

SCREEN TIME DURING THE CORONAVIRUS (COVID-19) PANDEMIC IS RELATED TO THE DEVELOPMENTAL STATUS OF PRESCHOOLERS

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ABSTRACT

The Covid-19 pandemic that preschoolers have faced for the past 2 years has caused children to stay at home for a long time and be exposed to more screen time. This study aims to determine the effect of screen time during the Covid-19 pandemic on the developmental status of preschool-aged children. This study used a cross-sectional analytic design with 60 mothers and their children aged 4-6 years (preschool). Samples were taken using a purposive sampling technique that met the inclusion criteria. This study used a screen time questionnaire, Developmental Pre Screening Questionnaire (KPSP), and a visual acuity test examination (TDL). Data were analyzed using univariate analysis and Chi-Square bivariate analysis. The results showed that the majority of children had a total screen time of 56.7% in the high category. Chi-square analysis showed that there was a significant relationship between children's screen time and developmental screening results (p -value = 0.001) and visual status (p -value = 0.005). Children with high screen time (≥ 2 hours/day) have a 22 times greater chance of experiencing doubtful development (OR = 22), and a 15.48 times greater chance of experiencing visual impairment (OR = 15.48) compared to children with low screen time (< 2 hours/day). This study recommends that parents limit screen time to no more than 2 hours per day for preschool-aged children because it can affect their developmental status.

Keywords: Screen time; Preschool; Covid-19; Child Development

INTRODUCTION

Efforts to realize children as the next generation of the nation have implications for the need for more attention to children growing and developing optimally. The world policy contained in the SDG's program by 2030 has a target, one of which is to meet the educational needs of children, especially education at an early age (KPPA,

2018). When entering school, 1 in 4 children show developmental delays, so many children start school with inadequate learning preparation, which hinders children from achieving academic achievement (Izzaty, 2017). Data from the World Statistics Agency shows that the age group of preschoolers in the world is the second largest age group, which is

29.28% of the total world population. Data from Indonesia's central statistics agency shows that the largest age group is the 1-4 year age group at 57.16%, and the number of preschoolers in 2022 is 21.2% (Badan Pusat Statistik, 2021).

This preschooler for 2 years was faced with the Covid-19 pandemic situation. The virus is transmitted between people very quickly so several countries have implemented physical distancing policies, including Indonesia. This policy makes preschoolers have to be at home for a long time, thus limiting their mobile environment to play and learn. As a result, parents are looking for alternative entertainment and education that can be provided at home, one of which is to provide screen time to children (Bergmann et al., 2022). The Covid-19 pandemic has also had an impact on adjusting learning methods applied, especially in early childhood education, namely using electronic device-based media such as the WhatsApp application, zoom, and Google classroom. Five learning patterns that are widely used during the pandemic include: learning via WhatsApp groups, home visits, shifts, TVRI shows, and zoom (Aprianti & Sugito, 2022).

The use of technology to support education in early childhood on the one hand provides benefits, one of which is to help in the child's learning process, but on the other hand, it still has a detrimental impact on children. Digital media and screens are now commonly owned by the wider community. Screen time is the interaction with any device that provides on-screen content for relaxing, learning, interaction, or play (Aprianti & Sugito, 2022; Bergmann et al., 2022). WHO recommends no sedentary screen time (such as watching TV/video, or playing

computer games) for children <2 years old and limiting sedentary screen time to no more than 1 hour per day for children aged 2-5 years (World Health Organization, 2019). The American Academy of Pediatrics also recommends the same thing which is limiting screen time to under 2 hours per day for preschool-aged children (Hill et al., 2016; Singh & Balhara, 2021). Data in the United States, as many as 98% of children aged 0 to 8 years have been given screen time and spend an average of 2 hours per day in front of a screen (Rideout & Robb, 2020). The average use of such screen time exceeds the recommended American Academy of Pediatric guidelines. Hal can be a problem for the growth and development of children because the duration of screen time that exceeds the limit in children is associated with an unhealthy diet; poor sleep quality; cardiovascular diseases; obesity; decreased visual acuity; as well as many behavioral, and cognitive deteriorations of the child (Domingues-Montanari, 2017; Fang et al., 2019; Hidayat & Maesyaroh, 2020; Hikmaturrahmah, 2020; Robinson et al., 2017; Tambalis et al., 2018).

Based on a preliminary study that has been conducted by researchers on 42 children aged 4-6 years in one of the PAUD in Rajabasa District, Bandar Lampung. Six of them use gadgets specially bought by parents to facilitate children to learn or communicate with children while parents are working. Two parents complained that their children had difficulty getting away if they had been exposed to smartphones, and even showed unstable emotions such as anger and bad mood when the smartphone was taken away from them. Almost all children have and watch television at home. For almost the last 2 years during this pandemic, 23 children

have used smartphones for online learning at home with a duration of time in front of a screen more than 1 hour per day. Various studies have been carried out on screen time for preschool-aged children, but there have not been many recent studies using PPP and viewing power tests in determining the development of preschool children exposed to screen time, especially during the Covid-19 pandemic, so researchers are interested in conducting related research. The purpose of this study was to determine the effect of screen time on the developmental status of preschool-age children during the Covid-19 pandemic, especially related to the results of developmental screening and children's viewing power.

METHOD

This study is an observational quantitative study with a cross-sectional analytic design. The research variable consists of an independent variable, namely screen time, and a dependent variable, namely a child development status variable which includes the results of developmental screening and the child's viewing power status. The population in this study was parents who had children in the age range of 4 to 6 years in PAUD Rajabasa District, Bandar Lampung City. The sample in this study was determined by a consecutive sampling technique from October to November 2022, which met the inclusion criteria: (1) Parents who have preschoolers (aged 4-6 years); (2) The parent has a gadget or TV or other electronic devices that is screen-based; (3) Parents can read and write; (4) Parents live in the same house with their children; (5) Willing to be a respondent. The

exclusion criteria are parents with children with special needs. There were 62 participants involved in the study. Two of the children were not willing/refused to be checked for health status (KPSP and see-power test). So the total sample involved amounted to 60 respondents. The research will be conducted at PAUD in Rajabasa Subdistrict, Bandar Lampung City.

The instruments in this study are screen time questionnaires taken from Maoludin's research (2019), a pre-screening progression questionnaire (KPSP), and a Snellen E chart. This screen time questionnaire has been tested for validity and reliability with Cronbach's Alpha > value of 0.7 and an r-value of > 0.361, so there is no need to test validity and reliability again to test its reliability. KPSP is a valid instrument issued by the Ministry of Health of the Republic of Indonesia for screening child development in the age range of 0 to 6 years. By using KPSP, it can be known whether the child's development is in normal development or has deviations (Hamdanesti et al., 2021). Check the power test view using the Snellen E chart. The demographic questionnaire includes the child's gender, child's age, parent's age, parent's education, parent's occupation, parents' screen time, and the number of digital tools they have.

The data collection procedure begins after obtaining a statement of proper ethics and a research permit from the Director of Tanjungkarang Health Police. Furthermore, the researcher submitted a research permit to the National Unity and Politics Agency of Bandar Lampung City and a kindergarten in Rajabasa

district. After obtaining permission from the head of the kindergarten, the research team selected respondents according to the inclusion and exclusion criteria. Parents of children are contacted to be explained the research procedure, provide informed consent to be involved in the research, and fill out demographic data questionnaires and screen time. Then continued with the examination of the status of development in children, namely developmental screening and examination of the status of children's viewing power. Each respondent took 15-30 minutes to complete the examination.

The data management process is carried out by univariate and bivariate data

analysis. Univariate analysis was performed on screen time variables, preschool child developmental status, viewing power status, and demographic data of children and parents. Bivariate analysis was performed on two interconnected or correlated variables using the chi-square test. If the value of $p > 0.05$ then it can be interpreted as not having a meaningful relationship, but if the value of $p < 0.05$ then it can be said that the two variables have a meaningful relationship and the hypothesis is accepted. This research has received ethical approval with number: 310 / KEPK-TJK / X / 2022 from the research ethics committee of the Tanjungkarang Health Police, Lampung, Indonesia.

RESULTS AND DISCUSSION

Univariate analysis results of respondents' demographic characteristics, dependent

variables, and independent variables can be seen in :

Table 1 Distribution Of Respondent Frequencies By Demographic Characteristics, Screen Time, Developmental Status, And Child Viewing Power Status, N=60 Respondents

Variable	n	%
Child gender		
Man	21	35
Woman	39	65
Children's age		
4 years	1	1,7
5 years	25	41,7
6 years	34	56,7
Age of parents		
≤ 35 years (cut-off point)	33	55
> 35 years	27	45
Parent's education		
Primary school	4	6,7
Junior High School/Equivalent	7	11,7
Senior High School/Equivalent	24	40,0

College	25	41,7
Parents' Work		
ASN/TNI/POLRI	3	5,0
Private employees	6	10,0
Entrepreneur	10	16,7
Housekeeping	30	50,0
Etcetera	11	18,3
Total Children's Screen Time		
Low screen time (< 2 hours/day)	26	43,3
High screen time (\geq 2 hours/day)	34	56,7
Child development status		
Appropriate	36	60,0
Doubt	24	40,0
Suspicious of deviations	0	0,00
Power Status See Child		
Normal	46	76,7
Disorders	14	23,3

Table 1. It was found that the percentage of preschool-age children with female sex (65%) was more dominant than men (35%) with the most children at age 6 years of 34 respondents (56.7%). The age of parents of 33 respondents (55%) was under 35 years old with the highest last education being college (41.7%). The most parental occupations were housekeeping with 30 respondents (50%). The total screen time of children showed a high category

screen time of more than two hours per day, totaling 34 respondents (56.7%). Child development was mostly age-appropriate at 36 respondents (60%) and children with dubious developmental status were 24 respondents (40%) and no children with suspected deviant status. Children with normal vision were 46 respondents (76.7%) and children with impaired vision status were 14 respondents (23.3%).

Table 2. Relationship Of Children's Screen Time With Developmental Screening Results, N=60 Respondents

Children's Screen Time	Child development						Total	OR (95% CI)	P value
	Appropriate		Doubt		Suspicious of Irregularities				
	f	%	f	%	f	%			
Low screen time (< 2 hours/day)	24	92,3	2	7,7	0	0	26	100	OR: 22.000 95 % CI Lower: 4,420 Upper: 109,496
High screen time (\geq 2 hours/day)	12	35,3	22	64,7	0	0	34	100	
Sum	36	60	24	40	0	0	60	100	

Table 2 describes the results of the bivariate analysis with the chi-square test, which is the relationship between screen time and child development screening results. The results showed a meaningful relationship between children's screen time and developmental

screening results (p -value < 0.05). It is also known that the OR value = 22, which means that children with high screen time (≥ 2 hours/day) have a dubious chance of developing 22 times greater than children with low screen time (< 2 hours/day).

Table 3 Relationship Of Children's SS Time To View Power Status, N=60 Respondents

Children's Screen time	Power Status View				Total		OR (95% CI)	P value
	Normal		Disorders		f	%		
	f	%	f	%				
Low screen time (< 2 hours/day)	25	96,2	1	3,8	26	100	OR: 15,476	0,005 Continuity correction
High screen time (≥ 2 hours/day)	21	61,8	13	38,2	34	100	95 % CI Lower: 1,867 Upper: 128,301	
Sum	46	76,7	14	23,3	60	100		

Based on Table 3, it is concluded that there is a meaningful relationship between screen time and child viewing power status (p -value < 0.05). Also obtained is the OR value = 15.48, which means that

children with high screen time (≥ 2 hours/day) have a 15.48 times greater chance of experiencing viewing power disturbances than children with low screen time (< 2 hours/day).

DISCUSSION

There are variations in the data from the study on the characteristics of respondents in this study. Such is the case with the composition of the male and female sexes in children of preschool age. Data shows that the participation of preschool-aged children of the male sex who participated in ECCE throughout Indonesia was around 35.05% and women were (KPPA, 2018). The data is quite different from the data obtained in this study, where the percentage of the female sex is quite dominant when compared to men. This can be caused because the scope of the sample used is not too wide in this study. Based on the data from the study, the age of 6 years was the most dominant, followed by

the age of 5 years, and the age of 4 years there was only 1 child, and there was not a single child aged 3 years who participated in this study. The data is by BPS Indonesia, there are only 17.71% of children aged 3-4 years in Indonesia who take part in ECCE, while children aged 5-6 years are 52.77% (Badan Pusat Statistik, 2021), so it can be concluded that 5-6 years old is the dominant age for preschoolers in early childhood education. Another study concluded that screen time in children during lockdown due to the Covid-19 pandemic has a positive relationship with children's age (Bergmann et al., 2022). The age characteristics of parents in this study had an average age of 35 years, with parents aged \leq

35 years at 55% and > 35 years at 45%. Parental education in this study was highest with college graduates (41.7%). The level of education of parents is one of the factors that influence the growth and

The results of this study show that the screen time of preschool-age children in Rajabasa District is quite high, namely 56.7% of preschool-age children use more than 2 hours per day for screen time. The screen time duration of children aged 0-8 years during the COVID-19 pandemic reaches an average of 2 hours and 24 minutes per day (Rideout & Robb, 2020). The same study showed results that there was an increase in screen time in preschool-aged children during the Covid-19 pandemic and a high risk of developing developmental disorders in children (Ghaisani & Salam, 2022). This condition is contrary to American Academy of Pediatrics (AAP) guidelines that currently recommend that preschool age should have less than 2 hours per day (Hill et al., 2016; Singh & Balhara, 2021). So it can be concluded that the results of this study support previous research which showed a high amount of screen time in preschool-age children, especially during the Covid-19 pandemic. Based on the results of the study, it can be concluded that screen time has a meaningful relationship with the results of developmental screening of preschool-age children, where dubious child development occurs more in children exposed to high-category screen time (64%). The results of this study are supported by several studies in Indonesia which state that there is a meaningful relationship between screen time and the development of preschool-age children (Imron, 2018; Putri et al., 2020; Putriana et al., 2019; Sapardi, 2018). This shows that high screen time in children can be risky

development of preschool-age children (Mulyanti et al., 2021). The occupational characteristics of parents have a balanced variation between housewives (50%) and working parents (50%).

and hinder the development of older children.

High screen time exposure is associated with developmental disorders in preschool-age children including cognitive and social development of children. Children with less screen time interaction have better cognitive abilities, especially in memory development. Limiting screen time exposure in preschool-aged children can facilitate better memory development (Zhang et al., 2022). Exposure to high screen time is associated with the low ability of children to solve problems, and the tendency to continue playing with gadgets so they experience a decrease in the quality and quantity of sleep, thus affecting children's cognition (Eric, 2021). Impaired cognitive function in children with high screen time refers to persuasive displays by digital screens that make children more interested than interacting directly (Axelsson et al., 2022). Children with a high level of screen time tend to have minimal social interaction with their environment, so they have difficulty socializing directly with their environment and exercising control over their emotions (Lin et al., 2020).

High screen time exposure in this study was also associated with developmental disorders of preschool-age children including children's language and motor development. The lack of interaction of children with the environment due to the high screen time has an impact on children's language development (Moon et al., 2019). The higher the screen time,

the lower the child's language skills. The study also explained that children who watch TV for more than 2 hours, but not more than 3 hours, have the potential to be 2.5 times greater to experience language development barriers, while children with screen time duration > 3 hours have a 3-fold risk of experiencing language development barriers. On the other hand, a meta-analysis study conducted by Madigan et al. (2019) found that although increased screen time was associated with lower language skills, quality screen time (educational programs) and caregiver scaffolding during screen time were associated with better language skills in children under the age of 12. Children's motor development is also affected by screen time. It is believed that conventional gaming activities have advantages over games with digital media. The study concluded that the level of gross motor development in preschool-age children living in urban areas in Indonesia is strongly influenced by sedentary screen time. This is related to the decline in activities to hone motor skills in children exposed to screen time, such as the lack of jumping activities and running which are motor achievements of preschool-age children (Martins et al., 2020).

The results showed that 23.3% of the samples experienced impaired viewing power (versus < 6/6, in one eye or both eyes). The study conducted by Mariana et al. (2019) related to the results of screening in preschool-age children in one of the kindergartens in Palembang, showed that preschool-age children who had sharp visual impairments with virus

<6/6 were 33 children (63%). The study also showed that a total of 29 children (88%) who experienced an impaired vision, especially decreased visual acuity, had the status of parental ownership of gadgets. The results of this study show a fairly high percentage of visual impairment, in line with previous studies. Based on the results of the study, it is also known that screen time in preschool-age children has a meaningful relationship with children's viewing power status, namely 38.8% of children with high screen time categories experience impaired viewing power. The results of this study are supported by previous research that there is a significant relationship between screen-based activity and children's sharpness of visibility (Wahyuningrum et al., n.d.). This study concluded that screen time in preschool-aged children has an impact on the acuity of children's viewing power with more than 1 hour of use a day and physically affects the child's seeability acuity. A study also concluded that children with higher screen time exposure are at risk of impaired viewing power (Lissak, 2018). Another study related to the status of viewing power in preschoolers found a decrease in the sharpness of viewing power in children exposed to screen time and found a significant association between screen time and damage to myopic eye disorders (farsightedness) (Yang et al., 2020). The use of gadgets in children can cause health problems because radiation exposure to gadgets can damage children's eyes (Hikmaturrahmah, 2020).

CONCLUSIONS

Preschool-age children in this study had a high screen time of more than two hours per day following the standards set by the American Academy of Pediatrics. This study shows that there is a meaningful relationship between screen time and children's developmental status. And there is a meaningful relationship between screen time and children's viewing power status.

Exposure to screen time in preschool-aged children should be a concern for parents as the child's main environment to prevent disturbances in the child's development process and impaired viewing power in children. Parents can limit screen time to follow the established standard of no more than 2 hours per day for preschool-age children.

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