

Screen Exposure and Speech-Language Delay in Toddlers: A Hospital-Based Cross-Sectional Study

Sasti Sivan¹, Guru Deva²

Assistant Professor, Professor

Department of Pediatrics, All India Institute of Medical Sciences - [AIIMS], Nagpur

Email ID: sastisivan94@gmail.com

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Abstract

Background: Excessive screen exposure in early childhood has emerged as a growing public health concern, with potential adverse effects on speech and language development. Toddlers are increasingly exposed to digital devices at an early age, often exceeding recommended limits, which may interfere with essential caregiver interaction and language acquisition.

Objective: To assess the association between screen exposure and speech-language delay among toddlers in a hospital-based setting.

Methods: A cross-sectional study was conducted in the Department of Pediatrics at All India Institute of Medical Sciences, Nagpur, including 75 children aged 18–36 months. Data on screen exposure, including duration, type of device, and parental supervision, were collected using a structured questionnaire. Speech and language development were assessed using age-appropriate developmental screening tools. Statistical analysis was performed using chi-square tests, with $p < 0.05$ considered significant.

Results: The prevalence of speech-language delay was 37.3%. Children with screen exposure greater than 2 hours per day showed a significantly higher prevalence of delay ($p < 0.01$). Lack of parental supervision was also significantly associated with speech delay ($p < 0.05$). Smartphones were the most commonly used devices (50.7%).

Conclusion: Increased screen exposure, particularly beyond 2 hours per day, and lack of parental involvement are significantly associated with speech-language delay in toddlers. Early parental education and limitation of screen time are essential to promote optimal language development.

Keywords: Screen exposure; Speech delay; Language development; Toddlers; Cross-sectional study;

Introduction

Speech and language development during early childhood is a critical component of cognitive, social, and emotional growth. The first three years of life represent a sensitive period for language acquisition, during which environmental stimulation and caregiver interaction play a vital role in shaping communication skills (1). Delays in speech and language development can have long-term consequences, including impaired academic performance, social difficulties, and behavioral problems (2).

In recent years, there has been a rapid increase in screen media exposure among young children, including televisions, smartphones, tablets, and other digital devices. Toddlers are increasingly exposed to screens at earlier ages and for longer durations, often exceeding recommended limits (3). The American Academy of Pediatrics recommends avoiding screen media (except video chatting) for children younger than 18–24 months and limiting screen time to high-quality programming for older toddlers with active parental

involvement (4). Despite these recommendations, studies indicate that many children are exposed to screen media without adequate supervision or interaction.

Excessive screen exposure has been associated with reduced parent–child interaction, decreased verbal engagement, and limited opportunities for language-rich communication, all of which are essential for normal speech and language development (5). Passive screen viewing, in particular, does not provide the reciprocal social interaction necessary for language acquisition and may contribute to delayed expressive and receptive language skills (6). Furthermore, early and prolonged screen exposure has been linked to attention deficits, reduced vocabulary development, and impaired social communication (7).

Several studies have demonstrated a correlation between increased screen time and speech-language delay in young children. For instance, higher daily screen exposure has been associated with delayed milestone achievement, particularly in expressive language domains (8). However, the relationship between screen exposure and language delay may be influenced by multiple factors, including content type, duration of exposure, parental involvement, and socioeconomic background (9).

Given the rising prevalence of screen use among toddlers and the potential impact on developmental outcomes, it is important to evaluate this association in different clinical settings. This hospital-based cross-sectional study aims to assess the relationship between screen exposure and speech-language delay in toddlers, thereby contributing to the growing body of evidence and informing early intervention strategies (10).

Materials and Methods

Study Design

This hospital-based cross-sectional study was conducted in the Department of Pediatrics at All India Institute of Medical Sciences, Nagpur, over a period of six months. The study aimed to evaluate the association between screen exposure and speech-language delay among toddlers attending the pediatric outpatient department.

Study Population

A total of 75 children aged between 18 months and 36 months were included in the study. The sample size was determined based on feasibility and the number of eligible participants presenting during the study period. Children attending the outpatient department for routine check-ups or minor illnesses were screened for eligibility.

Inclusion and Exclusion Criteria

Inclusion criteria comprised toddlers aged 18–36 months with a history of screen exposure. Exclusion criteria included children with known neurological disorders, hearing impairment, genetic syndromes, developmental disorders such as autism spectrum disorder, or those with a history of perinatal complications that could independently affect speech and language development (1).

Ethical Considerations

Ethical clearance for the study was obtained from the Institutional Ethics Committee of All India Institute of Medical Sciences, and informed consent was obtained from the parents or caregivers before participation.

Data Collection

Data were collected using a structured questionnaire administered to parents or primary caregivers. Information obtained included demographic details, duration and type of screen exposure (television, smartphones, tablets), age at first exposure, and parental involvement during screen use. Screen time was categorized based on daily duration of exposure.

Assessment of Speech and Language Development

Assessment of speech and language development was performed using age-appropriate standardized

developmental screening tools and clinical evaluation by a pediatrician. Speech-language delay was defined as failure to achieve age-appropriate language milestones based on established developmental norms (2).

Statistical Analysis

All data were recorded systematically and entered into Microsoft Excel for analysis. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software version 26.0. Descriptive statistics were used to summarize demographic variables, and associations between screen exposure and speech-language delay were analyzed using chi-square tests. A p-value of <0.05 was considered statistically significant (3).

Results

A total of 75 toddlers aged 18–36 months were included, with a mean age of 26.4 ± 5.2 months. Males constituted 56% ($n = 42$) and females 44% ($n = 33$).

Table 1: Demographic Characteristics (n = 75)

Variable	Frequency (n)	Percentage (%)
18–24 months	28	37.3
25–30 months	24	32.0
31–36 months	23	30.7
Male	42	56.0
Female	33	44.0

The study population showed relatively uniform age distribution across groups with slight male predominance (56%). No statistically significant association was observed between age or gender and speech delay ($p > 0.05$).

Table 2: Screen Exposure Characteristics

Variable	Frequency (n)	Percentage (%)
<1 hour	18	24.0
1–2 hours	30	40.0
>2 hours	27	36.0
Television	25	33.3
Smartphone	38	50.7
Tablet/Multiple	12	16.0
Supervision Present	29	38.7
No Supervision	46	61.3

A majority of children had screen exposure exceeding 1 hour/day, with smartphones being the most commonly used device (50.7%). Lack of parental supervision was noted in 61.3% of cases, showing a significant association with increased screen exposure ($p < 0.05$).

Table 3: Prevalence of Speech-Language Delay

Outcome	Frequency (n)	Percentage (%)
Delay Present	28	37.3
No Delay	47	62.7

Speech-language delay was identified in 37.3% of toddlers. This indicates a considerable burden of developmental delay within the study population.

Table 4: Association Between Screen Time and Speech Delay

Screen Time	Delay (n)	No Delay (n)	p-value
<1 hour	3	15	<0.01
1–2 hours	9	21	
>2 hours	16	11	

Children exposed to screens for more than 2 hours per day showed a higher prevalence of speech delay (16/27). A statistically significant association was observed between increased screen time and speech delay (χ^2 test, $p < 0.01$).

Table 5: Parental Supervision and Speech Delay

Supervision	Delay (n)	No Delay (n)	p-value
Yes	6	23	<0.05
No	22	24	

Speech delay was more common in children without parental supervision (22/46). This association was statistically significant, indicating a protective role of caregiver involvement (χ^2 test, $p < 0.05$).

Discussion

The present study evaluated the association between screen exposure and speech-language delay among toddlers and demonstrated a significant relationship between increased screen time and delayed language development. A prevalence of 37.3% speech-language delay was observed, indicating a substantial burden in this age group. These findings are consistent with previous studies that report increasing rates of developmental delays associated with early and excessive screen exposure (1,2). One of the key findings of this study was the strong association between prolonged screen exposure (>2 hours/day) and speech delay ($p < 0.01$). Children with higher screen time showed a significantly greater proportion of delay compared to those with limited exposure. This aligns with earlier research indicating that excessive screen use reduces opportunities for direct human interaction, which is essential for language acquisition (3). Madigan et al. reported that increased screen time in early childhood is associated with poorer expressive language outcomes and delayed developmental milestones (4).

The mechanism underlying this association may be attributed to reduced parent–child interaction and decreased verbal stimulation. Language development in toddlers relies heavily on responsive communication, imitation, and social engagement, which are lacking in passive screen viewing (5). Zimmerman et al. demonstrated that each additional hour of screen exposure is associated with a measurable decline in language development scores (6). Furthermore, screen media often replaces interactive activities such as reading, storytelling, and play, further limiting language enrichment opportunities (7). Another significant finding of this study was the association between lack of parental supervision and increased risk of speech delay ($p < 0.05$). Children who used screens without caregiver interaction had higher rates of delay compared to those with supervised use. This highlights the importance of co-viewing and active parental engagement in mitigating the negative effects of screen exposure. Previous studies have shown that interactive screen use with parental involvement may have less detrimental effects compared to passive, unsupervised viewing (8).

Smartphones were identified as the most commonly used devices (50.7%), reflecting the increasing accessibility and portability of digital media. Similar trends have been reported globally, where mobile devices have become the primary source of screen exposure in young children (9). The ease of access and frequent use may contribute to prolonged exposure durations and increased developmental risks.

The findings of this study are in accordance with guidelines from the American Academy of Pediatrics, which recommend limiting screen exposure in children under 2 years and encouraging supervised, high-quality content thereafter (10). The observed associations reinforce the need for adherence to these guidelines and increased parental awareness regarding the potential impact of excessive screen time. However, this study has certain limitations. Being a hospital-based cross-sectional study, causal relationships cannot be definitively established. The sample size was relatively small, and reliance on caregiver-reported screen time may introduce recall bias. Despite these limitations, the study provides valuable insights into the growing concern of screen-related developmental delays in toddlers.

Conclusion

This study demonstrates a significant association between increased screen exposure and speech-language delay among toddlers. Prolonged screen time, particularly exceeding two hours per day, and lack of parental supervision were identified as key risk factors contributing to delayed language development. These findings highlight the importance of limiting screen exposure during early childhood and promoting active caregiver interaction to support optimal language acquisition. Early identification and parental education are essential in preventing long-term developmental consequences. Further large-scale longitudinal studies are recommended to establish causal relationships and guide evidence-based recommendations.

Declaration

Conflict of Interest: Nil

Source of Funding: Nil

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