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ORIGINAL RESEARCH

Screen exposure and early language development: A cross sectional study

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ABSTRACT

Background: The significant increase in screen and digital media exposure among young children has raised concerns about its potential impact on language development.**Objective:** To explore the relationship between screen exposure and language development in children aged 0-3 years.**Methods:** A cross-sectional analytical study was conducted at a paediatric outpatient department. Parents of children aged 0-3 years were asked a questionnaire, and further children were evaluated using the Language Evaluation Scale Trivandrum (LEST).**Results:** The study found that 81.3% of cases showed no significant relationship between screen exposure and language delay, with these children demonstrating normal language development. Specifically, 12.6% had questionable development, 4.1% were suspected of having a delay, and 2.1% had a language delay. The results indicated that most children had typical language development, but some experienced delays according to the LEST. No significant relationship was found between screen time duration and language development. Additionally, the highest incidence of delay was observed in the 24-36 month age group.**Conclusion:** Most children showed no significant association between screen exposure and language delay. However, some variability in outcomes was observed. Therefore, parents should be mindful of potential risks and adhere to recommended guidelines for screen use to support healthy language development.

Keywords: screen time, language development, children, digital media, language delay, LEST scale

INTRODUCTION

Emerging technologies, including mobile and interactive screen media, are now embedded in the daily lives of young children. Since 1970, the age at which children begin to regularly interact with media has shifted from four years to four months, which means that children today are "digital natives," born into an ever-changing digital ecosystem that is enhanced by mobile media.[1] Further, in current era, digital devices are not only used to communicate but also to entertain, as provided by the availability of videos, games, and spectacle applications that attract everyone, including children.[2] There is no doubt that electronic devices have revolutionized learning, communication, and information dissemination, but recent research indicates that screen media use may have serious adverse effects on children's health over the long term, making this a pressing public health concern.[3]

The link between screen time and speech and language development is not straightforward, and several factors need to be considered.[4] There has been scientific debate as well as considerable public discourse as to whether screen use helps or hinders early child development and this issue has been reignited in the last decade, as children's access to and consumption of digital media is on the rise. The debate primarily centers around quantity vs quality of screen use. In terms of quantity of screen use (i.e, hours per day/week), it has been argued that screen use can be a passive or sedentary behavior that can displace critical learning opportunities for growth and development, such as language.[5]

Delay or abnormalities in language should be detected during the early stages of life for better outcome. Children with language delay and disorders need systematic assessment and training for which simple language development screening tools are needed. One such scale used in neuro-developmental follow-up clinics is LEST (Language Evaluation Scale Trivandarum).[6] It contains assessment items based on receptive and expressive language development. LEST (0–3) is a simple, reliable and valid screening tool for use in the community to identify children between 0-3 years with delay in language development, enabling early intervention

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practices.[7]We found recent increase in our outdoor patients complaining of language delay specially during covid era as social interaction is essential for language development.[8] Because of the increased exposure of screen time in children and the lack of research in this area, the current study aimed to gain a deeper understanding of the relationship between screen time (exposure) and the impact on language development (outcome) in children (population). This study is intended for early detection of language developmental delay, if any, in children of age group 0 – 3 years who are exposed to various screens like mobile, laptop, TV ,Tablet etc.

MATERIALS AND METHOD

This cross-sectional analytical study was conducted at the Paediatric OPD of People's College of Medical Sciences and Research Center, Bhopal, to investigate the association between screen time and language development in children aged 0-3 years. The study was conducted over 18 months at the OPD of People's Hospital, with a sample size of 390 children. The study variables were recorded using a proforma, and inclusion criteria consisted of children in the specified age group attending the OPD for minor ailments. Exclusion criteria included children with severe illnesses, chronic disorders, congenital anomalies, abnormal hearing, or delays in other developmental domains.

Additionally, children with risk factors for abnormal hearing, such as low birth weight, prematurity, or severe jaundice, were excluded. The study also excluded children with maternal illness during pregnancy, craniofacial anomalies, or in utero infections. Parents who did not provide consent for their child's participation were also excluded from the study.

Parents of the participating children were asked the Digital-Screen Exposure Questionnaire (DSEQ), . The language assessment of the children was done using the Language Evaluation Scale Trivandrum (LEST), a validated Indian tool for identifying language delay in children. The LEST scale was used to evaluate the children's language skills based on their chronological age, and any delay were noted. The study obtained ethical permission and informed consent from parents before commencing. Statistical analysis was performed using SPSS version 21, and data was expressed as mean, standard deviation, number, and percentage. Chi-square tests were used to compare categorical data, and the level of significance was set at 5%.

RESULTS

Table1–LestScaleInterpretation

Interpretation	No.of cases	Percentage
Delay	8	2.1%
Normal	317	81.3%
Questionable	49	12.6%
Suspect	16	4.1%
Total	390	100.0%

Out of total 390 children

- DELAY: There were 8 cases, constituting 2.1% of the total.
- NORMAL: There were 317 cases, making up 81.3%.
- QUESTIONABLE: There were 49 cases, accounting for 12.6%.
- SUSPECT: There were 16 cases, representing 4.1%.

In our study we found that out of all the children enrolled maximum had no significant delay in language development and found to be normal (81.3%) while rest of the children had some delay as per lest scale (table 1) .

Table 2 (a) – Total Duration of Screen Exposure

Screen time exposure(inminutes)	No.of cases	Percentage
< 30	161	41.3%
30-60.0	84	21.5%
60-90	88	22.6%
> 90	57	14.6%
TOTAL	390	100.0%

Table2(b)–Durationof screenexposurewithlanguagedelayasperlestscale

		Interpretation								Total	Chi-square value	p-value
		D		N		Q		S				
Screentime exposure(in minutes)G	< 30	1	12.5%	138	43.5%	16	32.7%	6	37.5%	161		
	30-60.0	1	12.5%	68	21.5%	13	26.5%	2	12.5%	84		

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P	60-90	2	25.0%	68	21.5%	13	26.5%	5	31.3%	88	12.767	0.173
	> 90	4	50.0%	43	13.6%	7	14.3%	3	18.8%	57		
Total		8	100.0%	317	100.0%	49	100.0%	16	100.0%	390		

As per this study we found that for maximum children duration of screen exposure was less than 30 minutes and no significant relationship was found between duration of screen exposure and language delay as per lest scale (table 2).

Table 3 – Age Distribution with language delay as per LEST scale

		Interpretation								**Total**	**Chi-squarevalue**	**p-value**
		D		**N**		**Q**		**S**				
Agegroup	**1**	**0**	**0.0%**	**155**	**48.9%**	**18**	**36.7%**	**3**	**18.8%**	**176**	**41.137**	**0.001**
	2	0	0.0%	91	28.7%	24	49.0%	9	56.3%	124		
	3	8	100.0%	71	22.4%	7	14.3%	4	25.0%	90		
Total		8	100.0%	317	100.0%	49	100.0%	16	100.0%	390		

As per this study we found that out of all the children enrolled , maximum children were of younger age group (0 to 12 months) and as per lest scale all children with language delay were found in the age group of 24 to 26 months (table 3).

DISCUSSION

Among the 390 patients who participated in this study, 45.1% were between the ages of 0 to 12 months, followed by 31.8% between the ages of 12 to 24 months, and finally23.1%between the ages of 24 to 36 months. These findings indicate that age group has a significant impact on the distribution .As per this study most of the children enrolled were of younger age group 0-12months while children with maximum language delay belonged to 24-36 months age group . In this study there was no significant relationship between duration of screen exposure and language delay as per lest scale and maximum children had exposure of less than 30 minutes. The American Academy of Pediatrics Council on Communication and Media has released guidelines for parentsand pediatricians regarding the use of screen by children. The guidelines discourage screen use for children under the age of two and emphasize the importance of parentalsupervision when children should use digital screens[9] The World Health Organization(WHO) has provided guidelines stating that children between the ages of 0 and 2 years should avoid screen time, while children between the ages of 2 and 4 years should not spend more than 1 hour passively watching television, using a smartphone, or using a tablet.[10] The Canadian Paediatric Society (CPS) conducted studies that revealed that only 15% of preschoolers adhere to the Canadian guidelines of limiting screen time to one hour per day. These studies also found that television is the primary activity duringscreen time and its prevalence is increasing among children aged 3-5 years.[11] Accordingto a British study, around 51% of infants aged 6 to 11 months are exposed to touch screens on a daily basis.[12]

According to research carried by Force DH[18] has shown that children's language development and learning are positively influenced by engaging in face-to-face interactions with family members or other adults who are caring for them. Adults should use caution with the presence of background media when children are present. Toddlers, who are younger than two years old, struggle to understand information and typically cannot integrate knowledge acquired from digital media. For children to improve their language skills and learning, it is important for them to interact in person with their family members or caretakers. Studies suggest that it can have an impact on various aspects of children's development, including their vocabulary, cognitive abilities, quality of play, language learning, ability to focus, and understanding of information, particularly in children under the age of five. In addition, excessive television exposure throughout early childhood might have a detrimental impact on a child's mathematical and literacy abilities.[19]

The way a child is brought up in their social environment greatly influences how they learn to speak and develop their language skills. Interacting with adults at a young age helps children develop their speech skills by learning how to communicate effectively. The parents plays a crucial role in speech development, and the quality of the parent- child relationship has a significant impact on the child's overall development, including speech development. Currently, technology is being used actively through smart screentechnology and passively through television viewing by children, largely influenced bytheir parents' attitude towards smart technology. This issue is of great importance in the scientific community today due to instances where children's use of smart device replaces meaningful interactions with their parents and peers. There could be potential negative effects on the mental health and personality development of children.[20]

Widoyoko (2022)[21] also reportedthat parents often

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believe that children's excessive screen time can harm their development, especially their language development.

In the present study, there were 8 cases, constituting 2.1% of the total that reported delay in language development; normal constituted 317 cases, making up 81.3%; there were 49 cases in questionable category, accounting for 12.6% and there were 16 cases in suspect category, representing 4.1%. This suggest that maximum cases are reported to be normal when it comes to association of screen time with language developmentin 0-3 years old children. Contrast to our study Lin et al[24] recruited patients from achildren's hospital and reported delayed language development in 49.3 % of childrenwatching television for more than 2 h daily. Al-Hosani et al[25] found that languagedelay was detected through analysis of language milestones and the results of the Receptive- Expressive Emergent Language Test (RELT). An adverse home environment and excessive screen usage over 2 hours per day were found to have a detrimental impact on speech and language development. Another similar study by Thomas J et al[26] used Language evaluation scale Trivandrum and reported 13.5% had speech and language delay, whereas 3% displayed questionable delay. Language delay was found to be connected with male gender, preterm, low birth weight, perinatal problems, being the second born child, and living in a rural area. Ganavi R et al[6] reported 6.5% had delay,18% had questionable delay and another 18% had suspectable delay. The effect of home environment on speech and language delay showed that in poor home environment 43% of children had delay and 57% were normal. Language delay was more prevalent among first birth child. There was no association found between the other demographic variables. The various other studies carried by Mondal N et al[27] reported language delay of 27%, Binu A et al[28] reported13.7%, Campbell TF et al[29] reported 15.6%, Sidhu M et al[30] reported 6.2% andKing TM et al[31] found 10%.

Here are the key strengths of the current study. We thoroughly evaluated the language skills of the children, enabling us to build upon previous research by investigating the language domains linked to the screen time and exposure . Nevertheless, the current study did have some limitations. Similar to previous studies, we utilized the parent report method to gather data on screen time, which could potentially lead to inaccurate reporting. Our findings align with previous studies in terms of the relationship between screen time and language ability. Additionally, our sample consisted of patients who sought treatment at a tertiary hospital. Thus, it is important to consider the education level of families when generalizing the results, as the findings may not accurately represent the screen time and language skills of children from well-educated, upper- class families who prefer private clinics. Further research should thoroughly investigate the relationship between the content of screen time and the language skills of children. Further, to generate more effective recommendations, it is important to conduct further large-scale population-based research that evaluates multiple factors, including screen time.

CONCLUSION

To conclude, this study found no significant association between screen time and language delay in most cases (81.3%), but noted variability in outcomes. Age (23-36 months) was a notable factor in language delay. The study acknowledges its limitations, including cross-sectional design and potential bias.

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