

## Duration of watching TV and child language development in young children

Silva Audya Perdana<sup>1</sup>, Bernie Endyarni Medise<sup>2</sup>, Erni Hernawati Purwaningsih<sup>3</sup>

### Abstract

**Background** Many factors contribute to language development in children. About 5-8% of children in Indonesia experience delayed language skills. Young children need appropriate stimulation for optimal development. Children who watch television (TV) for long periods of time may receive less two-way interaction, the appropriate stimulation for learning. As such, shorter duration of the appropriate stimulation may impede language development in small children.

**Objective** To assess for an association between duration of watching TV and language development in young children.

**Methods** This cross-sectional study was done with primary data collected from questionnaires. Subjects, aged 18 months to 3 years, were from a Jakarta-area community health center (Puskesmas) Jatinegara and the Pediatric Growth and Development Clinic, Cipto Mangunkusumo Hospital, Jakarta. Their language development was tested using the Developmental Pre-screening Questionnaire (Kuesioner Pra Skrining Perkembangan, KPSP) and the Early Language Milestone (ELM Scale 2) test.

**Results** From a total of 84 subjects, 47 (56%) had normal and 37 (44%) had delayed language development. Duration of watching TV was categorized as <4 hours per day or >4 hours per day. Children who watched TV >4 hours/day (OR 4.4; 95%CI 1.68 to 11.7; P=0.002), and children who watched both Indonesian and English language TV programs (OR 14.7; 95%CI 1.77 to 123.0; P=0.004) had higher risk of language delay. Other variables such as sex, first age exposed to TV, use of gadgets, and TV in the bedroom had no significant associations with delayed language development.

**Conclusion** Children who watch TV >4 hours/day have four times higher risk of developing language delay. In addition, those who watch TV programs in both Indonesian and English, also have a 14.7 higher risk of delayed language development. [Paediatr Indones. 2017;57:99-103. doi: <http://dx.doi.org/10.14238/pi57.2.2017.99-103> ].

**Keywords:** child TV viewing; duration of watching TV; delayed language development

Proper stimuli are needed for optimal child development. Parents should encourage their children to be physically active, in order to develop their potential.<sup>1</sup> However, children also like to watch TV, as many programs are offered for adults as well as children as target audiences. Some parents find TV to be helpful, especially while attending to household tasks, because their children are entertained by TV programs. However, some parents may not realize that despite the calming influence of TV on children, frequent TV viewing is a bad habit for children, as it may impact their language development.<sup>2</sup>

The American Academy of Pediatrics (AAP) recommends that children >2 years of age watch TV or use other media (gadgets) for no longer than 2 hours per day. In addition, children under 2 years, should not be exposed to media at all.<sup>2</sup> The time spent on TV or other media can inhibit child language development. However, TV programs and technological gadgets are interesting and always being improved. Their developers persuade parents to provide them as educational tools for children. Duch et al.<sup>3</sup> reported that 82% of children aged one year

From the Medical Student<sup>1</sup>, Department of Child Health<sup>2</sup>, and Department of Pharmacology<sup>3</sup>, University of Indonesia Medical School/ Dr. Cipto Mangunkusumo Hospital, Jakarta, Indonesia.

Reprint requests to: Bernie Endyarni Medise, Department of Child Health, University of Indonesia. Medical School, Jalan Diponegoro no. 71, Jakarta

watched TV everyday; some children aged 2 years watched TV longer than two hours per day. They also found that as children grew older they tended to watch more TV. This habit should be changed in order to achieve better development, as not only language development is affected, but cognitive development and academic achievement may also be affected as the child gets older.<sup>3,4</sup>

The Indonesian Pediatric Society (*Ikatan Dokter Anak Indonesia*) stated that 5-8% of preschool children have speech and language delays.<sup>5</sup> According to Suwarba et al. speech and walking delays are the most common developmental problems in children seen at Cipto Mangunkusumo Hospital.<sup>6</sup> Many etiologies can influence language development, one of which might be related to family habits, including time spent in front of the TV. Almost all Indonesian families have a television in the home, many of whom have a television in the bedroom.

Past studies on TV exposure in children and how it affects child language development have been inconclusive. Ruangdaraganon et al. found no association between watching TV and language development in 2-year-olds in Thailand.<sup>7</sup> However, Chonchaiya et al. found that 56 out of 110 children had delayed language development due to TV-watching habits. They also found that children younger than one year who watched TV more than two hours daily were at much higher risk of delayed language development.<sup>8</sup>

We aimed to assess for an association between duration of watching TV and child language development in toddlers. We chose an age range of 18 months to 3 years because language development, as well as brain development, occurs most rapidly in children below 5 years of age.

## Methods

We performed a cross-sectional study with simple random sampling for subjects aged 18 months to 3 years. The study was conducted at the Pediatric Growth and Development Clinic, Department of Child Health, Cipto Mangunkusumo Hospital and community health center (Puskesmas) Jatinegara, Jakarta from January to May 2015. A total of 84 children were included in this study. Language

development was measured with the Developmental Pre-screening Questionnaire (*Kuesioner Pra Skrinning Perkembangan or KPSP*) which had been used widely in Indonesia, and the *Early Language Milestone (ELM Scale – 2)* test.<sup>9,10</sup>

The exclusion criteria was children with genetic disease. Children who failed to complete the KPSP and ELM Scale-2 test as well as children whom parents did not complete the questionnaire were also excluded. Children with KPSP scores of 9-10 were considered to be normal in all aspects of development, including language development. However, children with KPSP scores of 8 or below underwent further testing with ELM Scale-2 to determine the status of their language development. The ELM Scale-2 was used to assess the language development in subjects, which consisted of three divisions namely auditory expressive, auditory receptive, and visual. Assessment was done according to the age of the subject. Subject were classified to have normal language development if she/he passed all the three divisions, and categorized to have delayed language development if subject failed on one of three divisions. Based on the results of the KPSP and ELM Scale-2 test, children were categorized as having delayed or normal language development. Parents filled questionnaires on their children's TV habits. Watching TV was assumed as the time when the children were put in front of TV, whether with parents or alone. The durations of watching TV were grouped into <4 hours or >4 hours per day. Types of language used in TV program were categorized into Indonesian or English language, or both. Assessment of duration of gadget usage per day was based on the question "How many hours does the child spent on playing gadget per day?" filled by the parents in the questionnaire. The term gadget includes tablets, computer, and laptop. The descriptive data was analyzed by Chi-square test using *SPSS version 17*. Results with P values <0.05 were considered to be statistically significant.

## Results

Of 84 children, those with normal language development (47 subjects) consisted of 57% females and 43% males. Children with delayed language development (37 subjects) consisted of 41% females

and 59% males. We found that 95% of children with delayed language development and 94% of children with normal language development had been first exposed to TV at less than 2 years of age. Regarding the duration of watching TV, children who watched TV for more than 4 hours/day had a higher risk of delayed language development (OR 4.4; 95%CI 1.68 to 11.7; P=0.002).

Other variables, such as sex, age that the child was first exposed to TV, the use of gadgets, and TV in the bedroom, were also evaluated, as shown in **Table 1**. There were 57% of children with normal and 62% of children with delayed language development who used gadgets (P=0.823). In addition, 49% of subjects with normal language development had a TV in their bedroom, while 70% of those with delayed language had a TV in the bedroom, but this difference was not significant (P=0.74). About 98% children with normal language development watched Indonesian TV programs, and only 2% watched both Indonesian and English TV programs. In children with delayed language development, 76% watched Indonesian TV programs and 24% watched Indonesian and English TV programs. Hence, significantly more subjects with normal language development watched only Indonesian programs, than did subjects with delayed language development (OR 14.7; 95%CI 1.77 to 123.02; P=0.004).

We found that the mean age of children were 26.1 months in the normal language development group, with the youngest being 10 months and the oldest being 36 months, as shown in **Table 2**. The mean age in the delayed language development group was 29.3 with the youngest being 18 months and the oldest being 36 months. Mean daily TV times was 2.9 hours in the normal language development group, with the shortest duration is less than 1 hour and the longest duration is 10 hours per day. For the delayed language development group the mean daily TV times was 4.4 hours, with the shortest duration is less than 1 hour and the longest duration is 12 hours per day. The mean daily gadget times were 1.5 hours for those with normal language development and 1 hour for those with delayed language development. The shortest duration is 30 minutes and the longest duration is 2 hours per day both in the normal and delayed language development group.

## Discussion

Many factors contribute to child language development. Development occurs progressively and varies at different ages. Children need appropriate stimulation for optimal development.<sup>11,12</sup> Children imitate the speech of the people around them, often

**Table 1.** Associations between language development in children aged 18-36 months and variables

Variables	Language development		Odds ratio (95%CI)	P value
	Normal (n=47)	Delayed (n=37)		
Gender, n(%)				
Male	20 (43)	22 (59)	0.5 (0.21 to 1.21)	0.187
Female	27 (57)	15 (41)		
Daily TV exposure, n(%)			4.4 (1.68 to 11.7)	0.002
≤ 4 hours	38 (81)	18 (49)		
> 4 hours	9 (19)	19 (51)		
First exposed to TV, n(%)			0.8 (0.13 to 5.29)	1.000
< 2 years old	44 (94)	35 (95)		
≥ 2 years old	3 (6)	2 (5)		
Use of gadgets, n(%)			0.8 (3.41 to 1.98)	0.823
Yes	27 (57)	23 (62)		
No	20 (43)	14 (38)		
TV in bedroom, n(%)			0.4 (0.16 to 1.0)	0.74
Yes	23 (40)	26 (70)		
No	24 (51)	11 (30)		
TV language, n(%)			14.7 (1.77 to 123.02)	0.004
Indonesian	46 (98)	28 (76)		
Indonesian & English	1 (2)	9 (24)		

**Table 2.** Mean age, duration of watching TV, and gadget use in children with normal and delayed language development

Variables	Meang age (SD), months	Mean daily TV time (SD), hours	P value	Mean daily gadget time (SD), hours	P value
Normal language development	26.1 (6.9)	2.9 (1.8)	0.025	1.5 (0.7)	0.067
Delayed language development	29.3 (7.7)	4.4 (3.2)		1 (0.9)	

mispronouncing words; for example, instead of saying, “hand,” they say, “and.” Eventually they will learn to pronounce words correctly, through stimulation and practice.<sup>13,14</sup> There are many ways to provide stimulation so that children improve their language development. Some parents believe that watching TV is one such method,<sup>7</sup> while TV may actually lead to language delays. Preventing children from watching TV is not easy, because TV is an interesting source of entertainment media at home. Some factors that influence watching TV are behavioral, such as total hours of daily sleeping, environmental factors such as family habit of watching TV, having TV in the bedroom, and non-parental child care. A child’s biological and demographic factors include sex, age, ethnicity, and firstborn status; while the family’s biological or demographic factors include parental education, income, and age.<sup>3</sup>

The AAP recommends that children watch TV only after the age of 2 years, and not exceeding 2 hours per day.<sup>1</sup> We found that 79 of 84 subjects started watching TV before 2 years of age. This observation suggests many parents are unaware of the potentially negative effects of watching TV at an early age. Of these 79 subjects, 44 had normal and 35 had delayed language development. Only 5 of our subjects began watching TV at  $\geq 2$  years of age.

A previous study showed a significant association between male sex and delayed language development.<sup>7</sup> In our study, the percentage of males with delayed language development was higher (59.5%) than for females, but the difference was not significant. We noted two significant variables related to delayed language development. First, children who had a  $>4$  hour/day duration of watching TV had 4 times the risk of delayed language development (OR 4.4; 95%CI 1.68 to 11.7;  $P=0.002$ ). Similarly, Chonchaiya *et al.* found that children who were first exposed to TV at less than 12 months of age and spent more than 2 hours daily watching TV had six times the

risk delayed language development.<sup>8</sup> In our subjects with normal language development, 81% watched TV  $<4$  hours daily. However, their mean duration of watching TV (2.9 hours daily) still exceeded the AAP recommendation ( $<2$  hours). Subjects with delayed language development watched TV for a mean 4.4 hours daily.

The second significant variable related to developmental delays in language was the viewing of TV programs in two languages, Indonesian and English (OR 14.7; 95%CI 1.77 to 123.02;  $P=0.004$ ). Children who watched TV programs in Indonesian and another language, most likely English (with Indonesian as the main language used at home), had 14.7 times the risk of delayed language development. The use of a language which is not often heard in daily life may confuse them. When children watch TV in a language different from their primary language, without their parents or caregivers to interact and guide them, they will likely have difficulty understanding the TV program. Learning is about repetitively receiving a stimulus, step-by-step.<sup>11</sup> Young children easily understand words they often hear due to direct interaction with the speaker. However, hearing words in another language on TV, is passive learning from TV. Furthermore, learning two languages at once may confuse the child and inhibit optimal learning, as children differ in their ability to learn. Moreover, differences in grammatical order (of Indonesian and English language) may confuse children in constructing sentences and may cause blended use of language.<sup>13,14</sup>

Although language development is complex, stimulation is one of the most important factors. Learning occurs in response to stimuli.<sup>2</sup> As such, watching TV itself may not directly affect language development, but the lack of stimuli does. In fact, the dangerous aspect of children watching TV is using the TV to replace interaction with parents or caregivers. As such, children spending long periods of time in

front of the TV, rather than interaction with parents, may affect their language development.<sup>15,16</sup>

In our study, having a TV in the bedroom was not significantly associated with language development, however we found more than half of children with delayed language development (70.3%) had a TV in their room. Besides TV, other entertainment media at home in the form of gadgets were not associated with child language development in our study. However, the use of gadgets should be evaluated in more detail, as to the suitability of various types of gadgets and software applications.

In conclusion, children who watch TV >4 hours/day have four times higher risk of developing language delay. In addition, those who watch TV programs in both Indonesian and English, also have a 14.7 higher risk of delayed language development.

### Acknowledgements

We would like to thank Anthonia Paramitha for assistance with data collection, as well as acknowledge Mr. Kus for assistance with statistical analysis.

### Conflict of Interest

None declared.

### References

1. Ginsburg KR, American Academy of Pediatrics Committee on Communications, American Academy of Pediatrics Committee on Psychosocial Aspects of Child and Family Health. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*. 2007;119:182-91.
2. Council on Communications and Media, Brown A. Media use by children younger than 2 years. *Pediatrics*. 2011;128:1040-5.
3. Duch H, Fisher EM, Ensari I, Harrington A. Screen time use in children under 3 years old: a systematic review of correlates. *Int J Behav Nutr Phys Act*. 2013;10:102.
4. Tomopoulos S, Dreyer BP, Berkule S, Fierman AH, Brockmeyer C, Mendelsohn AL. Infant media exposure and toddler development. *Arch Pediatr Adolesc Med*. 2010;164:1105-11.
5. Soebadi A. Keterlambatan bicara [internet]. 2013; updated 12 June 2013; [cited 8 January 2015]. Available from: <http://idai.or.id/public-articles/klinik/keluhan-anak/keterlambatan-bicara.html>.
6. Suwarba IGN, Widodo DP, Handryastuti RAS. Profil klinis dan etiologi pasien keterlambatan perkembangan global di Rumah Sakit Cipto Mangunkusumo Jakarta. *Sari Pediatri*. 2008;10:255-61.
7. Ruangdaraganon N, Chuthapisith J, Mo-suwan L, Kriweradachachai S, Udomsubpayakul U, Choprapawon C. Television viewing in Thai infants and toddlers: impacts to language development and parental perceptions. *BMC Pediatr*. 2009;22:9:34.
8. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. *Acta Paediatr*. 2008;97:977-82.
9. Dhamayanti M. Kuesioner Pra Skrining Perkembangan (KPSP) anak. *Sari Pediatri*. 2006;8:9-15.
10. Walker D, Gugenheim S, Down MP, Northen JL. Early Language Milestone Scale and Language Screening of Young Children. *Pediatr*. 1989;83:284-8.
11. Biedinger N. The influence of education and home environment on the cognitive outcomes of preschool children in Germany. *Child Dev Res*. 2011;13:1-10.
12. Venetsanou F, Kambas A. Environmental factors affecting preschooler's motor development. *Early Childhood Educ J*. 2009;37:319-27.
13. Ramirez NF, Lieberman AM, Mayberry RI. The initial stages of first-language acquisition begun in adolescence: when late looks early. *J Child Lang*. 2013;40:391-414.
14. Oxford M, Spieker S. Preschool language development among children of adolescent mothers. *J Appl Dev Psychol*. 2006;27:165-82.
15. Schmidt ME, Rich M, Rifas-Shiman SL, Oken E, Taveras EM. Television viewing in infancy and child cognition at 3 years of age in a US cohort. *Pediatrics*. 2009;123:370-5.
16. Jordan AB, Hersey JC, McDivitt JA, Heitzler CD. Reducing children's television-viewing time: a qualitative study of parents and their children. *Pediatrics*. 2006;118:1303-10.