Screen Time and Sensory Processing in Toddlers at Risk for Autism: A Cross-sectional Study

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Abstract

Background: In recent years, there has been growing concern over the potential developmental impact of screen media exposure in young children, particularly those with neurodevelopmental vulnerabilities such as risk for Autism Spectrum Disorder (ASD). Sensory processing challenges are common in children on the autism spectrum, and screen time may be a modifiable factor influencing sensory modulation **Objective:** This study aimed to examine the relationship between daily screen time exposure and sensory processing characteristics in toddlers identified as being at risk for ASD. **Methods:** A cross-sectional study was conducted involving 120 toddlers between 18 and 36 months of age who screened positive on the Modified Checklist for Autism in Toddlers, Revised (M-CHAT-R). Caregivers completed a 7-day screen time diary and the Infant/Toddler Sensory Profile (ITSP). Data were analyzed using descriptive statistics, independent samples t-tests, and Pearson correlation analysis. **Results:** Toddlers exposed to high levels of screen time (two hours or more per day) demonstrated significantly more sensory processing difficulties compared to their low screen time peers. Statistically significant differences were observed in auditory sensitivity ($p = 0.003$), tactile sensitivity ($p = 0.015$), and sensory seeking behaviors ($p < 0.001$). **Conclusion:** High screen time exposure is associated with atypical sensory processing patterns in toddlers at risk for ASD. These findings highlight the importance of early monitoring and parental guidance on screen use during critical developmental windows.

Keywords: Screen time, sensory processing, autism spectrum disorder, Infant/Toddler Sensory Profile, screen exposure, neurodevelopment

How to Cite this Article?

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Introduction: Screen time in early childhood has surged with the proliferation of digital devices. Toddlers are increasingly exposed to screens in the form of televisions, tablets, smartphones, and computers. While some educational content may support learning, excessive screen time has raised concerns about its impact on sensory, social, and cognitive development. The American Academy of Pediatrics recommends avoiding screen time (excluding video

chatting) for children under 18 months and limiting it to one hour per day of high-quality programming for children aged 2 to 5 years [1].

Children at risk for Autism Spectrum Disorder (ASD) often exhibit atypical sensory responses, such as hyper- or hypo-reactivity to sensory stimuli. These challenges can influence behavior, communication, and learning. Sensory processing patterns are shaped during the early developmental years when the brain is highly plastic. Therefore, the type and quality of sensory input—including that from screens—can significantly affect neurodevelopment [2].

Previous research has explored associations between screen time and various developmental outcomes, including language delays, attention problems, and behavioral issues [3,4]. However, few studies have specifically focused on the sensory processing domain, particularly in toddlers who are at elevated risk for ASD. The current study addresses this gap by exploring how screen exposure correlates with sensory profiles in this vulnerable population.

Methods

Study Design and Participants

This cross-sectional study was carried out from January to December 2024 at pediatric neurodevelopmental clinics (Paediatric Section of SOOP, DRIEMS University & PARIPURNATA Child Development Clinic). A total of 120 toddlers aged between 18 and 36 months were enrolled based on elevated risk for ASD as identified by the Modified Checklist for Autism in Toddlers, Revised (M-CHAT-R). Children with known genetic syndromes, significant motor impairments, or sensory deficits (e.g., blindness or deafness) were excluded.

Measures

1. **Screen Time Assessment:**

   Parents completed a 7-day screen time log, reporting total daily exposure to screens including TV, tablets, smartphones, and computers. Data were categorized into two groups: low screen time (<2 hours/day) and high screen time (≥2 hours/day).

2. **Sensory Processing Assessment:**

Sensory processing was assessed using the **Infant/Toddler Sensory Profile (ITSP)**, a validated caregiver-report questionnaire developed by Dunn [5]. The ITSP evaluates responses to sensory experiences across five domains: auditory, visual, tactile, vestibular, and oral sensory processing. It also includes sections on sensory seeking and emotional/social responses.

Data Analysis: Statistical analysis was conducted using IBM SPSS Statistics version 29. Continuous variables were presented as means and standard deviations. Categorical variables were expressed as frequencies and percentages. Independent samples t-tests were used to compare sensory profile scores between low and high screen time groups. Pearson correlation coefficients were calculated to assess the strength of relationships between screen time and sensory processing domains. A p-value <0.05 was considered statistically significant.

Results

Participant Demographics

Variable	Value
Mean Age (months)	28.3 ± 5.1
Male	68 (56.7%)
High Screen Time (≥2 hrs/day)	73 (60.8%)
Low Screen Time (<2 hrs/day)	47 (39.2%)

Group Differences in Sensory Processing

ITSP Domain	Low Screen Time (Mean ± SD)	High Screen Time (Mean ± SD)	p-value
Auditory Sensitivity	45.1 ± 6.3	39.2 ± 7.4	0.003 **
Visual Processing	43.5 ± 5.9	41.2 ± 6.1	0.078
Tactile Sensitivity	44.8 ± 6.1	40.9 ± 6.9	0.015 *
Sensory Seeking	50.3 ± 4.8	56.7 ± 5.3	<0.001 **

Correlation Analysis

Screen time was negatively correlated with auditory sensitivity ($r = -0.42$, $p < 0.001$) and tactile sensitivity ($r = -0.29$, $p = 0.004$), and positively correlated with sensory seeking behaviors ($r = 0.46$, $p < 0.001$).

Discussion

This study found that toddlers at risk for ASD who were exposed to more than two hours of screen time daily displayed significantly more atypical sensory processing behaviors. Specifically, they exhibited lower sensitivity to auditory and tactile stimuli, along with an increase in sensory seeking behaviors. These findings suggest that excessive screen time may contribute to a sensory environment that either under-stimulates or overstimulates specific sensory channels, leading to dysregulated responses.

The auditory and tactile domains are crucial for communication and physical interaction. Lower scores in these domains may indicate desensitization or reduced responsivity due to excessive passive screen engagement, which typically does not offer rich multisensory feedback. The observed increase in sensory seeking behaviors may reflect a compensatory mechanism by the child to gain additional sensory input not provided by screen-based interaction.

Our findings align with prior studies showing links between early screen use and negative developmental outcomes [3,6]. However, our study adds a novel focus on sensory processing and uses a validated instrument (ITSP) to quantify domain-specific effects.

Clinical Implications: The results underscore the importance of promoting sensory-rich, screen-free play in early childhood—especially for children already at developmental risk. Pediatricians, therapists, and early intervention providers should counsel parents on establishing healthy media habits.

Limitations: The study's cross-sectional nature precludes causal conclusions. The reliance on parent-reported screen time may introduce recall bias. Longitudinal studies using objective measures of screen exposure and sensory responses are needed to validate these findings further.

Conclusion

Toddlers at risk for ASD who are exposed to high levels of screen time exhibit more atypical sensory processing, especially in the auditory and tactile domains and in sensory seeking behaviors. These findings highlight the need for early parental education, screen time monitoring, and the promotion of interactive, multisensory activities to support optimal sensory development.

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