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FROM SCROLLING INTO SLEEPLESSNESS: A CRITICAL REVIEW OF SOCIAL MEDIA'S INFLUENCE ON SLEEP AND MENTAL HEALTH

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ABSTRACT

Social media has profoundly transformed communication, creating a globally interconnected landscape where individuals engage with one another. In the 21st century, its pervasive influence necessitates careful examination of its implications for user well-being. This study aims to investigate the impact of social media use before bedtime on sleep quality and, subsequently, mental health. Through a comprehensive review of the existing literature from peer-reviewed journals, conference proceedings, and other sources, our findings indicate that young users are increasingly using social media late at night and before bedtime. Factors contributing to this behavior include exposure to blue light from electronic devices and the psychological phenomenon of fear of missing out (FOMO). Both have been empirically shown to disrupt sleep architecture and exacerbate daytime fatigue. The consequences of poor sleep quality extend beyond mere tiredness; they can also elevate the risk of anxiety and stress, significantly affecting mental health. To address this issue, further research must adopt a longitudinal approach, utilizing various methodologies to elucidate the nuances of the interplay between social media usage and sleep patterns. We advocate for developing awareness programs within educational institutions that underscore the critical implications of night-time social media use on mental, physical, and visual health. By fostering this knowledge, we can encourage the development of healthier digital habits that promote better sleep quality and overall well-being.

***KEYWORDS**: Social Media, Scrolling, Sleep Disturbance, Sleep Quality, Mental Health, Review.*

Introduction

In the contemporary digital landscape, social media has significantly transformed communication practices. Every minute, billions of individuals across the globe engage with platforms such as Instagram, Snapchat, TikTok, X, and WhatsApp. While these platforms present invaluable opportunities for connection, entertainment, and information dissemination, it is important to consider the implications of their usage. On average, users dedicate approximately 4 to 5 hours daily to social media interactions. This duration varies widely based on demographic factors, usage patterns, and individual information needs. The habitual nature of social media engagement is evident, with many individuals promptly responding to notifications, underscoring the platform's extensive integration into daily life.

Nonetheless, this continuous connectivity raises several considerations, particularly regarding its impact on sleep quality. Late-night engagement with social media can disrupt sleep patterns and lead

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to significant mental health challenges, including anxiety, depression, and stress (Das-Friebel et al., 2020). The users are increasingly involved with digital platforms from midnight until early morning, which changes their style of life (Wang et al., 2021). The trend of nighttime social media use raises concerns about its impact on users' sleep quality, a crucial factor affecting both cognitive and physical health (Brautsch et al., 2023). As we navigate the complexities of digital engagement, it is crucial to evaluate how these behaviors impact overall health and well-being.

Sleep, a vital biological function, is essential for cognitive performance, emotional stability, and overall physical well-being. Nevertheless, the prevalent use of social media immediately before sleep has been associated with delayed sleep onset, reduced sleep duration, and poorer sleep quality (Drazenovic et al., 2023). This phenomenon is influenced by factors such as exposure to blue light, which inhibits melatonin production, and the mental stimulation triggered by engaging or emotionally charged content. Additionally, mental health is increasingly affected by the pressures of social comparison, the fear of missing out (FOMO), and the addictive nature of these social platforms, which encourage users to keep scrolling endlessly (Do et al., 2013).

The interplay between social media usage, sleeping patterns, and mental health is intricate and reciprocal. Insufficient or poor sleep exacerbates mental health, and conversely, difficulties with mental health may drive individuals to use social media as a form of coping, resulting in a detrimental cycle. Despite an increasing understanding of these concerns, a thorough and critical examination of how social media affects sleep and mental health, as well as its broader consequences for individuals and society, remains necessary.

This paper aims to address this gap by critically analyzing the existing literature regarding the impacts of social media on sleep and mental health. It investigates the physiological and psychological processes involved, emphasizes at-risk groups, and examines the ethical design factors associated with social media platforms. Through a synthesis of existing research, this review aims to enhance understanding of how scrolling can contribute to sleeplessness and impact mental health and well-being, and provide practical implications for minimizing these effects. This study aims to address the following research question: How does social media use affect sleep patterns and quality, particularly in the hours leading up to bedtime? How do sleep disturbances caused by social media use contribute to mental health challenges? What is the relationship between excessive social media use and mental health issues? Does a bidirectional relationship exist between poor sleep from social media use and worsening mental health? This study is structured as follows: the relevance of the study is presented, followed by the methods and materials to be considered. Furthermore, in the next section, the results are discussed, along with limitations and future scope.

Materials and Methods

A systematic review was conducted to investigate the motivations and effects of late-night social media use among young users. This study considered peer-reviewed published articles, as evaluating the factors influencing social media engagement during late hours, specifically before bedtime, is essential. Additionally, both forward and backward citation tracing were employed for the studies included in this review to identify potentially relevant research that the electronic search strategy may have overlooked. The review encompassed studies that analyzed active social media use in relation to sleep quality and prevalent mental health issues, including depression, anxiety, and psychological distress. While the primary focus was on youth aged 16 to 25, studies that included participants aged 12 to 30 years were also included to ensure comprehensive coverage of relevant information. Studies were excluded if they primarily concentrated on passive social media usage (e.g., watching television, listening to music) or on electronic devices incapable of accessing social media (e.g., video games). Moreover, studies assessing clinical sleep disorders (such as insomnia and restless legs syndrome) and those focusing on other mental disorders (including psychotic disorders and eating disorders) were also excluded from this review.

Results

- **Social Media Use and Sleep Patterns**

In the current technological landscape, the influence on modes of communication and interaction is profound. The immediate access to information provided by the internet has significantly transformed usage habits, merging social connectivity, entertainment, and research into an integrated

experience. However, these advancements also pose considerable challenges, particularly the risk of addiction to social media platforms by compulsive behavior, social validation, and peer influences (Siddharthan A et al., 2024). Young users dedicate approximately 4 to 6 hours daily to platforms such as Facebook, Instagram, and Snapchat. The convenience of mobile devices encourages continuous engagement and connectivity, raising important concerns regarding their impact on sleep quality (Azhari et al., 2022). A substantial body of empirical research has established a strong correlation between high social media engagement levels and disrupted sleep patterns (Brautsch et al., 2023). Engaging with social media before bedtime can detrimentally affect both the duration and quality of sleep (Khpalwak & Hamidi, 2024; Zhu et al., 2023). The stimulating nature of online content heightens cognitive activity, rendering relaxation difficult. Moreover, the blue light emitted from screens inhibits melatonin production, thereby disrupting the natural sleep cycle. As a result, increased cognitive arousal impedes the ability to unwind effectively, and habitual scrolling can extend screen time, ultimately reducing overall sleep duration (Brautsch et al., 2023).

Moreover, many users have cell phones near their beds before going to sleep, leading to increased social media usage, which can affect sleep latency. Moreover, it reduces sleep duration, as 8 hours is suggested for optimal health (Do et al., 2013). However, studies report that young users have only 5 to 7 hours of sleep (Wang et al., 2021). The use of social media before sleep, as users are engaged in playing games, also encourages the use of social media during bedtime (lying in bed) before sleep, which can lead to a later bedtime (Das-Friebel et al., 2020). Additionally, numerous studies indicate that many college students stay up until midnight, using their smartphones for activities such as communication and gaming. This late-night usage pattern diminishes sleep duration and increases vulnerability to serious physical health concerns (Brautsch et al., 2023). The resultant sleep deprivation can lead to the development of poor sleep habits and may contribute to social issues, including irritability, anxiety, and stress.

- **Sleep Disturbances Impact Mental Health**

Sleep disturbances are closely linked to mental health, affecting each other significantly. Mood disorders like depression and anxiety often occur alongside sleep disturbances, and poor sleep worsens these mental health symptoms, leading to increased irritability and mood swings (Do et al., 2013). Adequate sleep is crucial for maintaining cognitive functions, including memory and consciousness (Das-Friebel et al., 2020). Disrupted sleep can impair these abilities, making it difficult to concentrate and solve problems, which can result in frustration and low self-esteem. Furthermore, sleep disruption has a significant impact on academic performance, as students often engage with their devices late at night, resulting in difficulty waking up and an increased risk of vehicular accidents (Whipps et al., 2018). Moreover, chronic sleep disturbances can increase the risk of developing mental health disorders such as depression and bipolar disorder (Brautsch et al., 2023). This reciprocal relationship indicates that sleep issues can lead to mental health problems while existing conditions can cause sleep difficulties (Siddharthan A et al., 2024). Furthermore, sleep disturbances can lead to social withdrawal, as individuals may feel too fatigued to engage in daily activities. This isolation can exacerbate feelings of sadness and anxiety, worsening mental health.

An increasing number of university students are engaging in online activities late into the night, whether in academic settings such as laboratories or in their dormitories (Nasirudeen et al., 2017). . This pattern of late-night browsing has been linked to several adverse effects, including elevated levels of fatigue the following day (Khpalwak & Hamidi, 2024). In addition to general tiredness, many students report experiencing increased irritability, confusion, and symptoms of depression (Drazenovic et al., 2023). Moreover, compromised sleep quality makes students more susceptible to colds and other illnesses (Wang et al., 2021). Additionally, sleep also plays a critical role in emotional regulation. When sleep is disrupted, individuals may struggle to manage emotions, leading to heightened reactions to stress (Nasirudeen et al., 2017). This can trigger or worsen existing mental health conditions. Additionally, inadequate sleep can elevate cortisol levels, the stress hormone, which increases feelings of anxiety. Conversely, high stress can exacerbate sleep disturbances, creating a vicious cycle (Siddharthan A et al., 2024). In light of these challenges, some students are turning to sleep medications to enhance their rest, while others may resort to alcohol as a coping mechanism. This situation highlights a significant concern. While the benefits of digital engagement are undeniable, they can come at a substantial cost to students' overall well-being.

Table 1: Characteristics and Outcomes of Studies

Authors	Country	Description	Scale	Findings
(Do et al., 2013)	Korea	Sleep duration and health outcome	Sleep and internet usage, Mental health and physical health	Short sleep duration heightened the risk of depression and other mental health problems.
(Levenson et al., 2016)	U.S.	Social media use and sleep disturbance	Patient-Reported Outcomes Measurement Information System (PROMIS)	The findings indicate a strong correlation between social media use and sleep problems, indicating a significant impact on the health of users.
(Nasirudeen et al., 2017)	Singapore	Use of social media and day sleepiness	Cleveland Adolescent Sleepiness Questionnaire	Findings indicate that late-night social media usage can lead to users waking up late at night, resulting in daytime sleepiness.
(Whipps et al., 2018).	U.S.	Night-time usage of social media on sleep quality	Pittsburgh Sleep Quality Index (PSQI).	This study highlights the relationship between nighttime social media use and sleep behaviors, including texting, social media, and gaming.
(Das-Friebel et al., 2020)	England	Night-time usage of social media and sleep problem	Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989)	The findings show that using social media before bed does not predict subjective measures of sleep duration, satisfaction, or efficiency. However, it is associated with an increase in total sleep time.
(Pirdehghan et al., 2021)	Iran	Use of social media and sleep disturbance	(Pittsburgh Sleep Questionnaire Index (PSQI)), depression (Beck), and Electronic Media Use.	Findings state that high usage of social media is positively associated with poor sleep quality, sleep dysfunction, sleep duration, and depression.
(Wang et al., 2021)	Taiwan	Improper use of social media and influence on sleep	Internet addiction Scale, Pittsburgh Sleep Quality Index	Young medical students are prone to social media usage and addiction, which hampers their sleep duration and mental health along with academics.
(Azhari et al., 2022)	Europe and North America	Use of social media and its relationship with sleep disturbance and anxiety	Pittsburgh Sleep Quality Index, Social Media Disorder Scale, Beck Anxiety Inventory	The study suggests that social media usage increases social media disorder and hampers the weekday sleep cycle with an increase in anxiety.
(Zhu, Zheng, Ding, & Zhang, 2023)	China	Negative consequences of social media use	Pittsburgh Sleep Quality Index (PSQI), Social media addiction, FoMO	Social media use increases sleep disturbance, FoMO, and social media addiction and have delayed bedtime.
(Khpalwak & Hamidi, 2024).	Afghanistan	Night-time usage of social media and sleep problem	Social media usage, nightmare scale, sleep disturbance	The study highlights that social media use impacts the sleep quality and fatigue the following day
(Siddharthan A et al., 2024)	India	Social media addiction with sleep quality	Bergen Social Media Addiction Scale, Pittsburgh Sleep Quality Index	The findings highlight that social media addiction positively associated with poor sleep quality among females and fatigue on following day.

- **Association between Social Media Use, Sleep Quality, and Mental Health**

The use of social media disrupts sleep in several ways, including disrupting sleep patterns, promoting physiological activity, and delaying circadian rhythms, as seen with bright light from devices (Khpalwak & Hamidi, 2024). Moreover, engagement with social media platforms during night-time is often associated with addiction due to various psychological and behavioral factors. The fear of missing out (FOMO) drives people to check social media, disrupting their sleep and creating a cycle where the desire for connection overshadows the need for rest. So, excessive use of social media significantly negatively impacts sleep quality.

Social media platforms are intentionally designed to be captivating, employing techniques such as variable rewards to encourage frequent visits. Studies also report that increased social media use at night before sleep is associated with more sleep disturbances (Das-Friebel et al., 2020). Browsing late at night typically provides immediate gratification from notifications, which reinforces addictive behaviors and increases reliance on these platforms. The fear of missing out (FoMO) amplifies compulsive checking behaviors, often resulting in procrastination at bedtime (Siddharthan A et al., 2024). Furthermore, night-time engagement with social media often involves a pursuit of validation through sharing personal content, including selfies, videos, and various forms of information (Siddharthan A et al., 2024). This reliance on social approval can contribute to a cycle of addiction, rendering it increasingly difficult for individuals to disengage from these platforms (Levenson et al., 2016).

Late-night screen time significantly disrupts sleep by lowering melatonin production, making it harder to fall asleep and reducing sleep duration. Engagement with emotionally charged content such as heated discussions, distressing news, and violent videos heightens psychological arousal, further complicating the ability to relax and sleep. Users who continuously are on screens before bedtime often experience poor sleep quality, including restlessness, frequent awakenings, and irregular sleep patterns (Levenson et al., 2016). The consequences of inadequate sleep are crucial to study, as it increases the risk of developing disorders such as depression and anxiety, and contributes to emotional instability and cognitive impairment (Das-Friebel et al., 2020). Chronic sleep disturbance compromises the brain's ability to manage stress, thereby worsening existing mental health conditions.

Furthermore, poor sleep can exacerbate pre-existing psychological conditions, thereby perpetuating a cyclical relationship between sleep disturbances and mental health challenges (Levenson et al., 2016). Individuals who experience chronic sleep deprivation are particularly vulnerable to mood swings, difficulty concentrating, and heightened emotional responses, negatively affecting overall well-being (Nasirudeen et al., 2017). Additionally, late-night social media use can disrupt healthy sleep patterns, as it often serves as an escape from daily stress. Overall, late-night social media habits can foster addiction, harm sleep quality, and impact mental health, emphasizing the need to prioritize restorative sleep for better health and happiness.

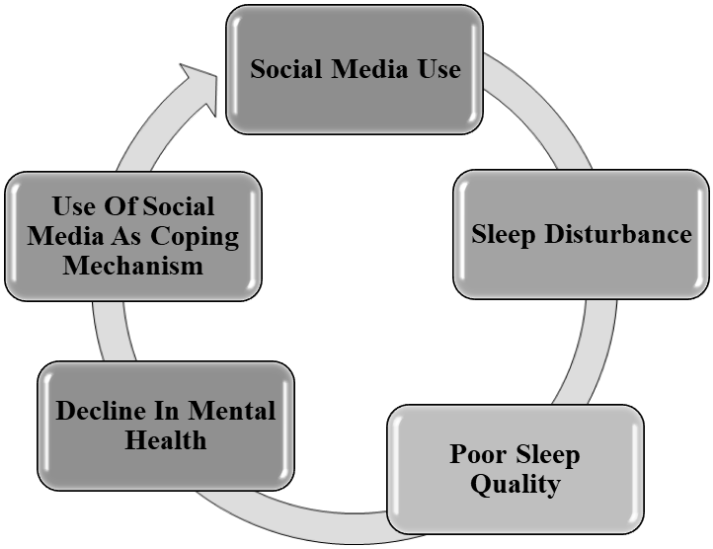

Fig. 1: Research Result Model

Discussion

According to the American Academy of Sleep Medicine and the Sleep Research Society (2015), adults are advised to have at least seven hours of sleep each night, with young adults potentially benefiting from durations exceeding nine hours. This guidance is particularly relevant given the established links between sleep deprivation and various adverse outcomes, including reduced academic performance, increased instances of negative emotional states, heightened anxiety and depression, feeling restless, and overall low productivity (Das-Friebel et al., 2020).

Several cohort studies indicate a significant link between excessive social media usage and poor sleep quality. Additionally, several cross-sectional studies show a positive correlation between frequent social media use and poor sleep quality. This includes research from Europe and Asia, as well as studies on high school students in Switzerland, where nighttime social media engagement was linked to reduced sleep duration and increased sleep difficulties (Drazenovic et al., 2023). Several studies have identified inadequate sleep patterns among college students, highlighting that chronic short sleep is a concern among various cultures. For instance, a decline in sleep duration has been observed in young adults in Japan and the US, highlighting its global significance. Overall, the evidence strongly suggests that usage of social media negatively impact the quality of sleep.

Conversely, research also highlights that social media use and sleep disturbance are personal factors, and mood swings are observed the following day (Das-Friebel et al., 2020). Furthermore, the results indicate that users who frequently engage in gaming, social media interactions, or texting late at night, immediately before sleep, are more likely to experience disturbances related to device usage in the bedroom but not impact their sleep quality. While smartphones and tablets can disrupt sleep patterns, some studies suggest that night-time media use does not inherently diminish sleep quality for young adults; instead, these individuals may use devices to cope with existing sleep issues. Additionally, poor sleep quality is associated with various health concerns, including weight gain and vision problems, particularly among college students.

Limitations

It is essential to highlight that this study is based on published data and purposefully excludes variables such as sleep hygiene. Furthermore, this study does not address the physical ramifications or emotional health concerns associated with other sleep and health issues. We also refrain from considering research that is associated with sleep problems and the use of social media as a coping strategy. By focusing on these particular aspects, this study aims to provide a clearer understanding of how social media behaviors influence sleep quality and overall mental well-being. Moreover, the greater focus on youth populations, thereby limiting the generalizability of our findings

Implications and Future Directions

Addressing sleep problems is crucial for improving mental health and vice versa. Interventions aimed at enhancing sleep quality, such as cognitive-behavioral therapy or sleep hygiene education, can have a positive impact on mental well-being. Similarly, addressing sleep disturbances is crucial in the treatment of mental health conditions to achieve overall well-being. Further study should focus on the specific use of social media during night-time, i.e., texting, video calling, scrolling, sharing content at night, or others. So, particular usage can be determined with longitudinal research. To study the significant impact of using social media that causes sleep latency, further research should be conducted on other potential impacts on physical health and emotional well-being. Assessing physical activity and dietary habits should also considered to study the sleep cycle.

Conclusion

This study investigates the significant relationship between social media usage before bedtime and its adverse effects on sleep quality. Our research indicates that engagement with social media can lead to increased sleep disturbances and prolonged sleep latency, which, in turn, negatively impacts mental health. Users often report elevated levels of irritability, challenges with concentration in academic settings, and difficulties in managing daily activities. Moreover, users also experience fatigue upon waking, feeling drained and unrefreshed.

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