

Influence of Electronic Media on Speech and Language Delay in Children

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INTRODUCTION

Speech and language development is an important parameter indicating the overall development of the child. It is influenced by genetic and environmental factors. Electronic media is a part of environmental factor influencing child development. Speech and language indicate the cognition, psychology, social interaction, emotions, and sensorimotor ability of the child.

An electronic media in the form of television, mobile phones, computer, and tablets has become an integral part of many households and has both positive and negative influences on the child. The duration spent by children on electronic media has drastically increased

ABSTRACT

Background: An electronic media in the form of television, mobile phones, computers, and tablets has become an integral part of many households and has both positive and negative influences on the child. The duration spent by children on electronic media has drastically increased leading to decreased vocabulary, attention span, and overall decrease in child-parent interaction leading to speech and language delay. **Aims:** We aimed to study the duration of electronic media usage and influence on the speech and language delay in children between 6 months and 6 years. **Materials and Methods:** This is a cross-sectional study conducted after institutional ethics committee approval and written informed consent. The duration of use of media and its effect on speech and language delay was assessed using the Language Evaluation Scale Trivandrum and hyperactivity by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Statistical analysis was done using MedCalc. **Results:** Four hundred and twenty-five children were enrolled. 3–6-year-old children from joint and extended families and from upper-middle and upper socioeconomic status used more media. Attention deficit hyperactivity disorder (ADHD) was seen in 9.4% of children using media. Speech and language delay was seen among 28.4% of children who used media for more than 3 h. **Conclusions:** The prolonged duration of electronic media for more than 3 h is associated with speech and language delay in children. Mobile media provides more interaction than passive television viewing, and the risk of speech delay is more in prolonged television viewing. Hyperactivity (ADHD) is seen more in children using electronic media.

KEYWORDS: *Electronic media, hyperactivity, speech and language delay*

due to easy accessible and portable technology like smartphones and tablets with mobile data and Wi-Fi availability.

Television is one of the most widely used communication media using pictures and sounds which affect the vision, hearing, and speech of the child.^[1,2] Television exposure increases aggression and behavior problems in children. Passive viewing leads to decreased vocabulary, attention

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span, planning and judging capabilities, and overall decrease in child–parent interaction leading to speech and language delay.

Unlike television, mobile media provides an opportunity to interact which may have a different influence on the child's communication. Educational applications and electronic books could promote early literacy skills and speaking skills but can also distract children from learning.^[3–5] Children use mobile media for playing games, chatting with friends, doing homework, for learning and educational packages, as a mode to attend classes, webinars and attending examinations.^[6]

The positive effects of media are improved cognition and academic skills, whereas the negative consequences are on social and psychological development.

Increased media time leads to social isolation leading to depression and loneliness.^[7,8]

Constant surfing on media or watching television leads to decreased social activities with an increased risk of obesity.^[9–11] The parents or children on media for longer time decreases active parent–child verbal interaction with adverse developmental outcomes, including language development, self-regulation, and later academic achievement.^[12–15] With frequent use of media, the child's playtime with peers and creative play is disturbed, interfering with their problem-solving skills and creative expression affecting their overall development. Brightly lit screens, especially at bedtime, have been associated with increased autonomic activation due to hyperarousal or disrupted melatonin production leading to sleep disturbances and adversely impacting development.^[16,17]

Playing violent games on mobiles or computers or viewing violent media programs on television can lead to aggressiveness, violent behavior increasing anxiety and fear in children.^[18,19] Excessive media time has effects on eyesight, decrease in bone density, difficulty to focus, and attention deficit hyperactivity disorder (ADHD).^[18]

Speech and language delay is the most common form of childhood disabilities and affects about 1 in 12 children or 5%–8% of preschool children.^[20] Delay in speech and language skills may be associated with other cognitive impairments including lower IQ scores, slower information processing skills, and poorer literacy skills such as reading and spelling.^[21,22] In the present study, the duration of electronic media such as television and mobiles, smartphones, and tablets and its effect on speech and language was seen.

Aims and objective

- To study the duration of media usage in children between 6 months and 6 years
- To study the impact of electronic media on the speech and language development in children from 6 months to 6 years of age.

MATERIALS AND METHODS

Study design

This was a cross-sectional study.

Study setting

This study was conducted at the Department of Paediatrics, Dr. D. Y. Patil Medical College, Pimpri, Pune.

Study period

This study was carried out for 12 months, March 2019–March 2020.

Ethical approval

Approval was obtained from the institutional ethics committee.

Consent

Written informed consent was obtained from the parents or caretakers before enrollment of the children.

Sample size

Four hundred and twenty-five children were enrolled in the study.

Selection criteria

Inclusion criteria

All children who were visiting pediatric outpatient department and were willing to participate in the study were included.

Exclusion criteria

Children with exclusive motor delay and not willing to participate were excluded.

Method of data collection and tools

A detailed history including demographic details and duration of media use was obtained from the informant and recorded. All children were evaluated for speech and language delay using screening tool – Language Evaluation Scale Trivandrum (LEST).^[23,24] In this study, a one-item delay was considered as delay in LEST. This is a screening tool with 35 test items (0–3 years) and 31 items (3–6 years) validated against the Receptive-Expressive Emergent Language Scale. All children were also screened for ADHD using the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition^[25] for hyperactivity and inattention.

Data analysis

The collected data were entered into a Microsoft Excel Sheet. Statistical analysis was done using MedCalc. For statistical significance, $P < 0.05$ was considered to be significant. All tests were carried out at a 5% significance level.

RESULTS

Four hundred and twenty-five children were enrolled.

1. There were 215 children in the age group of 6 months–3 years and 210 in the age group of 3–6 years. In the children below 3 years, 63.2% of children were viewing television and 55.81% were using mobile phones. In the age group between 3 and 6 years, 83.3% were viewing television and 75.2% were using mobile phones
2. Two hundred and fifty-seven children lived in nuclear families, of which 69.6% of children were viewing television and 63.03% were using mobiles. Out of 168 children from joint and extended families, 83.3% viewed television and 75.2% used mobile phones
3. According to socioeconomic status (SES) out of 5 children in lower SES, 40% were using media; 98 children in upper-lower SES, 68.3% used media; 240 children in lower-middle SES, 84% used media; 69 children in upper-middle SES, 92% used media; and 13 children in upper SES, 92% used media
4. ADHD was seen in 9.4% of 348 children using media and 5.1% of 77 children who were not using media
5. Association of television viewing duration and speech and language delay [Figure 1]:

Figure 1: Out of 425 children, 114 children did not watch television and a speech and language delay was seen in 22 children (19.3%). There were 23 children viewing television for <1 h, of which 3

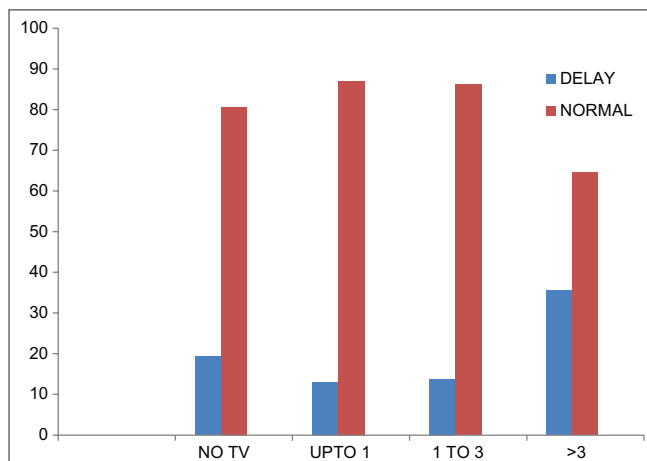


Figure 1: Viewing of Television (in hours)

had a delay (13%). One hundred and eighty-one children watched television between 1 and 3 h, of which 25 were delayed (13.8%). One hundred and seven watched television for more than 3 h, of which 38 were delayed (35.5%).

6. Association of mobile usage and speech and language delay [Figure 2]:

Figure 2: There were 147 children who were not using mobile, of which 23 (15.6%) had a delay. One hundred and forty-eight children were viewing mobile for <1 h, in which 42 (28.4%) had a speech and language delay. One hundred and nineteen children who were using mobile between 1 and 3 h had a delay in 21 children (17.6%). Eleven children were using mobile phones for more than 3 h, of which 2 (18.2%) had a delay

7. Association of speech and language delay with use of media [Table 1]:

Table 1: The children not using media in the form of television, mobiles, and laptops or tablets had a delay of 23.4%. The children using media for up to 1 h were 22.2%, in between 1 and 3 h were 5.7%, and for more than 3 h were 28.4%. The P value was statistically significant (<0.0001).

DISCUSSION

In the present study, 425 children were enrolled. In the age group between 3 and 6 years, 83.3% were viewing television and 75.2% were using mobile phones when compared to those below 3 years where 63.2% of children were viewing television and 55.81% were using mobile phones. Many studies have reported a positive association between the child's age and mobile screen media use. Compared with younger children, older children were more likely to use smartphones, tablets, or any media.^[26,27] Carson and Kuzik concluded that for every 1-month increase in age, the use of any media increased by 9.3 min/day (95% confidence interval 2.8–15.8).^[27] Two hundred and fifty-seven children lived

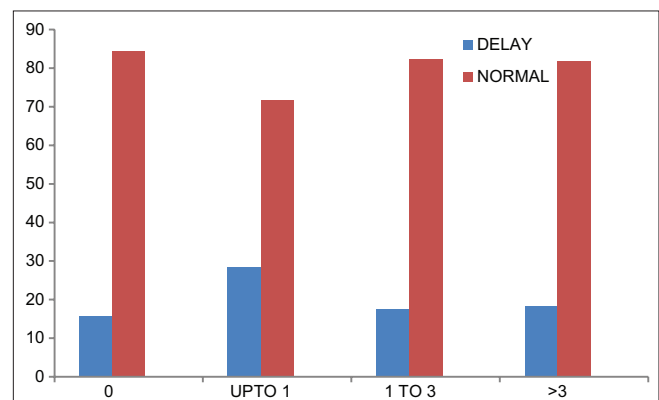


Figure 2: Use of Mobile Media (in hours)

Table 1: The children not using media in the form of television, mobiles, and laptops or tablets had a delay of 23.4%

Media usage (h)	Delay, n (%)	Normal, n (%)	Total, n (%)
0	18 (23.4)	59 (76.6)	77 (18.1)
0-1	4 (22.2)	14 (77.8)	18 (4.2)
1-3	7 (5.7)	115 (94.3)	122 (28.7)
>3	59 (28.4)	149 (71.6)	208 (48.9)
	88 (20.7)	337 (79.3)	425

The children using media for less than an hour were 22.2%, in between 1 to 3 hours were 5.7%, and for more than 3 hours were 28.4%. The *P* value was statistically significant (<0.0001)

in nuclear families, of which 69.6% of children were viewing television and 63.03% were using mobiles. Out of 168 children from joint and extended families, 83.3% viewed television and 75.2% used mobile phones. It is seen that the parents who use more mobile screen media were likely to have children using such devices and for the increased time duration.^[27] Families who watch more TV have children who more likely to engage in higher screen viewing.^[28] Family members, especially parents, are the role models for children.

According to SES out of 5 children in lower SES, 40% were using media; 98 children in upper-lower SES, 68.3% used media; 240 children in lower-middle SES, 84% used media; 69 children in upper-middle SES, 92% used media; and 13 children in upper SES, 92% used media. Common Sense Media's Zero to Eight surveys have found disparities in the use of educational media on mobile devices, with 54% of children from high-income families often or sometimes using educational content on mobile devices but only 28% of children from low-income families doing so.^[29] Few studies^[27] reported that children from high-income families were using touch screens or any media device longer than those from low-income families.

The children using electronic media in the form of television, mobiles, and laptops or tablets for less than an hour were 22.2%, in between 1 and 3 h were 5.7%, and for more than 3 h were 28.4%, which was statistically significant. The children who did not watch any form of media had a delay of 23.4%. The delay was seen more in children who either did not watch media at all or watched more than 3 h. The children who had the use of media in moderation were having a lesser incidence of speech and language delay. In a study in the United States, rates of mobile media use among 2–4-year-olds increased from 39% to 80% between 2011 and 2013,^[30] and in the UK, a study found that about 51% of infants 6–11-month-olds use a touch screen daily.^[31]

The children viewing television for <1 h had a speech and language delay of 13%, in between 1 and 3 h were 13.8%, and for more than 3 h were 35.5%. The children who were not watching television had a speech delay of 19.3%. In a study by Keten *et al.*,^[32] the duration of television watching is one of the important reasons for speech delay. Studies on the subject indicate that the length of time spent watching television and using computers leads to a lack of verbal communication. In the study by Byeon and Hong,^[33] toddlers with more than 2 h but <3 h of TV watching time had around 2.7 times more risk of language delay than those with <1 h, and those with more than 3 h had about 3 times more risk. In an epidemiological study by Zimmerman *et al.*^[34] in the USA, in 8–16-month-old infants, watching more than 1 h of video per day had a negative association with vocabulary acquisition. In a Thai case-control study on infants under 1, the risk of language delay was 6 times more in infants watching TV than those who did not.^[35] It is reported that young children diagnosed as language delayed watch TV earlier and more than normal children.^[35] The delay in speech and language was 19.3% in children who did not watch television might be due to less awareness and decreased audiovisual stimulation.

The children viewing mobile for <1 h had a delay of 28.4%, in between 1 and 3 h were 17.6%, and for more than 3 h were 18.2%. The children who were not watching mobile had a delay of 15.6%. The study sample by van den Heuvel *et al.*^[36] included 893 children (mean age: 18.7 months, 54.1% males). Most parents reported 0 min per day of mobile media device use in their children ($n = 693$, 77.6%). Among children whose parents reported any mobile media device use ($n = 200$, 22.4%), the median daily mobile media device use was 15.7 min (range: 1.4–300). The prevalence of parent-reported expressive speech delay was 6.6%, and the prevalence of other parent-reported communication delays was 8.8%. For children who used a mobile media device, each additional 30-min increase in daily mobile media device use was associated with increased odds of parent-reported expressive speech delay.

ADHD was seen in 9.4% of 348 children using media and 5.1% of 77 children who were not using media. Xie *et al.*^[37] studied the consequences of exposing preschoolers to screen time of >60 min and found a higher risk of negative effects on temper, character, and vulnerability to inattention and ADHD symptoms. Tong *et al.*^[38] showed that there was an increased risk of obesity in children with ADHD symptoms, and this was associated with the overuse of electronic devices, eating

while using electronic devices, and delaying bedtimes to snack and use electronic devices.

CONCLUSIONS

The prolonged duration of electronic media is associated with speech and language delay in children. Mobile media provides more interaction than passive television viewing, and the risk of speech delay is more in prolonged television viewing. Mobile media has educational applications which promote cognitive and academic skills but leads to psychosocial developmental issues and provides access to games and the Internet. Hyperactivity (ADHD) is seen more in children using electronic media. Moderate duration of usage of electronic media is recommended. The limitations of this study are that the content of the electronic media viewed and the type of activities the child was engaging in, were not taken into details.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Setiawati D, Hasyim A, Yanzi H. Peranan Orang Tua Mendampingi Remaja Menonton Televisi Terhadap Kenakalan Remaja Di Desa Bagelen Pesawaran. Jakarta: Jurnal Penelitian Pendidikan; 2012. p. 1-4.
- Pitriawanti A. Pengaruh Intensitas Menonton Televisi Dan Komunikasi Orang Tua-Anak Terhadap Kedisiplinan Dalam Mentaati Waktu Belajar. (Summary Skripsi). Semarang: Universitas Diponegoro; 2010. p. 1-11. <https://doi.org/>.
- Chiong C, Shuler C. Is there an App for That? Investigations of young Children's Usage and Learning with Mobile Devices and Apps; 2010. Available from: https://dmlcentral.net/wp-content/uploads/files/learningapps_final_110410.pdf. [Last accessed on 2016 Aug 16].
- Radesky JS, Schumacher J, Zuckerman B. Mobile and interactive media use by young children: The good, the bad, and the unknown. *Pediatrics* 2015;135:1-3.
- Parish-Morris J, Mahajan N, Hirsh-Pasek K. Once upon a time: Parent – Child dialogue and storybook reading in the electronic era. *Mind Brain Educ* 2011;7:200-11.
- Hosokawa R, Katsura T. Association between mobile technology use and child adjustment in early elementary school age. *PLoS One* 2018;13:e0199959.
- Amichai-Hamburger Y, Ben-Artzi E. Loneliness and Internet use. *Comput Hum Behav* 2003;19:71-80.
- Rikkers W, Lawrence D, Hafekost J, Zubrick SR. Internet use and electronic gaming by children and adolescents with emotional and behavioural problems in Australia – Results from the second child and adolescent survey of mental health and wellbeing. *BMC Public Health* 2016;16:399.
- Dennison BA, Erb TA, Jenkins PL. Television viewing and television in bedroom associated with overweight risk among low-income preschool children. *Pediatrics* 2002;109:1028-35.
- Bremer J. The internet and children: Advantages and disadvantages. *Child Adolesc Psychiatr Clin N Am* 2005;14:405-28.
- de Jong E, Visscher TL, HiraSing RA, Heijmans MW, Seidell JC, Renders CM. Association between TV viewing, computer use and overweight, determinants and competing activities of screen time in 4- to 13-year-old children. *Int J Obes (Lond)* 2013;37:47-53.
- Shimpi PM, Huttenlocher J. Redirective labels and early vocabulary development. *J Child Lang* 2007;34:845-59.
- Landry SH, Miller-Loncar CL, Smith KE, Swank PR. The role of early parenting in children's developmental and executive processes. *Dev Neuropsychol* 2002;21:15-41.
- NICHD Early Child Care Research Network. Predicting individual differences in attention, memory, and planning in first graders from experience at home, child care and school. *Dev Psychol* 2005;41:99-114.
- Hart B. A natural history of early language experience. *Top Early Child Spec Educ* 2000;20:28-32.
- Kubota T, Uchiyama M, Suzuki H, Shibui K, Kim K, Tan X, et al. Effects of nocturnal bright light on saliva melatonin, core body temperature and sleep propensity rhythms in human subjects. *Neurosci Res* 2002;42:115-22.
- Higuchi S, Motohashi Y, Liu Y, Maeda A. Effects of playing a computer game using a bright display on presleep physiological variables, sleep latency, slow wave sleep and REM sleep. *J Sleep Res* 2005;14:267-73.
- Subrahmanyam K, Kraut RE, Greenfield PM, Gross EF. The impact of home computer use on children's activities and development. *Future Child* 2000;10:123-44.
- Ferguson CJ, Olson CK. Video game violence use among "vulnerable" populations: The impact of violent games on delinquency and bullying among children with clinically elevated depression or attention deficit symptoms. *J Youth Adolesc* 2014;43:127-36.
- U. S. Preventive Services Task Force. Screening for speech and language delay in preschool children: Recommendation statement. *Pediatrics* 2006;117:497-501.
- Silva PA, Williams S, McGee R. A longitudinal study of children with developmental language delay at age three: Later intelligence, reading and behaviour problems. *Dev Med Child Neurol* 1987;29:630-40.
- Stevenson J, Richman N. The prevalence of language delay in a population of three-year-old children and its association with general retardation. *Dev Med Child Neurol* 1976;18:431-41.
- Nair MK, Nair GH, Mini AO, Indulekha S, Letha S, Russell PS. Development and validation of language evaluation scale Trivandrum for children aged 0-3 years – LEST (0-3). *Indian Pediatr* 2013;50:463-7.
- Nair M, Harikumar G, Babu G, Mini A. Language evaluation scale Trivandrum (LEST 3-6 years) development and validation. *Indian Pediatr* 2016;53:257-8.
- Ünsel Bolat G, Ercan ES, Salum GA, Bilaç Ö, Massuti R, Uysal Özarslan T, et al. Validity of proposed DSM-5 ADHD impulsivity symptoms in children. *Eur Child Adolesc Psychiatry* 2016;25:1121-32.
- Asplund KM, Kair LR, Arain YH, Cervantes M, Oreskovic NM, Zuckerman KE. Early childhood screen time and parental attitudes toward child television viewing in a low-income Latino population attending the special supplemental nutrition program for women, infants, and children. *Child Obes* 2015;11:590-9.
- Carson V, Kuzik N. Demographic correlates of screen time and objectively measured sedentary time and physical activity among toddlers: A cross-sectional study. *BMC Public Health* 2017;17:187.

28. Duch H, Fisher EM, Ensari I. Screen time use in children under 3 years old: A systematic review of correlates. *Int J Behav Nutr Phys Act* 2013;10:102-10.
29. Rideout V. *Zero to Eight: Children's Media Use in America*. San Francisco, CA: Common Sense Media; 2013.
30. Lauricella AR, Wartella EA, Rideout VJ. Young children's screen time: The complex role of parent and child factors. *J Appl Dev Psychol* 2015;36:11-7.
31. Cheung CHM, Vota W; LSE Department of Media and Communications. What Are the Effects of Touchscreens on Toddler Development? <http://blogs.lse.ac.uk/parenting4digitalfuture/> 2016/12/28/what-are-the-effects-of-touch-screens-on-toddler-development.
32. Keten S, Sahli AS, Kaya M. Evaluation of home communication skills in children with speech delay. *J Speech Pathol Ther* 2018;3:137.
33. Byeon H, Hong S. Relationship between television viewing and language delay in toddlers: Evidence from a Korea national cross-sectional survey. *PLoS One* 2015;10:e0120663.
34. Zimmerman FJ, Christakis DA, Meltzoff AN. Associations between media viewing and language development in children under age 2 years. *J Pediatr* 2007;151:364-8.
35. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. *Acta Paediatr* 2008;97:977-82.
36. van den Heuvel M, Ma J, Borkhoff CM, Koroshegyi C, Dai DW, Parkin PC, *et al.* Mobile media device use is associated with expressive language delay in 18-month-old children. *J Dev Behav Pediatr* 2019;40:99-104.
37. Xie G, Deng Q, Cao J. Digital screen time and its effect on preschoolers' behavior in China: Results from a cross-sectional study. *Ital J Pediatr* 2020;46:9.
38. Tong L, Xiong X, Tan H. Attention-deficit/hyperactivity disorder and lifestyle-related behaviors in children. *PLoS One* 2016;11:e0163434.