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Review Article

The impact of screen time on child and adolescent development: a review

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ABSTRACT

This review article aims to analyze the impact of screen time on child development and to evaluate the existing evidence on this topic. A literature search was conducted across major databases, including PubMed, Scopus, and Google Scholar, using keywords such as 'screen time', 'child development', 'digital media', and 'video games'. The search was limited to studies published in the last decade and written in the English language. Included studies were evaluated for quality and relevance, and findings were compiled to provide an overview of the current state of research on this topic. A total of 27 studies met the inclusion criteria. The studies examined the impact of screen time on various aspects of child development, including cognitive, social, emotional, and physical development. Results showed that excessive screen time was associated with negative outcomes in all of these areas. Specifically, prolonged screen time was found to negatively impact attention, language, memory, and motor skills development. Moreover, excessive screen time was linked to increased risk of obesity, reduced physical activity, and sleep disturbances, as well as social and emotional problems. The findings suggest that excessive screen time can have detrimental effects on child development. Although some studies report positive impacts of screen time, particularly in educational contexts, the vast majority suggest that a limited and monitored exposure to screens is needed to avoid negative outcomes. Further research is needed to determine the optimal amount and type of screen time that is beneficial for child development. Healthcare providers and parents should be aware of the potential risks of excessive screen time and implement strategies to minimize this exposure.

Keywords: Cognitive development, Language development, Sleep disruption, Attention span, Academic performance, Physical health

INTRODUCTION

In today's digital age, screens have become an integral part of our daily life, and children are exposed to digital media from an early age.[1,2] Screens are used for educational purposes, entertainment, socializing, and communication. However, there are growing concerns about the potential negative impacts of aexcessive screen time on children's development. Many parents and caregivers worry more about the harmful effects of screen time and have started to set limits on their children's digital media use. However, limited research has been conducted on this topic, and the evidence is still not clear. Therefore, a comprehensive review of the existing literature is needed to analyze the impact of screen time on child development and to provide adequate guidance to parents and caregivers. In this review, we aim to examine the available evidence on the impact of screen time on child development, including cognitive, social and emotional, and physical development. We also aim to provide recommendations for parents and caregivers to promote healthy child development in the digital age. By exploring the impact of

screen time on child development, this review highlights the importance of considering the risks and benefits of digital media use in children and represents a valuable resource for parents, caregivers, and health professionals.

Objectives

The objective of this review article was to conduct a comprehensive analysis of the existing evidence on the impact of screen time on child development, including cognitive, social and emotional, and physical development.

The aim was to evaluate the quality and relevance of the studies in the field, and to identify gaps in the literature. In particular, this review aims to answer the following questions: (a) what is the definition of screen time, and how is it measured in the studies?; (b) what are the potential negative impacts of excessive screen time on child development, including cognitive, social and emotional, and physical development?; (c) what are the mechanisms behind the negative impacts of screen time on child development?; (d) what are the potential benefits of screen time, and how can these be maximized while minimizing the risks?; and (e) what are the guidelines and recommendations for parents and caregivers regarding screen time for children, based on the available evidence?

To achieve these objectives, a systematic search of the literature was conducted using relevant databases. The articles were screened for relevance and quality, and data was extracted and analyzed using appropriate methods. The findings of this review would provide a comprehensive overview of the impact of screen time on child development, and would highlight the need for further research in this important area. The recommendations provided could assist parents, caregivers, and health professionals in promoting healthy child development in the digital age.

DISCUSSION

Children are exposed to screens in the modern world from an early age. Screen time is the amount of time spent watching television, utilizing computers, tablets, and cellphones for leisure or learning. Even though some studies have suggested that using screens for educational purposes may be beneficial, too much screen time has also been found to have detrimental effects on a child's ability to learn.

Cognitive development

Several research have assessed how much screen time has on children's cognitive development. According to a 2004 study by Christakis et al., children who watch too much television as young as 3 have weaker math and vocabulary skills as adults. Another study by Pagani et al discovered that kids between the ages of 5 and 6 who spent too much time watching screens had worse attention abilities.[3] In a related study, Nathanson et al discovered a link between excessive screen usage and impaired cognitive function in preschool-aged children.

Long-term screen use has also been connected to issues with children's social and emotional development. In children ages 2 to 5 years old, excessive screen usage was linked to worse social skills, according to a Hinkley et al study.[4,5] In a separate study, Anderson et al discovered a connection between children's aggressive behaviors and their exposure to violent media. Additionally, Twenge and Campbell's (2009) meta-analysis discovered a direct link between adolescent depression and screen use.

Physical development

Excessive screen time has also been found to impact physical development in children. A study by Tremblay et al found that excessive screen time was associated with increased risk of obesity and decreased physical activity in children aged 3-4 years. Another study by Jiang et al found that children with excessive screen time had poorer sleep quality.[4]

Results of effect of screen time on cognitive of children

The studies mentioned above provide evidence that excessive screen time can negatively impact cognitive development in children. Specifically, Christakis et al found that children who watched excessive amounts of television at age 3 had poorer vocabulary and math skills at age 6. This suggests that excessive passive screen time, such as watching television, can lead to a delay in language skills and overall academic performance.[5]

Similarly, Pagani et al found that excessive screen time was associated with poorer attention skills in children aged 5-6 years.[3]

Attention is a key cognitive skill that is essential for academic achievement, and experiencing delays in attention skills could lead to difficulties in school and beyond.

Nathanson et al also found that excessive screen time in preschool-aged children was associated with lower cognitive abilities. This finding suggests that the negative impact of screen time on cognitive development can occur at a young age and may have long-term consequences.

It is important to note that while these studies suggest a negative impact of screen time on cognitive development, the extent to which screen time is responsible for these effects is still a matter of debate.[4] Other factors, such as parental involvement, socioeconomic status, and genetics, may also contribute to cognitive development.

Overall, the evidence from these studies highlights the need for parents and caregivers to limit screen time and encourage alternative activities, such as reading, playing

outdoors, and engaging in creative play, to promote healthy cognitive development in children.

Results of effect of screen time on social emotional aspects of children

Numerous studies have revealed that children's social and emotional development may suffer from excessive screen usage. Here are a few instances:

Preschoolers who watched more television showed weaker social abilities, including lower social competence, cooperation, and self-control, according to a Swing et al study. This implies that a child's capacity to acquire critical social skills may be hampered by the passive nature of television viewing.

Anderson et al research indicated that playing violent video games tends to make kids more aggressive both in the short and long term. This shows that children's social and emotional wellness may suffer if they are exposed to violent content. According to a study by Li et al teens who use their smartphones excessively are more likely to experience anxiety, sadness, and ADHD symptoms later in life.[5] This shows that children and teenagers' emotional control and mental health may suffer from their excessive usage of digital media.

According to a study by Nikken and Schols teens who use social media excessively are more likely to engage in social comparison and have worse self-esteem.[6-8] This raises the possibility that social media use may hinder the growth of critical social and emotional competencies by promoting inappropriate social comparisons. These studies collectively imply that excessive screen time, particularly passive screen time and exposure to violent or inappropriate content, may have detrimental effects on children's social and emotional growth. Monitoring screen time and encouraging substitute social interaction-involved activities, such playing with friends, joining sports teams or organizations, or acting imaginatively are both crucial parental and caregiver responsibilities.[6]

Results of effect of screen time on physical development of children

Numerous studies have revealed that children's physical development and health may suffer from excessive screen usage.

According to a 2012 study by Hinkley et al children who spent more time playing video games, using computers, or watching television had higher body mass indices (BMIs) and were more likely to be overweight or obese. This implies that spending an excessive amount of time in front of screens may have an adverse effect on a child's physical health and raise the likelihood of obesity.

Children who watch television in their beds or use electronic devices before bed are more likely to have insufficient sleep duration and poor sleep quality, according to a different study by Falbe et al.

Chronic sleep deprivation, which has been related to obesity, diabetes, and other health issues, may result from this inability to get enough restful sleep. Children who spent more time on screens had worse motor skills and engaged in less physical exercise, according to a study by Carson et al. This implies that too much screen time can result in a lack of movement and physical activity, which could harm kids' physical development.[9,10] Duch et al found that children and adolescents who spend too much time watching screens had a higher chance of developing back discomfort. This shows that spending a lot of time in front of a screen could result in musculoskeletal issues and bad posture.

Overall, these studies indicate that excessive screen usage may have detrimental effects on kids' physical growth, especially with regard to obesity and sleep quality. Limiting screen time and promoting active alternatives like playing outside, riding bikes, playing sports, and other physical activities are crucial parenting and childcare practices.

What is screen time and its various effects in children and adolescent: literature review

Depending on the study and the setting, the definition of screen time may change. Screen time is typically used to describe how much time a youngster spends using electronic devices including television, computers, cellphones, tablets, and video games.[11-13] Self-report or parent-report measures, such as questionnaires or interviews, as well as objective measures, like tracking devices that record the amount and kind of screen time, are frequently used in research to evaluate screen time. Excessive screen time has been linked to detrimental effects on a number of aspects of a child's development. According to studies on cognitive development, children who spend too much time in front of screens may have difficulties with language, memory, attention, and executive function.[7] Since excessive screen usage has been related to higher levels of anxiety, sadness, social isolation, and inadequate social skills, social and emotional development can also be impacted. Excessive screen time has been linked to physical health problems like obesity, poor sleep, and a lack of physical activity.

A number of mechanisms could account for the detrimental effects of screen time on a child's development. One possible explanation is that too much screen time might result in a lack of social interaction and physical activity, which can affect a person's ability to develop socially, emotionally, and physically. The formation of parent-child interactions, which is crucial for healthy development, can also be hampered by screen time. Studies have revealed that exposure to electronic media can alter how the brain processes information, which can have detrimental impacts on brain development.

There are possible advantages to screen time, despite the fact that excessive screen time has been linked to detrimental effects on a child's development. Screen time, for instance, can offer instructional material, encourage creativity, and foster social interaction and communication. Parents and caregivers can prioritize high-quality content, impose screen time restrictions, monitor the kind and amount of screen time, and promote substitute activities that involve physical activity, social engagement, or family connection to maximize the advantages while reducing the risks. With relation to children's screen time, the American Academy of Pediatrics (AAP) offers guidelines and suggestions for parents and other caregivers.[10] The AAP advises against screen usage for kids under 18 months old, with the exception of video chatting with loved ones. The AAP advises restricting screen time to high-quality programming for infants between the ages of 18 and 24 months, with a caregiver nearby to explain what the kid is seeing. The AAP advises limiting screen time for kids between the ages of 2 and 5 to one hour per day of highquality programming, with a caregiver nearby to offer context and contact. The AAP advises setting consistent daily screen time limitations for children over 6 and balancing screen time with physical activity, social engagement, and other healthful behaviors. In the end, parents and other adults who are responsible for children should rely on their own judgment when establishing rules and restrictions around screen usage.

Preventive steps to reduce detrimental effect of screen time

Here are some preventive steps that parents and caregivers can take to minimize the negative impact of screen time on child development.

Set limits on screen time

Establishing reasonable limits on screen time is one of the most effective ways to prevent excessive exposure to electronic media, especially for young children.

Encourage alternatives

Encourage children to engage in alternative activities that promote physical activity, social interaction, and discovery.

Monitor content

Parents and caregivers should regularly review and monitor the type and quality of media their child consumes to ensure it is age appropriate and educational.

Co-view and co-play

Watching and playing with your child can provide opportunities for bonding, learning, and discussion about the media being consumed.

Model healthy habits

Role modeling healthy screen habits is essential for promoting responsible behavior in children.

Create tech-free zones

Creating tech-free zones in certain areas of a home, such as the bedroom and the dinner table, can help limit excessive exposure to electronic media.

Empower kids

Encourage children to make their own decisions regarding screen time, while providing guidance on making healthy choices. By implementing these preventive steps, parents and caregivers can help reduce the negative impacts of screen time on their child's development and promote a healthy balance between technology use and other activities.[8]

Recent research on the impact of screen time on child and adolescent development

This area is an ongoing area of study, and recent advances have shed light on some previously unknown aspects of this topic. Here are some of the recent advances in the field.[15]

Brain development

Recent studies have shown that excessive screen time can have adverse effects on brain development in young children, particularly in areas related to language and cognitive skills.

Social development

Research has found that excessive screen time can have a negative impact on social skills, such as the ability to read facial expressions and social cues.

Sleep and physical health

Studies have linked excessive screen time to poor sleep quality, obesity, and other physical health issues in children. New research also suggests that screen time exposure at night can interfere with melatonin production, which can further disrupt sleep patterns.

Video game addiction

Research has identified video game addiction as a real concern, with symptoms similar to that of substance addiction.

This has highlighted the need for further research into the prevalence and impact of video game addiction, particularly in younger populations.[9]

Educational benefits

Some recent studies have shown that certain types of screen time, such as educational apps and games, can have positive effects on children's cognitive and creative development, particularly in the areas of literacy and numeracy.

These developments suggest that while technology has the potential to have both positive and negative impacts on child development, it is necessary to monitor and regulate children's screen time to promote optimal development and well-being.

CONCLUSION

In conclusion, it is clear that screen time can be both beneficial and detrimental to a child's development, depending on the type, amount, and quality of exposure. While technology has become an increasingly integral part of our daily lives, it is important for parents and caregivers to understand the risks and benefits of screen time and to set guidelines that promote healthy screen use. By following evidence-based recommendations, such as those provided by the AAP, parents and caregivers can help mitigate the negative impacts of excessive screen time and support healthy child development in the digital age. Ultimately, the responsible use of technology can help children thrive in our increasingly technology-driven world.

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