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Smartphone Dependency Among Young Learners: A Growing Concern

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smartphone addiction

Abstract

This comparative quantitative study examined smartphone addiction rates among children using a modified Smartphone Addiction Questionnaire, focusing on differences between preschool and primary school students to inform prevention and health promotion strategies. For preschool participants, parents completed the questionnaire, whereas for primary school children, both parents and children provided responses. The assessment tool demonstrated robust psychometric properties, with validity established through rigorous evaluation and high internal consistency for both the children's and parents' scales, as indicated by Cronbach's alpha coefficients. The study cohort comprised 832 participants, including 104 preschool-aged children, 336 parents of primary school-aged children, and 392 primary school students. The prevalence of smartphone addiction differed significantly across groups, with primary school students exhibiting higher rates than preschool-aged children ($p < 0.05$). This disparity was consistent across both parent- and child-reported measures. Nevertheless, 3.8% of preschool-aged children were classified as high risk for smartphone addiction, with an additional 1% at very high risk, necessitating parental vigilance. Among primary school students, the prevalence was higher, with 7.4%–9.8% at high risk and 0.8%–2.1% at very high risk.

INTRODUCTION

Background of the Study

The rapid advancement of Industry 4.0 has significantly impacted various societal domains, particularly telecommunications. According to the Association of Internet Service Providers in Indonesia (APJII, 2022), 210,026,769 Indonesians (77.02% of the 272,682,600 population) were internet users in 2021-2022, marking a substantial increase from 64.80% in 2018. Regional distribution

showed Java (43.92%) as the dominant user base, followed by Sumatra (16.63%), Sulawesi (5.53%), Kalimantan (4.88%), Nusa Tenggara (2.71%), Bali (1.17%), Papua (1.38%), and Maluku (0.81%). Smartphones constituted the primary access device (89.03%), while computers/laptops (0.73%) and combined usage (10.24%) were less prevalent. Daily usage patterns revealed 1-5 hours as most common (women: 53.74%; men: 49.59%), followed by 6-10 hours (women: 30.75%; men: 33.11%). Notably, 14.16% of men and 11.26% of women reported exceeding 10 hours of daily use (APJII, 2022).

The increasing dependence on mobile phones stems from educational, occupational, and daily communication requirements. This heightened usage inevitably affects individuals' behavior, whether directly or indirectly. Excessive smartphone use may further contribute to diverse psychological and social difficulties (Fuady et al., 2023), including the potential for addiction (Amalia & Hamid, 2020). Research from Oxford University indicates that teenagers should limit daily gadget use to a maximum of 4 hours and 17 minutes, as exceeding this threshold could impair cognitive functioning (Marciano et al., 2022). Moreover, daily smartphone usage duration significantly predicts addiction likelihood, with extended use associated with elevated addiction risk (Cheever et al., 2018; Haug et al., 2020).

Problem of The Study

These data indicate that Indonesia is vulnerable to gadget addiction, particularly smartphone addiction. Excessive smartphone usage can result in various negative consequences, including depression, anxiety, and sleep disturbances (Rozgonjuk et al., 2021). In Indonesia, the highest increase in internet usage frequency is among teenagers (aged 13-18), accounting for 76.63%. Even Cisarua Mental Hospital in West Java has received hundreds of young patients addicted to gadgets, treating 11-12 children aged 7-15 in a month (Azizah, 2019). This aligns with research by Kutluay and Karaca, (2025), which found that teenagers have a higher tendency toward addiction. In South Korea reported that 17.9% of 1.63 million teenagers suffered from smartphone addiction, and more than 24% of children were diagnosed with internet addiction, requiring hospital treatment (Kwon et al., 2013).

Smartphone addiction is characterized by maladaptive patterns or behaviors resulting from excessive smartphone use, leading to disturbances in daily life, withdrawal symptoms, tolerance, preoccupation with online relationships, and overuse (Kwon et al., 2013). Kwon identified six dimensions of smartphone addiction: 1) Daily-life disturbance, where daily life is disrupted, including loss of pre-existing jobs, difficulty concentrating, headaches, blurred vision, wrist or neck pain, sleep disturbances, and excessive smartphone usage; 2) Positive anticipation, experiencing happiness when using a smartphone and feeling a strong sense of loss when not using it; 3) Withdrawal, feeling restlessness and irritability when not using a smartphone, constantly thinking about it, and becoming irritated when interrupted by others while using it; 4) Cyberspace-oriented relationship, forming stronger relationships in the virtual world compared to the real world; 5) Overuse, excessive and uncontrollable smartphone use, preferring to seek information on the smartphone rather than asking others, and always carrying a smartphone charger; 6) Tolerance, repeatedly attempting to control smartphone use but failing to do so (Kwon et al., 2013).

Research's State of The Art

Although the highest percentage of gadget users comprises teenagers, many children are also accustomed to using gadgets. Children's curiosity about new technologies through gadgets is high (Rahmawati, 2022). Gadgets are devices with various applications that connect to the internet, with smartphones or tablets being commonly used by children (Lukavská et al., 2022). According to APJII, the internet penetration rate among children aged 5-12 is already at 62.43%, although its contribution is currently only 8.08% (APJII, 2022). This figure is expected to rise further, necessitating mitigation measures to address both positive and negative impacts on children. Based on APJII's survey in 2018, 98% of school-aged children (5-12 years old) use gadgets to watch videos on YouTube application, and 50% use them for gaming. Additionally, Herawati and Utami, (2022) suggested that children and

adolescents exposed to gadget addiction experience decreased academic performance, poor social relationships with family, and dissatisfaction with school life Utami also noted that the negative effects of smartphone addiction can affect various aspects of children's and adolescents' academics and personal lives, leading to a decline in academic performance. Furthermore, smartphone addiction can lead to other addictive behaviors, such as addiction to online games accessed via smartphones. According to APJII's 2022 survey, the highest internet usage, whether through smartphones or computers, is for accessing social media and games, at 98.02% (APJII, 2022).

It is essential to control gadget usage to prevent children from developing gadget addiction or smartphone addiction and minimize the negative consequences associated with it. Research on gadget addiction in children has been widely conducted by various scholars (Budiarti et al., 2022; Ihm, 2018). However, studies comparing the tendency for gadget addiction between preschool-aged children and primary school-aged children remain limited. Therefore, the researcher is interested in conducting a study that examines and compares gadget addiction tendencies between preschool and primary school children. This research aims to assess smartphone addiction preferences among preschool and primary school children, with the goal of understanding the tendencies toward smartphone addiction in children and taking preventive and promotional measures for those at risk.

Gap Study and Objective

Preschool refers to an early childhood education program that combines learning with games and is conducted by professionally trained adults. Preschool programs typically cater to children aged three to five, emphasizing learning and development through enjoyable games (Moreno et al., 2022). Swartout-Corbeil further explains that preschool programs provide many benefits for children, especially during the first five years of life. Preschool prepares children to acquire fundamental skills for later schooling and life, both academically and socially, helps children develop gross and fine motor skills, enhances language and communication abilities, and fosters creativity (Swartout-Corbeil, 2023). Young children should ideally avoid using gadgets, as they require extensive engagement in various activities to stimulate all aspects of their development (Dennis et al., 2022). Nevertheless, school-aged children today require gadgets to support their learning process, making the use of gadgets and smartphones unavoidable (Petrović et al., 2022).

METHOD

Type and Design

This research is a quantitative study with a comparative design. Data collection in this study was conducted quantitatively by distributing questionnaires regarding smartphone addiction preferences to both parents and children. The research instrument used was a modified Smartphone Addiction questionnaire based on the model by Kwon et al (2013).

Data and Data Sources

This study examined cohorts from full-day (TK B and SD B) and half-day (TK A and SD A) educational programs across two preschools (TK) and two primary schools (SD). Educators distributed questionnaires to all eligible participants. However, complete questionnaire collection was impeded by time constraints and environmental factors. Due to preschoolers' limited literacy capabilities, parents completed questionnaires on their behalf. For primary school participants, questionnaires were administered to both students and their parents. The research participants are characterized as follows:

Table 1. Research sample

Description	Pre-School		Primary School	
	TK A	TK B	SD A	SD B
Amount of Parents	52	52	68	268
Amounts of Students	-	-	93	299
Total	52	52	161	567

As presented in Table 1, the study sample consisted of 832 participants: 104 preschool students, 336 primary school parents, and 392 primary school students. The demographic characteristics of participants were as follows: Regarding paternal occupations, the majority were employed in the private sector (37.5% of preschool students' fathers and 47.02% of primary school students' fathers) or worked as entrepreneurs/business owners (35.58% and 41.96%, respectively). Among mothers, the majority were housewives (47.12% of preschool students' mothers and 56.25% of primary school students' mothers).

For preschool students, the questionnaire was completed by parents, while for primary school children, the questionnaire was given to both parents and children. The research instrument consisted of six aspects of smartphone addiction as proposed by Kwon et al (Kwon et al., 2013), which are Daily Life Disturbance, Positive Anticipation, Withdrawal, Cyberspace-oriented Relationship, Overuse, and Tolerance. This measurement tool was tested on fifty individuals and analyzed using Cronbach's Alpha, resulting in a reliability coefficient of 0.910 for the child questionnaire and 0.946 for the parent questionnaire.

Data Collection Technique

The sampling technique employed in this study is purposive sampling, focusing on students in kindergarten (TK) and primary school (SD) who are familiar with and habitually use gadgets. In order to enhance the generalizability of the research findings while minimizing errors, the researcher opted to include the entire population as the sample (Arikunto & Suharsimi, 2019). Therefore, the total sample size for this study consisted of 832 individuals, comprising 104 preschool students, 336 primary school parents, and 392 primary school students. The data analysis technique utilized in this research involves comparative and descriptive analysis, which is one of the quantitative analysis methods used to test hypotheses regarding differences between variables or samples under investigation (Sutama, 2019).

Data Analysis

This analysis employs the t-test (or T-Test) and Analysis of Variance (ANOVA). The t-test is a statistical test used to examine the assumptions of the null hypothesis (Ho), which posits that there is no significant difference in smartphone addiction tendencies between preschool and primary school students. The t-test is employed to compare the means between two sample groups, in this case, the preschool and primary school student groups. Additionally, Analysis of Variance (ANOVA) is a statistical test used to investigate differences among three or more sample groups. In this study, ANOVA is employed to determine whether there is a significant difference in smartphone addiction tendencies among the three sample groups: preschool students, primary school parents, and primary school students. By employing these analytical techniques, this research aims to identify whether there are significant differences in smartphone addiction tendencies among these groups and provide a deeper understanding of this phenomenon.

RESULTS

The age range of children in this study falls into the categories of preschool and primary school, which includes ages 3 to 13 years, with the following details in Figure 1.

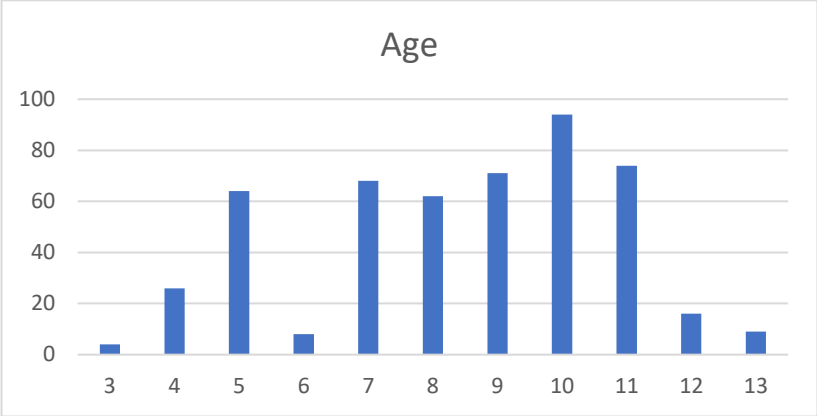


Figure 1. The Age Rage of Children

In the case of preschool students, the research subjects are predominantly 5 years old, accounting for 61.54% of the sample. On the other hand, for primary school students, the research subjects' ages are more evenly distributed between 7-11 years, while sixth-grade students, with an age range of 12-13 years, were less involved in data collection due to their busy schedules and school preparations for exams.

Based on the duration of smartphone usage, it was found that among preschool students, the majority use smartphones for less than two hours per day (67.31%), while 28.85% of children use smartphones for approximately 3-5 hours, and there are even some who use them for 5-7 hours (3.8%) daily. In contrast, among primary school students, there is a difference in responses between parents and children. According to parents, the majority of children use smartphones for 3-5 hours per day (50.30%), followed by 39.58% using them for less than 2 hours, 8.04% using them for 5-7 hours, and there are even 2.08% of children who use smartphones for more than 7 hours per day. However, according to the children themselves, the percentage of smartphone usage above 5 hours per day is higher, with 15.56% using smartphones for 5-7 hours and 14.54% using smartphones for more than 7 hours per day, as mentioned in Figure 2 and Figure 3 below.

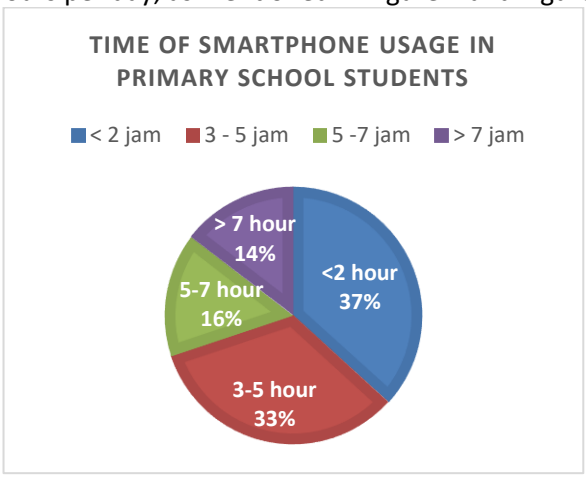


Figure 2. Time Of Smartphone Usage In Primary School Students

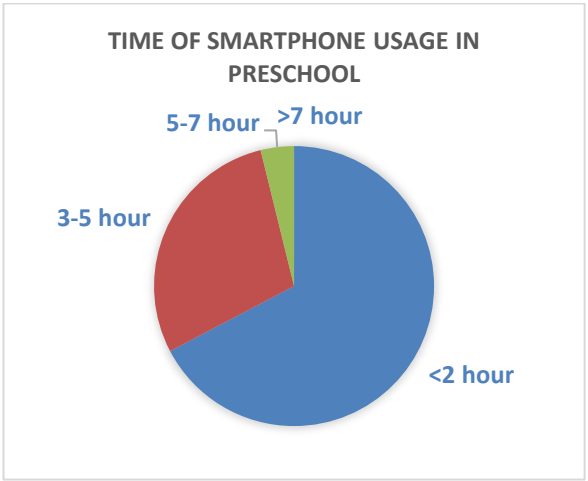


Figure 3. Time Of Smartphone Usage In Preschool

Based on the statistical description of the research data (Table 2), it is found that the empirical mean of smartphone addiction tendencies in preschool children is 63.02, which is lower than the hypothetical data of 105. This indicates that the tendency for smartphone addiction in preschool children in this study is generally low. Meanwhile, based on parental data, the empirical mean of

smartphone addiction tendencies in primary school children is 77.47, which is also lower than the hypothetical mean of 105. This suggests that the tendency for smartphone addiction in primary school children in this study is also relatively low. This is consistent with the data from the children, which shows an empirical mean of 91.34, lower than the hypothetical mean of 122.5, indicating a generally low tendency for smartphone addiction among primary school students in this study.

Table 2. Statistical Description of Research Data

Statistic	Preferences *Smartphone Addiction* in *Preschool*		Preferences Smartphone Addiction in Primary School			
			Based on parent's data		Based on student's data	
	Hipotetic	Empiric	Hipotetic	Empiric	Hipotetic	Empiric
X Max	180	154	180	164	210	194
X Min	30	30	30	30	35	35
Mean	105	63.02	105	77.47	122.5	91.34
Deviation	25.00	22.88	25.00	29.63	29.17	31.12

Table 3. Categorization of Smartphone Addiction Tendencies in Preschool and Primary School

Category	Preschool		Primary School			
			Parent's data		Student's data	
	Frek	%	Frek	%	Frek	%
Very low	66	63.5	143	42.6	145	37.0
Low	32	30.8	94	28.0	126	32.1
Moderate	1	1.0	59	17.6	89	22.7
High	4	3.8	33	9.8	29	7.4
Very High	1	1.0	7	2.1	3	0.8
Total	104	100.0	336	100,0	392	100,0

The data above in Table 3, indicates that the tendency for smartphone addiction among preschool students mostly falls into the categories of very low (63.5%) and low (30.8%). Nevertheless, parents still need to anticipate the possibility of their children becoming dependent on their smartphones, as 3.8% of children show a high tendency for addiction, and 1% exhibit a very high tendency for smartphone addiction.

According to parents of preschool students as seen in Figure 3, their children use smartphones more often to watch videos or movies (48.44%) and play games (35.94%). Meanwhile, in the case of primary school students as seen in Figure 4 and Figure 5, they use smartphones more for playing games (22.62% according to parents and 22.59% according to the children's responses), doing homework (20.77% according to parents and 19.81% according to the children's responses), and watching videos or movies (18.92% according to parents and 19.43% according to the children's responses).

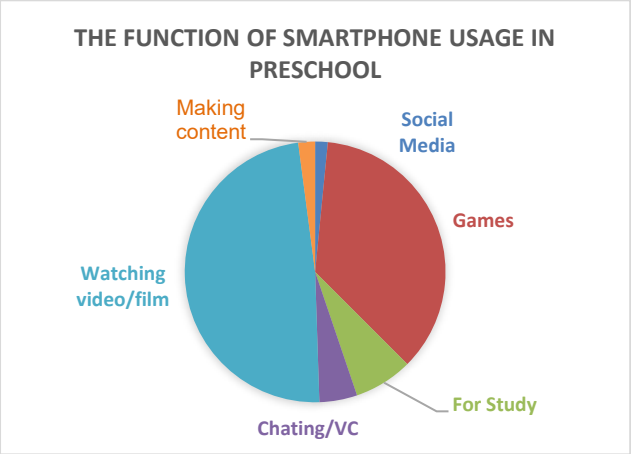


Figure 4. The function of smartphone usage in preschool

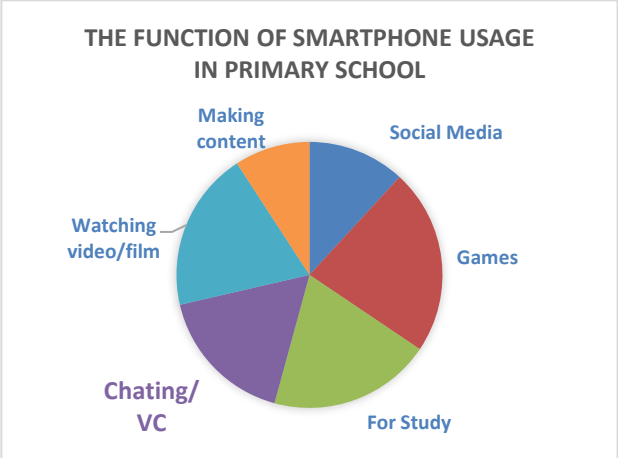


Figure 5. The function of smartphone usage in preschool primary school

The use of smartphones by children needs to be regulated with rules set by parents as seen in Fgure 6 and Figure 7. This was also practiced by the parents of the study subjects, where the majority of them imposed rules on their children (93% among preschool parents and 66.33% among primary school parents). Most parents set limits on the daily duration of smartphone usage (31.11% for preschool parents and 46.30% for primary school parents), allowed smartphone use only after completing homework (16.30% for preschool parents and 29.87% for primary school parents), and permitted smartphone use during school holidays or weekends (14.07% for preschool parents and 17.68% for primary school parents).

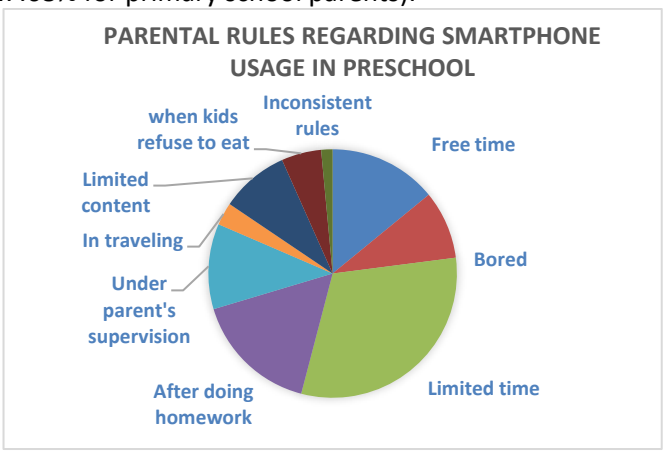


Figure 6. Parental rules regarding smartphone usage in Preschool

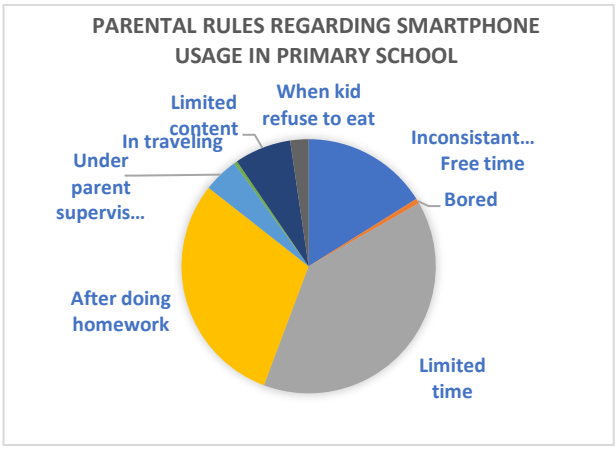


Figure 7. Parental rules regarding smartphone usage in Primary School

In the categorization of primary school students, the majority of children exhibit a very low tendency for smartphone addiction, accounting for 42.6% according to parents' responses and 37% according to children's responses. Nevertheless, there is still a need to anticipate the possibility of smartphone addiction in children, as 7.4% to 9.8% of children show a high tendency for smartphone addiction, and 0.8% to 2.1% of children exhibit a very high tendency for smartphone addiction.

To ensure that the data originates from a homogenous population or has the same variance, a homogeneity test is necessary (Sutama, 2019). Homogeneity testing is a prerequisite before conducting other tests such as the T-Test or Anova. Data is considered homogeneous if the significance value is greater than 0.05 (Sig > 0.05). In this study, homogeneity testing was performed significance value is greater than 0.05, indicating that the research data is homogenous. The data analysis in this

study was conducted using the Independent Sample One-Way ANOVA test because it compares three groups: the preschool group, the primary school group with questionnaire data filled out by parents, and the primary school group with questionnaire data filled out by children. This test was performed to determine whether there are differences in the means of two or more unpaired sample groups (Habiby, 2017). In making a decision about whether there are differences among the research data groups, the basis for the decision is to look at the value of Sig (2-tailed). If the value of Sig (2-tailed) < 0.05, then there is a significant difference between the sample groups. However, if the value of Sig (2-tailed) > 0.05, then there is no significant difference between the sample groups. Based on the SPSS calculation results (IBM SPSS version 25), the following results were obtained on table 5 below:

Table 4. Multiple Comparisons

ANOVA

Kecenderungan Smartphone Addiction

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	78511.284	2	39255.642	44.772	.000
Within Groups	726861.595	829	876.793		
Total	805372.880	831			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Kecenderungan Smartphone Addiction

Bonferroni

(I) Kategori	(J) Kategori	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Preschool (TK)	Primary School_Data Ortu (SD)	-14.454*	3.323	.000	-22.42	-6.48
	Primary School_Data Anak (SD)	-28.320*	3.266	.000	-36.15	-20.49
Primary School_Data Ortu (SD)	Preschool (TK)	14.454*	3.323	.000	6.48	22.42
	Primary School_Data Anak (SD)	-13.866*	2.201	.000	-19.15	-8.59
Primary School_Data Anak (SD)	Preschool (TK)	28.320*	3.266	.000	20.49	36.15
	Primary School_Data Ortu (SD)	13.866*	2.201	.000	8.59	19.15

*. The mean difference is significant at the 0.05 level.

Based on Table 4, it can be observed that the value of Sig < 0.05. Therefore, it can be concluded that there is a significant difference in smartphone addiction tendencies between preschool children (TK) and primary school children (SD). Furthermore, the researcher also attempted to analyze the differences in smartphone addiction tendencies using univariate analysis, and the following results were obtained on Table 5 and Table 6 below:

Table 5. Univariate Analysis of Variance & Descriptive Statistics

Univariate Analysis of Variance

Between-Subjects Factors

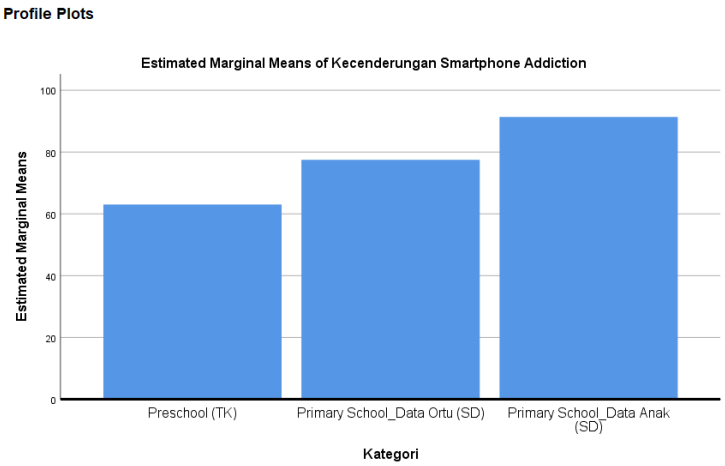
		Value Label	N
Kategori	1	Preschool (TK)	104
	2	Primary School_Data Ortu (SD)	336
	3	Primary School_Data Anak (SD)	392

Descriptive Statistics

Dependent Variable: Kecenderungan Smartphone Addiction

Kategori	Mean	Std. Deviation	N
Preschool (TK)	63.02	22.876	104
Primary School_Data Ortu (SD)	77.47	29.639	336
Primary School_Data Anak (SD)	91.34	31.121	392
Total	82.20	31.131	832

Table 6. Preferences for Smartphone Addiction between pre-school and primary



Based on Table 6, it can be seen that the tendency for smartphone addiction is higher in primary school students compared to preschool students.

DISCUSSIONS

When both parents work outside the home, they tend to give their children a smartphone to make communication easier. However, on the other hand, parental control over children's smartphone use tends to be lacking (Hsieh et al., 2018). Occupation as a series of activities related to a profession carried out with the aim of earning income to meet daily needs. Although there are also essential unpaid roles for the common good, such as homemakers who manage household needs. Occupations are closely related to working hours. Referring to the International Labor Organization (ILO), the maximum working hours for an employee are 48 hours per week, and exceeding this limit can affect a person's health and quality of life. Parents' working hours can also impact the time they spend with their children, although it does not always correlate with quality time (Magda & Keister, 2018).

Based on the level of education, parents with higher levels of education tend to pay more attention to their children's education and learning processes and have a positive belief in their children's abilities compared to children from parents with lower levels of education (Onyedikachim, 2021). This research stated that parents with higher education are more involved in their children's education, whether through online or offline learning methods. Apart from that, parents who are highly educated and have a good relationship with their children tend to anticipate various things that are dangerous for their children, including smartphone addiction (Budiarti et al., 2022).

Based on the economic background, the average income of fathers falls within the range of two to five million Indonesian rupiah per month, while the income of mothers is below two million Indonesian Rupiah per month, primarily because most of them are homemakers. According to (Gilarso, 2014), the size of a family's income cannot be a definite measure of its prosperity, but it is influenced by the family members' ability to manage their finances. A family may have a substantial income but also have significant debt, or conversely, it may have a modest income but no debt and can meet the basic needs of the family. Nevertheless, the socio-economic condition of a family can affect a child's development. The higher the socio-economic status, the easier it is to obtain desired or necessary items (Nurwati and Listari, 2021).

Although, according to the APJII survey results (APJII, 2024), the highest percentage of smartphone users is teenagers, children are vulnerable to gadget addiction because they have become accustomed to using gadgets in their daily lives (Rahmawati, 2022). This aligns with a study conducted by Rahmawati, (2022), which reported that 23.5% of 3,615 children were addicted to gadgets

(smartphone addiction), impacting their physical and mental well-being. Based on gender data, in the case of preschool research subjects, there are more males (59.62%) than females (40.38%). Conversely, among primary school students, there are more females (50.26%) than males (49.74%). The results of the difference test indicate that the average tendency scores for male children are higher (65.47 for preschool and 86.35 for primary school) compared to female children (59.40 for preschool and 96.38 for primary school). This is consistent with the research conducted by Favini et al., (2023), which stated that males have a higher average tendency towards gadget addiction compared to female students.

Various activities involving the use of smartphones, gadgets, watching television, or playing games are collectively referred to as screen time (Dennis et al., 2022). Screen time has both positive and negative impacts, especially on children. On one hand, the rapid development of technology and the use of information and communication technology can facilitate the learning process (Supriyadi et al., 2022). The use of gadgets can stimulate a child's creativity and imagination, but it can also affect emotional and behavioral regulation difficulties (Tomczyk & Selmanagic Lizde, 2023). The World Health Organization (WHO) and the American Academy of Pediatrics (AAP) have officially recommended screen time guidelines for children. For children under 5 years of age, it is recommended not to spend more than one hour per day on screen time activities, while children under 1 year old should not be exposed to screen time activities at all (WHO, 2019). According to the AAP, children aged 18-24 months should not be introduced to screen time activities at all, and for children aged 2 to 5 years, screen time should be limited to one hour per day (AAP, 2021). Excessive exposure to screen time during the early years of life can impact a child's optimal function and growth, influence a child's neuroplasticity, and hinder cognitive development (Basay et al., 2020). Additionally, excessive screen time can also affect socioemotional development (Hafsteinsson Östenberg et al., 2022). The longer the daily duration of smartphone usage, the higher the likelihood of smartphone addiction (Haug et al., 2020).

CONCLUSION

Based on the results of the research conducted, it can be concluded that there is a difference in the tendency of smartphone addiction between preschool and primary school children, where the tendency of smartphone addiction is higher in primary school children's data compared to preschool data, as well as primary school data filled out by parents. However, parents still need to anticipate the possibility of their children becoming dependent on their smartphones, as there are 3.8% of children with a high tendency for addiction and 1% with a very high tendency for smartphone addiction. Meanwhile, in primary school students, the majority have a very low tendency for smartphone addiction (42.6% according to parental responses and 37% according to child responses). However, there is still a need to anticipate the possibility of smartphone addiction in children, as 7.4% - 9.8% of children have a high tendency for smartphone addiction, and 0.8% – 2.1% of children have a very high tendency for smartphone addiction. The time children spend using gadgets or screen time is closely related to the interaction between parents and children and the attitude of parents in developing gadget usage policies at home (Dennis et al., 2022). Parents need to establish rules and restrictions for their children regarding gadget usage to avoid various negative impacts that may arise from excessive gadget use (Lissak, 2018).

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