



## SCREEN TIME EXPOSURE IN CHILDREN AND ITS IMPACT ON SLEEP QUALITY, VISION, AND BODY MASS INDEX

Makhpieva Guldonakhon Kabiljanovna,  
PhD, Associate Professor of the Department of Pediatrics,  
Faculty of Medicine, ASMI

### Abstract

This article synthesizes current evidence and guidance on how screen time influences sleep through circadian disruption and sleep displacement, influences vision through prolonged near work and reduced outdoor time, and influences body mass index through increased sedentary behavior, appetite stimulation, food marketing exposure, and sleep-mediated metabolic effects. Practical, family-centered strategies are proposed for clinicians and caregivers, emphasizing screen-free sleep routines, device placement rules, outdoor activity protection, and regular vision and growth monitoring.

**Keywords:** Screen time; children; sleep quality; myopia; vision; body mass index; sedentary behavior; digital media.

### INTRODUCTION

Screen exposure is no longer a “special activity” for children—it is the default background of modern life. Phones, tablets, televisions, and gaming devices are present in bedrooms, cars, schools, and even at the dinner table. For pediatric practice, this matters because screens interact with three biological systems that are extremely sensitive during childhood: sleep regulation, ocular development, and energy balance. The clinical reality is familiar: children who use screens late into the evening often sleep less or sleep worse; children who spend many hours indoors on near-viewing tasks have rising rates of myopia; and children with high recreational screen time tend to have higher rates of overweight and obesity.

### MATERIALS AND METHODS

The strongest and most consistent evidence across pediatric ages is that screen exposure—especially near bedtime—is associated with worse sleep outcomes. A recent overview summarizing systematic review evidence reports negative associations between screen time and multiple sleep measures including sleep timing, duration, quality, sleep-onset latency, and daytime sleepiness. [3] The mechanisms are straightforward and often overlap. First is sleep displacement: time





on screens simply pushes bedtime later, and children rarely “sleep in” enough to compensate, especially on school days. Second is physiologic circadian disruption: bright light exposure in the evening can suppress melatonin and delay the internal sleep signal, and interactive content can raise arousal, making it harder to transition into sleep. Third is conditioned dependence: if a child consistently falls asleep with a device, they may struggle to self-settle after normal nighttime arousals, lowering sleep continuity even when total time in bed is unchanged.

## RESULTS AND DISCUSSION

What matters clinically is that bedtime screen use is not just correlated with sleep loss; it often becomes the driver of a household’s sleep pattern. Children may appear “not sleepy,” but the real problem is that the brain is being stimulated and delayed by light and content. Families may interpret this as insomnia and ask for medication, when the most effective intervention is behavioral and environmental: remove screens from the bedtime window and rebuild a predictable pre-sleep routine. Modern pediatric guidance emphasizes protecting sleep by creating screen-free time in the evening and establishing household routines that prioritize sleep, movement, and relationships. [1] The evidence base supports a practical rule that is easier than “less screen time overall”: create a firm “digital sunset” (device-off period) before bedtime, keep devices out of the bedroom, and replace screen habits with calming transitions such as reading, hygiene routines, and quiet conversation.

Childhood myopia has become a major global concern, and digital screen exposure is now considered one of several near-work behaviors linked to myopia development and progression. A large systematic review and dose-response meta-analysis published in 2025 found that each additional daily hour of digital screen time was associated with higher odds of myopia, with a non-linear dose-response pattern and a suggested lower-risk region below about one hour per day in the analyzed dataset. [4] While observational evidence cannot prove causality in the same way as a randomized trial, the dose-response findings are clinically useful because they align with biologically plausible mechanisms and with broader myopia prevention concepts.

Mechanistically, screens often involve prolonged near viewing distance, sustained accommodation, reduced blinking (contributing to dryness and discomfort), and fewer breaks—especially when children are absorbed in games or videos. Another pathway is indirect: more screen time is associated with less time outdoors, and outdoor time is consistently protective against myopia development in children. The clinical implication is not that all screen exposure is harmful, but that high-volume,





close-range, uninterrupted near work is a risk pattern. Families can reduce risk through simple environmental engineering: encourage outdoor time daily, use “distance rules” (devices at least arm’s length when possible), ensure good lighting, and institute regular breaks such as the widely used “20-20-20” concept (look 20 feet away for ~20 seconds every ~20 minutes). The most powerful intervention is often not a vision-specific rule but a lifestyle rule: protect daily outdoor play. When outdoor time rises, indoor screen time tends to fall naturally, and the child’s eyes get both distance focus breaks and protective light exposure.

How screen time affects BMI and weight-related outcomes

The link between screen exposure and higher BMI operates through multiple reinforcing pathways. The first is sedentary displacement: time spent sitting with screens replaces time spent in moderate-to-vigorous physical activity. The second is dietary coupling: screens are often paired with snacking, and passive eating while watching reduces satiety cues. The third is marketing exposure: children are heavily exposed to advertising for energy-dense, nutrient-poor foods, and marketing shapes preferences and requests. The fourth is sleep-mediated metabolic risk: when screen time pushes bedtime later and reduces sleep duration, appetite regulation and insulin sensitivity can shift in an unfavorable direction, making weight gain more likely even without obvious overeating. These mechanisms are consistent with pediatric obesity frameworks that explicitly include sedentary behavior and media use as part of clinical assessment and counseling. [5]

Evidence syntheses consistently report a positive association between higher screen time and overweight/obesity risk in children and adolescents. For example, a dose-response meta-analysis in primary care literature reported an association between screen time and overweight/obesity risk in adolescents. [6] In addition, population studies using device-measured activity and self-reported screen time show that high screen time combined with low physical activity is associated with overweight and obesity. [7] The key clinical insight is that BMI risk is rarely caused by screens alone. Screens become harmful when they are woven into daily patterns that reduce movement, increase snacking, and compress sleep. Therefore the best obesity-prevention strategy is not simply “two hours max,” but a daily schedule that guarantees the protective behaviors first: adequate sleep, at least an hour of active play for school-age children, screen-free meals, and outdoor time.



## CONCLUSION

Screen time exposure in children is associated with measurable impacts on sleep quality, visual development, and BMI through converging pathways of sleep displacement and circadian disruption, prolonged near work and reduced outdoor time, and increased sedentary behavior with appetite and marketing influences. Evidence syntheses indicate that screen time is negatively associated with multiple sleep outcomes in children and adolescents, especially when devices are used at bedtime. The growing myopia literature also supports a screen-time association, including dose-response evidence linking additional digital screen hours with higher odds of myopia.

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