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The Smart Use of Smartphones in Pediatrics

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ABSTRACT

The problematic overuse of electronic devices, in particular smartphones, is negatively affecting the lives of American youth. Cell phone technology has advanced its capabilities with smartphones to now easily provide children and teens with endless access to the internet, social media, and other online activities. Research is showing that addictive, smart phone activities of youth in their formative years is directly impacting their wellbeing. The excessive time youth spend on their smartphones results in less human interaction, sleep, exercise, and productivity, as well as, increased risk of exposure to inappropriate or violent online media, anxiety, and depression. The purpose of this column is to explore the potential behavioral and developmental problems in youth related to the problematic overuse of the smartphone; inform the importance of monitoring and controlling indiscriminate youth use of technology, and the approaches pediatric nurses can employ to guide youth and their families to prevent negative outcomes for this evolving public health problem.

The excessive use of various electronic devices, in particular *smartphones*, adds to a growing uneasiness for potential harm affecting the health of today's youth. Research shows that the overuse of smartphones correlates with various mental health concerns, such as anxiety, depression, stress, and low self-esteem (Panova & Carbonell, 2018). Smartphones with accessorized capabilities, mobile tools, and access to the Internet, have become especially popular among American children. The purpose of this column is to provide an overview of the potential behavioral and developmental problems in youth related to the overuse of smartphones and the importance of monitoring and controlling youth's online and computer activities. Additionally, this column aims to increase awareness of the implications of smartphone overuse and make recommendations that pediatric nurses can employ to guide youth and their families to prevent adverse outcomes for this evolving public health problem.

Pediatric neuroplasticity and technology use

There is growing evidence that the early introduction of digital media through the use of smartphones is irreversibly rewiring the brains of infants during crucial stages of development (Swingle, 2016). Of concern in regards to young children is that nearly 40% of children under the age of two now use mobile devices like smartphones (Shifrin, Brown, Hill, & Jana, 2015). Giving a smartphone to an infant is different than distracting or soothing them with toys or objects, as these items do not override the larger environment (Swingle, 2016). Research has significantly associated poorer performance on developmental screening tests at 36 months with higher levels of screen time at 24 and 36 months (Madigan, Browne, Racine, Mori, & Tough, 2019). *Phubbing* (phone and snubbing) behaviors, or the ignoring or interrupting of others to interact on one's mobile device, correlate with negative parent-child relationships (Hong et al., 2019). With habitual replacement and rejection of primary caretaker(s) for smartphones, children soon learn to auto-regulate or feel better with technology, rather than attaching with people (Swingle, 2016). The viewing of a smartphone disallows the ability to read subtle emotional cues in a young child's immediate environment, potentially resulting in both social and emotional deregulations, which coincide as key symptoms of autism. "It is not what the viewing itself is doing, but rather what is not happening in the developmental cycle, while the infant, preschooler, and later young child is engaged with the medium" (Swingle, 2016, p. 117).

Physical health concerns

The public, policymakers, and health researchers have heightened concerns regarding children's unique vulnerability to exposure to wireless radiofrequency electromagnetic radiation emitted from smartphones and phone station antennae (American Academy of Pediatrics (AAP), 2016). Cancer risks for children may be greater than that for adults because children's skulls are thinner and can absorb more radiation exposing the developing nervous system of children to tissue-damaging agents (American Academy of Pediatrics (AAP), 2016).

Other physical problems reported from excessive smartphone use include rigidity and muscle pain resulting in neck strain or *Tech Neck* from individuals looking down at their phones for extended periods (DeWitt, 2018). *Texting Thumb* is a form of tendinitis that comes from overusing the thumb from excessive texting, video gaming, and web browsing using a smartphone (Jacob, 2018). Repetitive actions with using a smartphone can also aggravate pain and weakness in the wrists leading to an increase in the number of cases of de Quervain's tenosynovitis dubbed *Selfie Wrist*.

Children can develop ocular afflictions from excessive screen time, including myopia, eye fatigue, dryness, blurry vision, irritation, and ocular redness (Children's Hospital of Philadelphia, 2018). There are increased complaints of headaches related to staring at a screen for too long, as well as hearing problems such as tinnitus (De-Sola Gutiérrez, Rodríguez de Fonseca, & Rubio, 2016). Also reported are auditory and tactile illusions, known as *Ringxiety*, the false sense of having heard a ring, and *Textaphrenia*, feeling the vibration of a smartphone receiving a text message or call leading to continually checking the device (De-Sola Gutiérrez et al., 2016).

Recently noted is a conspicuous rise in the prevalence of allergic contact dermatitis (ACD) to nickel from prolonged exposure to this allergen commonly found in smartphones (Richardson, Hamann, Hamann, & Thyssen, 2014). Children may encounter nickel in various everyday objects, but it has become apparent that smart phones may constitute a substantial source of nickel exposure, causing dermatitis primarily to the cheek and ear (Richardson et al., 2014).

Of most concern is the overuse of smart phones and other digital devices potentiating a sedentary lifestyle that positively associates with the current childhood obesity epidemic among American youth (American Academy of Pediatrics (AAP), 2016 American Academy of Pediatrics (AAP) Council on Communications and Media, 2016). The World Health Organization [WHO] (2019) addresses the correlation between physical activity, sedentary behavior, and sleep time with physical and mental health and wellbeing. Sedentary screen time is not recommended for infants and children between the ages of 2–5 years (WHO, 2019). For this age group, sedentary screen time should be no more than 1 h to reaffirm the importance of hands-on, unstructured, social play that builds language, cognitive, and social-emotional skills. The American Academy of Pediatrics (AAP), 2016 American Academy of Pediatrics (AAP) Council on Communications and Media, 2016recommends that youth over 2 years of age spend no more than 2 h each day with screen media.

Mental health concerns

A 2018 Pew Research report found that 95% of teens report they have a smartphone or access to one with 45% of them disclosing they are online "almost constantly." As children's use of smartphones increases, advocates seek out inappropriate content children may stumble across (Jenco, 2018; Madigan et al., 2018). Approximately 20% of youth have been reportedly exposed to unwanted sexual material online, including unwanted pictures or videos that were sexually explicit through means like pop-up windows or spam e-mails (Jenco, 2018; Madigan et al., 2018). Of additional concern, many adolescents (1 in 7) participate in *sexting*, the sending of a sexually suggestive or nude photo or video to someone, placing them in a vulnerable position to become victims of violence or to suffer legal consequences (Madigan et al., 2018).

Smartphone technology is the most common medium for cyberbullying, with only 10% of victims informing a parent or trusted adult of their abuse (Connelly, 2014). Nearly 60% of American teens have personally experienced at least one form of abusive online behavior, including offensive name-calling and physical threats (Anderson, 2018) (Fig. 1).

A 2018 Pew Research report found that 45% of teens report that teens often post photos of themselves (*Selfies*) on social media. *Selfie Syndrome* can lead to depression and self-harm due to wanting to get that *perfect* selfie with repeated self-portraits becoming a common symptom of people with Body Dysmorphic Disorder (BDD) (Varcarolis, 2017). BDD is a distressing impairment affecting an individual's normal social activities due to body dissatisfaction often associated with comorbidities of depression, social phobia, and substance abuse disorder (Varcarolis, 2017). The problematic use of social media may also disclose narcissistic personality traits (Griffiths, 2018). *Selfie-obsessive* teens may be vulnerable to self-indulgence or attention-seeking social dependence. Teens who post multiple selfies on social media, may be disguising underlying low self-esteem (Griffiths, 2018).

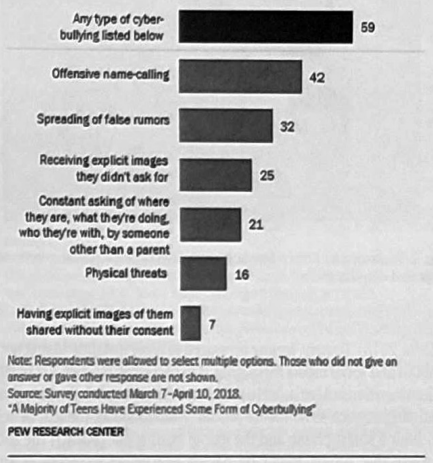

Fig. 1. A majority of teens have experienced some form of cyberbullying.
Source: Pew Research Center Survey, 2018. Reprinted with permission by the CDC.

Reported loneliness and social isolation have also catapulted among teens, despite their typically robust physical health and the vast size of their peer groups (Latson, 2018). Many experts blame the growing loneliness of young people on their social media use, which they argue may impede the development of the real-world social skills necessary to build close friendships (Latson, 2018). According to the U.S. Centers for Disease Control and Prevention [CDC] (2019), the number of children and teens in the U.S. who visited emergency departments (EDs) for suicidal thoughts and suicide attempts doubled between 2007 and 2015. Although causes for this disturbing increase in numbers was not examined, the rate of suicide attempts among youth increased most rapidly after 2011 when a fundamental shift in society occurred along with the rampant rise of smartphones and social media use (Plemmons et al., 2018).

The phenomenon of *Facebook depression* is the exhibition of classic symptoms of depression when susceptible teens, vulnerable to poor self-esteem, spend excessive time on social networking sites (Mir & Novas, 2019). Teens who spend time on sites like Facebook or Myspace in an attempt to connect with their peers, my feel unpopular or as if they are competing with their peers; this may result in feelings of inadequacy (Mir & Novas, 2019).

Behavioral concerns

Fifty percent (50%) of teens reportedly "feel addicted" to mobile devices, nearly 80% check their devices on an hourly basis (Common Sense

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Fig. 2. Illustration by Kristen Solecki (Kristen Solecki (www. kristensolecki.com)). Reprinted with permission.

Media, 2016). *Textiety*, feeling pressured to reply instantly to text notifications and social media messaging, is experienced by over 70% of teens (Common Sense Media, 2016). Smartphone overuse is inspiring new pathologies, such as *no-mobile phobia* (Nomophobia), the fear of being without a smart phone and *the fear of missing out* (FOMO) the social anxiety that others might be having rewarding experiences from which one is absent (Franchina, Vanden Abeele, van Rooij, Lo Coco, & De Marez, 2018). This pervasive apprehension triggers a constant desire to stay continually connected with what others are doing.

Smartphones contribute toward 30% of preschool-aged children and up to 90% of school-aged children and teens experiencing sleep insufficiency (LeBourgeois et al., 2017). Sleep deprivation and poor sleep quality are associated with daytime fatigue, as well as several other adverse outcomes, including poor academic performance, irritability, poor social skills, and diminished memory (LeBourgeois et al., 2017). The underlying mechanisms of sleep interruption are likely associated with screen time replacing the time spent sleeping. Also, psychological stimulation from the online media content and the effects of light emitted from mobile devices alter sleep physiology, circadian rhythms, and alertness (LeBourgeois et al., 2017) (Fig. 2).

The role of pediatric nurses: what can we do?

The greatest threat to a child's safety is when a parent provides a smartphone without guidance and education regarding safe use (Solecki, McLaughlin, & Goldschmidt, 2014). Pediatric nurses, with their expertise, knowledge, and assessment strategies, are well-positioned to address the implications of inappropriate smartphone use. It is recommended that all health care providers be familiar with the role of smartphones in their patients' lives, be informed with the effects of smartphone abuse, and encourage caregivers to actively engage in role modeling behaviors and monitoring of their children's smartphone use (Reid-Chassiakos, Radesky, Christakis, Moreno, & Cross, 2016).

Screening

Pediatric nurses play a vital role in screening for physical, emotional, and social risks and for providing harm reduction strategies with the overuse of smartphones. Using their screening skills, pediatric nurses can ask patients and families about the amount of time spent daily on smart phones. Pediatric nurses can assess for problematic areas such as physical complaints, changes in mood, avoidance of social events or extracurricular activities, any adverse effects on personal hygiene, relationships, or schoolwork, sleep disturbances, and if any history of using the smartphone in dangerous situations such as driving (Swingle, 2016).

Interventions

Pediatric nurses are valuable assets to providing resources and treatment options for those suffering from maladaptive smartphone use, including individual and family counseling that addresses anxiety, depression, and loneliness. Mental health referrals can lead to the provision of cognitive behavior therapy, family therapy, adaptive coping strategies (i.e., exercise, deep breathing, mindfulness), support groups, and pharmacotherapy (American Addiction Centers, 2019).

Anticipatory guidance

An international survey discovered that 32% of children felt unimportant and felt a need to compete with technology for their caregivers' attention when caregivers were distracted by their smartphone use (Matthews, 2017). One study suggests that *technoference*, technology-based interruptions in parent-child interactions, are associated with child problem behaviors (McDaniel & Radesky, 2018). Caregiver monitoring of smartphone use is a protective mechanism decreasing the risk of adolescents from being the victims of cyberbullying or having other mental health issues (Chang et al., 2015). Caregivers should exemplify responsible, smartphone use by establishing family plans that support balance, boundaries, and communication (Shifrin et al., 2015). Pediatric nurses and caregivers can play active roles in setting limits with technology use and demonstrating to children that there is more to life through the development of human relationships as opposed to technological connections (Solecki & Fay-Hillier, 2015).

Pediatric nurses can educate, assist, and refer families to developing a Family Media Use Plan, available at www.healthychildren.org/MediaUsePlan using specific evidence-based guidelines as recommended by the American Academy of Pediatrics (AAP) (2016). Pediatric nurses can guide the interaction between caregivers and children. Activities that encourage family time, including game nights, eating meals together, and sharing stories at bedtime or in the car, allow for greater personal connection (Johnson, 2014).

Advocacy

Pediatric nurses can promote safe digital citizenship through shared caregiver-child media use and advocate for the elimination of unethical advertising and unhealthy messages on apps exposed to children (American Academy of Pediatrics (AAP), 2016). Pediatric nurses can be influential by providing heightened awareness and support to policy initiatives that establish legal limits on smartphones sales to children and ban mobile phone use while driving.

Pediatric nurses are at the forefront for promoting healthy and positive media use and educating children and their families on the potentially multiple developmental and health hazards of problematic smartphone use in the pediatric population. As with any tool, giving a smartphone to a child has the potential for harm if not appropriately used. Smartphone use must have its benefits weighed against the obsessive nature that interferes with teens' interactions with the real world.

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