Screen Time for Preschool Children: Learning from Home during the COVID-19 Pandemic

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Abstract
Because of the COVID-19 pandemic, the Indonesian Government enacted a study at home policy for all students. This policy also applied to preschool children aged 2 to 6 years old. The purpose of the research was to examine the duration and impact of digital media use by preschool children in urban areas in Indonesia during weekdays and weekends. Data were collected using a validated questionnaire called the Surveillance of digital-Media habits in earLy chiLDhooD Questionnaire (SMALLQ®). A total of 951 parents or guardians (17-70 years old) who had preschool children volunteered to complete the questionnaire online. Preschool children have been using screen media since infancy, and the time they spend on-screen time is more than 1 hour per day. The digital media most used were mobile phones (91.6%), followed by television (86.1%) and computers (61%). The parents realized the impact and the importance of limiting time of screen media, but it difficult to prevent their children from using it, especially when learning from home. Hence, there is a need different approach to learning from home, especially to manage the duration of screen time for preschool children.

Keywords
screen time, pre-school child, Indonesia, school from home

Received March 13, 2021. Received revised March 22, 2021. Accepted for publication April 24, 2021.

Introduction
The COVID-19 Pandemic has required most students to learn from home. The Ministry of Education in Indonesia instituted a policy of learning from home from 24 March 2020 until the end of 2020. Furthermore, the process of studying now includes video conferences and online discussions, and assignments are sent online as well. This phenomenon even applies to preschool children, as they tend to use screen media more frequently because of the ubiquity of mobile technologies and increased access to technology. Furthermore, their outdoor activities have been limited by the pandemic.

According to the American Academy of Pediatrics1 the standard duration for using screen media for preschool children (2-6 years old) is 1 hour per day. There are unwelcome consequences from using screen media for extended periods. Sedentary behaviors, screen addiction, increased obesity and metabolic conditions and poor sleep and eyesight can come from excessive daily indulgence in digital media. Some descriptive studies conducted in several Asian countries in the last 5 years reported that young children experienced significant amounts of screen time from television, computers and other forms of mobile digital devices, even before primary school.2-5

Yet the research into the effects of such exposure to screen media on the health and development of preschool children in Asia and elsewhere cannot match the increased use of such technologies.4 Moreover, learning
from home in Indonesia mostly involved using screen media such as television, mobile phones, tablets, and laptops, and the duration of using screen media is longer than 1 hour among preschool children. The purpose of this research was to determine the amount of time that preschool children (2-6 years old) in Indonesia used digital media and the impacts of that use.

Methods
This paper is based on a multicentre study. It involved urban cities in Asian Countries, such as in Singapore, Indonesia, Taiwan, Thailand, China, India, South Korea, Egypt, United Arab Emirates, and Japan. However, this paper presents the data for Indonesia. A total of 951 parents or guardians (17-70 years old) who had preschool children volunteered to complete the questionnaires online. The subject gave informed consent and anonymously.

An online content validated questionnaire bundle, Surveillance of digital-Media hAbits in earLy chiLdhood Questionnaire (SMALLQ®) is organized into sections (I) screen media use; (II) non-screen media behavior, play, sleep and eyesight; and (III) particulars of parents and child was used for data acquisition.6 This instrument was developed from guidelines from the World Health Organization.7 Validation of the instrument followed WHO guidelines for adaptation of instruments. SMALLQ® was forward translated and back translated by an expert panel. Then it was pre-tested, followed by cognitive interviews and revision based on the test results.

The screen media used in this research were televisions, computers (desktops and laptops), gadgets (mobile phones and tablets), Blu-ray/DVD/CD/video recording players and games on computers or devices. Some questions were added about the child’s posture while using the screen media. Data were collected online, and participants were identified using the snowball technique. The questionnaire was shared on social media for 1 month, from 15 June to 15 July 2020. The data were analyzed using statistical software SPSS V 23, using the chi-square test and logistic linear analysis.

Results
Most of the respondents were mothers (40.3%), while fathers were 11.6% (see Table 1). Most of the children were 2 years old (52.8%), followed by those 5 years old (13%), 4 years old (12.5%) and 6 and 3 years old (each around 10%).

The digital media used most by respondents and their children were mobile phones (91.6%), followed by televisions (86.1%) and computers (61%). The first time most children used television, they were 1 year old (31.3%) or infants (27.7%). The first time most used gadgets (mobile phones and tablets) they were still infants (24.2%), then at age two (23.2%). Most of the preschool children used digital media less than 3 hours on weekdays, and they used it for learning purposes (35.6%), entertainment (26.7%), open application including social media (39.2%), and communication (40.5%). During weekends or public holidays, they used the media for learning purposes (35.2%), entertainment (21.2%), social media (36%), and communication (35.5%).

Meanwhile, the time that parents monitored their child’s use of digital media was less than 25% to 20.1% on weekdays and 15.4% on weekends. However, the highest rate at which parents were with their children while using screen media was more than 75%. On weekdays, 21.6% of parents spent this much time, while 29.7% did so on weekends. Most parents introduced screen media to their children to improve their knowledge and skills (61.5%), followed by entertainment (55.7%) and communication (34.4%). Meanwhile, the greatest reason parents used screen media with their children was to keep them calm/not fussy (31.6%). This was followed by distracting or diverting the child’s attention (37.3%) and to put the child to sleep (12.8%).

Parents knew that using screen media had impacts on their children besides their postures. They also reported poor sleep (60.2%), poor eyesight (60.1%), lack of physical exercise and play (62.5%), opening inappropriate content (62.2%), addiction (64.4%), and lack of interaction between children and parents (62.5%). Moreover, most parents were aware of the rules for screen digital media and children: limiting the use of digital media (56.6%), limiting screen time (55.6%), introducing only high quality and proper content (58.9%) and accompanying the children while they used digital media (58.3%). Even though parents already knew the impact of using digital media and were aware of their effects on children, only about half of the parents practiced the rules.

Two impacts of using digital media were the reduction of the children’s night time and quality of. However, the survey results showed that the duration of sleep was at least 8 hours per night (51% of children had this much time during the week, and 50.3% had it on weekends), and the quality of sleep was still good (57.2% during the week and 55.8% on weekends). The quality of sleep was identified as good if it was easy for the child to fall asleep at bedtime, and there was no disturbance during sleep.
| Category                        | Response (n) | Percent |
|--------------------------------|--------------|---------|
| Child’s age                    |              |         |
| 2                              | 502          | 52.8    |
| 3                              | 102          | 10.7    |
| 4                              | 119          | 12.5    |
| 5                              | 124          | 13.0    |
| 6                              | 104          | 10.9    |
| Parent/guardian respondent     |              |         |
| Mother                         | 383          | 40.3    |
| Father                         | 110          | 11.6    |
| Grandmother                    | 29           | 3.0     |
| Grandfather                    | 4            | 0.4     |
| Guardian                       | 39           | 4.1     |
| Not applicable                 | 386          | 40.6    |
| Digital media used (respondent could checked more than 1) | | |
| Television                     | 819          | 86.1    |
| Computer                       | 580          | 61.0    |
| Mobile devices                 | 871          | 91.6    |
| Video game devices             | 93           | 9.8     |
| Blue-ray/DVD/CD                | 148          | 15.6    |
| Intelligent/technology toy     | 487          | 51.2    |
| Child’s first exposure         |              |         |
| Fixed screens (television. desktop computer) | | |
| < 1 year                       | 263          | 27.7    |
| 1 year                         | 298          | 31.3    |
| 2 years                        | 210          | 22.1    |
| 3 years                        | 91           | 9.6     |
| 4 years                        | 42           | 4.4     |
| 5 years                        | 30           | 3.2     |
| 6 years                        | 15           | 1.6     |
| Not applicable                 | 2            | 0.2     |
| Mobile screen (smartphone. tablet) | | |
| < 1 year                       | 230          | 24.2    |
| 1 year                         | 187          | 19.7    |
| 2 years                        | 221          | 23.2    |
| 3 years                        | 130          | 13.7    |
| 4 years                        | 61           | 6.4     |
| 5 years                        | 61           | 6.4     |
| 6 years                        | 38           | 4.0     |
| Not applicable                 | 23           | 2.4     |
| Time spent on digital media (weekday) | | |
| Education                      |              |         |
| < 3 hours                      | 339          | 35.6    |
| 3-5 hours                      | 98           | 10.3    |
| 5-8 hours                      | 62           | 6.5     |
| > 8 hours                      | 50           | 5.3     |
| Not applicable                 | 402          | 57.7    |
| Entertainment                  |              |         |
| < 3 hours                      | 254          | 26.7    |
| 3-5 hours                      | 145          | 15.2    |
| 5-8 hours                      | 127          | 13.4    |
| > 8 hours                      | 123          | 12.9    |
| Not applicable                 | 302          | 31.8    |

**Table 1.** (continued)

| Category                        | Response (n) | Percent |
|--------------------------------|--------------|---------|
| Open application (including social media) | | |
| < 3 hours                      | 373          | 39.2    |
| 3-5 hours                      | 28           | 2.9     |
| 5-8 hours                      | 21           | 2.2     |
| > 8 hours                      | 13           | 1.4     |
| Not applicable                 | 516          | 54.3    |
| Communication                  |              |         |
| < 3 hours                      | 385          | 40.5    |
| 3-5 hours                      | 49           | 5.2     |
| 5-8 hours                      | 24           | 2.5     |
| > 8 hours                      | 21           | 2.2     |
| Not applicable                 | 472          | 49.6    |
| Time spent on digital media (weekend) | | |
| Education                      |              |         |
| < 3 hours                      | 335          | 35.2    |
| 3-5 hours                      | 92           | 9.7     |
| 5-8 hours                      | 58           | 6.1     |
| > 8 hours                      | 30           | 3.2     |
| Not applicable                 | 436          | 45.8    |
| Entertainment                  |              |         |
| < 3 hours                      | 202          | 21.2    |
| 3-5 hours                      | 134          | 14.1    |
| 5-8 hours                      | 147          | 15.5    |
| > 8 hours                      | 167          | 17.6    |
| Not applicable                 | 301          | 31.7    |
| Open application (including social media) | | |
| < 3 hours                      | 342          | 36.0    |
| 3-5 hours                      | 27           | 2.8     |
| 5-8 hours                      | 28           | 2.9     |
| > 8 hours                      | 16           | 1.7     |
| Not applicable                 | 538          | 43.4    |
| Communication                  |              |         |
| < 3 hours                      | 338          | 35.5    |
| 3-5 hours                      | 50           | 5.3     |
| 5-8 hours                      | 40           | 4.2     |
| > 8 hours                      | 31           | 3.3     |
| Not applicable                 | 492          | 51.7    |
| Time spent with parent while child used digital media | | |
| Weekday                        |              |         |
| < 25%                          | 191          | 20.1    |
| 25-50%                         | 182          | 19.1    |
| 50-75%                         | 104          | 10.9    |
| > 75%                          | 205          | 21.6    |
| Not applicable                 | 269          | 28.3    |
| Weekend                        |              |         |
| < 25%                          | 146          | 15.4    |
| 25-50%                         | 146          | 15.4    |
| 50-75%                         | 104          | 10.9    |
| > 75%                          | 282          | 29.7    |
| Not applicable                 | 273          | 28.7    |
Table 1. (continued)

| Category                                      | Response (n) | Percent |
|-----------------------------------------------|--------------|---------|
| Child’s purpose for using digital media       |              |         |
| Improve knowledge and skills                  | 588          | 61.5    |
| Entertainment                                 | 530          | 55.7    |
| Communication                                 | 327          | 34.4    |
| Parent’s purpose for using digital media      |              |         |
| Keep child occupied                           | 301          | 31.6    |
| Distract or divert child’s attention          | 354          | 37.3    |
| Put the child to sleep                        | 122          | 12.8    |
| Concern about impact of digital media         |              |         |
| Poor sleep                                    | 572          | 60.2    |
| Poor eyesight                                 | 574          | 60.1    |
| Lack of physical exercise and play           | 594          | 62.5    |
| Exposure to inappropriate contents            | 591          | 62.2    |
| Addiction                                     | 612          | 64.4    |
| Lack of parent–child interaction              | 594          | 62.5    |
| Knowledge of guidelines on digital media use  |              |         |
| by children                                   |              |         |
| Limit digital media use                       |              |         |
| Not aware                                     | 17           | 1.8     |
| Not aware but practicing                      | 60           | 6.3     |
| Aware but not practicing                      | 170          | 17.9    |
| Aware and practicing                          | 368          | 38.7    |
| Not applicable                                | 336          | 35.3    |
| Limit screen time                             |              |         |
| Not aware                                     | 14           | 1.5     |
| Not aware but practicing                      | 73           | 7.7     |
| Aware but not practicing                      | 163          | 17.1    |
| Aware and practicing                          | 366          | 38.5    |
| Not applicable                                | 335          | 35.2    |
| Introduce only high quality and proper content|              |         |
| Not aware                                     | 14           | 1.5     |
| Not aware but practicing                      | 46           | 4.8     |
| Aware but not practicing                      | 81           | 8.5     |
| Aware and practicing                          | 479          | 50.4    |
| Not applicable                                | 331          | 34.8    |
| Accompany while using digital media           |              |         |
| Not aware                                     | 16           | 1.7     |
| Not aware but practicing                      | 49           | 5.2     |
| Aware but not practicing                      | 77           | 8.2     |
| Aware and practicing                          | 476          | 50.1    |
| Not applicable                                | 333          | 35.0    |
| Duration of the child’s night time            |              |         |
| Weekday                                       |              |         |
| <8 hours                                      | 75           | 7.9     |
| 8 hours                                       | 166          | 17.5    |
| >8 hours                                      | 319          | 33.5    |
| Not applicable                                | 391          | 41.1    |

(continued)
the studies on this are few. Whereas the language learning process in children depends on the child’s attributes, the stimulation characteristics of screen media, the various environmental contexts where a child uses screen media and media content resemble infants’ and toddlers’ real-life experiences. Likewise, in this study, children were exposed to media before the age of 3, but that did not mean that the children’s language skills improved. Studies by Lin et al.11 and Barr et al.12 had the opposite results. Viewing screen media (television) for longer times increased the risk of delaying cognitive, language and motor development and led to poorer executive function.11,12 Tomopoulos et al.13 presented similar results that the duration of media exposure at age 6 months was associated with lower cognitive and lower language development at age 14 months. This research also showed that parents clearly understood the impact of excessive screen time, and they agreed if it need assisted and accompanied when their children used screen media. However, our study found that about 40% of parents supervised their children just under 50% of the time on weekdays and weekends. In line with that, 38% of parents had implemented rules to limit the amount of time their children used digital media. Another impact already seen by our respondents was the decline in the quantity and quality of sleep. Although most respondents claimed their children had good-quality sleep, they also reported that their children did not have good-quality sleep. Carter et al.14 found that the amount of screen time was associated with inadequate quantity of sleep, low quality of sleep and excessive daytime sleepiness to a significant degree. Other studies showed that screen time in children was correlated with migraine,15 sedentary lifestyle,16 less physical fitness17 and increased daytime tiredness.18,19 Regulations to limit the screen time are essential for children’s health. Such regulations are highly relevant under conditions of the pandemic, which could be guideline for children to use screen media for e-learning.

Conclusion
Preschool children have been using screen media since infancy, and the time they spend on screen time is more than the American Academy of Pediatrics recommendation. Besides, parents have realized the impact of using screen media and the rules for limiting it, but they find it difficult to prevent their children from using such media, especially when learning from home. Hence, there is a need for a different approach to learning from home, especially to manage the amount of time preschool children use screen media.

Author Contributions
All authors participated in substantial contributions in this article. IHS conceived the idea, designed and conducted the study, wrote the manuscript. SA conducted the study. SN designed and conducted the study. BPH conducted the study, wrote the manuscript, and the revision.

Declaration of Conflicting Interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study supported by PUTI Grant from Universitas Indonesia with contract number: NKB-4489/UN2.RST/HKP.05.00/2020.

Ethical Statement
This study was approved by the Research and Community Engagement Ethical Committee Faculty of Public Health Universitas Indonesia with ethical approval number: 109/UN2.F10.D11/PPM.00.02/2020.

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References
1. American Academy of Pediatrics. American Academy of Pediatrics Announces New Recommendations for Childrens Media Use. 2020. Accessed April 1, 2020. https://services.aap.org/en/news-room/news-releases/aap/2016/aap-announces-new-recommendations-for-media-use/
2. Ebbeck M, Yim HYB, Chan Y, Goh M. Singaporean Parents’ Views of Their Young Children’s Access and Use of Technological Devices. Early Child Educ J. 2016;44:127-134. doi:10.1007/s10643-015-0695-4
3. Tamana SK, Ezeugwu V, Chikuma J, et al. Screen-time is associated with inattention problems in preschoolers: results from the CHILD birth cohort study. PLoS One. 2019;14:e0213995. doi:10.1371/journal.pone.0213995
4. UNICEF. State of the Worlds Children 2017 - Children in a Digital World. UNICEF; 2017.
5. Van Den Heuvel M, Ma J, Borkhoff CM, 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. doi:10.1097/DBP.0000000000000630
6. Chia MYH, Tay LY, Chua TBK. The development of an online surveillance of digital media use in early childhood questionnaire-SMALLO™-for Singapore. Monten J Sports Sci Med. 2019;8:77-80. doi:10.26773/mjssm.190910
7. WHO. *WHO Guidelines on Physical Activity, Sedentary Behaviour and Sleep. For Children under 5 Years of Age*. World Health Organization; 2019.

8. McCloskey M, Johnson SL, Benz C, et al. Parent perceptions of mobile device use among preschool-aged children in rural head start centers. *J Nutr Educ Behav*. 2018;50:83-89.e1. doi:10.1016/j.jneb.2017.03.006

9. Common Sense Media. Zero to eight: children’s media use in America 2013. 2013. Accessed April 1, 2020. https://www.commonsensemedia.org/research/zero-to-eight-childrens-media-use-in-america-2013

10. Linebarger DL, Vaala SE. Screen media and language development in infants and toddlers: an ecological perspective. *Dev Rev*. 2010;30:176-202. doi:10.1016/j.dr.2010.03.006

11. Lin LY, Cherng RJ, Chen YJ, Chen YJ, Yang HM. Effects of television exposure on developmental skills among young children. *Infant Behav Dev*. 2015;38:20-26. doi:10.1016/j.infbeh.2014.12.005

12. Barr R, Lauricella A, Zack E, Calvert SL. Infant and early childhood exposure to adult-directed and child-directed television programming: relations with cognitive skills at age four. *Merrill Palmer Q*. 2010;56:21-48. doi:10.1353/mpq.0.0038

13. Tomopoulos S, Dreyer BP, Berkule S, Fierman AH, Brockmeyer C, Mendelsohn AL. Infant media exposure and toddler development. *Arch Pediatr Adolesc Med*. 2010;164:1105-1111. doi:10.1001/archpediatrics.2010.235

14. Carter B, Rees P, Hale L, Bhattacharjee D, Paradkar MS. Association between portable screen-based media device access or use and sleep outcomes a systematic review and meta-analysis. *JAMA Pediatr*. 2016;170:1202-1208. doi:10.1001/jamapediatrics.2016.2341

15. Attygalle UR, Hewawitharana G, Wijesinghe CJ. Migraine, attention deficit hyperactivity disorder and screen time in children attending a Sri Lankan tertiary care facility: are they associated? *BMC Neurol*. 2020;20:275. doi:10.1186/s12883-020-01855-5

16. Tremblay MS, LeBlanc AG, Carson V, et al. Canadian sedentary behaviour guidelines for the early years (aged 0-4 years). *Appl Physiol Nutr Metab*. 2012;37:370-391. doi:10.1139/H2012-019

17. Garriguet D, Carson V, Colley RC, Janssen I, Timmons BW, Tremblay MS. Physical activity and sedentary behaviour of Canadian children aged 3 to 5. *Health Rep*. 2016;27:14-23.

18. Lemola S, Brand S, Vogler N, Perkinson-Gloor N, Allemand M, Grob A. Habitual computer game playing at night is related to depressive symptoms. *Pers Individ Dif*. 2011;51:117-122. doi:10.1016/j.paid.2011.03.024

19. Wallenius M, Punamäki RL, Rimpelä A. Digital game playing and direct and indirect aggression in early adolescence: the roles of age, social intelligence, and parent-child communication. *J Youth Adolesc*. 2007;36:325-336. doi:10.1007/s10964-006-9151-5