The effects of social media on the sleep quality and sleep duration of adolescents: a commentary

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Introduction

Sleep is an essential component of health and is particularly important during childhood and adolescence. It is not surprising that adequate sleep is linked to better developmental outcomes, learning and cognitive functioning as well as psychological wellbeing. Conversely, poor sleep is associated with daytime tiredness, poor school performance, poor diet, obesity, as well as mental health concerns including depression, suicidal behavior, substance abuse, and risk-taking behaviors (Bozzola, et al., 2022; Brautsch, et al., 2023; LeBourgeois, et al., 2017). It is estimated that between 50% and 90% of school-aged children and adolescents do not get as much sleep as they may need (LeBourgeois, et al., 2017). One study, in particular surveyed 8th, 9th, 10th, 11th and 12th graders in the United States, and found that 40% reported that they did not get at least seven hours of sleep per night (Brautsch, et al., 2023). Another study suggested an even higher prevalence with approximately two thirds of high school students reporting sleeping less than 8 hours per night (Wheaton, et al., 2018).

One factor that is pervasive in the lives of American adolescents and may be affecting their sleep is the use of social media. "Social media are defined as Internet-based applications that facilitate the exchange and exploration of user-generated content" (Alonzo, et al., 2021). Most adolescents use social media and are often engaging on multiple applications and websites including TikTok, Instagram, Snapchat, Twitter, and YouTube (Alonzo, et al., 2021). Not only do they have a presence on multiple platforms, but they are often interacting with multiple social media simultaneously. Many of the current applications allow for both communication and entertainment. This allows users to message and share the content they are viewing with others. There are no geographical or time constraints to this type of communication. There are some benefits to social media use as adolescent users gather information, learn new skills, or find support in online communities. However, they can also be exposed to the more sinister side of social media with content that contains misinformation, negativity, hostility, or is inappropriate (Chassiakos, et al., 2016).

Peer pressure and peer acceptance appear important features of adolescent development and much of what their peers are doing and saying stems from content that is popular on social media (Alonzo, et al., 2021). It is not difficult to theorize that as adolescents gain further autonomy, they are willing to sacrifice their sleep for continued interaction with social media, not only because it is entertaining and distracting but also because it allows them to feel connected to their peers.

Background

Generalized media consumption and accessibility has changed and rapidly increased over the past two decades. Previous generations were exposed to more passive media, such as radio or television. Access was limited by resources and content was limited by specific

programing availability. Present-day adolescents are more engaged in communicative digital media. There is virtually no limit to the amount of content they can consume and engage in the devices that they are using, by swiping or typing. This type of engagement may lead to a greater arousal and subsequently have a greater impact on sleep than more passive media consumption of previous generations (Brautsch, et al., 2023). Because of the growing use of social media and the fact that insufficient sleep has been linked to poor health outcomes, it is important for clinicians to study the associations between social media use and sleep disturbance (Levenson, et al., 2016).

Impact

Several studies suggest that social media use contribute to poor sleep patterns in adolescence, e.g. delayed bedtime, decreased sleep duration, and decreased quality of sleep (Bozzola, et al., 2022; Brautsch, et al., 2023; LeBourgeois, et al., 2017). One large systematic review found that screen time in school-aged children and adolescents was associated with delayed bedtimes and reduced sleep duration in 90% of the 67 studies included from 1999–2014 (LeBourgeois, et al., 2017). There is consistent evidence that identifies an association between delayed bedtimes and additional time spent engaging with social media. There has been inconsistent evidence to suggest that the hindrance of sleep is secondary to difficulty initiating sleep after social media use (Brautsch, et al., 2023; Combertaldi, et al. 2021; Varghese, et al., 2021). One study found that "thirty minutes of social media use immediately before sleep did not significantly increase arousal and neither disturbed objective nor subjective sleep. It is well studied that rapid eye movement (REM) sleep is the most important stage of the sleep cycle. REM sleep consists of 3 stages of non-REM (NREM 1, NREM2 and NREM 3). One study found, after social media use, participants only spent less time in sleep stage NREM stage 2 which is the stage of REM where a person should spend half their sleep time (Combertaldi, et al., 2021). While another study found that social media use closer to bedtime has been associated with increased cognitive arousal (Alonzo, et al., 2021). The etiology is likely multifactorial. While the nature of social media is highly alerting and engaging, it has also been theorized that the light emitted from electronic devices may be contributing to increased cognitive arousal. Children and adolescents may be particularly vulnerable to light stimulus before bed as the magnitude of melatonin suppression and pupillary light response is greater at this age when compared to adults (LeBourgeois, et al., 2017). However, the direct association between light emitted from devices used for social media and sleep onset latency and sleepiness in adolescents has not clearly been established (Brautsch, et al., 2023).

Because of this delayed bedtime, adolescents, particularly during the school year, are faced with decreased sleep duration leading to sleep deprivation and daytime sleepiness. Greater than 5 hours of social media use daily, was associated with ≈50% lower odds of 1 hour more sleep (Kelly, et al., 2019). Disrupted sleep patterns may also lead to poor sleep quality, further compounding the problem (Brautsch, et al., 2023). Sleep quality may also be affected by bedtime use, and notification alerts through the night leading to sleep disturbance, and overall daily social media use. There are 53% higher odds of poor sleep quality among adolescents with consistent bedtime media use (Bozzola, et al., 2022; Levenson, et al., 2016). Unsurprisingly, similarly adolescents who slept with devices in their room had higher odds of poor sleep quality (Chassiakos, et al., 2016).

Finally, it is also important to evaluate the associations between social media use, sleep, and mental health in adolescents. Current literature continues to suggest a bi-directional relationship between sleep and psychological health, each impacting the other in various ways with different confounding variables (Alonzo, et al., 2021). Previous research in adolescents studying loneliness stratified by age, showed that higher feelings of loneliness

are associated with increased sleep disturbance among younger adolescents, aged 12–14, but not among adolescents, aged 18-21 (Tavernier, Heissel, Sladek, Grant, & Adam, 2017). In a study of undergraduate students specifically looking at social media use at bedtime, they found differences in sleep disturbances associated with levels of depressive symptoms. In students with high levels of depressive symptoms, social media use at bedtime was associated with shorter sleep duration. While students with low levels of depressive symptoms, bedtime social media use was associated with longer sleep duration (Brautsch, et al., 2023). Ultimately, poor psychosocial and sleep health may lead to increased risk-taking behaviors that will affect adolescent's physical health (Alonzo, et al., 2021).

Discussion:

As children transition into adolescence they begin to put more value on their peer relationships – looking to them for acceptance and belonging. Social media creates a new environment for adolescents to seek companionship and validation. They may also develop a fear of missing out or stress about inactivity on social media (Brautsch, et al., 2023). Because their frontal lobes are still developing, they often do not have the ability to self-regulate or the insight to identify the adverse effects surrounding social media use with regards to poor sleep and mental health (Alonzo, et al., 2021). For this reason, younger adolescents may be more susceptible than older adolescents (Tavernier, et al., 2017). Commonly, changing bedtime and psychological stimulations are associated with sleep disruption (LeBourgeois, et al., 2017). Understanding the associations between social media use and sleep duration, sleep quantity, and sleep quality can help guide adolescents.

Sleep displacement hypothesis states that the use of social media at bedtime may delay sleep onset and therefore displace time spent sleeping. Adolescents may prolong social media use at bedtime because they think it may help with sleepiness. However, there are no existing evidence to suggest a causal relationship between social media use and poor sleep in Adolescents at this time. Due to the characteristics of their brain development stage, in which peer approval is prioritized, adolescents may also stay awake because they feel an obligation to be available to their peers (Alonzo, et al., 2021). Using path analysis, one study found that the fear of missing out predicted shorter sleep duration by both behavioral and cognitive processes (Scott & Woods, 2018). There is also a psychological component that occurs while adolescents are actively using social media. For example, an adolescent engaging in conversation or watching stimulating content before sleep may find it difficult to disengage, thus delaying sleep onset. They may also have notification alerts on which leads to more nighttime sleep interruption (Brautsch, et al., 2023). Adolescents experiencing online harassment may be specifically vulnerable to this anxiety as they are already more likely to have poor sleep, poor body image and low self-esteem (Kelly, et al., 2019). There may however be nuisance to how social media is being used and its psychological impact on sleep. For example, when compared to messaging and computer work, talking on the phone was associated with longer sleep duration in adolescents as compared to it being done on the phone (Tavernier, et al., 2017). These more personal conversations may be associated with positive emotions. Conversely conversations may be of negative nature with adverse effects directly affecting sleep and its quality and increasing thoughts and anxious feelings. Having direct access to friends on social media could in fact lead to longer awake time and shorter sleep time as the lag time between ending the conversation and falling asleep could be negatively affected.

More robust and conclusive data in the future will be helpful. Many of the studies created thus far are self-reported, cross-sectional studies. This leaves room for measurement error, subjectivity, and we are unable to address causality. Longitudinal studies are required to investigate the above issues as well as issues related to the dynamics of human behavior in

relation to social media usage and sleep patterns in adolescents (Alonzo, et al., 2021; Kelly, et al., 2019; LeBourgeois, et al., 2017).

Conclusion:

The rise and prominence of social media has allowed consumers to have more robust and interactive content to explore than previous passive media types. Adolescents are large consumers of social media, with many engaging in multiple platforms daily. At a time in development when peer relationships are dominant, interactions with one another largely occur through social media. There have been studied associations between social media use and delayed bedtimes, decreased sleep duration, and decreased sleep quality. Adolescents may be more willing to sacrifice sleep quantity and quality to continue to interact with social media. They may also have difficulty disengaging from psychologically stimulating social media. Decreased sleep can have negative effects on their physical and mental health. More research is needed to further solidify the causality between social media use and sleep disturbances. It is important to talk with families about the importance of sleep and specifically discourage social media use prior to and during sleep.

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