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The Relationship Between Gadget Use and Motor Development in Preschool Children

Amanda Tiara Fatiha[1*], Dameria Br Saragih[1], Ernawati[1]

[1] Bachelor's Degree Program in Nursing, STIKes RS Husada, Central Jakarta, DKI Jakarta, Indonesia

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Corresponding author
Email:
amandatiara1616@gmail.com

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ABSTRACT

The rapid development of digital technology has led to the widespread use of gadgets across all age groups, including preschool children. Devices such as smartphones and tablets are commonly used for entertainment and learning purposes. However, excessive and unsupervised gadget use may negatively affect children's motor development, which is a crucial indicator of growth during early childhood. This study aimed to examine the relationship between gadget use and motor development among preschool children at KB PAUD Kiddy Club, North Jakarta. This study employed a quantitative approach with a cross-sectional design. The sample consisted of 62 preschool children aged 3–6 years, selected using a total sampling technique. Data were collected using a gadget usage questionnaire and the Denver Developmental Screening Test (DDST) II to assess fine and gross motor development. Data analysis was performed using the Chi-square (χ^2) test with a significance level of 0.05. The results showed that most preschool children had moderate to high levels of gadget use. Approximately 66.1% of children primarily used YouTube applications, and 87.1% used smartphones as their main device. Statistical analysis revealed a significant association between the level of gadget use and motor development ($p < 0.05$), indicating that children with high gadget use were more likely to exhibit suspected or delayed fine and gross motor development. These findings highlight the importance of parental supervision and appropriate regulation of gadget use to support optimal motor development in preschool children.

Keywords: Gadget Use, Motor Development, Preschool Children, DDST II, Screen Time.

ABSTRAK

Perkembangan teknologi digital yang pesat mendorong peningkatan penggunaan gadget pada berbagai kelompok usia, termasuk anak prasekolah. Meskipun gadget dapat dimanfaatkan sebagai sarana hiburan dan pembelajaran, penggunaan yang berlebihan dan tanpa pengawasan berpotensi mengganggu proses tumbuh kembang anak, khususnya perkembangan motorik yang merupakan indikator penting pada masa usia dini. Sejauh ini, kajian empiris mengenai hubungan antara intensitas bermain gadget dan perkembangan motorik anak prasekolah masih menunjukkan hasil yang bervariasi, sehingga diperlukan penelitian lebih lanjut untuk memperjelas hubungan tersebut dalam konteks lokal. Penelitian ini bertujuan untuk menganalisis hubungan antara kebiasaan bermain gadget dengan perkembangan motorik pada anak prasekolah di KB PAUD Kiddy Club, Jakarta Utara. Penelitian menggunakan pendekatan kuantitatif dengan desain cross-sectional, melibatkan 62 responden melalui teknik total sampling. Penggunaan gadget diukur menggunakan kuesioner, sedangkan perkembangan motorik dinilai menggunakan Denver Development Screening Test (DDST) II. Analisis data dilakukan menggunakan uji Chi-Square dengan tingkat signifikansi 0,05. Hasil penelitian menunjukkan adanya hubungan yang signifikan antara tingkat penggunaan gadget dan perkembangan motorik anak prasekolah (p-value < 0,05), di mana penggunaan gadget yang tinggi cenderung berkaitan dengan perkembangan motorik yang tergolong suspect atau mengalami keterlambatan. Temuan ini menegaskan pentingnya pengawasan dan pembatasan penggunaan gadget oleh orang tua serta pendidik sebagai upaya preventif untuk mendukung perkembangan motorik anak prasekolah secara optimal.

Kata Kunci: Gadget, Perkembangan Motorik, Anak Prasekolah, DDST II, Penggunaan Gadget.

INTRODUCTION

The rapid development of digital technology has encouraged the widespread use of gadgets in various age groups, including preschool children. Gadgets such as smartphones and tablets are now commonly used not only for entertainment but also as learning media in early childhood. Along with changes in modern family lifestyles, parents often have limited time to supervise children's daily activities, resulting in gadgets being used as a practical solution to keep children occupied. However, uncontrolled and excessive use of gadgets has the potential to negatively affect various aspects of children's growth and development, including motor, social, and behavioral development (Syaifuddin, Rizka, & Ro'isa, 2024).

One developmental aspect that requires serious attention is motor development in preschool children. Motor development, which includes fine and gross motor skills, plays an important role in children's readiness for learning, independence, and social interaction. Children who frequently use gadgets tend to engage less in physical activities, have limited interaction with their environment, and show reduced opportunities for motor stimulation. Several studies have reported that high-intensity gadget use is associated with delays in fine and gross motor development, especially when not accompanied by adequate parental supervision (Maulusi & Rahagia, 2022; Widiana, 2022).

Data from the World Health Organization (WHO) indicate a continuous increase in gadget and screen time exposure among young children worldwide (World Health Organization, 2020). In Indonesia, this trend is also evident. Data from the Central Statistics Agency show that a significant proportion of preschool-aged children have been exposed to gadgets and the internet, particularly in urban areas (Badan Pusat Statistik, 2024). Indonesia is reported to be one of the countries with a relatively high duration of daily gadget use among children, which may reach several hours per day (Wardianti et al., 2024). This condition raises concerns regarding reduced physical activity and insufficient motor stimulation during the early childhood period.

Motor development in early childhood is strongly influenced by opportunities for active movement, play, and environmental exploration. Excessive screen time encourages children to adopt a more passive lifestyle, which may reduce opportunities for physical activity and motor practice. If this condition persists, children are at risk of experiencing delays in both fine and gross motor development (Nurjanah, Suryaningsih, & Putra, 2017).

In addition, parenting style and the level of parental supervision play an important role in regulating gadget use among preschool children. Permissive parenting and lack of supervision are associated with longer gadget use duration and reduced engagement in active play (Senjaya et al., 2022). Therefore, appropriate regulation and supervision of gadget use are essential to support optimal child development, in line with national guidelines on early childhood education and health (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2021; Kementerian Kesehatan Republik Indonesia, 2021). Therefore, this study aims to analyze the relationship between gadget-playing habits and motor development in preschool children at KB PAUD Kiddy Club, North Jakarta, as an effort to provide a scientific contribution and serve as a basis for parents and educators in managing gadget use for children aged 3-6 years.

RESEARCH METHODS

This study used a quantitative approach with a cross-sectional design to examine the relationship between gadget use and motor development in preschool children (Sugiyono, 2020; Subhaktiyasa, 2024). This approach aims to determine the relationship between independent variables, gadget play habits, and dependent variables, motor development in preschoolers. The research was conducted at KB PAUD Kiddy Club, North Jakarta, in May 2025. The study population consisted of all preschoolers aged 3-6 years, with a total of 62 children. The entire population was included as a research sample using the total sampling technique. The assessment of children's motor development was conducted using an observation sheet adapted from standardized early childhood motor development indicators, which have been widely used in similar studies and proven to have acceptable validity and reliability (Batlajery et al., 2021; Sulastri & Rini, 2022; Amin, Garancang, & Abunawas, 2023).

Data collection was carried out using a questionnaire on the use of gadgets and instruments Denver Developmental Screening Test (DDST) II. The gadget use questionnaire refers to an instrument developed by Wandella (2022), which consists of 9 statements, with 3 items to measure the intensity of gadget use and 6 items to obtain supporting information regarding gadget usage habits. Gadget usage scores are categorized into low (score 3–4), medium (score 5–6), and high (score 7–9). This instrument has undergone validity and reliability testing in previous studies and was declared suitable for use as a measuring tool for the use of gadgets in preschoolers.

The DDST II instrument is used to assess children's development, covering four aspects of development: gross motor, fine motor, language, and social. In this study, the assessment focuses on aspects of gross motor development and fine motor in children aged 3-6 years. Each aspect consists of 12 assessment items. The assessment results are categorized as normal, untestable, and suspicious. DDST II is a standardized instrument with proven validity and reliability and is widely used in child development research. Motor development was assessed using the Denver Developmental Screening Test II (DDST II), which is a standardized instrument commonly used to screen developmental delays in children (Azwaldi, Damanik, & Erman, 2021; Batlajery et al., 2021).

The data source used in this study is primary data obtained directly through questionnaires and observations of children's motor development. Before the research was conducted, the researcher obtained permission from the KB PAUD Kiddy Club North Jakarta. In addition, parents or guardians are provided with an explanation of the objectives, procedures, and benefits of the study, and are asked to sign an informed consent form as a statement of consent for the child's participation. This research was conducted in accordance with the ethical principles of the research, including the confidentiality of respondents' identities and the use of data solely for scientific purposes. The data obtained were analyzed using univariate and bivariate analysis. Univariate analysis was used to describe the frequency and percentage distribution of each study variable, while bivariate analysis was used to test the relationship between gadget use and preschoolers' motor development. The statistical test used is the Chi-Square test with a significance level of 0.05. A p< value of 0.05 is considered to indicate a statistically significant relationship between the variables studied.

RESULTS

Table 1. The distribution, frequency, and characteristics of the respondents.

Respondent characteristics	**N**	**%**
Age		
3 years	6	9.7
4 years	14	22.6
5 years	17	27.4
6 years	25	40.3
Parents' last education		
Junior High School (SMP)	3	4.8
High School/Equivalent (SMA)	46	74.2
Diploma/Bachelor's Degree	13	21
Child caretaker		
Mom/Dad	47	75.8
Grandfather/Grandmother	13	21
Babysister	1	1.6
Other	1	1.6
Type of gadget used		
Smartphone	54	87.1
Tablet	7	11.3
Lainnya	1	1.6
Application used		
Game	21	33.9

Respondent characteristics	N	%
Youtube	41	66.1
Parental supervision		
Seldom	13	21
Never	49	79
Children's responses to the surrounding environment		
Don't care about the surroundings	6	9.7
Does not turn around when called	9	14.5
Not answering when spoken to	3	4.8
Doesn't often play with his friends	16	25.8
Gets angry when disturbed or his gadget is taken	25	40.3
Lack of appetite/thirst	3	4.8

Table 1 shows that most respondents were 6 years old (40.3%), with parents predominantly educated to the high school level (74.2%) and primary caregivers being mothers or fathers (75.8%). Smartphones were the most commonly used gadgets (87.1%), with YouTube as the main activity (66.1%). Notably, most children did not receive supervision while using gadgets (79%), and many became angry when disturbed or when their gadget was taken away (40.3%).

Table 2. The level of gadget usage among preschool children at the North Jakarta Kiddy Club Early Childhood Education Center.

Use gadgets	Frequency	Percentage (%)
Currently	19	30.6
Tall	43	69.4

The results of table 2 show that 43 children (69.4%) of the total use gadgets at a high frequency.

Table 3. Fine motor development in preschool children at the KB PAUD Kiddy Club North Jakarta.

Use gadgets	Frequency	Percentage (%)
Normal	21	33.9
Untestable	16	25.8
Suspect	25	40.3

The results from table 3 show that of the 62 respondents, 25 respondents (40.3%) were in the suspect category.

Table 4. Gross motor development in preschool children at the KB PAUD Kiddy Club, North Jakarta.

Fine motor skills	Frequency	Percentage (%)
Normal	21	33.9
Untestable	16	25.8
Suspect	25	40.3

The results of Table 4 show the development of gross motor skills of the 62 respondents, 25 respondents (40.3%) were in the suspect category.

Table 5. The relationship between playing with gadgets and fine motor development in preschool children at the KB PAUD Kiddy Club, North Jakarta.

Use Gadget	Gross Motor Development			p-value
	Normal	Unstestable	Suspect	
Currently	5 (23.8%)	10 (62.5%)	4 (16.0%)	
Tall	16 (76.2%)	6 (37.5%)	21 (84.0%)	0.005
Total	21 (100%)	16 (100%)	25 (100%)	

Table 5 indicates that most respondents (84%) had high gadget use, with 23.8% showing suspected fine motor development issues. The chi-square test produced a p-value of 0.005 ($p \leq$

0.05), confirming a significant relationship between gadget use and fine motor development among preschool children aged 3–6 years at KBPAUD Kiddy Club, North Jakarta.

Table 6. The relationship between playing with gadgets and gross motor development in preschool children at the KB PAUD Kiddy Club, North Jakarta.

Use Gadget	Gross Motor Development			p-value
	Normal	Unstestable	Suspect	
Currently	9 (52.9%)	1 (5.0%)	9 (36.0%)	0.043
Tall	8 (47.1%)	19 (95.0%)	16 (64.0%)	
Total	17 (100.0%)	20 (100.0%)	25 (100.0%)	

Table 6 shows that among children with high gadget use, 95% were untestable for gross motor development. The chi-square test yielded a p-value of 0.043 ($p \leq 0.05$), indicating a significant relationship between gadget use and gross motor development in preschool children aged 3–6 years at KB PAUD Kiddy Club, North Jakarta.

DISCUSSION

The results of this study indicate a significant relationship between the level of gadget use and motor development in preschool children at KB PAUD Kiddy Club, North Jakarta. Children with a high intensity of gadget use tend to experience fine and gross motor development in the suspect category. These findings suggest that excessive gadget use may inhibit the motor stimulation process that children should obtain through active physical movement and direct interaction with their environment. This result is consistent with previous studies showing that prolonged gadget use is associated with delayed motor development in preschool-aged children (Fitri et al., 2022).

In terms of fine motor development, this study found that most children with high gadget use were categorized as suspect. This condition may be caused by reduced engagement in activities that involve hand and finger coordination, such as drawing, writing, cutting, or playing with blocks. Previous studies have reported that children who frequently use gadgets receive less stimulation through manipulative play activities, which are essential for fine motor development (Purwanti et al., 2023). As a result, fine motor skills may not develop optimally.

The findings of this study align with several previous studies, which have reported a significant relationship between the intensity of gadget use and motor development in preschool children. Research conducted by (Chairiyah & Hikma, 2023; Wandella, 2022) found that excessive gadget use was associated with decreased opportunities for physical activity and motor stimulation. Similar results were also reported by Br Saragih (2024) and Noviandry et al. (2024), who emphasized that prolonged screen time contributes to delays in both fine and gross motor development among young children.

Similarly, in gross motor development, children who used gadgets excessively also tended to fall into the suspect category. Excessive screen time is associated with decreased physical activity involving large muscle movements such as running, jumping, and climbing. Several studies have shown that low levels of physical activity due to excessive gadget use can delay gross motor development in preschool children (Syaifuddin, Rizka, & Ro'isa, 2024). From a theoretical perspective, motor development during the preschool period depends heavily on children's opportunities to move actively and explore their surroundings. Excessive gadget use encourages sedentary behavior, which reduces children's chances to practice and refine motor skills. If this condition continues over a long period, children are at risk of experiencing both fine and gross motor development delays (Nurjanah, Suryaningsih, & Putra, 2017).

Furthermore, several studies have highlighted the importance of parental supervision and balanced activity patterns in minimizing the negative effects of gadget use on child development. Pitayanti et al. (2024) and Prayito et al. (2024) stated that appropriate regulation of gadget use, combined with active play and motor stimulation, can reduce the risk of developmental delays. These findings reinforce the need for parents and educators to collaboratively manage children's gadget exposure to support optimal motor development. The findings of this study highlight the importance of parental and educational roles in managing gadget use among preschool children.

Parents are expected to supervise and limit the duration of gadget use while encouraging children to participate in physical and creative play activities. Parental involvement and supervision have been shown to significantly influence children's gadget use patterns and overall development (Senjaya et al., 2022). In addition, early childhood educators play a strategic role in providing learning activities that stimulate fine and gross motor development through structured play, physical exercises, and interactive games. Support from health professionals and government policies is also crucial in educating parents and the community about healthy and age-appropriate gadget use. National guidelines emphasize the importance of balancing screen time with physical activity to support optimal child development (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2021; Kementerian Kesehatan Republik Indonesia, 2021; World Health Organization, 2020).

This study is limited by its focus on a single PAUD institution and the lack of analysis of other external factors such as parenting styles, nutritional status, and environmental stimulation that may influence children's motor development, which may restrict the generalizability and comprehensiveness of the findings. Therefore, further research is suggested to involve broader research locations, consider these external factors, and use research designs that allow for a more comprehensive analysis of relationships.

CONCLUSION

This study confirms a significant relationship between gadget use intensity and the motor development of preschool children, where excessive gadget exposure is associated with delays in both fine and gross motor skills. These findings highlight the importance of collaborative efforts to manage gadget use, including active parental supervision, structured motor-stimulating activities by PAUD teachers, educational support from health professionals, and government policies promoting age-appropriate gadget use, in order to minimize the risk of motor development delays in early childhood.

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