

- **The Impact of Digital Media on Sleep in Children with Attention Deficit Hyperactivity Disorder**

**M. Eslami**

**Child and Adolescent Psychiatrist**



# Introduction

- As many as , 73% of children with ADHD suffer from sleep problems (Sung, Hiscock, Sciberras, & Efron,2008).
- Frequently reported sleep complaints include difficulties initiating and maintaining sleep with increased night awakening (Cortese, Faraone, Konofal, & Lecendreux,2009).
- The resulting fragmentation of the physiological sleep architecture reduces the sleep recovery process and,thus, may lead to excessive daytime sleepiness in people with ADHD (Cortese et al., 2009; Yoon, Jain, & Shapiro, 2012).

# Introduction

- Higher rates for circadian-related abnormalities in children and adolescents suffering
- from ADHD exist for chronic sleep-onset insomnia (Corkum, Moldofsky, Hogg-Johnson, Humphries, & Tannock, 1999; Cortese et al., 2009) accompanied by circadian phase delay with later dim light melatonin onset (DLMO; Van der Heijden, Smits, VanSomeren, & Gunning, 2005),
- a stronger evening circadian tendency (Benk Durmuş, Rodopman Arman, & Ayaz, 2017; Gruber et al., 2012), and
- the association of a polymorphism(rs1801260) of the circadian locomotor output cycles
- kaput (CLOCK) gene (Xu et al., 2010),
- which was reported to be related to eveningness typology and delayed sleep onset in
- patients with ADHD (Mishima, Tozawa, Satoh, Saitoh, & Mishima, 2005).

# Introduction

- These findings were confirmed by a more recent study, revealing a doseresponse relationship between disrupted sleep patterns including sleep-onset latency, sleep deficiency, short sleep duration, delayed sleep phase disorder (DSPD), and ADHD-like behavior, with higher odds for inattention than for hyperactive/impulsive symptoms (Hysing, Lundervold, Posserud, & Sivertsen, 2016).

## Introduction

- The impact of digital media on sleep in children, particularly those diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), has emerged as a critical area of concern for parents, educators, and healthcare professionals.

# Introduction

- As digital media use becomes increasingly prevalent among young populations, research has shown a significant correlation between high levels of media consumption and sleep disturbances.
- These disturbances manifest as reduced sleep duration, difficulties in falling asleep, and overall poorer sleep quality, all of which can exacerbate the symptoms of ADHD and affect a child's development and well-being.

# Introduction

- Various forms of digital media, such as smartphones, social media platforms, online gaming, and streaming services, exhibit different effects on sleep patterns.
- Problematic media usage, especially concerning online gaming and social media engagement, has been linked to heightened sleep disruptions.
- Emotional content consumed via these platforms can lead to increased arousal, making it more challenging for children to wind down before bedtime.
- Moreover, the compulsive nature of digital interactions often leads to delayed sleep onset and reduced total sleep time, further complicating the sleep issues faced by children with ADHD.

# Introduction

Cultural factors also influence the relationship between digital media use and sleep

outcomes, with studies indicating that the effects may be more pronounced in Eastern cultures.

This suggests that societal norms surrounding media consumption can impact how children engage with digital platforms and the resultant effects on their sleep quality.

Given the growing body of evidence linking digital media usage with sleep disturbances, particularly in children with ADHD, the necessity for further research and targeted interventions becomes increasingly apparent.

# Introduction

Research indicates a robust

correlation between the increased use of electronic media and the prevalence of sleep problems, particularly in populations affected by Attention Deficit Hyperactivity Disorder (ADHD) .

The types and duration of digital media engagement play critical roles in determining sleep outcomes.

# Types of Digital Media and Their Impact

- Various forms of electronic media, including smartphones, social media, online gaming, and streaming services, exhibit differing effects on sleep quality.
- Notably, problematic use of online gaming and social media has been linked to more pronounced sleep disturbances compared to smartphone use, which tends to exert a lesser influence when considered independently .
- A longitudinal analysis suggested that the content consumed via these devices may exacerbate sleep issues; for example, emotionally charged content can increase arousal and make it difficult to relax before sleep, contributing to disrupted sleep patterns.

# Behavioral Indicators of Problematic Use

- The impact of digital media on sleep is not merely a function of time spent on devices but also the nature of that engagement.
- Problematic use, characterized by addictive behaviors, is associated with more significant sleep disruptions.
- Such behaviors may include the compulsive need to check notifications or engage in gaming, which can delay bedtime and reduce total sleep duration .
- Children and adolescents who exhibit signs of problematic use tend to experience heightened emotional arousal and sleep disturbances.

# Cross-Cultural Considerations

- Cultural factors also moderate the relationship between digital media use and sleep issues.
- Studies indicate that the effects of electronic media on sleep quality are
- more pronounced in Eastern cultures, suggesting that societal norms and values may influence media consumption patterns and their associated outcomes .
- This highlights the need for culturally sensitive approaches when addressing sleep issues related to digital media use among children with ADHD.

# Overview of Findings

- Research has shown that the increasing use of digital media among children, particularly those with Attention Deficit Hyperactivity Disorder (ADHD), is associated with various sleep disturbances.
- A systematic review of 49 epidemiological studies indicated a consistent relationship between electronic media use and reduced sleep duration in children aged 0–15 years.
- Notably, television watching and tablet device
- use among preschool children were linked to difficulties in falling asleep and shorter sleep duration, suggesting a detrimental impact on their sleep patterns.

The review highlighted that media usage is particularly problematic for the youngest demographic.

For instance, heavy television use was correlated with increased daytime napping, indicating poor sleep consolidation.

In contrast, there was insufficient evidence linking video games, mobile phones, or computers to negative sleep outcomes among children aged 0–5 years.

However, as children grow older, the relationship between media use and sleep issues appears to strengthen, reflecting the complexities of digital interactions during developmental stages.

# ADHD and Media Use

Children with ADHD may experience unique challenges related to media use and its impact on sleep.

Research indicates that over 60% of children diagnosed with ADHD also contend with mental disorders that can affect their overall health.

A study examining remote learning during the COVID-19 pandemic noted that adolescents with ADHD faced additional difficulties in navigating their media habits, further complicating their sleep and mental health situations.

The continuous exposure to screens may exacerbate inattention and other ADHD symptoms, creating a cycle that disrupts both sleep and cognitive function.

# Need for Further Research

- While existing studies have documented the effects of electronic media on sleep,
- further research is necessary to explore the long-term implications of digital media
- use, particularly for children with ADHD. Future studies should focus on differentiating
- the effects based on various factors such as age, the type of media consumed, and
- individual susceptibility to sleep disturbances. As the landscape of digital media
- evolves, understanding its influence on sleep will be crucial for developing targeted
- interventions and support systems for affected children and their families.

# Screen exposure exacerbates ADHD symptoms indirectly through increased sleep disturbance

Over the past 30 years, children are increasingly spending more and more time in front of digital screens (television, computer, and mobile devices).

Unfortunately, strong empirical evidence has demonstrated that excessive screen exposure can disturb a child's development, well-being, weight balance (obesity), and sleeping patterns.

A direct causal link has been established between screen exposure and sleep disturbance.

Experimental studies measuring physiological and polysomnographic information in individuals have demonstrated that screen light significantly disrupted sleep continuity and architecture.

Specifically, it has been found that short wavelength light emitted from monitors stop or delay normal production of melatonin, exposure to light in the evening has a direct impact on the circadian cycle of melatonin, leading to circadian rhythm.

Moreover, sleep disturbance has been found to be associated with behavioral disorders ,attentional disorders, irritability, emotional lability, and a low tolerance for frustration , hence leading to an increased risk of ADHD.

Body Mass Index (BMI)-for-age (in z-scores) since overweightness/obesity has been found to be linked with sleep quality and screen exposure levels.

# Conclusion

- Longer media time and inadequate sleep-wake behavior increase the risk of ADHD-like symptoms.