



Preventing adverse health outcomes among children and adolescents by addressing screen media practices concomitant to sleep disturbance

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Executive Summary

In today's digital age, screen media use is prevalent in the daily life and functioning of children and adolescents. Sleep disturbance and adverse health outcomes related to screen media practices are on the rise affecting physical, cognitive, and behavioral health outcomes. Mounting evidence from studies worldwide support the following recommendations addressing practice, research, and policy: (a) All practitioners are encouraged to assess youth and their families at each health encounter for screen media practices, sleep disruption and daytime sleepiness, and be able to refer to specialists or be trained on interventions to address problems; (b) Children and families are encouraged to seek information about and take responsibility for screen media use practices, effective sleep habits, and signs and symptoms of adverse health outcomes; (c) Policy makers are encouraged to promote public awareness and provide funding for further research into screen media practices, sleep disturbance, and adverse health outcomes. The American Academy of Nursing (Academy) supports individual, family, community, and population-based initiatives to inform screen media practices among children and adolescents, to assess for and treat adverse health outcomes linked to screen media use, and to help families adopt sleep-friendly practices.

Background

Social media is a ubiquitous part of children and adolescents' daily lives. Social media activities along

with the use of mobile devices, computers, gaming platforms, and televisions increase screen use and saturate our culture. Infants and young children use screens; 75% of 0 to 8 year olds (Lup, Trub, & Rosenthal, 2015) and 97% of 0 to 4 year olds have used a mobile device (Lenhart, 2015). Among teens, over 89% own a smartphone, 39% report feeling "addicted to their phones," and 68% keep their phone in their bed or within reach during the night (Robb, 2019). Youth screen media use is highly influenced by adult use and parental attitudes (Lauricella, Wartella, & Rideout, 2015).

Screen media practices include content (Murray et al., 2006), usage time and tasks performed (Ferguson, 2017), the level of interference with other activities (Laurson, Lee, & Eisenmann, 2015), time of day of use and simultaneous use of multiple screens (Hysing et al., 2015), degree of social interaction and comparison (Lup et al., 2015), and the type of screen used (Hale & Guan, 2015). While such devices have revolutionized information and communication in many ways, their negative effects are numerous and significant. Screen media practices are associated with sleep disturbances, peer problems (Parent, Sanders, & Forehand, 2016), high likelihood of self-injury (Oshima et al., 2012), and high levels of internalizing as well as externalizing behavior (Przybylski, 2014; Tamana et al., 2019) that, in turn, influence a wide range of physical, cognitive, and behavioral health outcomes. National rates of internalizing behavior (depression, thoughts of suicide, anxiety, and poor peer relations) and externalizing behavior (aggression, conduct problems, and violence) have been rising (Kann et al., 2018) along with screen media use and merit serious attention.

The interactions between screen media practices, sleep, and adverse health outcomes are multifaceted, and in several cases, bidirectional. First, screen media

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practices act as a psychosocial risk factor for child and adolescent adverse outcomes. For example, watching violent entertainment from ages 2 to 4 is associated with significantly increased risk for antisocial behavior for boys when they are ages 7 to 9 (Christakis & Zimmerman, 2007). Playing digital games that include violence is associated with direct aggression among boys at age 10 and negative interpersonal behaviors such as shunning and revenge-seeking among 13-year-old children (Wallenius, Punamaki, & Rimpela, 2007). Second, screen media practices affect sleep health. The use of screen media at bedtime is highly prevalent; on average adolescents engage in up to four activities involving screens after 9 PM (Calamaro, Mason, & Ratcliffe, 2009). A strong and consistently reported association exists between bedtime screen media use and inadequate sleep quantity, quality, and excessive daytime sleepiness (Garmy & Ward, 2019). Among the reasons for this association are suppression of melatonin production and physiological as well as psychosocial arousal caused by viewing social media content (Carter et al., 2017).

The indirect effect between screen media practices and adverse health outcomes may lead to less and poorer quality sleep (Reid Chassiakos, Radesky, Christakis, Moreno, & Cross, 2016). Screen media practices are associated with reduced sleep duration in children ages 3 through 12 years and sleep disturbance at all ages that, in turn, share a reciprocal relationship with externalizing behaviors (Quach, Nguyen, Williams, & Sciberras, 2018). The consequences of sleep-related externalizing behaviors extend to criminal behavior in adulthood. In contrast to teens who did not report being sleepy during the afternoon at age 15, those who did were 4.5 times more likely to become convicted criminals by age 29 (Raine & Venables, 2017). Sleep disturbances were also associated with other adverse outcomes such as being fearful, worried, self-conscious, argumentative, destructive or disobedient, having disturbed interpersonal relationships with peers (Parent et al., 2016), poor mental health, suicidal thoughts, and self-injury (Oshima et al., 2012). These outcomes demonstrate that early life habits have long-lasting consequences.

The interaction between biological factors such as sleep and psychosocial factors such as screen media practices provides a framework to understand the development of aggressive behavior and violence, as well as, predicting and preventing it (Liu, 2011). With sleep as a potential mediating factor between screen media practices and adverse outcomes, addressing risk factors that contribute to poor sleep has significant potential societal and public health benefit.

Responses and Policy Options

To date, systematic literature reviews (Hale & Guan, 2015; Stiglic & Viner, 2019) and meta-analyses (Carter et al., 2017) have explored the relationship between screen

media practices, sleep, and adverse health outcomes. Few randomized controlled studies and no population level programs of research have been conducted. In response to the needs of parents, children, and health, social, and education professionals, however, statements and guidelines have been developed by the American Academy of Pediatrics (<https://www.aap.org/en-us/about-the-aap/aap-press-room/news-features-and-safety-tips/Pages/Children-and-Media-Tips.aspx>), the American Academy of Family Physicians (<https://www.aafp.org/afp/2017/0701/p56.html>), the National Sleep Foundation (<https://www.sleepfoundation.org/articles/electronics-bedroom-why-its-necessary-turn-you-tuck>), and the World Health Organization (<http://www.who.int/iris/handle/10665/311664>). Strategies to promote sleep friendly practices (Hiscock et al., 2015) and safe screen media practices (Sanders, Parent, & Forehand, 2018) have been tested and published.

The 116th United States Congress re-introduced the bi-partisan Children and Media Research Advancement Act (CAMRA, H.R. 1367 and S. 558). It calls for the directors of the National Institutes of Health and other leaders to develop a research agenda concerning the cognitive, physical, and socio-emotional health and developmental effects of exposure to screen media with a progress report due to Congress one year after the law is enacted. The bill proposes an important step to develop evidence for guidelines, recommendations, and interventions. Appropriations proposed are \$15 million for each of fiscal years 2020 through 2022 and \$25 million for each of fiscal years 2023 and 2024. If enacted and funds appropriated, funds would need to grow over time to effectively address the issues systematically.

Corporations that develop and manufacture devices have a role guiding families, schools, and communities in screen media practices. Jim Steyer (Common Sense Media) proposed that companies “practicing institutional manipulation of screen media use should be accountable” and Tim Cook (Apple CEO) stated if device use is harmful, “we should do something to make (them) more productive” (Sloan, 2019, May 3).

The American Academy of Nursing’s Position

The Academy supports individual, family, community, and population-based initiatives to inform screen media practices among children and adolescents, to assess for and treat adverse health outcomes linked to screen media practices, and to help families adopt sleep-friendly habits. These initiatives include funding for research to create high quality evidence to develop and test interventions and train nurses and other healthcare professionals to deliver these interventions. The Academy supports raising awareness about the potential serious public health consequences of screen media practices, their influence on sleep disturbance, and impact on adverse health outcomes.

Recommendations

Clinical and Practice Recommendations

1. To encourage all health professionals to assess duration, content, and timing of screen media use; sleep quality, behavior, and duration; and daytime sleepiness at each health encounter. Practice guidelines need to include pertinent health history items.

Standardized instruments are available to identify those in need of screen media practices modification and sleep health education. The Modern Digital Use Questionnaire (Ra et al., 2018), the Adolescent Sleep, Caffeine Intake, and Technology Use, including a multi-tasking index (Calamaro et al., 2009), the Insomnia Severity Index (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015), the Pediatric Daytime Sleepiness Scale (Drake et al., 2003), and the Epworth Sleepiness Scale (Janssen, Phillipson, O'Connor, & Johns, 2017) are examples. Additional recommendations include providing patient informational materials in clinical settings, such as pamphlets, reading material in waiting rooms, posters along hallways, and the like. Useful sources to obtain materials include: The National Heart Lung and Blood Institute (<https://www.nhlbi.nih.gov/health/educational/wecan/tools-resources/tools-reduce-screen-time.htm>); Common Sense Media (<https://www.commonsensemedia.org/>); and Nemours Children's Health System (https://healthykidshealthyfuture.org/wp-content/uploads/2015/02/Reducing-Screen-Time_FINAL.pdf).

2. Evidence-based, sleep-friendly practices guidelines in the form of parent and youth education should be readily available for school nurses, clinicians, educators, and social service professionals in schools and primary care to help families achieve sleep-friendly practices and safe screen media practices.

With the family, school, and community as the intended audience, school nurses, psychologists, and counselors should provide accessible and continually updated information on the use of screen media and its potential positive and negative effects. Evidence-based, sleep-friendly screen behavior recommendations for clinicians and educators include: teaching families about the importance of adequate sleep, building healthy sleep habits early, and emphasizing the negative effects of bedtime use of light-emitting screens on sleep; removing screen devices from bedrooms; and considering that children's mood, academic, or adverse health outcomes may be caused by excessive screen media use (Hale et al., 2018). Examples of evidence-based sleep friendly screen practice tips include the Fact Box (Carskadon, 2013) and Screen Friendly Recommendations for Parents (Hale et al., 2018).

Children and families need to take an active role and assume responsibility for understanding how screen media use affects their health. A Family Media Use Plan is available through the American Academy of Pediatrics (www.HealthyChildren.org/MediaUsePlan).

3. Federal and private funding should be allocated to research the risks of screen media practices.

There may be a "critical developmental period" during which screen media and sleep practices contributing to adverse health outcomes are established (Tamana et al., 2019), yet the evidence underlying universal recommendations may be flawed due to limitations of the research (Ashton & Beattie, 2019). Passage and funding of CAMRA and other sources of research funding is critical. Future studies need to: (a) include objective measures of sleep parameters such as sleep logs, actigraphy, and wakefulness testing (Bhat, Pinto-Zipp, Upadhyay, & Polos, 2018); (b) recruit samples that are racially, ethnically, and economically diverse; (c) focus on multiple reports of behavior including youth, parents, and teachers (Przybylski, 2014); (d) address confounders, such as screen media use outside the home, consideration that daytime sleepiness increases during puberty despite optimal sleep, parental beliefs about screen media use (Thompson et al., 2018), and level of in-person social interaction (Twenge, Martin, & Campbell, 2018); and (e) use longitudinal designs with large, randomly selected samples that contribute data at frequent intervals (Quach et al., 2018).

Particularly necessary is research on how screen media is embedded in the social fabric of families and peer networks (Ferguson, 2017) that, in turn, may lead to excessive use. Ideas needing further study include youth actively using screen media as a sleeping aid or to counteract boredom, creating a self-perpetuating cycle of screen media use (Hysing et al., 2015) and that pre-existing psychopathology may lead to screen media use to avoid or escape distress (Kaess et al., 2014). Research is needed on the mechanisms involved in the pathways of sleep disturbance and adverse health outcome as they may differ by youth developmental stage.

4. Governmental agencies and private foundations should fund developmentally suitable prevention and intervention strategies aimed at the individual, family, community, and population levels to achieve youth sleep guidelines. Developers and manufacturers of screen media should consider support for professional training and literacy around screen device use.

Public health campaigns conveying the hazards of screen media practices, sleep disturbance, and adverse health outcomes should be developed and evaluated through comparative effectiveness trials. Safe screen media and sleep friendly practices should be communicated to all American households.

5. Future Healthy People frameworks, Youth Risk Behavior Surveillance Surveys (YRBSS), and World Health Organization (WHO) monitoring should include objectives and items to address sleep health and screen media practices.

Healthy People 2020 includes an objective to reduce the proportion of early and middle childhood youth who have poor sleep quality. A similar objective should be included for adolescents. Since the use of screen media has increased at an unprecedented rate and is associated with sleep disturbances and adverse

health outcomes, future Healthy People frameworks should use data available from the YRBSS to establish targets for screen media practices by children and adolescents. The WHO might consider inclusion of screen time in future monitoring and surveillance systems.

Taken together these recommendations if widely disseminated and enacted will protect the health and development of children and adolescents worldwide.

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