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Article Review

The Impact of Screen Time on Social Communication Skills in Children with Autism Spectrum Disorder: A Comprehensive Review

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ABSTRACT

A neurological impairment in brain functioning causes autism spectrum disorder (ASD), which keeps a youngster from having a normal social life like his peers. It makes it difficult to engage and converse with other people. It should come as no surprise that children's concerningly high screen time exposure has raised even more concerns. The use of electronic equipment has two drawbacks. Notwithstanding their advantages, they pose a number of risks to kids' cerebral development. Prior research has examined the impact of unsupervised screen usage on young children's white matter development. In the development of brain functions, the white matter plays a significant role. A qualitative analysis of the body of research on screen time exposure and its impact on social communication abilities in kids with ASD is the goal of this thorough assessment.Research is increasingly raising concerns regarding the negative behaviour and enhanced poor communication skills of children's use of screens

INTRODUCTION

A disease of brain development known as autism spectrum disorder (ASD) impacts children's social abilities. Children with ASD struggle to engage and communicate with others in a normal way. Although research has not yet identified a single cause for autism, it does point to a possible interaction between environment and genetics. According to the Centers for Disease Control and Prevention (CDC), one in 44 children is diagnosed with ASD, and boys are four times more likely than girls to have the disorder. Due to social isolation and low self-esteem, which can result in anxiety and despair, people with autism typically have a lower quality of life than those without the condition. (1).

For children ages two to five, the American Association of Paediatrics advises exposing them to screens for an hour during the week and three hours on the weekends, under the supervision of an adult. Additionally, before the age of two, the American Association of Paediatrics recommends avoiding unsupervised screen use. Regretfully, screen time is currently higher than what is advised. A report claims that the majority of American kids use screens for five to seven hours every day, which is more than the recommended amount. Furthermore, a different study conducted in Japan showed that the typical person used their phone for about 24 hours every week (3) Children with ASD are highly attracted to screens.

They are exposed to more screen time than typically developing children – they watch more TV, play more computer games, engage more with cell phones, and spend more time on the Internet.
Unsurprisingly, the alarming increase in screen-time exposure in children has become even more of a concern. Although there is no denying the advantages of electronic gadgets, a child's brain development is negatively impacted by excessive screen time. A 2019 study looked at the possible effects of increased screen usage on toddlers' and preschoolers' white matter development. (4)
White matter is essential for language, reading, and cognitive function. Numerous studies have linked excessive screen time to symptoms similar to autism. Furthermore, a 2022 study discovered a connection between extended screen usage at age one and ASD in boys at age three, possibly as a result of neurochemical disturbances and white matter alterations. An excessive amount of screen light might reduce melanin formation, which can interfere with sleep. Children who were addicted to the internet in urban left-behind schools also lacked other neurotransmitters, such as dopamine, acetylcholine, gamma-aminobutyric acid (GABA), and 5-hydroxytryptamine (5-HT), which also causes mental and physical problems.(5)
Although numerous research have demonstrated the detrimental impacts of screen usage, an intriguing 2020 study reveals that children with higher-quality screen exposure also had superior language skills. Nonetheless, the same study comes to the conclusion that low language abilities have been linked to early exposure to higher screen times. (5) Technological developments have guaranteed its unavoidable incorporation into our daily lives. Children are using electronic devices more frequently when they are at a susceptible developmental stage. To list a few, electronic devices have facilitated children's social communication during repetitive lockdowns and restricted outdoor activities. In addition, it has revolutionized learning as children have easy access to educational content. Hence, the American Academy of Paediatrics' has made age-specific recommendations for media use by children that balance its risks and benefits. The recommendation on screen time is for caregivers to co-watch good programs with children of 2–5 years of age for a duration not exceeding one hour a day. Children above 5 years can watch alone while adhering to clear restrictions on screen time and program types left to the caregiver to set, avoiding negative effects on the child's sleep, behaviour, or other aspects of health.(7)

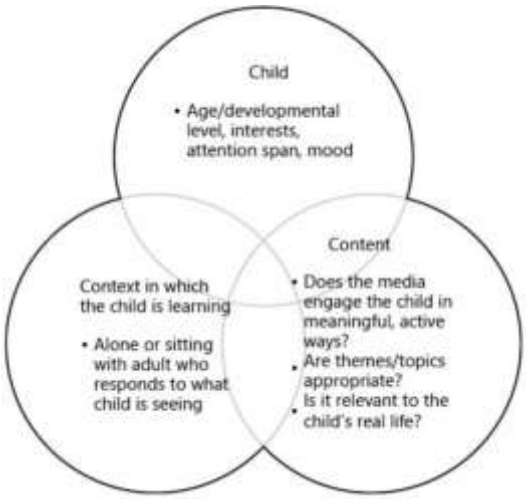

Figure 1. Factors to consider when using digital media. (6)

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Despite the value of screens, there is increasing concern regarding the harmful effects of screen time, with research showing that large amounts of screen time can be detrimental. Even with typically developing children and adults, large amounts of screen time have been associated with the following adverse effects: Delayed language development, attention deficit hyperactivity disorder (ADHD) behaviours,(8) Reduced ability to read facial cues, sleep disorders, increased aggressive behaviour, mainly when persons watch violent media, Poorer self-regulation and greater likelihood of participating in risky behaviour.(9) The electronic screen syndrome, i.e. screen time addiction, has been widely discussed in recent years. Before addiction is actually developed, the child's nervous system is likely to become overstimulated from regular exposure to screens. (9)Screen time increases stress, induces over-arousal, and causes emotional dysregulation and over-stimulation. Children with ASD are prone to arousal regulation issues. They have exaggerated stress responses, they have difficulty regulating emotions, and they have a tendency to be over- or under-stimulated, which places them more at risk for electronic screen syndrome.(10)

Screen Time and Technology Use. Screen time refers to the amount of time spent in front of devices such as smartphones, tablets, computers, and televisions. Digital media use has become ubiquitous among children, including those with ASD. The American Academy of Paediatrics' (AAP) recommends limiting screen time for children, but with increasing access to technology, children with ASD may spend significant portions of their day engaging with screens, whether for recreational purposes, education, or therapy.(11)

Negative Impacts of Screen Time. Reduced Face-to-Face Interaction: A major concern is that excessive screen time can displace face-to-face interactions. Children with ASD may become more reliant on screens for communication, reducing opportunities to practice real-world social interactions with peers, family members, or educators. This lack of social engagement may hinder the development of critical social skills like empathy, tone modulation, and perspective-taking. (12)

The public is worried that communication via smartphones compromises wellbeing by replacing in-person relationships. Nevertheless, there have been conflicting findings from studies on this "social displacement hypothesis." We evaluated an intervention to reduce smartphone communication and looked at whether this hypothesis is valid (between vs. within-persons). For fifteen days, participants (N = 109) provided daily reports on their emotional health, face-to-face conversation, and smartphone communication.

On the sixth day, individuals were split into two groups: one receiving mindfulness treatment and the other receiving no treatment. The social displacement hypothesis was validated among individuals, but not between them. In particular, a person who uses her smartphone extensively on a given day tends to interact with people less in person that day. Nonetheless, individuals who frequently communicate via their smartphones do not have fewer in-person interactions than those who mostly avoid smartphone communication. Negative emotions dropped as a result of the mindfulness intervention's reduction in daily smartphone communication. (12)

Reinforcement of Solitary Behaviour: For children with ASD, screen-based activities can often be solitary, reinforcing tendencies toward isolation. Some children may become engrossed in digital worlds, leading to an increase in repetitive behaviours and a decline in the desire to engage in social activities. This can exacerbate the social withdrawal often seen in ASD.(13)

Impairment of Communication Skills: Excessive screen time has been linked to deficits in both verbal and non-verbal communication. Children may struggle to interpret non-verbal cues (such as facial expressions or body language) when interacting with others in person, as screens often eliminate these

cues. Furthermore, too much screen time can lead to a lack of focus on verbal communication, as children may be less motivated to initiate or engage in conversations outside of digital environments.(14)

Negative Impact on Sleep and Mental Health: Increased screen time is associated with sleep disturbances and poor mental health outcomes, including anxiety and depression. For children with ASD, who may already experience heightened levels of anxiety and sensory sensitivities, these effects can be more pronounced. Sleep deprivation, in turn, can further exacerbate behavioural issues and hinder the acquisition of new social communication skills.(15)

Difficulty in Generalizing Skills: While screen-based interventions may teach specific social or communication skills, children may struggle to generalize these skills to real-life settings. They may know how to follow social scripts in a controlled digital environment but fail to apply these strategies in less predictable, real-world social situations.(15)

Objectives. The primary goals are to identify the negative behaviour among autism spectrum disorder, overcome the negative behaviour and improve their social and communication skills. Overall, to improve the quality of life of Children with ASD.

RESEARCH METHODS

This review and analysis followed the Preferred Reporting Items for Reviews and Meta-Analyses (PRISMA) guideline. The two main variables of interest were screen time, i.e., screen use hours per day or week and ASD. The ASD variable consisted of two measures:(6)

1. A binary variable (Yes or No) that indicated the presence of a clinical diagnosis of ASD.
2. A continuous variable that indicates the existence of symptoms or behaviours typical of ASD.

This comprehensive review employed a systematic approach to identify children with autism spectrum disorder.

Engage the child in outdoor physical activities. Parents' time and group activities, social involvement, setting limits to screen time, and bedtime stories will overcome these issues.

Inclusion criteria-

- Child aged between 2.5-6 years.
- Both girls and boys are included.
- Moderate to severe level of ASD.
- Including peer-reviewed journals (or were a thesis or dissertation), and (4) specifically examined screen time and ASD (as multiple studies were conducted among ASD populations but addressed other negative behaviours. Research quality was assessed using the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) approach.

Exclusion criteria-

- Children with other physical disability.
- Children with mental retardation.

RESULTS AND DISCUSSION

Pediatric radiography, particularly in the context of Autism Spectrum Disorder (ASD), requires a highly careful approach due to the unique challenges faced by children with this condition. Screen time, as one of the factors that can affect the development of social communication skills in children with ASD, has become an area of increasing research attention. Various studies have shown that different durations of screen time can significantly impact children's social skills and interactions, with varying outcomes depending on the level of exposure. The following discussion will present findings related to the relationship between screen time duration and the development of social

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communication skills in children with ASD, as well as provide insights into more effective strategies for managing screen time to support their social development.

Table 1. Screen time and social communication skills in Children with Autism Spectrum Disorder (ASD)

Screen Time Catagory	Avarage Screen Time Per Day	Social Communications Skills	Findings
Low Screen Time (1/2 HR /DAY	1-2 hr	Moderate	Children engage in more real-world social interaction and communication
Moderate Screen Time(2-4HR/DAY)	2-4hr	Mild Impairment	Slightly delay in social communication interaction skills
High Screen Time (>4HR /DAY0\)	>4hr	Severe Impairment	Significant delay in social communication and increased social isolation
Educational Screen Time	1-3hr	Improvement in social skills	Children showed improved emotion recognition, conversation skills and social reciprocity
Passive Screen Time	>3hr	Decline in social communication	Children showed signs of social withdrawals, limited verbal communication.

This table shows the relationship between screen time categories and social communication skills in children with ASD. The findings illustrate how different durations of screen time affect social communication skills, with varying results depending on the amount of screen time spent by the child.
Low Screen Time (1/2 Hour/Day): Children with low screen time (1-2 hours per day) show moderate social communication skills. These children tend to engage more in real-world social interaction and communication, which helps in developing their social skills.
Moderate Screen Time (2-4 Hours/Day): With moderate screen time, children experience mild impairments in social communication skills. They show slight delays in initiating conversations and responding to social cues, although they can still communicate effectively.
High Screen Time (>4 Hours/Day): Children who spend more than 4 hours per day in front of screens show significant impairments in their social communication skills. This leads to greater delays in their ability to initiate social interactions and respond to social cues, as well as an increased risk of social isolation.
Educational Screen Time (1-3 Hours/Day): Children who spend screen time on educational activities (such as learning apps) show significant improvements in social skills. They experience enhancements in emotion recognition, conversation skills, and social reciprocity.
Passive Screen Time (>3 Hours/Day): Excessive passive screen time (more than 3 hours per day) shows a decline in social communication skills. These children tend to display signs of social withdrawal, with limited verbal communication, leading to delays in their social skill development.
The table below shows the relationship between hours of screen time per day and social communication skill development. The graph highlights how different level of screen time can affect communication skills, based on findings from various studies.

Table 2. The Impact of screen time on social communication skills in children with ASD.

Screen time group	Social communication Improvement
1-2 Hours/Day (low)	70%
2-4 Hours/Day (Moderate)	45%
>4hr /Day (High)	20%
Educational screen-time(1-3hr/Day)	85%
Passive screen time>3hr/Day)	15%

This table provides more specific data on the relationship between the number of hours of screen time per day and the development of social communication skills in children with ASD. Based on findings from various studies, the results show significant differences in the improvement of social communication skills in children with varying screen time durations.

Low screen time (1-2 hr/day); Children with this level of screen time generally shows moderate improvement in social communication skills. With better engagement in real world interaction.(16). 1-2 Hours/Day (Low Screen Time): Children with low screen time show a 70% improvement in social communication skills. They tend to engage more in real-world social interactions, which positively impacts their social skill development.

Moderate screen time(2-4hours/Day)-There is mild impairment in social communication, with some delay in initiating conversation or responding to social cues.(17). 2-4 Hours/Day (Moderate Screen Time): Children with moderate screen time show a 45% improvement in social communication skills, but there is still mild impairment in their ability to initiate conversations or respond to social cues.

High Screen Time (>4 Hours/Day): Children who spend more than 4 hours per day in front of screens show only a 20% improvement in social communication skills. They are more likely to experience severe impairments in social communication skills and have a higher risk of social isolation.

Educational Screen time (1-3Hours/day)-Shows higher improvement in social communication skills due to the structured nature of learning apps and games focused on social interaction.(18). Educational Screen Time (1-3 Hours/Day): Children with educational screen time show an 85% improvement in social communication skills. Structured apps and games that focus on social interaction positively impact their social skill development.

Passive screen time(>3hr/day)-Results in minimal improvement, often causing increase social withdrawal, reduced verbal interaction, and limited communication skills.(19). Passive Screen Time (>3 Hours/Day): Children with passive screen time over 3 hours per day show only a 15% improvement in social communication skills. This leads to greater social withdrawal, with reduced verbal interaction and limited communication skills.

CONCLUSION

These cases support literature suggesting that screen exposure may impact the social communication skills of children with autism. These studies showed fluctuations in autistic symptoms, including repetitive behaviour, poor social interactions, social isolation, etc. Interventionists may consider a trial of replacement of screen time with socially engaging activities in young children with a history of high screen exposure and autism spectrum disorder. As concluded in a previous literature review on this topic, Children with ASD seem to show increased interest in screen viewing, which begins at a very young age. It is also reasonable to assume that parents of children with clinically diagnosed ASD adopt a relatively permissive position regarding their children's screen use. Excessive screen time may indeed to meet the expense of positive real-life activities and close familial relationships that

could increase ASD risk and hinder social and communication skills. However, further research is needed to support this concern, as the increase in ASD prevalence.

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