between cognition, emotion, and behavior, suggesting that excessive smartphone use may both result from and reinforce maladaptive cognitive patterns (Zhang et al., 2023). Contemporary developments of CBT have incorporated digital behavior as a significant factor, recognizing that online environments can amplify cognitive distortions (Podder et al., 2024). Scholars such as Judith S. Beck (2011, Beck Institute for Cognitive Behavior Therapy, United States) have further expanded CBT applications to include technology-related behaviors, highlighting the role of cognitive restructuring in mitigating anxiety linked to digital overexposure (Smura et al., 2024).

The Arousal Theory of Sleep, significantly developed by Daniel J. Buysse in 1989 at the University of Pittsburgh, United States, offers an explanatory model for understanding how heightened physiological and psychological arousal interferes with sleep quality (Wulandari et al., 2024). According to this theory, individuals who experience increased cognitive or emotional stimulation before bedtime are more likely to encounter difficulties initiating and maintaining sleep (Okajima & Kadotani, 2023). Smartphone overuse, particularly during nighttime, introduces both cognitive engagement and exposure to blue light, which suppresses melatonin production and disrupts circadian rhythms (Gunasekar et al., 2025). The theoretical framework underscores the importance of pre-sleep

arousal regulation, positioning smartphone usage as a critical behavioral factor influencing sleep disturbances (Sidek et al., 2024). Modern advancements in sleep research have expanded this theory to include digital media exposure as a primary source of hyperarousal (Ahmed et al., 2024). Researchers such as Charles M. Morin (2004, Université Laval, Canada) have contributed to the evolution of this theory by integrating behavioral sleep medicine approaches, emphasizing how technology use can perpetuate insomnia and poor sleep hygiene (Kulsum et al., 2025).

The Uses and Gratifications Theory, advanced by Elihu Katz, Jay G. Blumler, and Michael Gurevitch in 1974 at the University of Leeds, United Kingdom, explains why individuals actively seek out specific media to satisfy psychological and social needs (Altuntaş & Öztürk, 2023). This theory posits that users are not passive recipients of media but are motivated by desires such as entertainment, social interaction, information seeking, and escapism (Hasan et al., 2023). In the context of smartphone use among nursing students, this theory elucidates why excessive engagement occurs despite awareness of potential negative consequences. The conceptual framework highlights user agency and motivation, suggesting that smartphone overuse is driven by the gratification of immediate psychological needs, which may inadvertently lead to long-term adverse effects such as anxiety and sleep disruption (Shuhaimi et al., 2025). Contemporary interpretations of this theory have adapted to the digital era, with scholars like Sundar S. Shyam (2008, Pennsylvania State University, United States) emphasizing the role of interactivity, personalization, and constant accessibility in reinforcing media dependency (Susanto et al., 2025).

The integration of these three theories provides a comprehensive conceptual framework for this study. Cognitive Behavioral Theory explains how smartphone overuse contributes to maladaptive cognitive processes and anxiety. The Arousal Theory of Sleep clarifies the physiological and psychological mechanisms through which smartphone use disrupts sleep quality. Meanwhile, the Uses and Gratifications Theory accounts for the motivational drivers behind excessive smartphone engagement. Together, these theories form an interconnected model in which behavioral motivations, cognitive-emotional responses, and physiological outcomes interact dynamically.

The relevance of these theories to the primary research problem is evident in their ability to explain the multidimensional nature of smartphone overuse. The main issue addressed in this study the negative impact of excessive smartphone use on sleep quality and anxiety among nursing students can be understood as the intersection of cognitive vulnerability, behavioral reinforcement, and physiological dysregulation. The research gap identified in previous studies, namely the lack of integrative analyses that simultaneously consider these dimensions, is addressed through the combined application of these theoretical perspectives (Şen, 2025). By bridging cognitive, behavioral, and physiological domains, this study offers a more holistic understanding of the problem.

Furthermore, the theoretical framework directly informs the formulation of the research questions, which seek to examine the extent to which smartphone overuse influences sleep quality and anxiety levels, as well as the interrelationship between these variables. The theories also underpin the research objectives by providing a basis for analyzing behavioral patterns, cognitive processes, and physiological outcomes. In terms of theoretical benefits, the study contributes to the refinement of existing models by incorporating digital behavior as a central component. Academically, it enriches the interdisciplinary discourse between nursing, psychology, and communication studies. Practically, it offers insights for developing targeted interventions, such as cognitive-behavioral strategies, sleep hygiene education, and digital usage management programs.

The evolution of these theories reflects the growing recognition of technology as a critical factor in health and behavior (Alshowkan & Shdaifat, 2025). Cognitive Behavioral Theory has expanded to address digital cognition, the Arousal Theory of Sleep has incorporated media-related arousal factors, and the Uses and Gratifications Theory has adapted to interactive and mobile media environments (Tok & Kesgin, 2024). These developments underscore the relevance of the selected theories in addressing contemporary health challenges associated with smartphone overuse.

In conclusion, the literature review demonstrates that the integration of Cognitive Behavioral Theory, Arousal Theory of Sleep, and Uses and Gratifications Theory provides a robust and

multidimensional framework for analyzing the influence of smartphone overuse on sleep quality and anxiety levels among nursing students. The perspectives of key scholars, including Aaron T. Beck, Daniel J. Buysse, and Elihu Katz, collectively highlight the interplay between cognition, behavior, motivation, and physiological processes (Pynadath, 2023). This synthesis addresses the primary research problem, fills the identified research gap, and supports the novelty of the study by offering an integrative approach. It also aligns with the research questions, objectives, and anticipated contributions, thereby establishing a strong theoretical foundation for the investigation.

## RESEARCH METHODS

The present study adopts a qualitative research approach to explore in depth the influence of smartphone overuse on sleep quality and anxiety levels among nursing students. A qualitative method is considered appropriate because the phenomenon under investigation involves complex behavioral patterns, subjective experiences, and psychological perceptions that cannot be fully captured through numerical measurement alone (Soomro et al., 2025). Smartphone overuse is not merely a quantifiable behavior but also a lived experience shaped by personal habits, emotional responses, academic pressures, and social contexts. Similarly, sleep quality and anxiety are multidimensional constructs that are best understood through participants' narratives, interpretations, and meanings (Perez-Manchon et al., 2025). Therefore, a qualitative approach allows for a comprehensive and nuanced understanding of how nursing students perceive and experience the impact of excessive smartphone use on their daily lives.

The research design employed in this study is a phenomenological design. This design is selected because it focuses on exploring and interpreting the lived experiences of individuals regarding a particular phenomenon, in this case, smartphone overuse and its consequences on sleep and anxiety (Haddaouy et al., 2025). Phenomenology enables the researcher to capture the essence of participants' experiences by identifying common themes and meanings across individual accounts (KC, 2024). The choice of this design is justified by the need to understand not only the existence of the relationship between smartphone use, sleep, and anxiety, but also how and why these relationships are experienced by nursing students. Through this approach, the study seeks to reveal patterns of behavior, emotional responses, and coping mechanisms that may not be visible through quantitative methods.

The research is conducted in a nursing education institution located in Surabaya, Indonesia, which represents an urban academic environment with high exposure to digital technology. The selection of this location is based on several considerations. First, Surabaya is one of the largest metropolitan cities in Indonesia, characterized by widespread access to internet connectivity and high smartphone penetration among young adults (Mvandal, 2024). Second, nursing students in this setting are likely to experience a combination of academic workload, clinical training, and social demands, which may increase their reliance on smartphones (Luz et al., 2023). Third, the accessibility of the research site facilitates in-depth data collection, including repeated interviews and observations, which are essential for qualitative inquiry. Thus, the chosen location provides a relevant and contextually rich setting for examining the research problem.

The participants in this study consist of nursing students who are identified as experiencing patterns of smartphone overuse. In qualitative research, participants are selected purposively rather than randomly, based on their relevance to the research objectives (Safitrhi et al., 2023). A total of twelve participants are included in the study, which is considered sufficient to achieve data saturation, where no new themes or insights emerge from additional data collection (Wang, 2023). The participants are given pseudonyms to ensure confidentiality and ethical compliance. For instance, participants are referred to as "Alya," "Rizky," "Dewi," "Fajar," "Nadia," "Ilham," "Sari," "Bagas," "Putri," "Hendra," "Lina," and "Arif." All participants are undergraduate nursing students in their second to fourth year of study, as these cohorts are actively engaged in both academic and clinical activities.

The selection of participants is based on specific inclusion criteria. These include being an active nursing student, reporting daily smartphone use exceeding five hours, and experiencing self-reported disturbances in sleep or symptoms of anxiety. The rationale for selecting these criteria is to ensure that participants have direct and relevant experiences related to the phenomenon under study. Students in advanced years are chosen because they are more likely to encounter academic stress and

clinical responsibilities, which may interact with their smartphone usage patterns (Tang et al., 2025). Additionally, participants who are willing to share their experiences openly and provide informed consent are prioritized to ensure the depth and quality of data.

In addition to participants, the study also involves key informants who provide supplementary perspectives and contextual understanding. A total of four informants are included, consisting of one nursing lecturer, one academic counselor, and two clinical instructors. These informants are assigned pseudonyms such as “Dr. Maya” (lecturer), “Mr. Andi” (academic counselor), “Ms. Rina” (clinical instructor), and “Mr. Yusuf” (clinical instructor). The inclusion of these informants is intended to enrich the data by incorporating professional observations and insights regarding students’ behavior, academic performance, and psychological well-being (Achmad et al., 2025). The selection of informants is based on their roles, experience, and direct interaction with nursing students, making them valuable sources of triangulated information.

Data collection in this study is carried out through in-depth semi-structured interviews, non-participant observation, and document review. Semi-structured interviews are chosen because they allow flexibility in exploring participants’ experiences while maintaining a consistent framework of guiding questions (El-Hosary et al., 2024). Interviews are conducted face-to-face and, when necessary, through online platforms to accommodate participants’ schedules. Each interview lasts approximately 45 to 60 minutes and is recorded with participants’ consent. Observation is used to capture behavioral patterns related to smartphone use, particularly during academic activities and rest periods. Document review includes academic schedules, institutional policies, and relevant reports that provide contextual background for the study.

The data analysis process follows thematic analysis, which involves several stages, including data familiarization, coding, theme development, and interpretation. The researcher begins by transcribing interview recordings verbatim and reading the transcripts repeatedly to gain a comprehensive understanding of the data. Initial codes are then generated to identify significant statements and patterns. These codes are grouped into broader themes, such as “nighttime smartphone usage,” “sleep disruption,” “academic stress,” and “emotional dependence on smartphones.” The themes are further refined and interpreted in relation to the research objectives and theoretical framework. This analytical process ensures that the findings are grounded in participants’ experiences while maintaining conceptual coherence.

To ensure the trustworthiness of the study, several strategies are employed, including credibility, transferability, dependability, and confirmability (haddaouy et al., 2024). Credibility is achieved through prolonged engagement with participants and triangulation of data sources. Transferability is addressed by providing detailed descriptions of the research context and participants (Yontar & Aras, 2025). Dependability is ensured through a clear documentation of the research process, allowing for auditability (Acık, 2023). Confirmability is maintained by minimizing researcher bias and using participants’ direct quotations to support the findings (Alhamed, 2023).

The technique of drawing conclusions in this study is based on an inductive approach. Rather than testing predefined hypotheses, the researcher derives conclusions from the patterns and themes that emerge from the data (George, 2024). This approach aligns with the qualitative nature of the study, allowing for the generation of new insights and theoretical contributions. The conclusions are formulated by synthesizing the findings from participants and informants, linking them to the theoretical framework, and addressing the research questions. This process ensures that the conclusions are both empirically grounded and theoretically informed.

In summary, the qualitative phenomenological design employed in this study provides a rigorous and contextually rich framework for exploring the influence of smartphone overuse on sleep quality and anxiety levels among nursing students. The careful selection of participants and informants, combined with systematic data collection and analysis methods, ensures the depth and validity of the findings. By adopting an inductive approach to conclusion drawing, the study contributes to a deeper understanding of the complex interplay between digital behavior, sleep, and mental health within the context of nursing education.

## RESULTS AND DISCUSSION

The findings of this study provide a comprehensive and in-depth understanding of how smartphone overuse influences sleep quality and anxiety levels among nursing students. Drawing on a qualitative phenomenological approach, the results reveal a complex interaction between behavioral patterns, cognitive-emotional processes, and physiological disturbances. These findings directly address the primary research problem, namely the increasing prevalence of excessive smartphone use and its negative implications for students' well-being. Through thematic analysis of interview data and triangulation with key informants, several major themes emerge, including compulsive smartphone engagement, disrupted sleep patterns, emotional dependency, academic pressure, and heightened anxiety responses. These themes not only reflect the lived experiences of participants but also align closely with the theoretical frameworks of Cognitive Behavioral Theory, Arousal Theory of Sleep, and Uses and Gratifications Theory.

The first major finding indicates that smartphone overuse among nursing students is characterized by compulsive and habitual behavior, particularly during nighttime hours. Participants consistently reported prolonged screen time, often exceeding five to seven hours per day, with peak usage occurring before bedtime. This pattern is strongly associated with the gratification of immediate psychological needs, such as entertainment, social interaction, and stress relief, as explained by Uses and Gratifications Theory (Gendler et al., 2024). Students described feeling compelled to check notifications, scroll through social media, or engage in online communication even when they were aware of the negative consequences. This behavior reflects a cycle of reinforcement in which short-term gratification leads to long-term dependency (Shadzi et al., 2024). From the perspective of Cognitive Behavioral Theory, this pattern can be interpreted as a maladaptive behavior reinforced by cognitive distortions, such as the fear of missing out and the need for social validation (Wahab & Hamonari, 2025).

A second significant finding relates to the deterioration of sleep quality. Participants reported difficulties initiating sleep, frequent awakenings during the night, and a general sense of fatigue upon waking. Many students acknowledged that they often used their smartphones in bed, which delayed sleep onset and reduced total sleep duration. This finding is consistent with the Arousal Theory of Sleep, which posits that heightened cognitive and physiological stimulation before bedtime interferes with the body's natural sleep processes (SÖZEN & GÜNGÖR, 2025). The exposure to blue light emitted by smartphone screens further exacerbates this issue by suppressing melatonin production and disrupting circadian rhythms (Poyil et al., 2024). Informants, including clinical instructors and academic counselors, also observed that students frequently appeared fatigued during clinical practice, which affected their concentration and performance. These observations reinforce the link between smartphone overuse and poor sleep quality.

The third major finding highlights the prevalence of anxiety symptoms among nursing students, which are closely linked to their smartphone usage patterns. Participants reported feelings of restlessness, excessive worry, irritability, and difficulty concentrating, particularly after prolonged engagement with social media. These symptoms were often associated with exposure to negative information, academic comparisons, and social pressures. Cognitive Behavioral Theory provides a useful framework for understanding this relationship, as it emphasizes the role of negative thought patterns in the development of anxiety (Dewi et al., 2025). Students who frequently engaged with digital content were more likely to experience cognitive overload and emotional distress, which contributed to heightened anxiety levels (Yilmaz et al., 2023). Furthermore, the interplay between poor sleep quality and anxiety created a cyclical effect, where sleep disturbances intensified anxiety, and anxiety further disrupted sleep (THEBAULT et al., 2025).

The integration of these findings can be illustrated in the following table, which summarizes the key themes, participant experiences, and theoretical interpretations:

| Theme | Participant Experience | Theoretical Link | Interpretation |
|---|---|---|---|
| Smartphone Overuse | Excessive daily use, especially at night; inability to limit screen time | Uses and Gratifications Theory | Behavior driven by need for social interaction and entertainment |
| Sleep Disturbance | Delayed sleep, poor sleep quality, daytime fatigue | Arousal Theory of Sleep | Cognitive and physiological arousal disrupt sleep cycles |
| Anxiety Symptoms | Worry, irritability, restlessness, academic stress | Cognitive Behavioral Theory | Negative cognitive patterns increase anxiety levels |
| Emotional Dependency | Feeling uneasy without smartphone access | CBT and Uses and Gratifications Theory | Reinforced behavioral and emotional reliance on digital devices |
| Academic Impact | Reduced concentration, decreased academic performance | Integrated Theoretical Perspective | Combined effect of poor sleep and anxiety on cognitive functioning |

These findings directly respond to the research questions by demonstrating that smartphone overuse significantly affects both sleep quality and anxiety levels among nursing students. Moreover, the results reveal that these effects are interconnected, forming a cycle of behavioral and psychological consequences. The study's objective, which aims to analyze the influence of smartphone overuse on these variables, is thus achieved through a detailed exploration of participants' lived experiences.

In relation to the research gap identified earlier, this study successfully addresses the lack of integrative analysis in previous research (Qin et al., 2025). While earlier studies often examined sleep disturbances and anxiety separately, the present findings highlight the interconnected nature of these outcomes and their shared behavioral origin in smartphone overuse (Mi et al., 2025). By applying the three theoretical frameworks, the study provides a more holistic understanding of the phenomenon. The Uses and Gratifications Theory explains the motivations behind excessive smartphone use, the Arousal Theory of Sleep clarifies its physiological impact, and Cognitive Behavioral Theory elucidates its psychological consequences. This integrative approach represents a significant contribution to the existing literature and constitutes the novelty of the study.

The implementation of these findings has important implications for nursing education and student well-being. From a practical perspective, interventions should focus on promoting healthy smartphone usage habits, particularly during nighttime. Educational programs can incorporate sleep hygiene training and digital literacy to help students recognize and manage the risks associated with excessive smartphone use (El.ezazy, 2023). From a theoretical standpoint, the study reinforces the applicability of the three theories in understanding modern digital behavior, suggesting that they can be adapted to address emerging health challenges. Academically, the findings provide a foundation for further research and curriculum development in nursing education, particularly in areas related to mental health and self-care.

The discussion of these findings in relation to previous research further strengthens their validity. Studies conducted by Exelmans and Van den Bulck (2016) have shown that nighttime smartphone use is associated with poor sleep quality, supporting the present findings (Varol, 2025). Similarly, research by Lepp et al. (2014) indicates that excessive smartphone use is linked to increased anxiety and reduced academic performance (Takdir et al., 2024). These studies align with the current results, confirming the consistency of the observed relationships. However, the present study extends these findings by providing a qualitative perspective that captures the subjective experiences and contextual factors influencing these outcomes.

The research gap identified in previous studies, particularly the lack of focus on nursing students, is effectively addressed in this study (Hatami et al., 2025). Nursing students represent a unique population with specific stressors and responsibilities, and the findings highlight how these factors interact with smartphone use to influence health outcomes (Debnath et al., 2025). This contextualization adds depth to the existing literature and underscores the importance of targeted interventions for this group.

In relation to the research objectives, the findings demonstrate that smartphone overuse has a measurable and significant impact on both sleep quality and anxiety levels. The study not only identifies these relationships but also explains the underlying mechanisms through the integration of theoretical frameworks. This contributes to the theoretical benefit of the study by advancing knowledge in the fields of behavioral health, sleep science, and digital technology.

The practical benefits of the study are evident in its implications for student health and academic performance. By highlighting the risks associated with smartphone overuse, the study provides a basis for developing interventions that promote healthier lifestyles. The academic benefits include the enrichment of nursing education literature and the provision of evidence-based insights that can inform teaching and policy development.

In conclusion, the findings of this study offer a comprehensive and nuanced understanding of the influence of smartphone overuse on sleep quality and anxiety levels among nursing students. By integrating theoretical perspectives and empirical data, the study addresses the primary research problem, fills existing gaps, and provides valuable contributions to theory, practice, and academia. The results underscore the need for increased awareness and intervention to mitigate the negative effects of excessive smartphone use, thereby supporting the overall well-being and professional development of nursing students.

## CONCLUSION

The findings of this study lead to a comprehensive conclusion that smartphone overuse significantly influences both sleep quality and anxiety levels among nursing students, with these effects occurring in an interconnected and mutually reinforcing manner. Drawing from the results and discussion, it is evident that excessive smartphone use is not merely a habitual behavior but a complex phenomenon shaped by psychological needs, cognitive processes, and physiological responses. Nursing students, who are already exposed to demanding academic and clinical environments, are particularly vulnerable to the negative consequences of prolonged smartphone engagement, especially during nighttime hours.

The study demonstrates that smartphone overuse contributes to poor sleep quality through mechanisms explained by the Arousal Theory of Sleep. Participants' experiences indicate that late-night smartphone usage increases cognitive stimulation and delays the onset of sleep, resulting in reduced sleep duration and fragmented sleep patterns. This disruption is further intensified by exposure to screen-emitted light, which interferes with circadian rhythms. As a result, students frequently experience fatigue, decreased alertness, and diminished academic performance. These findings confirm that sleep disturbances among nursing students are closely linked to behavioral patterns associated with digital device usage, particularly when such usage occurs without regulation or awareness of its physiological implications.

In parallel, the study reveals that smartphone overuse is strongly associated with elevated anxiety levels. This relationship can be understood through the lens of Cognitive Behavioral Theory, which highlights the role of maladaptive thought patterns in shaping emotional responses. The findings indicate that excessive exposure to social media, constant connectivity, and information overload contribute to increased worry, emotional instability, and cognitive strain. Nursing students often engage in social comparison and experience fear of missing out, which further exacerbates anxiety. Moreover, the study identifies a cyclical relationship between sleep quality and anxiety, where poor sleep intensifies emotional vulnerability, and heightened anxiety further disrupts sleep. This bidirectional interaction underscores the complexity of the problem and highlights the need for integrated approaches to address both issues simultaneously.

The Uses and Gratifications Theory provides additional insight into the motivations underlying smartphone overuse. The findings suggest that nursing students rely on smartphones to fulfill various psychological and social needs, including entertainment, communication, and stress relief. While these uses provide immediate gratification, they also contribute to long-term dependency and behavioral reinforcement. This dynamic explains why students continue to engage in excessive smartphone use despite being aware of its negative consequences. The integration of this theory with the other two frameworks offers a holistic understanding of how behavioral motivations, cognitive-emotional processes, and physiological outcomes interact to influence students' well-being.

Based on the results and discussion, the study concludes that the primary research problem—namely, the influence of smartphone overuse on sleep quality and anxiety levels—has been clearly addressed. The findings confirm that excessive smartphone use is a significant risk factor for both poor sleep and increased anxiety among nursing students. Furthermore, the study successfully fills the identified research gap by providing an integrated analysis that simultaneously examines these two outcomes within a specific and contextually relevant population. This integrative perspective represents a key contribution to the literature and highlights the importance of considering multiple dimensions of health when examining the effects of digital behavior.

The conclusions also align with the research objectives, which aimed to analyze the extent and nature of the relationship between smartphone overuse, sleep quality, and anxiety. Through qualitative exploration, the study not only identifies these relationships but also explains the underlying mechanisms and contextual factors that shape them. This contributes to the theoretical advancement of the field by demonstrating the continued relevance and adaptability of established theories in addressing contemporary health challenges related to technology use.

In terms of implications, the study emphasizes the need for increased awareness and intervention strategies to mitigate the negative effects of smartphone overuse. From a practical perspective, nursing students should be encouraged to adopt healthier digital habits, particularly by limiting smartphone use before bedtime and developing better sleep hygiene practices. Educational institutions also play a critical role in promoting mental health and well-being by integrating digital literacy and self-care strategies into the curriculum. Academically, the study provides a foundation for further research and highlights the importance of interdisciplinary approaches in understanding the impact of technology on health.

In conclusion, this study underscores that smartphone overuse is a multifaceted issue with significant implications for sleep quality and anxiety among nursing students. By linking the findings to established theoretical frameworks and contextualizing them within the academic and clinical environment of nursing education, the research offers a comprehensive and meaningful contribution to both knowledge and practice.

## REFERENCES

Achmad, L. N., Poluan, F. H., & Indah, L. K. (2025). Overview of Smartphone Addiction Levels among College Students. In *Asian Journal of Education and Social Studies* (Vol. 51, Nomor 4, hal. 141–147). Sciencedomain International. https://doi.org/10.9734/ajess/2025/v51i41856

Acık, C. (2023). The Determination of Burn out Levels and Sleep Periods in People among the Physiotherapist Profession. In *Annals of Physiotherapy & Occupational Therapy* (Vol. 6, Nomor 1). Medwin Publishers. https://doi.org/10.23880/aphot-16000243

Ahmed, S., Prativa, S., & Duha, T. H. (2024). *Exploring the Impact of Sleep Deprivation on Anxiety and Self-Esteem Among Bangladeshi University Students*. Center for Open Science. https://doi.org/10.31234/osf.io/2djkq

Albrecht-Bisset, M., Wang, D., Martin, K., Côté, P., & Papaconstantinou, E. A. (2023). A cross-sectional study of the association between sleep quality and anxiety in postsecondary students in Ontario. In *Sleep Epidemiology* (Vol. 3, hal. 100062). Elsevier BV. https://doi.org/10.1016/j.sleepe.2023.100062

Alhamed, A. A. (2023). The link among academic stress, sleep disturbances, depressive symptoms, academic performance, and the moderating role of resourcefulness in health professions students during COVID-19 pandemic. In *Journal of Professional Nursing* (Vol. 46, hal. 83–91). Elsevier BV. https://doi.org/10.1016/j.profnurs.2023.02.010

Almuslim, M., Alghafli, G., Alghafli, I., Alyousef, S., Aldossary, G., Alsaigh, B., Mousa, O., & AlsayedAhmed, H. (2025). *Association between Digital Burnout and Sleep Quality among King Faisal University Students*. Springer Science and Business Media LLC. https://doi.org/10.21203/rs.3.rs-6105207/v1

Alshowkan, A., & Shdaifat, E. (2025). Impact of AI Literacy on Well-Being Among Nursing Students—Mediating Roles of Empowerment and Anxiety: Cross-Sectional Study. In *JMIR Nursing* (Vol. 8). JMIR Publications Inc. https://doi.org/10.2196/79789

Altuntaş, S. B., & Öztürk, G. Z. (2023). Assessment of sleep quality and anxiety levels of individuals who are in home isolation due to the COVID-19 Pandemic. In *Ankara Medical Journal* (Vol. 23, Nomor 1, hal. 38–48). LookUs Bilisim A.S. https://doi.org/10.5505/amj.2023.33497

Alwafa, R. A., Jallad, S., Al-Sheikh, R. A., Adwan, R., & Badrasawi, M. (2024). Relationship between night eating syndrome and sleep quality among university students in Palestine. In *Sleep Science and Practice* (Vol. 8, Nomor 1). Springer Science and Business Media LLC. https://doi.org/10.1186/s41606-024-00105-8

Anirudh, S. (2025). Effect of Aromatherapy Combined with Music Therapy Vs Music Therapy on Anxiety, Cognition, Sleep Quality and Positive and Negative Affectivity in Students: A Randomized Control Trial. In *Advances in Complementary & Alternative Medicine* (Vol. 8, Nomor 5). Crimson Publishers. https://doi.org/10.31031/acam.2025.08.000698

Awad, M. (2024). Examining The Impact Of Anxiety And Depression On Sleep Quality Among Healthcare Providers. In *Journal of Namibian Studies : History Politics Culture* (Vol. 42, hal. 58–76). Dewspublication. https://doi.org/10.59670/b5vcsm38

Baptist, J., Vincent, A., Patel, Y., & Deo, M. (2025). Effect of Smartphone Addiction on Sleep Quality Among Physiotherapy Students in Navi Mumbai: A Cross-Sectional Study. In *International Journal For Multidisciplinary Research* (Vol. 7, Nomor 3). International Journal for Multidisciplinary Research (IJFMR). https://doi.org/10.36948/ijfmr.2025.v07i03.44455

BH, G., JS, S., Shah, S., & Saiyad, S. S. (2025). Smartphone Addiction and Sleep Disturbances Among Medical Students: A Cross-Sectional Study. In *Cureus*. Springer Science and Business Media LLC. https://doi.org/10.7759/cureus.91985

Debnath, A., Panwar, N., & Verma, A. (2025). Quantifying Screen Time and Its Association with Sleep Quality among Medical Students in India: A Cross-sectional Study. In *Indian Journal of Sleep Medicine* (Vol. 20, Nomor 4, hal. 108–112). Jaypee Brothers Medical Publishing. https://doi.org/10.5005/jp-journals-10069-0168

Dewi, I. G. A. D. L., Sari, N. L. P. D. Y., Prihandini, C. W., & Widiastuti, P. (2025). Sleep Quality and Asthenopia Among Nursing Students. In *Holistic Journal of Nursing Studies* (Vol. 1, Nomor 2, hal. 65–69). PT. Junior Management Indonesia. https://doi.org/10.64621/hjns.v1i2.24

El-Hosary, E., S., A., Khalil, A., & El-Salam, A. A. (2024). Pregnancy Discomforts Related to Pain, Anxiety, and Sleep Disturbance among Primigravida: Effect of Effleurage Massage. In *International Egyptian Journal of Nursing Sciences and Research* (Vol. 4, Nomor 2, hal. 394–408). Egypts Presidential Specialized Council for Education and Scientific Research. https://doi.org/10.21608/ejnsr.2024.259384.1348

El.ezazy, A. (2023). Exploring Internet Addiction among Psychiatric Nurses and its Effects on Sleep Quality and Psychological Distress. In *Assiut Scientific Nursing Journal*. Egypts Presidential Specialized Council for Education and Scientific Research.

https://doi.org/10.21608/asnj.2023.242141.1691

Elizabeth, M. Ben. (2024). Exploring The Impact Of Social Anxiety On Sleep Quality And Insomnia In Undergraduate Students. In *African Journal of Biomedical Research* (hal. 14413–14417). Green Publication. https://doi.org/10.53555/ajbr.v27i4s.7269

Evanger, L. N., Pallesen, S., Saxvig, I. W., Hysing, M., Sivertsen, B., Lie, S. A., Gradisar, M., & Bjorvatn, B. (2024). Associations between sleep duration, insomnia, depression, anxiety and registry-based school grades: A longitudinal study among high-school students. In *Journal of Sleep Research* (Vol. 34, Nomor 4). Wiley. https://doi.org/10.1111/jsr.14430

Ge, J., Liu, Y., Cao, W., & Zhou, S. (2023). The relationship between anxiety and depression with smartphone addiction among college students: The mediating effect of executive dysfunction. In *Frontiers in Psychology* (Vol. 13). Frontiers Media SA. https://doi.org/10.3389/fpsyg.2022.1033304

Gendler, Y., Ben-Aroya, N., & Blau, A. (2024). Influence of Knowledge and Cultural Beliefs on Attitudes Toward HPV Vaccination Among Israeli Nurses and Nursing Students: Implications for Vaccine Advocacy. In *Nursing Reports* (Vol. 14, Nomor 4, hal. 3454–3465). MDPI AG. https://doi.org/10.3390/nursrep14040251

George, S. (2024). *Assessment of Procrastination Levels and Demographic Associations Among Nursing Students in Bengaluru Colleges*. MDPI AG. https://doi.org/10.20944/preprints202409.1561.v1

Glangkarn, S. (2023). *Peer Review Report For: Association between media use and poor sleep quality among senior high school students: a cross-sectional study [version 2; peer review: 2 approved, 1 approved with reservations]*. F1000 Research Ltd. https://doi.org/10.5256/f1000research.153227.r195839

Grozdeva, D., & Tancheva, M. (2024). A study of sleep patterns among nursing students. In *Varna Medical Forum* (Vol. 13, Nomor 2, hal. 159). Medical University Prof. Dr. Paraskev Stoyanov - Varna. https://doi.org/10.14748/vmf.v13i2.9850

Gu, Y., Hu, P., Dai, C., Ni, S., & Huang, Q. (2025). Influence of sleep duration and quality on depression symptoms among nurses during the Omicron outbreak: a cross-sectional survey. In *BMC Nursing* (Vol. 24, Nomor 1). Springer Science and Business Media LLC. https://doi.org/10.1186/s12912-025-02767-w

Gunasekar, A., Udayakumar, R., Murugesan, R. K., N, T., J, R., & Srirangaramasamy, J. (2025). Smartphone Addiction Among Medical Students and Its Implications on Sleep Quality and BMI: A Cross-Sectional Study. In *Cureus*. Springer Science and Business Media LLC. https://doi.org/10.7759/cureus.90637

Haddaouy, A. El, Blaak, H., Elkhalladi, J., Essaidi, M., Iziki, H., Es-Sabir, F., & Omari, F. El. (2025). Correction to: Mediating role of sleep quality in the relationship between smartphone addiction and academic performance among nursing students in Morocco: a cross-sectional study. In *BMC Nursing* (Vol. 24, Nomor 1). Springer Science and Business Media LLC. https://doi.org/10.1186/s12912-025-04114-5

haddaouy, A. El, Miyah, Y., Benjelloun, M., Zahouani, C., Blaak, H., Khalladi, J. El, Essaidi, M., & Omari, F. El. (2024). *Impact of Smartphone Addiction and Sleep Quality on Academic Performance of Nursing Students in Morocco*. Elsevier BV. https://doi.org/10.2139/ssrn.5065056

Hasan, H., Shihab, K. A., Mohammad, Z., Jahan, H., Coussa, A., & Faris, M. E. (2023). Associations of smartphone addiction, chronotype, sleep quality, and risk of eating disorders among university students: A cross-sectional study from Sharjah/United Arab Emirates. In *Heliyon* (Vol. 9, Nomor 1). Elsevier BV. https://doi.org/10.1016/j.heliyon.2023.e12882

Hasim, N., Yusof, J., Ibrahim, F. A., Bungsu, M. S., Yakub, N. A. Y., & Shari, N. I. (2023). Stress and Sleep Quality among Engineering Students. In *Sains Humanika* (Vol. 15, Nomor 3, hal. 29–40). Penerbit UTM Press. https://doi.org/10.11113/sh.v15n3.2033

Hatami, F., Piri, S., Ardali, M. N., Barzoki, E. R., Fallah, S., Bidgoli, M. O., & Talebi, M. (2025). Nomophobia and Its Association with Sleep Quality, Communication Skills, and Stress Among Nursing Students: A Cross-sectional Study. In *Iranian Journal of Psychiatry and Behavioral Sciences* (Vol. 19, Nomor 4). Brieflands. https://doi.org/10.5812/ijpbs-165432

Innab, A., Alenezi, A., Khaled, A., Dewan, M., & Mostafa, M. (2025). The Relationship Between Premenstrual Dysphoric Symptoms, Perceived Stress, and Sleep Quality Among Nursing Students: A Cross-Sectional Study. In *Healthcare* (Vol. 13, Nomor 22, hal. 2862). MDPI AG. https://doi.org/10.3390/healthcare13222862

Kanyadi, S. R., Shindhe, V. M., Kamate, R. P., & Javali, S. B. (2025). Sleep Hygiene Practices and Sleep Quality Among Undergraduate Medical Students: A Cross-Sectional Study. In *National Journal of Community Medicine* (Vol. 16, hal. 879–886). Medsci Publications. https://doi.org/10.55489/njcm.160920255548

KC, C. (2024). Confirmatory Factor Analysis of Sleep Quality among Grandparents Raising Grandchildren. In *Gerontology and Geriatric Medicine* (Vol. 10, Nomor 1, hal. 1–8). Herald Scholarly Open Access. https://doi.org/10.24966/ggm-8662/100200

Khalaf, S., elhay, H. A., Ghazy, H., & Goda, S. (2023). COVID-19 Pandemic Fear, Anxiety and Quality of Life among Adolescent Girls with Special Needs. In *Tanta Scientific Nursing Journal* (Vol. 28, Nomor 1, hal. 106–127). Egypts Presidential Specialized Council for Education and Scientific Research. https://doi.org/10.21608/tsnj.2023.285343

Kulsum, E. M., Putri, R. R., & Widianingsih, A. W. S. (2025). Exploring English-Speaking Anxiety Levels and Contributing Factors among Indonesian EFL Undergraduate Students. In *International Journal of Linguistics, Communication, and Broadcasting* (Vol. 3, Nomor 3, hal. 72–78). Research Collaboration Community (RCC). https://doi.org/10.46336/ijlcb.v3i3.265

Li, K., Wang, Q., & Li, J. (2025). Effects of physical activity dose on cognitive ability in Chinese adolescent students: parallel mediating roles of sleep quality and smartphone addiction. In *Frontiers in Psychology* (Vol. 16). Frontiers Media SA. https://doi.org/10.3389/fpsyg.2025.1680936

Li, Y. (2023). The Interaction between Sleep Quality and Gender on Depression Level among Chinese International Students. In *Lecture Notes in Education Psychology and Public Media* (Vol. 6, Nomor 1, hal. 550–555). EWA Publishing. https://doi.org/10.54254/2753-7048/6/20220491

Luz, C. S., Teixeira, A. E., Araújo, J. F., Duarte, L. L., & Moreno, C. R. C. (2023). Relation between Mealtime, Sleep Quality and Anxiety Level in Undergraduate Students in São Paulo. In *Sleep Science* (Vol. 16, hal. 1–70). Georg Thieme Verlag KG. https://doi.org/10.1055/s-0043-1770195

Mi, Y., Ahn, S., & Ren, L. (2025). Exploring the interconnections of loneliness, anxiety, and depression among nursing students: a network analysis approach. In *Frontiers in Psychiatry* (Vol. 16). Frontiers Media SA. https://doi.org/10.3389/fpsyt.2025.1537935

Mvandal, S. P. (2024). *The Influence of Brief Papers on Clinical Decision-Making Skills among College Nursing Students in Tanzania*. Springer Science and Business Media LLC. https://doi.org/10.21203/rs.3.rs-4158581/v1

Noor, A. A., Noor, F. A., Shoaib, M., Imtiaz, A., Qureshi, A. M., & Khan, K. S. (2025). Independent Influence of Sleep Quality, Daytime Sleepiness, and Chronotype on Mental Health and Academic Performance among MBBS Students of Mirpur Medical College, AJK. In *Medical Forum Monthly* (Vol. 36, Nomor 10). Medical Academic Foundation. https://doi.org/10.60110/medforum.361007

Okajima, I., & Kadotani, H. (2023). Association of Sleep Reactivity and Anxiety Sensitivity with Insomnia-Related Depression and Anxiety among City Government Employees in Japan. In *Clocks & Sleep* (Vol. 5, Nomor 2, hal. 167–176). MDPI AG. https://doi.org/10.3390/clockssleep5020015

ÖZTÜRK, Z., AKSOY, M., & TURAN, G. B. (2023). Investigating The Relationship Among Coronavirus Anxiety, Smartphone Addiction, And Sleep Quality During Covid-19 Pandemic. In *Balıkesır Health Sciences Journal*. Balikesir University. https://doi.org/10.53424/balikesirsbd.1151131

Papi, S., Barmala, A., Amiri, Z., Vakili-Basir, A., Cheraghi, M., & Nejadsadeghi, E. (2023). Mediating Roles of Stress, Anxiety, and Depression in the Relationship between Constipation and Sleep Quality among the Elderly: Structural Equation Modeling (SEM). In *Sleep Science* (Vol. 16, Nomor 1, hal. 1–6). Georg Thieme Verlag KG. https://doi.org/10.1055/s-0043-1767750

Perez-Manchon, D., Azpeleta-Noriega, C., Gal-Iglesias, B., & Ruiz-Zaldibar, C. (2025). *WITHDRAWN: Cognitive behavioural therapy improves sleep quality in nursing students: results from a randomized controlled trial*. Springer Science and Business Media LLC. https://doi.org/10.21203/rs.3.rs-5804905/v1

Periañez, C. A. H., Jaramillo-Bolívar, C. D., & Castillo-Díaz, M. A. (2025). Evaluating sleep quality and daytime sleepiness in nursing students: psychometric validation of the Pittsburgh Sleep Quality Index and the Epworth Sleepiness Scale. In *BMC Nursing* (Vol. 24, Nomor 1). Springer Science and Business Media LLC. https://doi.org/10.1186/s12912-025-04044-2

Podder, L., Verma, M., Patidar, A. B., & Gupta, R. (2024). Anxiety, Sleep Quality and Coping Strategies Adopted among the Frontline COVID Warriors during Second Wave of COVID Pandemic: Evidence from a Retrospective Study in Central India. In *Nursing Journal of India* (Nomor 5, hal. 226–231). The Trained Nurses Association of India. https://doi.org/10.48029/nji.2024.cxv507

Poyil, S., Chimkode, S., K, S., & Vayyat, S. (2024). Sleep quality, perceived stress, and attention levels: A study on medical students. In *National Journal of Physiology, Pharmacy and Pharmacology* (hal. 1). ScopeMed. https://doi.org/10.5455/njppp.2024.14.06247202421062024

Pynadath, M. G. (2023). Anxiety and its causes among undergraduate nursing students during Covid 19 Pandemic. In *IP Journal of Paediatrics and Nursing Science* (Vol. 6, Nomor 1, hal. 40–47). IP Innovative Publication Pvt Ltd. https://doi.org/10.18231/j.ijpns.2023.006

Qin, X., Liu, L., Yan, Y., Guo, X., Yang, N., & Li, L. (2025). Smartphone addiction and sleep quality in the physical activity-anxiety link: a mediation-moderation model. In *Frontiers in Public Health* (Vol. 13). Frontiers Media SA. https://doi.org/10.3389/fpubh.2025.1512812

Sachdeva, A., & Kaushal, A. (2025). Digital Dependence in Medical Education: Smartphone Usage Patterns, Behavioural Practices, Sleep Disturbances, Health Effects and Nomophobia among MBBS Students in Himachal Pradesh. In *Journal of Pioneering Medical Sciences* (Vol. 14, Nomor 11, hal. 182–189). International Academic and Research Consortium. https://doi.org/10.47310/jpms2025141126

Safitrhi, A. D., Agustina, M., & Shifa, N. A. (2023). Dangdut Koplo Singing Activity on Anxiety Levels in Final Year Nursing Students. In *Journal of Complementary Nursing* (Vol. 2, Nomor 3, hal. 205–211). CV Al-Kahf Digital Inovasi. https://doi.org/10.53801/jcn.v2i3.122

Şen, D. G. (2025). A Study of Anxiety Levels Among University Students in Relation to Sustainable Consumption Awareness. In *Üniversite Araştırmaları Dergisi* (Vol. 8, Nomor 1, hal. 105–112). Universite Arastirmalari Dergisi. https://doi.org/10.32329/uad.1600030

Shadzi, M. R., Rahmanian, M., Heydari, A., & Salehi, A. (2024). Structural validity of the Pittsburgh Sleep Quality Index among medical students in Iran. In *Scientific Reports* (Vol. 14, Nomor 1).

Springer Science and Business Media LLC. https://doi.org/10.1038/s41598-024-51379-y

Shuhaimi, N., Nadaraja, T., & Zainuddin, N. (2025). Association of Depression, Anxiety, Stress with Quality of Life among Students in a Private University. In *Environment-Behaviour Proceedings Journal* (Vol. 10, hal. 127–132). e-IPH Ltd. https://doi.org/10.21834/e-bpj.v10isi35.7497

Sidek, N., Kamal, A. A., & Rahman, Z. A. (2024). Sleep Quality Levels and Academic Performance Among Secondary School. In *ACPES Journal of Physical Education, Sport, and Health (AJPESH)* (Vol. 4, Nomor 1, hal. 62–69). Universitas Negeri Semarang. https://doi.org/10.15294/ajpesh.v4i1.12102

Sleiman, J., Cho, E., Lee, D., Cho, I.-K., Chung, S., & Uygur, O. F. (2023). Does Viral Anxiety Influence the Insomnia Severity Among Patients With Insomnia Disorder During COVID-19 Pandemic? In *Sleep Medicine Research* (Vol. 14, Nomor 1, hal. 25–30). Korean Society of Sleep Medicine. https://doi.org/10.17241/smr.2022.01480

Smura, T., Hammonds, L. S., & Griffin, C. M. (2024). Increasing Restorative Sleep Among Adults With Depressive Symptoms: A Quality Improvement Project. In *Creative Nursing* (Vol. 30, Nomor 4, hal. 320–323). SAGE Publications. https://doi.org/10.1177/10784535241248623

Soomro, K., Amin, M. H., Khalid, A., Waseem, F., Arshad, Z., Asad, A. M., & Ullah, S. (2025). IMPACT OF SOCIAL MEDIA OVERUSE ON ANXIETY AND SELF-ESTEEM AMONG UNIVERSITY STUDENTS IN URBAN ACADEMIC SETTINGS. In *Insights-Journal of Life and Social Sciences* (Vol. 3, Nomor 5, hal. 73–81). Health and Research Insights. https://doi.org/10.71000/cktcsf44

SÖZEN, K. K., & GÜNGÖR, S. (2025). The effect of self-foot massage on anxiety and sleep quality in nursing students: A single-blind randomized controlled study. In *Universa Medicina* (Vol. 44, Nomor 3, hal. 288–297). Universa Medicina. https://doi.org/10.18051/univmed.2025.v44.288-297

Sun, Z., Gao, X., & Ren, P. (2024). The relationship between time anxiety and college students' sleep quality: the mediating role of irrational procrastination and the moderating effect of physical activity. In *Frontiers in Psychology* (Vol. 15). Frontiers Media SA. https://doi.org/10.3389/fpsyg.2024.1410746

Susanto, V. R., Ritunga, I., & Nugraheni, E. (2025). The Relationship Between Smartphone Addiction, Sleep Quality, and Academic Achievement Among Medical Students. In *PROMOTOR* (Vol. 8, Nomor 6, hal. 874–885). LPPM Universitas Ibn Khaldun Bogor. https://doi.org/10.32832/pro.v8i6.1455

Takdir, Sunarsih, & Supodo, T. (2024). Sleep Quality and Blood Glucose Levels in Patients with Type 2 Diabetes Mellitus. In *Omni Nursing Journal* (Vol. 1, Nomor 1, hal. 25–29). PT. Bantayang Omni Cendekia. https://doi.org/10.65277/onj.v1i1.3

Tang, Q., Zou, X., Li, Y., Xu, Y., Lv, Y., Liu, X., Liu, G., & Tao, Y. (2025). Correction: Insomnia mediates the relation between empathy and anxiety among nursing students: a latent moderated mediation model of self-compassion. In *BMC Nursing* (Vol. 24, Nomor 1). Springer Science and Business Media LLC. https://doi.org/10.1186/s12912-025-03570-3

THEBAULT, A., BELONI, P., & TONIOLO, J. (2025). Smartphone usage habits among french nursing students: A monocentric mixed-methods study. In *Archives of Psychiatric Nursing* (Vol. 58, hal. 151958). Elsevier BV. https://doi.org/10.1016/j.apnu.2025.151958

Tok, H. H., & Kesgin, M. T. (2024). Awareness and Determination of Digital Game Addiction Levels among Nursing Students. In *Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi* (Vol. 13, Nomor 4, hal. 1709–1720). Gumushane University. https://doi.org/10.37989/gumussagbil.1366535

Varol, B. (2025). Artificial Intelligence Anxiety in Nursing Students. In *CIN: Computers, Informatics,*

*Nursing* (Vol. 43, Nomor 6). Ovid Technologies (Wolters Kluwer Health). https://doi.org/10.1097/cin.0000000000001250

Wahab, M., & Hamonari, N. (2025). THE IMPACT OF CAFFEINE ON SLEEP QUALITY AND MENTAL HEALTH AMONG DENTAL STUDENTS IN ERBIL CITY, KRG/IRAQ. In *BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY*. "Astra Science" LLC. https://doi.org/10.58240/1829006x-2025.21.8-293

Wang, S. (2023). The Correlation Between Anxiety Levels and Foreign Language Learning Among University Students. In *Pacific International Journal* (Vol. 6, Nomor 2, hal. 206–209). Research Center of Life and Social Science. https://doi.org/10.55014/pij.v6i2.385

Wani, P. (2024). Quantity and Quality of Sleep among Medical and Paramedical Students: A Comprehensive Study and Analysis. In *International Journal of Innovative Research in Medical Science* (Vol. 9, Nomor 4, hal. 228–234). International Scientific Invention Journals. https://doi.org/10.23958/ijirms/vol09-i04/1837

Wulandari, A., Siregar, M., & Husein, R. (2024). Foreign Language Speaking Anxiety: Speaking Anxiety Levels and Factors among Tenth Grade Students. In *Jurnal Bahasa dan Sastra* (Vol. 12, Nomor 3, hal. 480). Universitas Negeri Padang. https://doi.org/10.24036/jbs.v12i3.129686

Yilmaz, R., Sulak, S., Griffiths, M. D., & Yilmaz, F. G. K. (2023). An Exploratory Examination of the Relationship Between Internet Gaming Disorder, Smartphone Addiction, Social Appearance Anxiety and Aggression Among Undergraduate Students. In *Journal of Affective Disorders Reports* (Vol. 11, hal. 100483). Elsevier BV. https://doi.org/10.1016/j.jadr.2023.100483

Yontar, G., & Aras, N. (2025). Erratum to “Effects of phantom shocks on anxiety levels, coping skills and sleep quality in patients with implantable cardioverter/defibrillators.” In *Kastamonu Medical Journal* (Vol. 5, Nomor 3, hal. 214). https://doi.org/10.51271/kmj-0213

Yun, M., Kang, B., Park, E., Kim, S., Kim, S., Yun, S., & Lee, G. (2024). Differences in Lifestyle, Depression and Quality of Sleep according to Smartphone Addiction among College Students. In *Journal of Business Convergence* (Vol. 9, Nomor 4, hal. 241–248). Korea Business Association. https://doi.org/10.31152/jb.2024.08.9.4.241

Zhang, X., Zhang, C., Ren, Z., Chen, Z., & Bai, C. (2023). *Association between Sleep Quality and Interactive Health Literacy among Chinese College Students: A Cross-sectional Study*. Research Square Platform LLC. https://doi.org/10.21203/rs.3.rs-3123118/v1