

# The Correlation Between Gadget Usage Intensity And Speech Delay In Toddlers

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## ABSTRACT

**Background:** Globally, gadget usage has reached 67% of the world's population. Speech delay can be defined as a condition that a toddler's conversation does not match his/her stage of speech and language ability. It also can be defined as a condition that child shows difficulty in pronouncing sounds or speech. The use of gadgets in toddlers causes decreasing interest in interacting and playing with their peers. It interferes the natural development process. **Methods:** This literature review method was carried out by taken literatures of 35 journals and 3 textbooks. The journals were obtained from searching with the keywords "screen time", "media use", "speech delay", "child development delay", and "child language delay", which have been indexed by SINTA and SCOPUS. **Results:** The results of the analysis shows that excessive gadget use (> 1 hour) is associated with speech delays in toddlers. **Conclusion:** There was a correlation between gadget usage intensity and speech delay in toddlers.

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## 1. INTRODUCTION

Based on a Datareportal review in January 2020, global gadget use has reached 67% of the world's population, which is 5.19 billion people, and gadget users at the beginning of 2020 reached 4.5 billion people<sup>1</sup>. Gadget use has increased by 2.4% from a review in January 2019. This means there are around 1 billion people every 2.7 years. Gadget use in Southeast Asia is 665 million people<sup>1</sup>. In Indonesia, gadget users are 338.2 million people or equivalent to 124% of the population in Indonesia of 267 million people [1]. The use of gadgets including smartphones, tablet PCs, computers, video games, and televisions is used by all people of various ages, including children under 5 years old [2]. Based on data from the Ministry of Information and Communication in 2018, it is known that there are 30 million children and adolescents who use the internet and digital media for communication channels used [3]. Introducing gadgets from an early age to children has positive and negative impacts<sup>4</sup>. This can be influenced by several factors, such as frequency, duration, and parental supervision. In Indonesia, popular gadgets among children and adolescents include television, smartphones, game consoles, tablets, and iPads [4].

Gadget use by toddlers can reduce their interest in interacting with their environment or playing with peers, thus disrupting the child's natural development process [2]. The age under five is the most crucial period in a child's growth and development because growth and development during infancy will influence and determine

the child's future development [5]. Children who use gadgets are limited in their ability to learn to speak and speak because gadgets only communicate one way: responding [5]. This limited response will disrupt the child's ability to socialize and adapt. This can trigger speech disorders, one of which is speech delay [5]. The use of gadgets for too long in children triggers complaints felt by children, for example speech delay, problems with eye health, motor and movement problems, irritability, unstable emotions, lack of concentration, difficulty sleeping<sup>6</sup>. According to the World Health Organization (WHO), preschool children experience speech disorders of 5-25% and the incidence of speech disorders in children in Indonesia reaches 13-18%<sup>7</sup>. The use of gadgets has a direct influence on speech-language development, as well as the development of socialization and independence of children [2].

## 2. METHOD

This literature review uses a literature review method by conducting a literature review of 36 journals and 3 textbooks. These journals were obtained from PubMed and Google Scholar searches with the keywords "screen time," "media use," "speech delay," "child development delay," and "child language delay" which were selected using the criteria of national journals that have been accredited by SINTA and reputable international journals that have been indexed by SCOPUS and non-SCOPUS.

## 3. RESULTS AND DISCUSSION

The analysis results show that excessive gadget use (>1 hour) is associated with speech delay in toddlers. Gadgets are modern telecommunications devices introduced in the era of globalization and are tools used by humans to assist human activities. <sup>8</sup> Currently, gadgets are the most frequently used smart devices by people of all ages worldwide, including children. <sup>9</sup> Types of gadgets include televisions, tablet PCs, netbooks, video games, and cell phones. <sup>4</sup> The most frequently used gadgets are TVs (97%), tablets (83%), and smartphones (77%) [10].

Speech delay can be defined as a condition in which a toddler's speech does not match the expected stages of speech and language development based on their age or shows signs of difficulty when pronouncing sounds. <sup>11</sup> The National Institute on Deafness and Other Communication Disorders (NIDCD) (2016) states that the incidence of children with voice disorders, namely articulation disorders, in children under 5 years of age is 8-9% [12].

Over the past decade, there has been much scientific debate and public discourse regarding screen use, defined as the use of gadgets, such as smartphones, watching TV, or reading digital books, that help or hinder early childhood development [13]. This expert debate primarily centers on the quantity and quality of children's gadget use. This includes the quantity of gadget use, such as how long children should ideally use gadgets per day or week, and the quality of gadget use, such as the involvement of parents or caregivers when children use gadgets and the content children view while using gadgets [13]. Gadget use can lead to passive and inactive behavior in children, thus missing critical learning opportunities for children's growth and development, such as language [14]. This is because when children are exposed to screens, there is no reciprocal communication between the sender and receiver, which has been shown to improve communication and language acquisition in children [13].

Increased TV viewing time is associated with speech delays in early childhood. This is because when children watch TV, there are fewer opportunities for communication and play between children and their parents or caregivers, which are critical processes in child development [15]. The audio produced by TV is associated with a decrease in the number of parent words and conversations in children aged 2 to 48 months [15]. However, currently it is not only watching TV that is related to speech delay, but the use of other gadgets, such as smartphones or mobile tablets can affect the occurrence of speech delay in children<sup>15</sup>. Every additional 30 minutes of gadget use in children is 2.3 times greater risk of increasing the likelihood of expressive speech delay reported by parents [15]. Watching TV more than 2 hours per day increases the risk of low communication scores in children [15]. The use of educational media does not significantly encourage cognitive stimulation activities or reading and teaching<sup>9</sup>. Toddlers who watch TV more than 2 hours per day and less than 3 hours per day have a 2.7 times higher risk of experiencing speech delay than children who watch TV less than 1 hour per day, and children who watch TV more than 3 hours per day have a 3 times higher risk [16]. The risk of speech delay will increase proportionally with the increase in TV viewing time in toddlers<sup>16</sup>. Children who are frequently exposed to TV have a 3.3 times increased risk of speech delay compared to children who are not exposed to TV [17].

The presence of a TV in the background while children are playing or interacting with their parents or caregivers is associated with speech delays [18]. Background TV is defined as the time the TV is on when no one is watching [19]. This is because leaving the TV on and creating a background TV while children are playing and interacting with their parents or caregivers disrupts their focus and distracts their attention, reducing the number

of new vocabulary words they learn while playing and interacting with their parents or caregivers. Having a TV in the background while children are interacting with their parents or caregivers results in fewer words produced by the parents or caregivers compared to when there is no TV in the background [18].

The presence of parents or caregivers while children are using gadgets can help facilitate children's language acquisition [20]. Mothers of preschool-aged children have varying attitudes toward gadget use. In their reports, although mothers often use gadgets as a distraction, some mothers are concerned about their children's gadget use. Others report that gadget use is unavoidable and need to set rules to limit gadget use [20]. Parents who play with gadgets will reduce parent-child interaction [21]. Active gadget use by mothers during household activities, such as playing with gadgets while eating, is associated with higher maternal education and the child's gender being female [21]. Children who use gadgets are influenced by their parents' frequent gadget use habits [22]. Parental gadget use is associated with decreased responsiveness to children, resulting in a reduced verbal and nonverbal vocabulary [22].

Excessive gadget exposure in children and brain connectivity as measured by Magnetic Resonance Imaging (MRI) scans [23]. Based on research, children who use gadgets excessively show decreased functional connectivity in cognitive and language areas. This contrasts with brain activity in children who enjoy reading. In children who spend time reading, there is increased functional connectivity in cognitive and language areas [23]. Gadget use in children, as assessed using DTI (Diffusion Tensor Imaging), affects the greatest degree of lateralization in the arcuate fasciculus, which is an association pathway in the white matter of the brain that functions to connect Wernicke's area and Broca's area [24].

The American Academy of Pediatrics (AAP) (2016) [25] recommends that parental or caregiver support when children use gadgets is very beneficial for child development because support from parents or caregivers helps children improve their executive function and helps children control themselves when playing with gadgets [26]. The appropriate attitude to deal with children in the technological era is through mediation regarding gadget use and negotiation [27]. Other recommendations for reducing gadget use in children, stated by the Canadian Paediatrics Society (2017), are that children under 2 years old are not recommended to use gadgets, children aged 2-5 years old should limit gadget use to no more than 1 hour per day, and avoid using gadgets while eating or reading books. In addition, to reduce the risks associated with gadget use, the Canadian Paediatrics Society (2017) states that parents or caregivers should always accompany children when using gadgets, parents or caregivers should always pay attention to the content that children watch, parents or caregivers should always teach children about self-control in using gadgets, parents and caregivers should assess children's gadget usage habits, parents or caregivers should always try to help children recognize and question every advertisement that passes by, be sure that there is nothing that supports the introduction of technology at an early age, and avoid the TV in the background when not in use [28]. This is in line with the recommendations suggested by The American Academy of Pediatrics (2016), namely limiting gadget use time for children aged 2-5 years to no more than 1 hour per day. This aims to provide children with sufficient time to engage in other activities that are important for children's health and development. It is recommended for parents to avoid children under 18-24 months from using digital media except for video calls. If you want to introduce digital media to children aged 18-24 months, if you want to introduce digital media, choose high-quality programs and need parental guidance when children use digital media, and for children aged 2-5 years, limit the use of digital media to 1 hour per day with high-quality programs, parental guidance, and help children understand what they see in digital media, as well as help children to apply knowledge from digital media in their daily lives [25].

#### 4. CONCLUSION

The American Pediatric Society recommends that toddlers under 18-24 months avoid using digital media except for video calls. Children aged 2-5 years should be limited to no more than 1 hour per day. For children aged 2-5 years, choose high-quality programs and ensure parental supervision. For children aged 2-5 years, limit digital media use to 1 hour per day with high-quality programs, parental supervision, and help children understand what they see on digital media. Furthermore, children aged 2-5 years should be encouraged to apply digital media knowledge to their daily lives.

#### 5. REFERENCES

- [1] S. Kemp, \*Digital 2020: Global Overview\*, Datareportal, 2020. \[Online]. Available: [<https://datareportal.com/reports/digital-2020-global-digital-overview>](<https://datareportal.com/reports/digital-2020-global-digital-overview>). \[Accessed: Apr. 20, 2020, 23:06 WIB].
- [2] S. N. Fajariyah, A. Suryawan, and Atikah, "Dampak penggunaan gawai terhadap perkembangan anak," \*Sari Pediatri\*, vol. 20, no. 2, pp. 101–105, 2018, doi: 10.14238/sp20.2.2018.101-5.

- [3] Kementerian Informasi dan Komunikasi, \*Riset Kominfo dan UNICEF Mengenai Perilaku Anak dan Remaja dalam Menggunakan Internet\*, 2014. [Online]. Available: [<https://kominfo.go.id/index.php/content/detail/3834/Siaran+Pers+No.+17-PIH-KOMINFO-2014>](<https://kominfo.go.id/index.php/content/detail/3834/Siaran+Pers+No.+17-PIH-KOMINFO-2014>). [Accessed: Dec. 06, 2019, 17:27 WIB].
- [4] M. Wijaya and F. Sandriya, "The usage of gadget in school environment: Islamic education teachers' efforts in maximizing the usage of mobile phones and their impact toward students," *\*Journal of Research in Islamic Education\**, vol. 1, no. 1, pp. 21–30, 2019, doi: 10.25217/jrie.v1i1.438.
- [5] M. N. Hairunis, et al., "Hubungan status gizi dan stimulasi tumbuh kembang dengan perkembangan balita," *\*Sari Pediatri\**, vol. 20, no. 3, pp. 146–1515, Oct. 2018, doi: 10.14238/sp20.2.2018.101-5.
- [6] R. Novianti and M. Garzia, "Penggunaan gadget pada anak usia dini: Tantangan baru orang tua milenial," *\*Jurnal Obesesi\**, vol. 4, no. 2, pp. 1000–1010, 2020, doi: 10.31004/obsesi.v4i2.490.
- [7] World Health Organization, \*Language and Speech Disorder in Children\*, 2016. [Online]. Available: [<https://www.who.int/>](<https://www.who.int/>). [Accessed: May 03, 2020, 21:47 WIB].
- [8] T. M. P. Astuti, H. T. Atmaja, and Frahsini, "The impact of the use of gadgets in school of school age toward children's social behavior in Semata village," *\*Journal of Education Social Studies\**, vol. 7, no. 2, pp. 161–186, Dec. 2018, doi: 10.15294/jess.v7i2.26842.
- [9] J.-H. Moon, S. Y. Cho, S. M. Lim, J. H. Roh, M. S. Koh, Y. J. Kim, and E. Nam, "Smart device usage in early childhood is differentially associated with fine motor and language development," *\*Acta Paediatrica\**, vol. 5, p. 903, 2019, doi: 10.1111/apa.14623.
- [10] H. K. Kabali, M. M. Irigoyen, R. Nunez-Davis, J. G. Budacki, S. H. Mohanty, K. P. Leister, and R. L. Bonner, "Exposure and use of mobile media devices by young children," *\*Pediatrics\**, vol. 136, no. 6, pp. 1044–1050, 2015, doi: 10.1542/peds.2015-2151.
- [11] T. Sunderajan and S. V. Kanhere, "Speech and language delay in children: Prevalence and risk factors," *\*Journal of Family Medicine and Primary Care\**, vol. 8, no. 5, pp. 1642–1646, 2019, doi: 10.4103/jfmpe.jfmpe.v8i5.1642.
- [12] National Institute on Deafness and Other Communication Disorders, \*Quick Statistics About Voice, Speech, Language\*, 2016. [Online]. Available: [<https://www.nidcd.nih.gov/health/statistics/quick-statistics-voice-speech-language>](<https://www.nidcd.nih.gov/health/statistics/quick-statistics-voice-speech-language>). [Accessed: Oct. 29, 2020, 20:46 WIB].
- [13] S. Madigan, B. A. McArthur, C. Anhorn, R. Eirich, and D. A. Christakis, "Associations between screen use and child language skills: A systematic review and meta-analysis," *\*JAMA Pediatrics\**, vol. 174, no. 7, pp. 665–675, 2020, doi: 10.1001/jamapediatrics.2020.0327.
- [14] S. Madigan, H. Prime, S. Graham, M. Rodrigues, N. Anderson, J. Khoury, and J. Jenkins, "Parenting behavior and child language: A meta-analysis," *\*Pediatrics\**, vol. 144, no. 4, e20183556, 2019, doi: 10.1542/peds.2018-3556.
- [15] M. van den Heuvel, J. Ma, C. M. Borkhoff, C. Koroshegyi, D. Dai, P. C. Parkin, J. L. Maguire, C. S. Birken, and TARGet Kids! Collaboration, "Mobile media device use is associated with expressive language delay in 18-month-old children," *\*Journal of Developmental and Behavioral Pediatrics\**, vol. 40, no. 2, pp. 99–104, 2019, doi: 10.1097/DBP.0000000000000630.
- [16] H. Byeon and S. Hong, "Relationship between television viewing and language delay in toddlers: Evidence from a Korea national cross-sectional survey," *\*PLoS One\**, vol. 10, no. 3, e0120663, 2015, doi: 10.1371/journal.pone.0120663.
- [17] L. Y. Lin, R. J. Cheng, Y. J. Chen, Y. J. Chen, and H. M. Yang, "Effects of television exposure on developmental skills among young children," *\*Infant Behavior & Development\**, vol. 38, pp. 20–26, 2015, doi: 10.1016/j.infbeh.2014.12.005.
- [18] E. F. Masur, V. Flynn, and J. Olson, "Infants background television exposure during play: Negative relations to the quantity and quality of mothers speech and infants vocabulary acquisition," *\*First Language\**, 2016, doi: 10.1177/0142723716639499.
- [19] G. Taylor, P. Monaghan, and G. Westermann, "Investigating the association between children's screen media exposure and vocabulary size in the UK," *\*Journal of Children and Media\**, pp. 1–15, 2017, doi: 10.1080/17482798.2017.1365737.
- [20] G. F. Bentley, K. M. Turner, and R. Jago, "Mothers' views of their preschool child's screen-viewing behaviour: A qualitative study," *\*BMC Public Health\**, vol. 16, p. 718, 2016, doi: 10.1186/s12889-016-3440-z.
- [21] J. Radesky, C. Leung, D. Appugliese, A. L. Miller, J. C. Lumeng, and K. L. Rosenblum, "Maternal mental representations of the child and mobile phone use during parent-child mealtimes," *\*Journal of Developmental and Behavioral Pediatrics\**, vol. 39, no. 4, pp. 310–317, 2018, doi: 10.1097/DBP.0000000000000556.
- [22] N. Yuan, H. M. Weeks, R. Ball, M. W. Newman, Y. J. Chang, and J. S. Radesky, "How much do parents actually use their smartphones? Pilot study comparing self-report to passive sensing," *\*Pediatric Research\**, vol. 86, no. 4, pp. 416–418, 2019, doi: 10.1038/s41390-019-0452-2.
- [23] T. Horowitz-Kraus and J. S. Hutton, "Brain connectivity in children is increased by the time they spend reading books and decreased by the length of exposure to screen-based media," *\*Acta Paediatrica\**, vol. 107, no. 4, pp. 685–693, 2018, doi: 10.1111/apa.14176.
- [24] J. S. Hutton, J. Dudley, T. Horowitz-Kraus, T. DeWitt, and S. K. Holland, "Associations between screen-based media use and brain white matter integrity in preschool-aged children," *\*JAMA Pediatrics\**, vol. 174, no. 1, e193869, 2020, doi: 10.1001/jamapediatrics.2019.3869.
- [25] American Academy of Pediatrics Council on Communications and Media, "Media and young minds," *\*Pediatrics\**, vol. 138, no. 5, 2016, doi: 10.1542/peds.2016-2591.
- [26] T. G. Munzer, A. L. Miller, H. M. Weeks, N. Kaciroti, and J. Radesky, "Parent-toddler social reciprocity during reading from electronic tablets vs print books," *\*JAMA Pediatrics\**, vol. 173, no. 11, pp. 1076–1083, 2019, doi: 10.1001/jamapediatrics.2019.3480.
- [27] S. E. Domoff, J. S. Radesky, K. Harrison, H. Riley, J. C. Lumeng, and A. L. Miller, "A naturalistic study of child and family screen media and mobile device use," *\*Journal of Child and Family Studies\**, vol. 28, no. 2, pp. 401–410, 2019, doi: 10.1007/s10826-018-1275-1.
- [28] Canadian Paediatric Society, Digital Health Task Force, "Screen time and young children: Promoting health and development in a digital world," *\*Paediatrics & Child Health\**, vol. 22, no. 8, pp. 461–477, 2017, doi: 10.1093/pch/pxx123.