RESEARCH PAPER

Assessment of Gadgets Addiction, Sleep Quality, Academic Performance, and Depression among Nursing Students: A Mixed-Methods Triangulation Study

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ABSTRACT

Background: Gadget addiction has become an increasing concern among nursing students because smartphones and other digital devices are extensively used for academic, social, and recreational activities. Excessive and uncontrolled gadget use may interfere with sleep, academic functioning, and emotional well-being. Nursing students are particularly vulnerable because of demanding academic schedules, clinical responsibilities, and associated stress. The present study was undertaken to assess quality of sleep, academic performance, and depression among gadget-addicted nursing students and to explore their experiences regarding gadget use using a triangulation approach.

Methods: A mixed-methods study was conducted using an explanatory sequential research design. In Phase I, 170 B.Sc. Nursing and GNM students fulfilling inclusion criteria were selected by purposive sampling and assessed for gadget addiction using the Smartphone Addiction Scale. In Phase II, quantitative data were collected from 120 students regarding sleep quality, academic performance, and depression using the Pittsburgh Sleep Quality Index, Academic Performance Rating Scale, and Hamilton Depression Rating Scale, respectively. In Phase III, 30 students with poor sleep quality, higher depression, and reduced academic performance were purposively selected for qualitative exploration. Open-ended interviews were audio-recorded, transcribed, and analysed thematically. Quantitative and qualitative findings were integrated through a joint display.

Results: Among nursing students, 44.1% had moderate gadget addiction, 29.4% had low, and 26.5% had high addiction. Regarding sleep quality, 36.7% had poor sleep quality, 33.3% had good sleep quality, and 30.0% had severe sleep disturbance. Academic performance was poor among 65.0%, moderate among 21.7%, good among 8.3%, and excellent among 5.0% of students. Depression was moderate in 35.0%, mild in 33.3%, and severe in 7.5%. Sleep quality showed a significant positive correlation with academic performance ($r = 0.815$, $p = 0.017$) and significant negative correlations with depression ($r = -0.766$, $p = 0.028$). Academic performance was negatively correlated with depression ($r = -0.742$, $p = 0.034$). Thematic analysis generated seven major themes illustrating habitual checking, emotional dependence, sleep disturbance, academic difficulties, and emotional distress, alongside positive outcomes following behavioural modification.

Conclusion: Gadget addiction is a significant concern among nursing students and is associated with impaired sleep, poor academic performance, and depressive symptoms. An integrated approach involving digital wellness education, sleep hygiene, stress management, and institutional support is essential.

Keywords: Gadget addiction; Nursing students; Sleep quality; Academic performance; Depression; Smartphone use; Mixed-method study; Digital wellness.

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INTRODUCTION

Gadget addiction refers to the excessive and compulsive use of electronic devices, such as smartphones, tablets, and laptops, despite their negative effects on social relationships, academic responsibilities, and personal well-being (Kim et al., 2020). Rapid advancements in information and communication technology have transformed education, healthcare, and social interaction. Although digital devices facilitate communication and learning, their excessive use has become a growing concern, particularly among young adults and university students (Kuss & Griffiths, 2017; Elhai et al., 2020). The increasing use of online learning platforms and electronic educational resources, particularly following the COVID-19 pandemic, has further increased students' dependence on digital technology (Roeser et al., 2020; UNESCO, 2021).

University students are vulnerable to gadget addiction because of academic demands, social networking, and continuous digital connectivity. Its characteristics include difficulty controlling screen time, tolerance,

withdrawal-like symptoms, and prioritizing gadgets over essential activities (Samaha & Hawi, 2016; Cho et al., 2018; Montag et al., 2021; Yang et al., 2021). Fear of Missing Out (FOMO) also encourages frequent checking of social media and notifications, reinforcing problematic device use (Przybylski et al., 2013; Elhai et al., 2020). Studies indicate that problematic smartphone use affects approximately 20%–50% of university students (Sohn et al., 2019). Nursing students represent a critical subgroup because their education involves intensive theoretical learning, clinical training, practical examinations, and professional responsibilities. Excessive gadget use among nursing students may negatively affect their sleep quality, academic achievement, and emotional stability (George et al., 2020; McKenna et al., 2020; Labrague, 2021; Rony et al., 2022).

Need for the Study & Research Gap

Digital technology has transformed education, communication, and lifestyle. However, excessive screen exposure, particularly at night, suppresses melatonin secretion, alters circadian rhythms, and disrupts sleep patterns, leading to daytime fatigue and reduced concentration (Lemola et al., 2015; Exelmans & Van den Bulck, 2016; Hale & Guan, 2019; Alotaibi et al., 2020; Memon et al., 2023). Although several studies have focused on gadget addiction, few have explored its simultaneous impact on sleep quality, academic performance, and depression within a single comprehensive investigation, particularly among nursing students in India. Combining quantitative and qualitative methods through triangulation provides a robust framework to address this gap (Denzin, 2017; Creswell & Plano Clark, 2018; Polit & Beck, 2021; Grove et al., 2023).

Theoretical Framework

This study is grounded in George Engel's Biopsychosocial Model (1977). The framework conceptualizes health outcomes through the dynamic interaction of Biological Factors (Sleep Quality measured via PSQI), Psychological Factors (Depression assessed via HAM-D), Social/Behavioral Factors (Gadget Addiction via SAS and Demographic Profile), and Functional Outcomes (Academic Performance via APRS).

REVIEW OF LITERATURE

A thorough literature search was conducted across databases including PubMed, Google Scholar, and CINAHL to contextualize current evidence (Gray et al., 2003; Cronin et al., 2008).

Prevalence of Gadget Addiction among Nursing Students

Gadget addiction has emerged as an important behavioural and psychological concern among nursing students due to the increasing use of smartphones, tablets, laptops, and other digital devices for academic, social, and recreational activities. A cross-sectional study conducted in Western Rajasthan, India, among 160 nursing students reported that 38.1% had moderate smartphone addiction, while 61.9% had mild addiction. Furthermore, 37.5% of students spent 1–3 hours daily on smartphones, whereas 22.5% reported more than five hours of daily usage. Another Indian study involving 402 nursing students reported a 39% prevalence of severe problematic mobile phone use, highlighting the growing concern regarding excessive gadget use. A recent 2025 study involving 515 undergraduate nursing students identified smartphone addiction in 23.1% of participants. Excessive gadget use may interfere with concentration, clinical learning, interpersonal communication, sleep quality, and academic productivity. Factors such as social media engagement, online gaming, continuous notifications, academic dependency, and fear of missing out may contribute to problematic gadget use. Therefore, assessing the prevalence of gadget addiction among nursing students is essential for identifying risk factors and developing digital wellness education, healthy screen-time practices, and appropriate behavioural interventions..

Sleep Quality, Academic Performance, and Depression

Sleep quality plays a significant role in determining academic performance and psychological well-being among university students. Poor sleep quality, characterized by insufficient sleep duration, frequent nighttime awakenings, difficulty falling asleep, and irregular sleep patterns, can negatively affect concentration, memory, cognitive functioning, learning ability, and classroom participation. Students experiencing inadequate sleep are more likely to report reduced academic productivity, lower examination performance, daytime fatigue, and difficulties in decision-making. Furthermore, poor sleep quality is closely associated with depressive symptoms, including persistent sadness, loss of interest, irritability, emotional instability, and reduced motivation. Depression may further disturb sleep patterns, creating a bidirectional relationship between sleep disturbances and mental health problems. Academic pressure, examination stress, excessive screen time, irregular lifestyles, and poor time management may contribute to these interconnected problems. Therefore, assessing sleep quality, academic performance, and depression among university students is essential for identifying vulnerable individuals and developing appropriate interventions, including sleep hygiene education, stress management, psychological counselling, and

student wellness programmes to improve academic outcomes and overall mental health.

METHODOLOGY

This study utilized an explanatory sequential mixed-methods research design (Polit & Beck, 2021; Kothari, 2004). The quantitative phase assessed prevalence and statistical correlations, followed by a qualitative phase exploring lived experiences.

Setting & Sample: Conducted at Texcity College of Nursing, Coimbatore, Tamil Nadu. A sample of 170 nursing students fulfilling inclusion criteria was selected via purposive sampling for Phase I (Gangadharan et al., 2022). Phase II evaluated 120 students, and Phase III purposively selected 30 students with poor sleep, higher depression, and reduced academic performance for qualitative interviews.

Instruments: (1) Demographic Profile, (2) Smartphone Addiction Scale (SAS; Kwon et al., 2013), (3) Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989), (4) Academic Performance Rating Scale (APRS; Birchmeier et al.), and (5) Hamilton Depression Rating Scale (HAM-D; Hamilton, 1960). Content validity CVI and CVR were established at 1.0 by 7 subject experts (Lawshe, 1975; Yaghmaie, 2003). Reliability using Cronbach's alpha demonstrated high internal consistency (SAS r=0.87, PSQI r=0.88, APRS r=0.85, HAM-D r=0.85). Ethical approval was granted by Desh Bhagat University Committee.

RESULTS AND ANALYSIS

Data were analyzed using SPSS version 23 for quantitative metrics and NVivo for qualitative thematic analysis.

Phase I: Prevalence of Gadget Addiction (N=170)

Demographic distribution revealed that 100% were aged 18-25 years, 63.5% were female, 52.9% were pursuing B.Sc. Nursing, and 47.1% GNM. Regarding daily screen time, 51.2% reported 2-4 hours, 26.5% reported 4-6 hours, and 22.4% reported >6 hours. Overall gadget addiction severity: Low = 29.4% (n=50), Moderate = 44.1% (n=75), High = 26.5% (n=45). Mean SAS score = 82.78 ± 14.63.

Phase II: Quantitative Assessment & Correlations (N=120)

Sleep Quality (PSQI):

- Good = 33.3% (n=40)
- Poor = 36.7% (n=44)
- Severe disturbance = 30.0% (n=36).
- Mean PSQI = 7.34 ± 2.65.

Academic Performance (APRS):

- Poor = 65.0% (n=78)
- Moderate = 21.7% (n=26), Good = 8.3% (n=10)
- Excellent = 5.0% (n=6).
- Mean APRS = 17.76 ± 4.93.

Depression (HAM-D):

- Normal = 24.2% (n=29)
- Mild = 33.3% (n=40)
- Moderate = 35.0% (n=42)
- Severe = 7.5% (n=9)
- Mean HAM-D = 16.76 ± 3.93.

Variable	Sleep Quality	Academic Performance	Depression
Sleep Quality	-	r = 0.815 (p=0.017*)	r = -0.766 (p=0.028*)
Academic Performance	r = 0.815 (p=0.017*)	-	r = -0.742 (p=0.034*)
Depression	r = -0.766 (p=0.028*)	r = -0.742 (p=0.034*)	-

Chi-square tests confirmed significant associations between Sleep Quality, Academic Performance, Depression and demographic variables including place of staying ($p<0.001$), grading point ($p<0.01$), average sleep duration ($p<0.001$), and daily screen time ($p<0.05$).

Phase III & IV: Qualitative Findings & Joint Display Integration

Thematic analysis generated 7 major themes: (1) Academic Use of Smartphones, (2) Development of Smartphone Addiction, (3) Impact on Daily Life, (4) Emotional and Psychological Experiences, (5) Healthy Coping and Self-Management, (6) Positive Changes Following Behavioural Modification, and (7) Recommendations for Promoting Healthy Smartphone Use. Joint display integration demonstrated strong statistical-qualitative convergence regarding sleep deterioration and academic impairment, alongside expansion regarding psychological distress mechanisms.

DISCUSSION

The findings of this study demonstrate that gadget addiction is prevalent among nursing students (44.1% moderate, 26.5% high), aligning with Mudgal et al. (2026), Aslani et al. (2025), and Ayaz-Alkaya et al. (2025). Sleep quality impairment (66.7% poor/severe) corroborates evidence from Ravi and Mohamed (2024), Wang et al. (2024), and Sahu et al. (2024). Academic performance deficits (65.0% poor) mirror results reported by Berdida and Grande (2023), Khatony et al. (2024), and Fooladi et al. (2022). Furthermore, depressive symptom prevalence (35.0% moderate, 7.5% severe) resonates with Quesada-Puga et al. (2024), Nway et al. (2023), and Zeng et al. (2026). The strong triangular intercorrelations validate the Biopsychosocial Model in nursing education contexts.

IMPLICATIONS

The findings of the study have important implications for nursing education, nursing practice, nursing research and nursing administration. They emphasize the need to address gadget addiction through awareness, early identification, counselling, healthy lifestyle practices and institutional support to improve nursing students' academic performance, sleep quality and psychological well-being.

Nursing Education

Nurse educators should create awareness regarding the effects of excessive gadget use on sleep, academic performance and mental health. The curriculum may incorporate digital wellness, sleep hygiene, time management and healthy coping strategies. Students should also be educated about identifying warning signs of gadget addiction, sleep disturbances and depression through appropriate assessment tools and educational programmes.

Nursing Practice

Nurses and nursing faculty should actively participate in the early identification of students experiencing problematic gadget use, poor sleep, academic difficulties and depressive symptoms. Regular assessment, individualized health education, counselling and timely referral can help promote healthy gadget use, adequate sleep and psychological well-being among nursing students.

Nursing Research

The study provides opportunities for further research using larger samples, different geographical settings and multiple nursing institutions. Future researchers may conduct experimental and longitudinal studies to evaluate digital wellness programmes, sleep hygiene education, counselling and time-management interventions. Further qualitative and mixed-method studies may provide deeper insights into students' experiences and challenges related to gadget addiction.

Nursing Administration

Nursing administrators and college authorities should develop institutional policies and support programmes addressing problematic gadget use among students. Regular screening, awareness workshops, counselling facilities and referral services should be established to identify students experiencing sleep disturbances, depression and academic difficulties. These initiatives may promote a healthier academic environment and improve students' overall well-being.

LIMITATIONS

The study had certain limitations, including the use of purposive sampling, which may have introduced selection bias and limited the generalizability of findings. Reliance on self-reported assessment tools may have influenced responses due to recall and social desirability bias. The qualitative phase included only 30 purposively selected students, whose experiences may not represent the entire population of gadget-addicted nursing students. Participants' hesitation during interviews may also have limited the depth of information collected. Furthermore, the cross-sectional design could not establish cause-and-effect relationships between gadget addiction, sleep quality, academic performance and depression. Although quantitative and qualitative findings were integrated, differences between statistical outcomes and subjective experiences may have influenced the overall interpretation.

RECOMMENDATIONS

Future studies should include larger samples from multiple nursing institutions and use probability sampling techniques to improve representativeness and generalizability. Similar research may be conducted across different geographical regions and educational settings. Nursing colleges should implement digital wellness programmes, regular screening, counselling and health education focusing on responsible gadget use, sleep hygiene, time management and healthy coping strategies. Experimental studies may evaluate the effectiveness of digital detox programmes, counselling and sleep-hygiene interventions. Further qualitative research

should explore students' experiences in greater depth, while longitudinal and mixed-method studies may provide better understanding of the long-term relationship between gadget addiction, sleep quality, academic performance and depression.

CONCLUSION

The study concluded that gadget addiction was prevalent among nursing students, with 44.1% experiencing moderate, 29.4% low and 26.5% high addiction. Sleep disturbances were also common, with 36.7% reporting poor sleep quality and 30.0% experiencing severe sleep disturbance. Academic performance was unsatisfactory among 65.0% of students, while 35.0% experienced moderate depression, 33.3% mild depression and 7.5% severe depression. Quantitative findings revealed a strong positive relationship between sleep quality and academic performance ($r = 0.815$, $p = 0.017$), and significant negative relationships between sleep quality and depression ($r = -0.766$, $p = 0.028$) and academic performance and depression ($r = -0.742$, $p = 0.034$). Qualitative findings indicated that excessive smartphone use for educational and recreational purposes, habitual checking, emotional dependence and difficulty controlling screen time contributed to delayed sleep, poor concentration, procrastination, academic difficulties and emotional distress. Students identified family and peer support, exercise, meditation, screen-time limits and healthy sleep practices as useful coping strategies. Behavioural modifications were associated with improvements in concentration, productivity, emotional well-being and sleep quality. Overall, the findings highlighted gadget addiction as a multidimensional concern affecting sleep, academic performance and mental health, emphasizing the importance of digital wellness education, healthy coping strategies and institutional support.

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