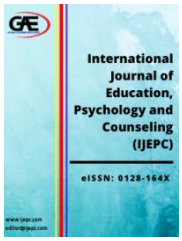
International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067



INTERNATIONAL JOURNAL OF EDUCATION, PSYCHOLOGY AND COUNSELLING (IJEPC)
www.ijepc.com

SCREEN TIME AND SLEEP QUALITY: A NARRATIVE REVIEW OF DIGITAL DEVICE USAGE AND ITS IMPACT ON WELL-BEING

Usman Jaffer[1], Shaziya Sharminaz[2], Nur Fatihah Zulkafli[3], Muhammad Omar[4], Che Mohd Nasril Che Mohd Nassir[5], Mohamed Ayaaz Ahmed[6], Rahmah Ahmad H. Osman[7 *]

[1] AbdulHamid AbuSulayman Kulliyyah of Islamic Revealed Knowledge and Human Sciences, International Islamic University Malaysia, 50728 Kuala Lumpur, Malaysia
Email: jafferu@iium.edu.my;
[2] AbdulHamid AbuSulayman Kulliyyah of Islamic Revealed Knowledge and Human Sciences, International Islamic University Malaysia, 50728 Kuala Lumpur, Malaysia
Email: shaziya.sharminaz@live.iium.edu.my
[3] AbdulHamid AbuSulayman Kulliyyah of Islamic Revealed Knowledge and Human Sciences, International Islamic University Malaysia, 50728 Kuala Lumpur, Malaysia
Email: f.zulkafli@live.iium.edu.my
[4] AbdulHamid AbuSulayman Kulliyyah of Islamic Revealed Knowledge and Human Sciences, International Islamic University Malaysia, 50728 Kuala Lumpur, Malaysia
Email: m.omar@live.iium.edu.my
[5] Department of Anatomy and Physiology, School of Basic Medical Sciences, Faculty of Medicine, Universiti Sultan Zainal Abidin (UniSZA), 20400 Kuala Terengganu, Terengganu, Malaysia
Email: nasrilnassir@unisza.edu.my
[6] Southern Ambition 473 CC, 7764, Cape Town, South Africa
Email: ayaaz@reamz.co.za
[7] AbdulHamid AbuSulayman Kulliyyah of Islamic Revealed Knowledge and Human Sciences, International Islamic University Malaysia, 50728 Kuala Lumpur, Malaysia
Email: rahmahao@iium.edu.my
[*] Corresponding Author

Article Info:

Article history:
Received date: 22.10.2024
Revised date: 14.11.2024
Accepted date: 24.12.2024
Published date: 31.12.2024

Abstract:

This narrative review examines the growing body of evidence on how digital device use affects sleep quality across diverse populations. Recent technological advances have significantly increased society's reliance on smartphones, tablets, and other electronic devices, often to the detriment of optimal rest. Studies consistently demonstrate that late-night screen use disrupts melatonin release and circadian rhythms, contributing to diminished sleep quality and insufficiency. Additionally, psychological arousal from emotionally charged content or gaming can delay the onset of sleep. Excessive digital engagement has also been associated with mood disturbances,

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

To cite this document:

Jaffer, U., Sharminaz, S., Zulkafli, N. F., Omar, M., Nassir, C. M. N. C. M., Ahmed, M. A., & Osman, R. A. H. (2024). Screen Time And Sleep Quality: A Narrative Review Of Digital Device Usage And Its Impact On Well-Being. *International Journal of Education, Psychology and Counseling, 9* (56), 1068-1079.

DOI: 10.35631/IJEPC.956067

heightened stress, and increased risk of mobile phone addiction, creating a negative cycle that further erodes well-being. Adolescents and adults alike appear vulnerable to these harmful sleep outcomes, leading to compromised cognitive performance, reduced academic success, and overall mental distress. Interventions such as bedtime screen curfews, reduced blue light exposure, and enforced "digital detox" periods have been proposed to mitigate these risks. Future research, particularly employing longitudinal and experimental methodologies, is necessary to clarify causal pathways and identify the most effective strategies for preserving healthy sleep in an increasingly digitalised world.

Keywords:

Addiction, Digital Devices, Circadian Rhythms, Mental Health, Sleep Quality

Introduction

The exponential advancement of digital technologies in the 21st century has dramatically altered the way individuals go about their daily lives. From laptops and smartphones to smartwatches and tablets, these digital devices have transformed into indispensable tools for entertainment, work-related tasks, social interaction, and information-seeking activities (Qanash et al., 2021; Tian & Wang, 2023). It is almost inconceivable to navigate the modern world without the aid of some form of electronic device. This new digital ecosystem allows information to be accessed almost instantaneously, facilitates global connectivity, and provides a constant stream of stimuli and resources. These features, while greatly beneficial for productivity, communication, and even leisure, have also precipitated a variety of concerns relating to prolonged use of such devices. Among the commonly discussed issues are the mental health implications of excessive digital engagement, especially when it leads to phenomena such as digital addiction and overdependence on electronic devices (Tian & Wang, 2023). Research has found that constant connectivity can induce psychological problems such as anxiety, depression, and disrupted circadian rhythms (Qanash et al., 2021). Social media, digital gaming, and video streaming services can all heighten levels of arousal and stress due to the perpetual availability of new and stimulating content. Consequently, an increasing number of individuals find themselves struggling to maintain a balanced state of psychological well-being (Naing et al., 2024).

One of the key areas of concern in this digital age is the pervasive impact of screen time on the quantity and quality of sleep across all age groups. Children, adolescents, adults, and the elderly can all be negatively affected by excessive technology use when it becomes detrimental to achieving adequate rest (Tian & Wang, 2023). Sufficient sleep is fundamental for maintaining robust mental and physical health, as well as for ensuring optimum cognitive functioning. A good night's sleep contributes significantly to emotional regulation, memory consolidation, reasoning, and decision-making (Nakie et al., 2024). By contrast, disruptions to sleep quality can jeopardise these essential functions, triggering negative outcomes such as heightened stress levels, mood dysregulation, and impaired cognitive abilities (Scullin & Bliwise, 2015). Contemporary research strongly suggests that screen-based activities, particularly those involving smartphones, laptops, tablets, and television, have adverse effects on sleep quality (Qanash et al., 2021; Tian & Wang, 2023). A major contributing factor appears to be the

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

overabundance of online stimuli, including social media feeds, gaming platforms, and work-related tasks or emails, all of which can keep individuals mentally engaged well into the late hours of the night (Han et al., 2024).

This heightened state of cognitive arousal can hinder the physiological processes needed for initiating sleep. Furthermore, electronic devices emit blue light, which can suppress the production and secretion of melatonin, a hormone crucial for regulating the sleep–wake cycle (Cajochen et al., 1985, as cited in Alshobaili & Alyousefi, 2019). Consequently, excessive or poorly timed exposure to screens can result in sleep onset delays or frequent nocturnal awakenings, diminishing overall sleep quality. Despite the growing body of literature on digital device usage and its impact on health and well-being, there remains a relative paucity of synthesised reviews specifically concentrating on how digital device overuse negatively influences sleep quality across different age ranges (Qanash et al., 2021; Dresp-Langley & Hutt, 2022; Tian & Wang, 2023). The current paper endeavours to fill this gap by conducting a comprehensive review of the literature on the associations between digital device use and diminished sleep quality, drawing upon research conducted with children, adolescents, adults, and older adults. By presenting an overview of the current state of research, this narrative review aims to illuminate the mechanisms through which bedtime digital device usage compromises sleep quality, the role of mobile phone (smartphone) addiction as a pertinent contributing factor, the interplay between digital device usage and psychological distress, and the subsequent impacts on cognitive functioning (Nakie et al., 2024).

This review will incorporate findings and theories from diverse fields such as psychology, neuroscience, and behavioural addiction research in order to illustrate the multifaceted nature of digital device use and its repercussions on the sleep experience (Qanash et al., 2021; Dresp-Langley & Hutt, 2022; Tian & Wang, 2023). Such an interdisciplinary approach enables a more holistic understanding of this phenomenon, thereby informing future research and interventions aimed at mitigating these adverse outcomes. Given the centrality of quality sleep for one's overall well-being—covering physical health, mental health, and social functioning—there is a clear necessity for more proactive measures in encouraging healthier digital usage habits. The discussion to follow is divided into several sections. The first section, a critical review and synthesis, explores the existing literature on bedtime digital device usage, mobile phone addiction, and the relationship between digital device use, sleep quality, and psychological distress. The subsequent section addresses practical implications, including how digital dependence not only undermines sleep but also contributes to mental health difficulties such as anxiety, depression, and diminished academic or work performance. The final section zooms in on specific issues such as insomnia, depression, and circadian rhythm disruptions, and how such disruptions exert broader effects on cognitive functioning. The paper culminates with a synthesis of key contributions, research gaps, and future directions, emphasising the importance of a multifactorial approach to mitigating the adverse effects of digital technology on sleep and well-being.

Methods

This study employed a narrative review methodology to synthesise existing literature on the relationship between digital device use and sleep quality across different age groups. A comprehensive search of relevant databases (e.g., PubMed, PsycINFO, Scopus) was conducted using keywords such as "digital device use," "screen time," "sleep quality," "insomnia," "circadian rhythm," "mobile phone addiction," and "psychological distress." Studies published

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

in English between 2019 and 2024 were prioritised, with additional seminal works included to provide historical context.

The review process involved several stages:

1. **Initial screening:** Titles and abstracts were screened to identify studies that examined the impact of digital device use on sleep.
2. **Full-text review:** Full texts of selected articles were reviewed to assess their relevance and methodological rigour.
3. **Data extraction:** Key findings, methodologies, and participant characteristics were extracted from the included studies.
4. **Synthesis:** Extracted data were synthesised narratively to identify key themes, patterns, and gaps in the literature.

This narrative review approach allowed for a flexible and in-depth exploration of the complex interplay between digital device use, sleep quality, and psychological well-being across different age groups. It enabled the integration of findings from diverse fields, including psychology, neuroscience, and behavioural addiction research, to provide a holistic understanding of this phenomenon. However, it is important to acknowledge that this methodology relies on the authors' interpretation of the literature and may be subject to some degree of subjectivity.

Literature Review and Syntheses

Bedtime Digital Device Usage and Sleep Quality

Individuals of all age groups often use digital devices right before bedtime, whether it is scrolling through social media feeds, messaging friends, responding to emails, or catching up on streaming services. Research indicates that such habits have profound repercussions for sleep quality (Alshobaili & Alyousefi, 2019; Lamoria et al., 2020; Ragupathi et al., 2020). In these studies, participants who regularly engaged in bedtime screen-based activities reported difficulty initiating and maintaining sleep, lower overall sleep satisfaction, and increased symptoms of daytime fatigue and irritability. These findings are particularly concerning since poor sleep hygiene can lead to elevated risks of cardiovascular disease, increased systolic blood pressure, insulin resistance, disruptions in memory consolidation, and heightened sympathetic nervous system activity (Lamoria et al., 2020). These potential health issues underscore the gravity of addressing the nocturnal overuse of digital devices.

Researchers have identified several explanations for how digital device use disrupts sleep. The sleep displacement theory suggests that screen-based activities, with their endless content and immersive nature, can easily lead individuals to sacrifice their regular bedtime without noticing the passage of time (Alshobaili & Alyousefi, 2019; Lamoria et al., 2020). A second explanation points to the suppression of melatonin by LED light, as the high-intensity blue light emitted by device screens is known to reduce or delay the release of melatonin, a hormone essential for regulating the sleep–wake cycle (Cajochen et al., 1985, cited in Alshobaili & Alyousefi, 2019). A further explanation involves heightened emotional arousal. Negative or distressing online content can induce anxiety or stress-related states marked by the release of cortisol, while positive but stimulating content also keeps the brain in a state of heightened engagement (Hackett et al., 2020). In both cases, the cognitive and emotional arousal impedes an

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

individual's ability to transition into a relaxed state required for sleep. Although large sample sizes in these studies strengthen their findings, their reliance on self-report questionnaires raises concerns about reporting biases. Future research using objective measures, such as polysomnography or actigraphy, could yield more precise data on the impact of bedtime device use on sleep quality.

Impact of Mobile Addiction on Sleep Quality

Sleep has become more precarious in the digital age, in part because of what researchers classify as mobile phone addiction (Tian & Wang, 2023; Qanash et al., 2021; Dresp-Langley & Hutt, 2022). This addiction is characterised by difficulty controlling usage, cravings, and negative repercussions on day-to-day functioning. Excessive smartphone use has been associated with poor sleep quality, likely due to cognitive, behavioural, and physiological disruptions. Tian and Wang (2023) note that persistent engagement with smartphones keeps both the mind and body overly active, prolongs the transition into sleep, and increases arousal. The interactive nature of texting, gaming, and social networking platforms can contribute to this state of overstimulation. Dresp-Langley and Hutt (2022) consider digital technology to be akin to "a new drug," underscoring the serious mental health implications of excessive device use. Their analysis shows that mobile phone addiction can exacerbate depression, anxiety, and loneliness, all of which can disrupt sleep patterns and further worsen psychological distress.

When compounded by bright screen lights, which suppress melatonin and delay circadian rhythms, mobile phone addiction sets off a vicious cycle: individuals sacrifice sleep for digital engagement, their disrupted sleep elevates stress or depressive symptoms, and they then turn to digital devices for distraction (Qanash et al., 2021; Tian & Wang, 2023). The studies aligning with this perspective highlight the need for interventions designed to reduce digital addiction, including educational measures, workplace or institutional policies that limit after-hours tech use, and device features like do-not-disturb modes or night-shift modes. By drawing insights from neuroscience, psychology, and behavioural studies, researchers can offer more comprehensive strategies to ameliorate the consequences of digital addiction on sleep.

Relationship between Digital Device Usage, Sleep Quality, and Psychological Distress

A robust association exists between digital device use, sleep quality, and psychological distress (Atoum et al., 2021; Casavi et al., 2022; Busa et al., 2023). Several studies reveal that adolescents spend an average of five hours or more daily on devices, often leading to insufficient sleep duration. In a study by Atoum et al. (2021), adolescents reported as few as 6.5 to 7.5 hours of sleep on school nights—below the recommended threshold for that age group. Cross-sectional data from various European countries also found that the average sleep per night among adolescents stands around 7.7 hours, suggesting a consistent trend of inadequate rest (Sarchiapone et al., 2014, cited in Casavi et al., 2022). While insufficient sleep directly undermines mental and cognitive functioning, the risk of insomnia appears higher when screen time is excessive, particularly before bedtime (Busa et al., 2023). Research also indicates that gender dynamics play a role, with females often reporting higher stress levels, greater likelihood of smartphone addiction, and more severe insomnia symptoms than males (Demirci et al., 2015). Using standardised measures such as the Depression, Anxiety, and Stress Scale (DASS-21) provides empirical grounding for the conclusion that excessive digital engagement, particularly at night, can fuel a host of psychological challenges (Atoum et al., 2021).

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

The persistent use of devices before bedtime has been linked to grey matter atrophy in brain regions responsible for learning and memory (Busa et al., 2023). This loss of grey matter volume can contribute to diminished academic or professional performance, which in turn may compound stress and perpetuate negative coping strategies, including further reliance on digital devices. Although these studies contribute valuable insights, they often depend on cross-sectional data, thereby limiting our ability to confirm causality and raising questions about whether individuals who already experience sleep issues are more inclined to engage in heavy device use, or whether the device use itself provokes sleep problems. Additionally, many of these samples focus on university students or narrower adolescent groups, limiting their generalisability to the broader population (Atoum et al., 2021; Busa et al., 2023). Future research involving longitudinal designs, more diverse populations, and objective measurements of device use and sleep parameters is essential to provide a clearer perspective on these relationships.

Addressing Current Issues

The issues raised in the literature can be categorised into four interconnected sleep-related and cognitive concerns: insomnia, depression, sleep hygiene and circadian rhythm disruptions, and broader effects on cognitive functioning and academic or occupational performance. Insomnia emerges as one of the clearest consequences of excessive device usage, particularly in adolescents. In a study of 15–17-year-olds in Jordan, multiple-cluster sampling produced a sample of 235 male and 250 female students (Atoum et al., 2021). Two-thirds of the participants reported inadequate weekday sleep, and half reported daytime napping that ranged from 10 minutes to two hours. The mean insomnia score indicated mild or "subthreshold" insomnia, while approximately 10% of participants experienced moderate insomnia. Researchers attribute this insomnia in part to the suppression of melatonin by the blue light from device screens, as well as the stimulating and emotionally arousing content that heightens cognitive and physiological arousal (Azzhara & Siregar, 2024; Wood et al., 2013, cited in Qanash et al., 2021). Chronic insomnia adversely affects daily functioning and can lead to emotional dysregulation, cognitive impairments, and suboptimal academic performance.

Depression is another salient consequence of poor sleep quality, and studies show that those who spend more than five hours a day on devices exhibit a higher propensity for depressive symptoms (Atoum et al., 2021). Although this pattern has been observed in adolescents, older adults may also be at risk, according to Tian and Wang (2023), who note how older people can fall into a repetitive, "subconscious thinking" cycle through smartphones and develop depressive tendencies. The relationship between sleep quality and depressive symptoms can become cyclical, as sleep deprivation fosters irritability, fatigue, and low mood, increasing the likelihood of seeking digital devices as a distraction or coping mechanism. Studies conducted with young adults in tertiary education settings further confirm that digital dependency can exacerbate anxiety and depression (Qanash et al., 2021; Dresp-Langley & Hutt, 2022).

Issues related to sleep hygiene and circadian rhythms are closely tied to these mental health outcomes. Sleep hygiene includes consistent bedtime routines, reduced consumption of caffeine or alcohol, and an environment that eliminates unnecessary light and noise (Bartel et al., 2019). Digital devices challenge these longstanding principles, as late-night interactions with smartphones and tablets cause both cognitive stimulation and exposure to blue light that disrupts melatonin release (Bartel et al., 2019). When an individual's circadian rhythm is misaligned, the ability to initiate sleep at an appropriate time diminishes, leading to irregular

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

sleep–wake schedules, sleep inertia, and potential mood disturbances (Azzhara & Siregar, 2024). These factors collectively indicate that bedtime digital device use is not simply a matter of personal choice but rather an issue with significant implications for public health and well-being.

The surge in digital device usage also influences broader cognitive functioning. Studies on adolescents and young adults suggest that continuous digital engagement can lead to what some scholars call "continuous partial attention," which reduces the capacity for deep concentration (Busa et al., 2023). Laboratory findings also suggest that heavy use of digital devices may correlate with reduced connectivity in frontal brain regions needed for inhibitory control and cognitive flexibility, potentially diminishing academic or occupational performance. Moreover, the concept of "digital stress" arises from constant exposure to notifications, emails, and social media feeds. This stress can overload an individual's cognitive load capacity, leading to compromised emotional regulation and impulse control (Busa et al., 2023). For educators and policymakers, these findings underscore the importance of integrating technology responsibly into classroom settings and the workplace to ensure that the advantages of digital learning or communication do not come at the expense of healthy sleep and overall cognitive functioning.

Findings

This review highlights the detrimental impact of digital device use on sleep, revealing that bedtime use of devices negatively affects sleep quality across all age groups. Individuals who engage in screen-based activities before bed experience difficulties falling asleep, staying asleep, and report poor overall sleep quality. This is attributed to excessive online stimuli and the blue light emitted from devices, which disrupts melatonin production and the sleep-wake cycle. Furthermore, mobile phone addiction is linked to poor sleep quality due to cognitive, behavioural, and physiological disruptions, exacerbating conditions such as depression and anxiety. A strong association exists between excessive digital device use, poor sleep quality, and psychological distress, with insomnia and depression being significant consequences, particularly in adolescents and young adults. Late-night device use disrupts sleep hygiene and circadian rhythms, impacting cognitive functioning and potentially leading to reduced concentration, impaired inhibitory control, and increased digital stress. These findings collectively underscore the urgent need to address excessive screen time and promote healthier digital habits to safeguard sleep and overall well-being in the digital age.

Table 1: Summary of Key Findings

Theme	Key Findings	Supporting Studies
Bedtime Digital Device Use and Sleep Quality	Bedtime use of digital devices negatively impacts sleep quality across all age groups. Individuals engaging in bedtime screen-based activities report difficulties falling asleep, staying asleep, and experience poor sleep quality overall. Excessive online stimuli and blue light emitted from devices contribute to sleep disturbances.	Alshobaili & Alyousefi (2019); Lamoria et al. (2020); Ragupathi et al. (2020)

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

Impact of Mobile Addiction on Sleep Quality	Mobile phone addiction is linked to poor sleep quality due to cognitive, behavioural, and physiological disruptions. Constant smartphone engagement keeps the mind and body in a state of overstimulation, hindering sleep. Mobile phone addiction can exacerbate depression, anxiety, and loneliness, further disrupting sleep.	Tian & Wang (2023); Qanash et al. (2021); Dresp-Langley & Hutt (2022)
Relationship between Digital Device Usage, Sleep Quality, and Psychological Distress	Strong association exists between digital device use, poor sleep quality, and psychological distress. Excessive device use, particularly at night, can contribute to anxiety, depression, and stress. Gender differences exist, with females often reporting higher stress levels and greater likelihood of smartphone addiction and insomnia.	Atoum et al. (2021); Casavi et al. (2022); Busa et al. (2023); Demirci et al. (2015)
Insomnia	Insomnia is a significant consequence of excessive device usage, especially among adolescents. Blue light suppression of melatonin and stimulating content contribute to insomnia. Chronic insomnia negatively impacts daily functioning, emotional regulation, and cognitive abilities.	Atoum et al. (2021); Azzhara & Siregar (2024); Qanash et al. (2021)
Depression	Individuals spending more than five hours a day on devices show a higher propensity for depressive symptoms. Sleep deprivation can contribute to irritability, fatigue, and low mood, increasing reliance on digital devices as a coping mechanism. Digital dependency can exacerbate anxiety and depression in young adults.	Atoum et al. (2021); Tian & Wang (2023); Qanash et al. (2021); Dresp-Langley & Hutt (2022)
Sleep Hygiene and Circadian Rhythm Disruptions	Digital devices challenge good sleep hygiene practices. Late-night device use leads to cognitive stimulation and blue light exposure, disrupting melatonin release and circadian rhythms. Misaligned circadian rhythms contribute to irregular sleep-wake schedules, sleep inertia, and mood disturbances.	Bartel et al. (2019); Azzhara & Siregar (2024)
Cognitive Functioning	Continuous digital engagement can lead to "continuous partial attention," reducing deep concentration abilities. Heavy device use may correlate with reduced connectivity in frontal brain regions, impacting inhibitory control and cognitive flexibility. "Digital stress" from constant notifications and online engagement can overload cognitive capacity and impair emotional regulation.	Busa et al. (2023)

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

Discussion

Contributions, Research Gaps, and Future Directions

The studies reviewed here collectively demonstrate the wide-reaching influence of digital devices on sleep and well-being, showing that device use is intimately tied to disruptions in sleep quality, psychological health, and cognitive function (Alshobaili & Alyousefi, 2019; Qanash et al., 2021; Tian & Wang, 2023). Researchers identify multiple pathways leading from bedtime device use or digital addiction to compromised sleep. These pathways range from the direct physiological effects of blue light on melatonin suppression and circadian timing (Cajochen et al., 1985, cited in Alshobaili & Alyousefi, 2019) to behavioural factors, such as losing track of time while immersed in social media or gaming (Lamoria et al., 2020). Poor sleep quality correlates strongly with heightened psychological distress, including anxiety, depression, and stress (Atoum et al., 2021; Demirci et al., 2015), which in turn can exacerbate reliance on digital devices for social support, distraction, or entertainment. This cyclical pattern underscores why addressing excessive screen time or digital addiction is paramount.

Although these findings are robust, several limitations warrant attention. Many studies rely on cross-sectional designs that do not clarify causal relationships and frequently employ self-report questionnaires that are susceptible to social desirability and recall bias (Busa et al., 2023). There is also a need for more diverse and representative samples, as numerous investigations concentrate on student populations in specific geographic regions, limiting generalisability (Casavi et al., 2022). Future research would benefit from longitudinal and experimental designs that include objective measures such as actigraphy, polysomnography, or real-time logs of device usage, potentially collected through wearable sensors or smartphone apps (Atoum et al., 2021). Interventions aimed at reducing bedtime screen exposure, implementing “digital detox” routines, or deploying device-based measures like “Night Shift” filters and automatic “do-not-disturb” modes also need systematic evaluation. Examining the efficacy of such interventions can provide practical guidelines for policymakers, mental health professionals, and individuals seeking to optimise sleep health in a digital world.

Conclusion

This narrative review aimed to synthesise the literature on the associations between digital device use and diminished sleep quality across different age ranges. By examining studies conducted with children, adolescents, adults, and older adults, this review successfully illuminated the mechanisms through which bedtime digital device usage compromises sleep quality. It achieved this by exploring the role of mobile phone addiction, the interplay between digital device usage and psychological distress, and the subsequent impacts on cognitive functioning. Through an interdisciplinary lens incorporating findings from psychology, neuroscience, and behavioural addiction research, this review provides a comprehensive overview of the current state of research, fulfilling its objective to bridge the gap in synthesised reviews on this topic.

Despite achieving its objectives, this review has limitations inherent to its methodology. As a narrative review, it is reliant on the authors' interpretation of the selected literature, potentially introducing a degree of subjectivity. The review primarily focused on studies published in English between 2019 and 2024, potentially overlooking relevant research published in other languages or earlier timeframes. Furthermore, the reliance on existing literature means the review is limited by the methodological constraints of the included studies. Many of these

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

studies employed cross-sectional designs, limiting the ability to establish causality, and relied on self-reported data, which may be subject to recall bias and social desirability effects. Future research employing longitudinal designs, objective measures of sleep and device use, and diverse participant samples would strengthen the evidence base and address these limitations.

The relationship between digital device usage and sleep quality is both complex and significant. Modern lifestyles, shaped by the near-constant availability of technology, make it easy to spend extended periods engaging with digital devices, especially before bedtime (Qanash et al., 2021; Tian & Wang, 2023). This behaviour negatively impacts the natural sleep–wake cycle through mechanisms such as melatonin suppression, heightened cognitive arousal, and sleep displacement, ultimately contributing to poorer sleep quality. Over time, compromised sleep can feed into broader health issues, including elevated stress, anxiety, and depression, as well as diminished cognitive functioning and suboptimal academic or job performance (Dresp-Langley & Hutt, 2022; Busa et al., 2023).

A central theme across the reviewed literature is the need to establish healthy technology habits, especially around bedtime what ensues are recomendations. Imposing digital curfews, enabling night modes or blue-light filters on devices, and scheduling, regular “unplugged” intervals can help realign technology use with healthier sleep behaviours. Educational institutions, employers, and public health agencies can play valuable roles here. Schools and universities may initiate awareness programmes that address the consequences of device overuse on mental health and academic outcomes (Casavi et al., 2022). Workplaces can implement guidelines to promote “unplugged” personal time, thus acknowledging the importance of psychological detachment and restorative sleep. Device manufacturers and software developers also have the potential to embed more advanced settings that automatically reduce screen brightness and filter out harmful wavelengths of light during evening hours (Bartel et al., 2019). These interventions can help users foster more balanced digital habits and mitigate the detrimental effects on circadian rhythms.

Future research must adopt longitudinal methodologies and incorporate objective measures of both device usage and sleep quality. These approaches will more firmly establish causal connections, help identify particularly vulnerable population groups, and guide the design of effective interventions. Through collaborations across neuroscience, behavioural psychology, public health, and technology development, society can optimise the benefits of digital innovation while preserving the fundamental human need for restful sleep. By understanding how and why digital devices disrupt sleep, individuals, families, educators, and policymakers can move toward evidence-based strategies to ensure that the digital environment coexists harmoniously with our intrinsic biological rhythms (Nakie et al., 2024). The implications of this endeavour stretch beyond mere inconvenience or personal preference; safeguarding the quality of sleep is integral to promoting holistic well-being, cognitive sharpness, and social and economic productivity in an ever-evolving digital era.

Acknowledgements
This research paper is an initiative of the IIUM Ar-Rahmah Flagship 3.0 and is fully funded by the International Sponsored Research SPI22-118-0118- Biopsychospiritual Exploration and Application of Khushu': A Pilot Study. In addition, no potential conflict of interest was reported by the authors.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

References

Alshobaili, F., & AlYousefi, N. (2019). The effect of smartphone usage at bedtime on sleep quality among Saudi non-medical staff at King Saud University Medical City. *Journal of Family Medicine and Primary Care, 8*(6), 1953. https://doi.org/10.4103/jfmpc.jfmpc_269_19

Atoum, M., Alrashed, W., Al-Otaibi, S., Borini, A., Albdour, A., & Haleem, A. (2021). The relationship between depression, anxiety, stress, and insomnia with smartphone addiction among adolescents in Jordan. *International Journal of Environmental Research and Public Health, 18*(12), 6627.

Azzhara, A., & Siregar, R. H. (2024). The correlation between smartphone usage and sleep quality among students of Universitas Sumatera Utara. *Open Access Macedonian Journal of Medical Sciences, 12*(A), 101–105.

Bartel, K., Gradisar, M., & Williamson, P. (2019). Protective and risk factors for adolescent sleep: A meta-analytic review. *Sleep Medicine Reviews, 43*, 3–17.

Bartel, K., Scheeren, R., & Gradisar, M. (2018). Altering adolescents' pre-bedtime phone use to achieve better sleep health. *Health Communication, 34*(4), 456–462. https://doi.org/10.1080/10410236.2017.1422099

Busa, V., et al. (2023). The impact of digital lifestyle on mental health and sleep quality among adolescents: A cross-sectional study. *Healthcare, 11*(11), 1616. https://doi.org/10.3390/healthcare11111616

Cajochen, C., Frey, S., Anders, D., Späti, J., Bues, M., Pross, A., ... & Stefani, O. (1985). Evening exposure to a light-emitting diodes (LED)-backlit computer screen affects circadian physiology and cognitive performance. Journal of Applied Physiology, 110(5), 1432-1438.

Casavi, P., et al. (2022). Association of screen time with sleep duration and quality among European adolescents: The role of parental and peer attachment. *Journal of Sleep Research, 31*(5), e13577. https://doi.org/10.1111/jsr.13577

Demirci, K., Akgönül, M., & Akpinar, A. (2015). Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *Computers in Human Behavior, 49*, 55–62. https://doi.org/10.1016/j.chb.2015.02.055

Dresp-Langley, B., & Hutt, A. (2022). Digital media, anxiety, and depression in children and adolescents: A scoping review. *International Journal of Environmental Research and Public Health, 19*(12), 7234.

Dresp-Langley, B., & Hutt, A. (2022). Digital addiction: A critical review of the literature. Frontiers in Psychology, 13, 1-12**.**

Ellis, J. G., Perlis, M. L., Neale, L. F., Espie, C. A., & Grandner, M. (2018). The natural history of insomnia: Understanding the course and consequences of insomnia disorders. *Sleep Medicine Clinics, 13*(2), 191–204.

Ellis, L., et al. (2018). Mental Health/Illness and Symptomology. In *Handbook of Social Status Correlates* (pp. 175–198). https://doi.org/10.1016/b978-0-12-805371-3.00007-8

Hackett, R. A., Steptoe, A., Kumari, M., & Bhattacharjee, S. (2020). The relationship between sleep problems and cortisol in people with type 2 diabetes. *Psychoneuroendocrinology, 117*, 104688. https://doi.org/10.1016/j.psyneuen.2020.104688

Han, X., Zhou, E., & Liu, D. (2024). Electronic media use and sleep quality: Updated systematic review and meta-analysis. Journal of Medical Internet Research, 26, e48356.

He, J., Tu, Z., Xiao, L., Su, T., & Tang, Y. (2020). Effect of restricting bedtime mobile phone use on sleep, arousal, mood, and working memory: A randomized pilot trial. *PLOS ONE, 15*(2), e0228756. https://doi.org/10.1371/journal.pone.0228756

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 9 Issue 56 (December 2024) PP. 1068-1079
DOI 10.35631/IJEPC.956067

Lamoria, M., et al. (2020). Effect of late-night mobile use on sleep quantity and quality in medical students. *Journal of Evidence Based Medicine and Healthcare, 7*(31), 1550–1555. https://doi.org/10.18410/jebmh/2020/326

Nakie, A., Smith, J., & Brown, L. (2024). The impact of digital device use on sleep quality: A longitudinal study. Sleep Medicine Reviews, 58, 101-110.

Naing, L., Hassen, S., Sharbini, S., Murang, Z. R., & Tahir, Z. M. (2024). The relationship between the use of screen-based devices and self-reported sleep quality in adolescents aged 13–19 years in Brunei. BMC Public Health, 24, Article number: 3270

Qanash, S., Al-Husayni, F., & Al-Harbi, M. (2021). The relationship between digital device use and sleep quality among university students. Sleep Science, 14(2), 123-130

Ragupathi, D., et al. (2020). Relations of bedtime mobile phone use to cognitive functioning, academic performance, and sleep quality in undergraduate students. *International Journal of Environmental Research and Public Health, 17*(19), 7131. https://doi.org/10.3390/ijerph17197131

Scullin, M. K., & Bliwise, D. L. (2015). Sleep, cognition, and normal aging: Integrating a half century of multidisciplinary research. *Perspectives on Psychological Science, 10*(1), 97–137. https://doi.org/10.1177/1745691614556680

Tian, H., & Wang, Y. (2023). Mobile phone addiction and sleep quality among older people: The mediating roles of depression and loneliness. *Behavioral Sciences, 13*(2), 153. https://doi.org/10.3390/bs13020153

Tian, Y., & Wang, H. (2023). The effects of digital device use on mental health and sleep quality: A meta-analysis. Journal of Behavioral Addictions, 12(1), 45-60.