

# Reducing gadget use intensity in preschool-aged children through storytelling and coloring therapy

Umi Kalsum,<sup>1</sup> Andi Lis Arming Gandini,<sup>1</sup> Sutrisno Sutrisno,<sup>1</sup> Emmy Putri Wahyuni,<sup>1,2</sup> Rosalin Ariefah Putri,<sup>3</sup> Nyimas Heny Purwati<sup>2</sup>

<sup>1</sup>Department of Nursing, Poltekkes Kemenkes Kalimantan Timur, Samarinda; <sup>2</sup>Faculty of Nursing, Universitas Muhammadiyah Jakarta, Jakarta; <sup>3</sup>Department of Midwifery, Poltekkes Kemenkes Kalimantan Timur, Samarinda, Indonesia

## Abstract

The use of gadgets in the current era of globalization has become a concerning trend, especially among preschool children,

Correspondence: Umi Kalsum, Department of Nursing, Poltekkes Kemenkes Kalimantan Timur, Wolter Monginsidi Street No. 38, Samarinda Ulu sub-district, Samarinda City, Indonesia.  
E-mail: umi2508@gmail.com

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leading to addiction and detrimental effects on their physical, psychological, and emotional health. It has also resulted in increased social isolation and hindered development. The impact of this trend is significantly influenced by the roles of parents, family, and the surrounding environment. This study aimed to determine the effectiveness of health education using modules on the benefits of storytelling and coloring therapy in enhancing parents' knowledge, attitudes, and behaviors regarding prudent gadget use in preschool children. The research design was a pre-post quasi-experiment without a control group. The population comprised parents with preschool children attending 11 public kindergartens in Samarinda City. A total sampling method was utilized, resulting in 303 respondents. Health education intervention occurred after the pre-test, followed by one month of assistance and a subsequent post-test. The research instrument was a questionnaire adapted from the theory of planned behavior, assessing parents' knowledge, attitudes, and behaviors related to providing gadgets to children. Data analysis included univariate and bivariate analyses using the Wilcoxon test. The results indicate a significant influence of health education using modules on the benefits of storytelling and coloring therapy on parents' wise gadget use in preschool children (p-value < 0.005). Thus, health education for parents on prudent gadget use in preschoolers is highly recommended, particularly during parent meetings at school.

## Introduction

Children are at a stage of rapid growth and development, necessitating proper nutrition, stimulation, a conducive environment, and access to health services.<sup>1,2</sup> Among these, toddlers and preschoolers are particularly vulnerable to health issues.<sup>3</sup> During the preschool years, children are in the initiative versus guilt phase, characterized by burgeoning curiosity and imagination, leading them to ask numerous questions about their surroundings that they don't yet understand.<sup>4</sup> In this golden age, children absorb information quickly, becoming adept imitators and laying the groundwork for their character, personality, and cognitive abilities.<sup>5</sup> While technology has become indispensable in contemporary life, its rapid advancement has significantly impacted various spheres, including education.<sup>6</sup> Gadgets, in particular, have gained immense popularity, with both adults and children utilizing them. Many gadget manufacturers target children as their primary market, resulting in children becoming active consumers of such devices.<sup>7</sup> Studies indicate that approximately one-third of preschoolers globally have access to digital devices, with a majority exceeding recommended screen time.<sup>8-10</sup> Nathan, Muthupalaniappen, and Muhammad (2022) found that the prevalence of digital device use among preschoolers was 95.9%, primarily smartphones (94.2%). Despite this high usage, most chil-

dren (95%) did not own the devices, and usage was supervised (95.7%) to prevent exposure to inappropriate content (70.5%). Notably, digital devices were mainly used for educational (37.4%) and entertainment purposes (36%), primarily through videos (30.9%) and games (30.2%). Alarming, a significant portion of children (21.5% on weekdays and 50.3% on weekends) spent more than 1-2 hours on digital devices.<sup>9</sup>

In Indonesia, a substantial proportion (79.5%) of children and adolescents are gadget users, primarily for information retrieval, entertainment, and online communication.<sup>11</sup> Moreover, a survey by Indonesia Hottest Insight in 2013 revealed that about 40% of Indonesian children are active internet users.<sup>12</sup> Despite parents' awareness of the detrimental effects of excessive screen time, including poor posture, sleep disturbances, eye strain, reduced physical activity, exposure to inappropriate content, addiction, and diminished parent-child interaction, adherence to screen time guidelines remains low.<sup>13</sup>

One of the adverse consequences of excessive gadget use is dependency and addiction, leading to developmental issues in children.<sup>6</sup> Additionally, limited communication and interaction between parents and children due to gadget use can hinder speech development in toddlers.<sup>14</sup> It's crucial to acknowledge that the ages of 1-5 years represent the most sensitive period of child development, underscoring the importance of cautious gadget use during early childhood.<sup>15</sup> Parents play a pivotal role in fostering effective communication and continuously anticipating and addressing their children's negative habits.<sup>16</sup>

Research has consistently demonstrated the negative impacts of gadget use on preschoolers, including speech delays, attention deficits, learning difficulties, anxiety, mental health problems, and character assassination.<sup>17,18</sup> Conversely, activities like coloring and storytelling have been shown to enhance imagination, fine motor skills, and knowledge in preschoolers.<sup>19,20</sup> Thus, encouraging parents to engage in storytelling and coloring activities with their children can help mitigate the negative effects of excessive gadget use. Parental involvement is paramount in regulating children's gadget usage. This study aimed to assess the impact of health education, focusing on the benefits of storytelling and coloring therapy, on parents' behavior regarding gadget use in preschoolers. By promoting alternative activities and empowering parents with knowledge, attitudes, and behaviors conducive to prudent gadget use, this research endeavors to steer children away from excessive gadget dependency and toward healthier developmental pathways.

## Materials and Methods

The research design employed in this study was quantitative, utilizing a quasi-experimental design, specifically a pre-post test non-equivalent group without a control group.

### Study participants

The study population consisted of parents with preschool children. Samples were drawn from all parents with preschool-aged children at 11 kindergartens in Samarinda City who met the inclusion criteria. These included parents of preschool children aged 3-7 years whose children were capable of using gadgets and who themselves owned gadgets. The exclusion criteria were preschool children unable to monitor gadget use. The sampling used the total sampling method, resulting in 303 respondents selected from 11 public kindergartens in Samarinda City, Indonesia.

### Variable, instrument and data collection

Independent variables comprised the effect of health education using modules on the benefits of storytelling and coloring therapy. Dependent variables encompassed parents' knowledge, attitudes, and behaviors regarding prudent gadget use with children. A questionnaire was utilized to assess knowledge about preventing and managing gadget use in preschoolers (consisting of 8 questions), parents' attitudes toward gadget use in children (12 questions), and parental and child behavioral practices in gadget use (5 questions). The instrument was adapted from Lani's (2019) research, with validity and reliability tests yielding satisfactory results (knowledge questionnaire:  $r=0.540-0.933$ , attitude questionnaire:  $r=0.643-0.780$ , behavior questionnaire:  $r=0.519-0.740$ ), indicating validity and reliability. The Cronbach alpha value exceeded 0.6, indicating instrument reliability.<sup>21</sup>

### Data analysis

Univariate and bivariate analyses were conducted using the IBM SPSS Statistics 26 computer program. Bivariate analysis utilized the Wilcoxon test due to non-normally distributed data, with a significance level set at 95%.

### Ethical clearance

Ethical approval for the research was obtained from the Health Research Ethics Commission, Poltekkes Kemenkes Kalimantan Timur, under ethical certificate DL.02.03/4.3/10432/2022. Throughout the research process, adherence to ethical principles, including informed consent, respect for human rights, beneficence, and non-maleficence, was observed, with the study subjects being parents with preschool children.

## Results

Table 1 presents data on the characteristics of parents. The majority of mothers (51.2%) have graduated from high school, while a similar proportion of fathers (51.8%) have attained the same level of education. Furthermore, a significant portion of mothers (74.6%) are not employed, whereas a considerable pro-

**Table 1.** Characteristics of respondents

Indicator	Mom		Father	
	F	%	F	%
<b>Education</b>				
Not in School	2	0.7	4	1.3
Elementary School	18	5.9	13	4.3
Junior High School	34	11.2	31	10.2
Senior High School	155	51.2	157	51.8
Higher Education	94	31.0	98	32.3
<b>Work</b>				
Doesn't work	226	74.6	0	0.0
Employee	32	10.6	147	48.5
Civil servant	13	4.3	27	8.9
Self-employed	32	10.6	107	35.3
Laborer/Farmer/Fisherman	0	0.0	22	7.3
<b>Family income</b>				
< IDR 1,500,000	23	7.6		
IDR 1,500,000-3,000,000	114	37.6		
IDR 3,000,000-5,000,000	99	32.7		
> IDR 5,000,000	65	21.5		

portion of fathers work in the private sector. Additionally, approximately 37.6% of respondents reported incomes ranging between IDR 1,500,000 and 3,000,000.

Based on Table 2, the data regarding children’s dependence on gadget use reveals that the majority of children (57.4%) exhibit a dependency on gadgets, while nearly half of the children (42.6%) do not show such dependence. Regarding the types of gadget use activities among children, the data indicates that playing games is predominantly observed (57.4%), while listening to songs is mostly not observed (71.3%). Moreover, the data suggests that watching cartoons is nearly universal (85.1%), indicating that children primarily engage in watching cartoons when using gadgets.

Based on the results of the Wilcoxon test presented in Table 3, it is evident that there is a significant difference in knowledge, attitude, and behavior before and after the intervention with health education, focusing on the benefits of storytelling and coloring therapy for children.

## Discussion

### Level of gadget dependency

Gadgets are small devices or tools widely utilized by various age groups, offering numerous benefits and often regarded as innovative items. They cater to diverse needs, serving users ranging from adults to children. While adults typically use gadgets for 1 to 4 hours per session, often multiple times a day, preschool children have specific time limits and usage patterns distinct from adults.<sup>22</sup> Consequently, negative effects such as gadget addiction can manifest quickly due to prolonged use.<sup>23</sup> Increased gadget usage can lead to heightened levels of gadget addiction, which, in turn, heightens the risk of attention deficit disorder and hyperactivity. Gadget addiction disrupts the normal release of dopamine, a neurotransmitter associated with the brain’s reward system, emotions, motivation, and perception of rewards. Excessive gadget usage triggers excessive dopamine release, fostering a cycle of addiction where users continually seek gratification through gadget activities.<sup>24,25</sup>

The consequences of gadget addiction can adversely affect brain development, particularly the maturity of the Pre Frontal Cortex (PFC), responsible for executive functions like impulse control, decision-making, and concentration.<sup>26</sup> Studies indicate that excessive gadget use, particularly at a young age, can impede the PFC’s normal development, leading to diminished impulse control and concentration skills.<sup>27</sup> Therefore, it’s crucial to recognize the potential risks of gadget addiction and prudently limit gadget usage, especially in children. Effective supervision and scheduling are vital to ensuring gadget use remains moderate and doesn’t interfere with healthy brain development. Moreover, offering alternative, stimulating activities such as sports, outdoor play, reading, and social interaction can foster balanced brain development and mitigate the risk of gadget addiction.<sup>24,28</sup>

This study corroborates Nurfitri Rahmawati’s research (2020), which highlights that daily gadget usage often indicates high dependency levels, with many children experiencing negative impacts associated with gadgets.<sup>29</sup> Excessive screen time among young children has been linked to various harmful consequences, including screen dependency, as evidenced by research indicating a troubling prevalence of media-related dependency among adolescents and preschoolers.<sup>30</sup>

### Types of gadget use activities in children

In reality, when children become excessively engrossed in their gadget world, they often overlook fundamental needs such as learning and proper socialization in life.<sup>31</sup> Many children derive great enjoyment from using smartphones in their daily activities at home, school, and during playtime, leading some to develop a sense of coolness associated with gadget use. Some children even prioritize their gadgets over obeying parental instructions and may react negatively when asked to disengage. This behavior exemplifies a form of gadget addiction among children. Providing gadgets to children without adult supervision or guidance can indeed lead to various negative impacts.<sup>32</sup>

The study highlights some of the adverse effects of excessive gadget use on children’s physical and mental health. From vision impairments to severe mental disorders, the consequences can be significant. Moreover, if children are left unsupervised while using gadgets, their condition may deteriorate further. While engaging in play is acceptable, it’s crucial to ensure that children don’t become excessively immersed in gaming to the point where it adversely affects their well-being.

### Parents’ knowledge in preventing gadget use

Having good knowledge forms a solid foundation for making informed decisions and taking appropriate actions regarding gadget use in children.<sup>33,34</sup> Parents’ attitudes towards gadget usage vary. Some parents are comfortable with their children using gadgets for over an hour a day, viewing them as suitable play tools for preschool-age children. Additionally, many parents see gadgets as an engaging entertainment medium for their children. Some parents even support their children’s gaming skills by downloading specific applications. However, a minority of parents permit gad-

**Table 2.** Dependence and types activities of gadget use in children.

Indicator	F	%
Gadget use		
Dependency	174	57.4
Not dependent	129	42.6
Playing Games		
Yes	174	57.4
Not	129	42.6
Listening to Songs		
Yes	87	28.7
Not	216	71.3
Watching cartoons		
Yes	258	85.1
Not	45	14.9

**Table 3.** Results of bivariate analysis using the Wilcoxon Test before and after intervention.

Indicator	F	Min-Max	p
Knowledge			0.001
Before	303	1-8	
After	303	2-7	
Attitude			0.010
Before	303	27-44	
After	303	26-44	
Behavior			0.001
Before	303	9-20	
After	303	10-20	

get use at the dinner table, believing it enhances their children's appetite while eating. Furthermore, parents may resort to giving gadgets to their children when they are occupied with work.<sup>21</sup>

### Parents' attitude in preventing gadget use

Parents, as the primary caregivers spending considerable time with their children at home, bear the responsibility of regulating and supervising their children's gadget usage. This entails selecting appropriate content for their children, ensuring it aligns with their age and is free from harmful elements such as pornography or violence, and enforcing time limits on gadget use. Each parent employs distinct parenting styles and approaches, collectively termed as parenting.<sup>35,36</sup> The role of parents holds immense significance in shaping the future quality and contribution of children to the nation and society.<sup>37,38</sup> Therefore, parents must exert optimal efforts in educating and nurturing their children, guaranteeing their rights are fulfilled both physically and mentally.<sup>39</sup> Parental involvement during children's gadget use forms part of digital parenting strategies aimed at preventing gadget addiction.<sup>40</sup> Parental methods of assisting children with gadget usage vary, including supervising their internet access, providing guidance on responsible gadget use, and diverting their attention from gadgets by allocating dedicated time for interactive play.<sup>41</sup>

### Parents' behavior in preventing gadget use

Parents often hold the belief that providing gadgets to their children will keep them entertained indoors, favoring gadget use over outdoor play with friends.<sup>42,43</sup> However, this mindset may indicate a lack of awareness regarding age-appropriate child development. Allowing children unrestricted access to gadgets can be perceived as a convenient solution for keeping them occupied. Nevertheless, without proper supervision and limitations, excessive gadget use can impede children's social and physical growth.<sup>21</sup>

Researchers suggest that imposing time limits is an effective strategy to curb gadget dependency. While initially challenging, children gradually adapt to new rules within a week. Implementing such restrictions aims not to inconvenience children but rather to encourage engagement in alternative activities and outdoor pursuits. By regulating gadget usage duration, children are more inclined to explore other beneficial activities such as playing with peers, participating in sports, engaging in artistic endeavors, or reading books.<sup>44</sup> Moreover, time constraints facilitate improved time management skills, mitigate gadget addiction, and minimize the adverse effects of excessive technology exposure.

## Conclusions

Considering the evidence, targeted health education interventions are demonstrably effective in shaping parental attitudes and practices regarding gadget use in preschoolers. Consequently, educational institutions must place emphasis on incorporating modules that extol the benefits of storytelling and coloring therapy into the curriculum of parent meetings at schools. Such an initiative would ensure that schools are at the forefront of equipping parents with essential knowledge and strategies to guide gadget use amongst their children. This measure is pivotal for cultivating a more conducive digital environment that supports the well-being and development of preschool-aged children.

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