

Screen time and sleep in children

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Abstract

Question I continue to hear concerns from parents in my practice about the frequent use of light-emitting devices by their children. I have also found that many children suffer from sleep disturbances. What are the effects of screen time on sleep, and what are some best practices for sleep hygiene and screen use among children?

Answer Screen time is higher now than before the onset of the COVID-19 pandemic, and knowledge about the effects of screen time is evolving. Spending time in front of a screen may replace sleep time or sleep-promoting activities such as exercise, and the engaging content and social interactions on screens interfere with falling asleep. Evidence exists on the disruption of the circadian rhythm by light emitted by screens. Advice to families should include sleep hygiene activities as well as elimination of screen use at least 1 hour before sleep.

Le temps d'écran et le sommeil chez les enfants

Résumé

Question À ma clinique, les parents se plaignent constamment que leurs enfants passent beaucoup de temps à utiliser des dispositifs lumineux. J'ai aussi constaté que de nombreux enfants souffrent de troubles du sommeil. Quels sont les effets du temps passé à l'écran sur le sommeil, et quelles sont certaines des pratiques à recommander concernant l'hygiène du sommeil et l'utilisation des écrans chez les enfants?

Réponse Le temps passé devant les écrans a augmenté considérablement par rapport à la période précédant la pandémie de la COVID-19, et les connaissances entourant les répercussions du temps d'écran changent. Le temps passé devant un écran peut écourter la durée du sommeil ou remplacer des activités propices au sommeil comme l'exercice. La stimulation engendrée par le contenu et les interactions sociales sur les écrans peut nuire à l'endormissement. Des données probantes existent sur la perturbation du rythme circadien causée par la lumière émise par les écrans. Les conseils à donner aux familles devraient être de pratiquer des activités associées à une bonne hygiène du sommeil et d'arrêter l'utilisation des écrans au moins 1 heure avant le coucher.

Household access to the Internet in Canada increased in all provinces between 2010 and 2022.^{1,2} In 2017 and 2018, more than one-third (38%) of girls and 30% of boys aged 11 to 15 years old reported using social media “almost all the time throughout the day.”³ During the height of the COVID-19 pandemic, children’s exposure to screen time rose substantially.⁴ Even though pandemic restrictions have waned, some evidence suggests that screen time is still higher than in the pre-pandemic era⁵ and that screen use is potentially affecting sleep in children.

Effect of screen time on sleep

Several studies published since 2009 have evaluated the effects of screen time on sleep quality and duration, which can affect learning and memory, behaviour, brain development, and other factors.⁶⁻⁸ When sleep duration was assessed through parental records of bedtimes and wake-up times among 736 children aged 3 to 6 years in Finland, each 1-hour increase in screen time was associated with a reduced sleep duration of approximately 10 minutes ($P<.001$).⁹ Among 2903 children aged 2 to 6 years in Hong Kong, each additional hour of electronic device use was associated with mean decreases in sleep duration of 11 minutes for boys and 6 minutes for girls.¹⁰

In a cross-sectional study of children aged 3 to 6 years ($N=2278$) in China, each 1-hour increase in television viewing a day was associated with a 12% increased risk of sleep disorder based on parental reports using the Children’s Sleep Habits Questionnaire.¹¹ A study conducted in the United States found that the use of any device at bedtime by older children (8 to 17 years of age) was associated with decreased sleep quantity and quality, as reported by parents.¹²

Systematic reviews also support these findings; 1 review about children aged between 6 and 19 years who used portable media devices at bedtime found that bedtime device use was associated with children not getting enough sleep, not getting good-quality sleep, and being excessively sleepy during daytime (odds ratio [OR]=2.17, 95% CI 1.42 to 3.32, $P<.001$; OR=1.46, 95% CI 1.14 to 1.88, $P=.003$; OR=2.72, 95% CI 1.32 to 5.61, $P=.007$, respectively).¹³ The authors noted that merely having access to devices (but not using them) at night was associated with the same shortfalls of sleep quantity and quality and with a greater likelihood of daytime sleepiness.¹³ In another systematic review of 67 studies on children and adolescents between 5 and 17 years old, screen time was negatively correlated with sleep outcomes such as timing, duration, quality, onset latency, sleepiness, and other effects.

The authors found 90% of published studies reported statistically significant adverse associations between screen use and at least 1 sleep outcome.¹⁴ Notably, participants were randomized into 2 distinct groups in only 3 studies.¹⁵⁻¹⁷ However, poor sleep due to screen use is difficult to determine since other factors can affect sleep habits in youth, and confounding factors such as low levels of physical activity may also contribute to disturbed sleep.¹⁴

How screen time affects sleep

Several mechanisms may explain the effect of screen time on sleep. Spending too much time in front of a screen may replace sleep time or sleep-promoting activities such as exercise.¹⁸ Also, the engaging content and social interactions on screens, especially for children, can make it difficult to fall asleep.¹⁸ Lastly, the light emitted by screens can disrupt the circadian rhythm by suppressing melatonin, a hormone that helps with sleep regulation.¹⁹

Problematic gaming is an example of an activity that might displace sleep or good sleep habits. Kristensen et al reviewed 34 studies including more than 50,000 people (adolescents and adults).²⁰ They reported problematic gaming as assessed by various methods, including self-reported questionnaires (based on established diagnostic tools such as Internet gaming disorder criteria in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition, and the Game Addiction Scale for Adolescents).^{21,22} Problematic gaming was associated with decreased sleep duration (approximately 20 minutes less, where data were available), poor sleep quality, daytime sleepiness, and sleep problems. The effect size of general technology use on sleep was lower than problematic gaming on sleep (OR=1.33 and OR=2.60, respectively), possibly due to the interactive nature of video games.²⁰

Content consumed on screens can also influence sleep. Social media use and the “fear of missing out” effect among full-time students aged 18 to 27 years (N=1398) and full-time working professionals (N=472) in India were found to affect sleep; these effects were exacerbated by the impact of anxiety and depression on compulsive social media use and sleep hygiene.²³ Anxiety, depression, social media use, fear of missing out, social media sleep hygiene, and problematic sleep due to social media were all assessed using participants’ responses to a survey, and links between each construct were analyzed with structural equation modelling.²³

Circadian rhythm

Light emitted by screens has a substantial impact on sleep patterns. The circadian system responds to cues such as light, eating, and activity, known as *zeitgebers*.²⁴ One such zeitgeber is the light-dark cycle, and the human circadian system is known to synchronize with this cycle.²⁵ Light exposure before bedtime can offset circadian timing and is seen to decrease melatonin.²⁶ In a small study of young adults (N=12, mean age 25 years) in the United States, exposure to an electronic

reader emitting short-wavelength (452 nm) light reduced melatonin secretion by 55% (standard error of the mean [SEM]=20%), and participants took 10 minutes longer to fall asleep on average compared with when they read printed books before bedtime ($P=.009$). Rapid eye movement sleep was also reduced, with means of 109 minutes (SEM=26 min) with electronic reader use and 121 minutes (SEM=25 min) with printed books ($P=.03$).²⁷

Recommendations

To improve sleep-related health outcomes, screen viewing should be eliminated at least 1 hour before bedtime. In a small study conducted in Japan, Higuchi et al found melatonin levels dropped substantially (mean decrease of 46%) in adults exposed to light up to 2 hours before bedtime and an even greater drop in melatonin levels (mean decrease of 88%) was seen in children (mean age 9.2 years) with light exposure before bedtime.¹⁹ In another small study conducted in the United States, Hartstein et al observed suppression of melatonin levels (ranging from 69% to as much as 99%) in 36 children (3.0 to 4.9 years old) exposed to light 1 hour before bedtime.²⁸

Healthy habits related to screen time should be adjunct to other good sleep hygiene measures.²⁹⁻³¹ In 1 review²⁹ with 44 studies, bedtime routines, reading at bedtime, low light and noise in the bedroom, avoidance of caffeinated drinks, and having a child sleep in their own bed (vs parental co-sleep) all contributed to better sleep outcomes.

Conclusion

Screen time is associated with reduced sleep duration and poor sleep quality. Problematic gaming and bedtime device use exacerbate these issues. Moreover, content consumed on screens, including that of social media, can contribute to anxiety and depression, which can further affect sleep. Limiting or eliminating screen time 1 hour before bedtime and maintaining recommended sleep hygiene routines are imperative for all children. 🌿

Competing interests

None declared

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