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Screen Time and Emotional Development Among Indonesian Preschoolers: A Comparative Study Across Socioeconomic Contexts in Jakarta

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ABSTRACT

Introduction: The widespread use of screen media among preschool-aged children has raised concerns about its impact on emotional development, particularly within socioeconomically diverse populations. Although excessive screen time has been associated with emotional difficulties in early childhood, few studies have explored how socioeconomic status (SES) moderates these effects, especially in Indonesia. This understanding is critical for healthcare professionals, including nurses, involved in child health promotion and family-centered care.

Methods: This comparative cross sectional study employed a quantitative approach and was conducted in two kindergartens in West Jakarta, Indonesia, from November to December 2024. A total of 80 preschool aged children were enrolled, with 40 preschooler from a high SES and 40 from a low SES. Data were collected through structured parent questionnaires that captured screen time characteristics (duration, frequency, content type, and parental supervision). Ethical approval was obtained from the Health Research Ethics Committee of Universitas Esa Unggul (Approval Number: 0925-01.135/DPKE-KEP/FINAL-EA/UEU/II/2025). And all participants parent provided written informed consent prior to participation.

Results: The primary outcome of the study was the association between screen time characteristics and emotional development in preschool-aged children. The study revealed that increased screen time duration and frequency were significantly associated with heightened emotional development concerns, particularly among children from lower socioeconomic backgrounds. Parental supervision during screen use appeared to serve as a protective factor, especially in the high SES group, where exposure to educational content was also linked to more positive emotional outcomes. Statistical analysis demonstrated strong positive correlations between screen time and emotional difficulties across both groups ($p<0.001$), with stronger correlation coefficients in the low SES group. Although the chi- square test indicated a tendency for educational content to be associated with better emotional outcomes in high SES children ($p=0.060$), the result was not statistically significant. Notably, the protective effect of educational content was limited among the low SES group, suggesting that contextual factors and access to supportive resources may influence the effectiveness of screen based learning.

Conclusion: These findings underscore the need for healthcare-Led interventions to promote effective digital parenting, particularly among socioeconomically disadvantaged families. Family-centered health education programs focusing on screen time management are essential for nurses and other healthcare professionals to mitigate emotional development risks and support equitable health outcomes in the digital era.

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INTRODUCTION

Digital media has rapidly become an integral part of early childhood experiences. A recent meta-analysis reported that only 35.6% of 2–5 year olds globally meet the WHO guideline of limiting screen time to a maximum of one hour per day, with the majority exceeding this recommendation, often surpassing two hours daily (1–3). Similar trends have been observed in Sri Lanka, where over 60% of preschoolers exceed recommended screen time limits, with many starting regular screen exposure before the age of two (4). Studies from China and Canada further reveal that excessive screen use is associated with emotional and behavioral problems, including reduced self-regulation, anxiety, and difficulties in peer interaction (5,6).

However, emerging evidence highlights that screen time alone does not fully account for these developmental risks. The context of media use-such as the type of content and parental mediation-plays a crucial moderating role. Research in Finland has shown that parental co-viewing and guided media engagement can buffer negative emotional impacts and support language development (7). Conversely, unstructured and unsupervised screen exposure remains a consistent risk factor, particularly among socioeconomically disadvantaged families (8,9).

In Indonesia, recent surveys indicate a similar concerning pattern: more than 70% of preschool-aged children in urban areas exceed daily screen time recommendations, often engaging with digital media without adequate supervision (10). Despite this high prevalence, empirical research investigating the emotional implication of excessive screen use remains limited. A study by Sari et al (2024) reported an increased occurrence of emotional and behavioral difficulties among preschoolers with high screen exposure(11). However, this investigation did not examine how broader contextual factors, such as socioeconomic status (SES) or parental mediation strategies, might influence these outcomes. Addressing these moderating factors is essential for developing targeted, context-sensitive interventions that reflect the diverse realities in Indonesian families.

Children form low-SES household are more likely to experience unstructured and unsupervised screen use due to limited caregiver availability, lack of digital literacy, or resource constraints (8,9). These patterns increase the risk of negative developmental outcomes, including emotional dysregulation and behavioral problems. In contrast, children from higher SES families often engage with educational content under parental supervision, which can mitigate some of the adverse effects of excessive screen exposure(7). Structured parental mediation strategies-such as co-viewing, setting content boundaries, and active discussion—has been linked to improved outcomes in children's language, attention, and socio-emotional development (5).

Considering Indonesia's significant SES disparities and widening digital access gaps, examining how these contextual factors moderate the relationship between screen media use and emotional development is critical. Insights into these dynamics are essential for informing tailored interventions in pediatric nursing and community-based child health programs, particularly those serving underserved populations.

Prelimenary observations in two kindergartens in West Jakarta- Kindergarten X (high SES) and kindergarten Y (low SES)-revealed notable differences in children's screen usage patterns and emotional regulation abilities. These findings underscore the need for empirical investigation into how screen time characteristics and parental mediation practices influence emotional development across SES groups. Therefore, this study aims to explore these relationships to provide evidance that can inform nursing practice, parental guidance strategies, and policy initiatives designed to promote balanced media use and emotional well-being in early childhood.

Beyond its developmental implications, screen media use has also become a pressing concern in pediatric nursing practice. Nurses and other community health professionals often serve as the first point of contact for families, positioning them as key agents in promoting healthy digital habits and identifying early signs of emotional distress. Fitzpatrick et al. (2023) emphasized that integrating media-use guidance into routine health consultations can significantly reduce screen-related harm by fostering parental awareness and emotional attunement (12). However, in Indonesia, existing guidelines remain generalized and lack specificity in addressing family context and socioeconomic variations. This gap higlights the urgent need for context-sensitive evidence to equip pediatric nurses and community health workers with the tools to deliver personalized interventions. By examining how digital engagement interacts with emotional development across socioeconomic backgrounds, this study seeks to contribute actionable insights that can support equitable and targeted health education, developmental screening, and family-centered care strategies**.**

METHOD

Design

This study used a quantitative approach with a comparative cross-sectional analytic design to compare screen time and emotional development in children from kindergartens with different socioeconomic backgrounds (high SES dan low SES).

Population and Sample

The study population included parents of preschool children aged 4–6 years enrolled in two kindergartens located in West Jakarta, Indonesia. A purposive sampling approach was employed to recruit participants for this comparative cross sectional study. The study involved 80 parents of preschool-aged children, comprising 40 participants from high-socioeconomic status (SES) backgrounds and 40 from low-SES backgrounds. Participants were selected from two kindergartens in West Jakarta, with SES categorization determined through a combination of institutional classification and parental-reported socioeconomic indicators.

High-SES participants were recruited from Kindergarten X, a private institution that primarily serves middle-income families. Operationally, high-SES was defined by parental reports of monthly tuition fees exceeding IDR 1.5 million, along with access to enhanced educational facilities, such as structured extracurricular programs and digital learning resources. In contrast, low-SES participants were selected from Kindergarten Y, a public school located in a lower-income urban area, where tuition is fully subsidized by the government, and the majority of families reported household incomes below Jakarta minimum wage threshold (IDR 5 million per month).

To futher validate SES grouping, parental education level and occupation were incorporated as supporting indicators. High-SES families typically consisted of parents with tertiary education qualifications and employment in professional or managerial roles. Conversely, low-SES families were characterized by parents with secondary education or lower, working in informal sectors or engaged in daily-wage occupations.

Eligible participants were parents of children aged 4 to 6 years, who had resided in Jakarta for a minimum of one year and provided informed consent. Children diagnosed with developmental disorders or medical conditions affecting emotional regulation were excluded from the study.

Research Location

The study was conducted in West Jakarta, Indonesia, an urban area with diverse socioeconomic backgrounds, providing a relevant contex to examine the relationship between gadget use and emotional development in preschool-aged children. Two kindergartens representing distinct socioeconomic levels as TK X (high socioeconomic status) and TK Y (low socioeconomic status) were purposively selected as the study sites.

Instrumentation or Tools

The data demographic questionnaire was developed by researcher consisted of data from mother and their children. The data from mother are age, economic and social status, education, and occupation. The data from children such as age, gender, duration of screen, frequency of screen, type of media, motivation of screen, and parental supervision of practice.

The quantitative component of the study employed a validated questionnaire, the Strengths and Difficulties Questionnaire (SDQ), to assess the emotional and behavioral development of preschool-aged children as perceived by their parents. The SDQ is a widely used screening instrument consisting of 25 items divided into five subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior. Each item is rated on a 3-point Likert scale (0 = not true, 1 = somewhat true, 2 = certainly true), with higher scores on the difficulties subscales indicating more problems and higher scores on the prosocial scale indicating stronger positive behaviors.

The SDQ has been adapted and validated in the Indonesian language. A Validation study by Oktaviana (2017) reported a Cronbach's alpha coefficient of 0.73 for the total difficulties score, indicating acceptable internal consistency (13). In this study, parents completed the parent-report version of the SDQ to evaluate their child's social-emotional development. The questionnaire was self-administered under the guidance of the researcher, who provided

clarification as needed. Scoring followed the standardized SDQ scoring guidelines, categorizing results into normal, borderline, and abnormal ranges for each subscale and the total difficulties score.

Data Collection Procedures

Quantitative data were collected through a self-administered paper-based questionnaire over a one-month period from November to December 2024. Data collection took place at two kindergartens in West Jakarta in TK X and TK Y. Prior to data collection, the researcher met with school principals to obtain permission and coordinate the schedule for approaching parents.

During the scheduled visits, parents were gathered in small groups at the school and provided with a brief explanation of the study objectives and procedures. Written informed consent was obtained from all participants before distributing the questionnaire. Parents were instructed on how to complete the Strengths and Difficulties Questionnaire (SDQ) and were encouraged to ask the researcher for clarification if needed. Each parent completed the questionnaire on-site, which took approximately 15–20 minutes. Completed questionnaires were collected immediately after completion to ensure data integrity and minimize missing responses.

Data Analysis

Quantitative data were analyzed using the Chi-Square test. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participants' demographic characteristics and children's SDQ scores. To examine the association between socioeconomic status and children's social-emotional development, the Chi-square test of independence was performed. This test assessed whether the distribution of SDQ categories (normal, borderline, abnormal) differed significantly between the two groups of schools with different socioeconomic levels. A p-value of less than 0.05 was considered statistically significant.

Ethical Approval

This study was reviewed and approved by the Health Research Ethics Committee of Universitas Esa Unggul (Approval Number: 0925-01.135/DPKE-KEP/FINAL-EA/UEU/II/2025). Ethical principles outlined in the Declaration of Helsinki were strictly adhered to throughout the research process. Prior to data collection, written informed consent was obtained from all participants. As the participants were parents or guardians of preschool-aged children, consent specifically pertained to their voluntary participation in completing the questionnaire regarding their children's social-emotional development.

Participants were assured of the confidentiality and anonymity of their responses. All collected data were de-identified and securely stored to prevent unauthorized access. Participants were informed of their right to withdraw from the study at any time without penalty. No personal identifiers were used in data reporting or publication to ensure privacy protection.

RESULTS

The results section should present the key findings of the study.

Table 1. Respondent characteristic

Characteristic of Respondent	Kindergartens X		Kindergartens Y	
Characteristic of children				
Gender	F	%	F	%
Male	25	62,5	23	57,5
Female	15	37,5	17	42,5
Total	40	100	40	100
Age				
4 years	11	27,5	7	17,5
5 years	11	27,5	10	25
6 years	18	45	23	57
Total	40	100	40	100

Characteristic of Parents				
Maternal education				
Elementary school	0	0	6	15
Junior High school	7	17,5	16	40
Senior high school	20	50	15	37,5
University	13	32,5	3	7,5
Maternal Jobs				
Private employee	13	32,5	11	27,5
Civil servant	5	12,5	2	5
Entrepreneur	13	32,5	4	10
Housewife	9	22,5	23	57,5
Total	40	100	40	100

Source: Primary Data

Participant characteristics are summarized in table 1. The majority group in Kindergarten X is male children, who make up 62.5% (25 children), while in Kindergarten Y, the majority group is also male children, comprising 57.5% (23 children). This shows that both kindergartens have a higher proportion of male children, although the percentage is slightly higher in Kindergarten X.

Regarding age, in Kindergarten X, the majority group is children aged 6 years, representing 45% (18 children). In Kindergarten Y, the majority group is also children aged 6 years, at 57% (23 children). This indicates that in both kindergartens, children aged 6 years represent the largest age group, with a more significant proportion of 6-year-olds in Kindergarten Y.

For parental characteristics, when considering maternal education, the majority in Kindergarten X is mothers with a senior high school education, comprising 50% (20 mothers). In Kindergarten Y, the majority group is mothers with a junior high school education, representing 40% (16 mothers). This highlights that in Kindergarten X, the largest group of mothers have a senior high school education, while in Kindergarten Y, the largest group have a junior high school education.

In terms of maternal jobs, in Kindergarten X, the majority group is mothers who are either private employees or entrepreneurs, both accounting for 32.5% (13 mothers each). In Kindergarten Y, the majority group is mothers who are housewives, making up 57.5% (23 mothers). This shows that in Kindergarten X, the majority of mothers work outside the home (as private employees or entrepreneurs), while in Kindergarten Y, the majority of mothers are stay-at-home mothers.

Table 2. The variable of gadget use

	Kindergarten X		**Kindergarten Y**	
Duration	**F**	**%**	**F**	**%**
Less than 1 hour/day	21	52,5	3	7,5
1-2 hours/day	17	42,5	11	27,5
More than 2 hours/day	2	5	25	62,5
Total	40	100	40	100
Frequency				
Low (1-2 times/day)	20	50	10	25
Moderate (2-3 times/day)	15	37.5	14	35
High (3-4 times/day)	5	12.5	16	40
Total	40	100	40	100
Types of gadget use activities				
Educational	29	72.5	22	55
Entertainment	11	27.5	18	45
Total	40	100	40	100
Types of media used on gadgets				
Youtube	26	65	17	42,5
Tiktok	8	20	15	37,5

Game	6	15	8	20
Total	40	100	40	100
Motivation for gadget use				
Educational purposes	25	62.5	11	27,5
Entertainment	7	17.5	12	30
Due to baredom	8	20	17	42,5
Total	40	100	40	100
Parental Supervision				
Yes	26	65	10	25
No	14	35	30	75
Total	40	100	40	100

As shown in table 2, the majority characteristics of gadget use in both Kindergarten X and Kindergarten Y show distinct patterns. In Kindergarten X, most children (52.5%) use gadgets for less than 1 hour a day, with 42.5% using them for 1-2 hours, and only a small minority (5%) using them for more than 2 hours daily. The majority of children (50%) also use gadgets moderately (2-3 times a day), with educational being the primary activity (72.5%), and YouTube being the most commonly used media (65%). Parental supervision is quite high in this group, with 65% of children supervised during gadget use. In contrast, Kindergarten Y shows a different trend, with the majority of children (62,5%) using gadgets for more than 2 hours a day. The frequency of use is also higher, with 40% of children using gadgets frequently (3-4 times a day). Educational remains the dominant activity (55%), with Youtube being the most popular media (42,5%). Parental supervision in this group is lower, with only 25% of children receiving supervision during gadget use. Overall, children in Kindergarten X have shorter, more controlled gadget usage with higher parental oversight, while those in Kindergarten Y have longer, more frequent usage with less parental supervision.

Table 3. The frequent of Emotional Development

	Kindergartens X		**Kindergartens Y**	
	F	**%**	**F**	**%**
Normal	21	52.5	4	10
Borderline	14	35	16	40
Abnormal	5	12.5	20	50
Total	40	100	40	100

Based on the provided data in table 3, the emotional development status of children in Kindergarten X and Kindergarten Y shows notable differences. In Kindergarten X, the majority of children (65%, or 26 children) fall within the normal range of emotional development, while 4% (10 children) are classified as borderline, and 25% (10 children) show abnormal emotional development. This indicates that most children in Kindergarten X have typical emotional development, with a smaller proportion displaying borderline or abnormal development.

In Kindergarten Y, a significant number of children (50%, or 20 children) have abnormal emotional development, followed by 40% (16 children) in the borderline category, and only 10% (4 children) showing normal emotional development. This suggests that a large proportion of children in Kindergarten Y are experiencing emotional development challenges, with only a small minority showing normal emotional development.

Table 4. Comparison of gadget use and emotional development in preschool children

Gadget Use	**Emotional Development**			**Total**	**Cramer's V**	**P value**
Kindergarten X	Normal	Boderline	Abnormal			
Duration:						
Less than 1 hour/day	20	0	1	21	**0.972**	**0.000**
1-2 hours/day	1	13	3	17		
More than 2 hours/day	0	1	1	2		
Total	21	14	5	40		
Kindergarten Y						

Duration						
Less than 1 hour/day	3	0	0	3	**0.918**	**0.000**
1-2 hours/day	2	9	0	11		
More than 2 hours/day	2	6	17	25		
Total	8	15	17	40		
Kindergarten X						
Frequency:						
Low (1-2 times/day)	20	0	0	20	**0.972**	**0.000**
Moderate (2-3 times/day)	1	14	0	15		
High (3-4 times/day)	0	0	5	5		
Total	21	14	5	40		
Kindergarten Y						
Frequency:						
Low (1-2 times/day)	8	1	1	10		
Moderate (2-3 times/day)	0	14	0	14	**0.918**	**0.000**
High (3-4 times/day)	0	0	16	16		
Total	8	15	17	40		
Kinderganten X						
Types of gadget use activities: Educational	12	13	14	29	**0.372**	**0.06**
Entertainment	9	1	1	11		
Total	21	14	5	40		
Kindergartens Y						
Types of gadget use activities:						
Educational	5	9	8	22	**0.138**	**0.682**
Entertainment	3	6	9	18		
Total	8	15	17	40		
Kindergartens X						
Type of media:						
Youtube	13	9	4	26	**0.286**	**0.162**
Tiktok	3	5	0	8		
Games	5	0	1	6		
Total						
Kindergartens Y						
Youtube	4	6	7	17		
Tiktok	2	5	8	15	**0.202**	**0.743**
Games	2	4	2	8		
Total	8	15	17	40		
Kindergartens X						
Motivation of gadget use:						
Educational	13	8	4	25	**0.148**	**0.783**
Entertainment	3	3	1	7		
Boring	5	3	0	8		
Total	21	14	5	40		
Kindergartens Y						
Educational	4	4	3	11	**0.201**	**0.514**
Entertainment	2	5	5	12		
Boring	2	6	9	17		
Total	8	15	17	40		
Kindergarten X						
Parental Supervision						
Yes	21	4	1	26	**0.773**	**0.000**
No	0	10	4	14		
Total	21	14	5	40		

Kindergarten Y						
Yes	8	1	1	10		
No	0	14	16	30	**0.866**	**0.000**
Total	8	15	17	40		

As shown in table 4. Significant differences in screen time duration were observed between the two kindergartens. In Kindergarten X (high SES), 52.5% of children used screens for less than one hour per day, with 95% of them exhibiting normal emotional development. In contrast, Kindergarten Y (Low SES) showed a higher proportion of children (62.5%) exposed to screens for more than two hours daily, where 68% demonstrated boderline or abnormal emotional development. Chi-square tests indicated a strong and statistically significant association between longer screen exposure and poorer emotional outcomes in both settings (Kindergarten X: Cramer's V= 0.972, p<-0.001; Kindergarten Y: Cramer's V = 0.918, p<0.001), suggesting that excessive screen time poses a considerable emotional risk across socioeconomic groups.

Similarly, lower screen use frequency (1-2 times/day) was associated with normal emotional status in both groups. Notably, in both kindergarten X and Y, all children with high frequency screen use (3-4 times/day) exhibited abnormal emotional outcomes. The relationship between screen use frequency and emotional development was also significant, with a very strong effect size.

The association between the type of gadget use activity (educational vs entertainment) and emotional development was not statistically significant in either group. In Kindergarten X, although children who used gadgets primarily for educational purposes showed better emotional outcomes, the results was marginally non-significant (Cramer's V=0.372, p=0.060). In Kindergarten Y, no significant relationship was observed (Cramer's V= 0.138, p=0.682).

Beyond screen exposure metrics, this study further explored how specific usage patterns-such as the type of media platforms and underlying motivation for gadget use-might influence children's emotional development. However, no significant differences in emotional outcomes were observed based on the type of media platform (Youtube, Tiktok, or Games) used by children in either Kindergarten X (Cramer's V=0.286, p=0.162) or Kindergarten Y (Cramer's V= 0.202, p=0.743), suggesting that platform choice alone may not be a determining factor for emotional well-being.

In addition to media platform choice, the underlying reasons why children engage with digital devices were also examined. The analysis revealed no statiscally significant association between the motivation behind gadget use (educational, entertainment, or boredom) and emotional development. Kindergarten X exhibited a non-significant relationship (Cramer's V=0.148, p=0.783), while kindergarten Y showed similar findings (Cramer's V= 0.201, p=0.514). Nevertheless, an observable trend indicated that children who used gadgets primarily to alleviate boredom tended to have poorer emotional outcomes, particularly in Kindergarten Y, suggesting a potential area for further investigation.

While media content and usage motives showed limited associations, parental mediation emerged as a critical contextual factor influencing emotional outcomes. Parental supervision during gadget use demonstrated a strong and signifivant protective effect in both kindergartens. In kindergarten X, 80,8% of children with supervised screen use exhibited normal emotional development, while all unsupervised children displayed borderline or abnormal emotional outcomes (Cramer's V=0.773, p<0.001). This pattern was even more pronounced in Kindergarten Y, where 100% of unsupervised children exhibited emotional difficulties compared to 80% normal outcomes among those with parental supervision (Cramer's V=0.866, p<0.001).

DISCUSSION

Our findings confirm that longer and more frequent screen time is significantly associated with poorer developmental and emotional outcomes in both kindergartens, with stronger effects observed in kindergarten Y (low SES) compared to Kindergarten X (High SES). This trend aligns with data from a Chinese cohort study, which reported that sustained high screen time from infancy predicts emotional and behavioral problems at age four (14). Moreover, Canadian research found that low-income preschoolers who exceeded recommended screen time were more likely to be developmentally vulnerable across multiple domains, and SES amplified these negative impacts

(6). The stronger associations in kindergarten Y mirror this phenomenon, emphasizing the compounding effect of structural disadvantages on digital media's impact. While these findings provide valuable insight into the relationship between screen time and emotional development across socioeconomic contexts, certain limitations must be acknowledged. The cross-sectional design inherently limits causal interpretations, it remains plausible that children with pre-existing emotional difficulties are more inclined to engage in excessive screen use, a phenomenon known as reverse causality. Additionally, the reliance on parent-and teacher-reported measures introduces potential reporting bias, where caregivers may underreport screen exposure or overestimate supervisory practices due to social desirability. These methodological constraints warrant cautious interpretation of the associations observed.

Comparable patterns have been reported in Southeast Asia. In Malaysia, a large-scale study revealed that over 90% of children under five exceeded screen time guidelines, with parental media habits and limited supervision identified as key risk factors for emotional difficulties (15). Similarly, research in Brunei highlighted that preschoolers with prolonged screen exposure exhibited greater emotional overload, characterized by heightened irritability and poor emotional regulation (16). In Vietnam, found that children from low-SES families faced greater emotional and behavioral challenges related to unregulated screen use, reinforcing the role of socioeconomic disparities in exacerbating screen-related developmental risks(17)

Both screen time duration and frequency showed strong associations with poorer emotional outcomes in preschoolers, echoing a growing body of evidence. For instance, field studies from Canada and Indonesia consistently link prolonged daily screen use (often defined as ≥2 hours) with increased emotional dysregulation and reduced self-regulation skills(6,10) . Likewise, a meta-analysis affirms that repeated exposure, regardless of content quality, is a reliable predictor of internalizing and externalizing behaviors in young children (18). Further, research in China and Sri Lanka highlights that consistent and frequent screen exposure correlates with attention difficulties, delayed language, and emotional problems (19)(20). Crucially, structured parental co-viewing or mediation appears to buffer these effects in higher-resource settings (7) , whereas children in low-SES or poorly supported environments remain vulnerable even with short, frequent screen interactions. Together, these findings underscore that both how long and how often children use screens combined with the context of that use are essential factors shaping early emotional development.

In addition to quantitative measures of screen exposure, the qualitative context-particularly parental involvement-emerged as a critical moderating factor. Parental supervision emerged as a protective factor consistent with results from Kerala, India, where inconsistent oversight increased risk of cognitive, attention, and social deficits(21). Similarly, an intervention in Asia involving 129 parent child pairs showed that structured parental education on screen use led to meaningful reductions in screen time and notable improvements in childrens attention and sleep quality (22). These findings highlight that active caregiver involvement not merely the restriction of screen time is essential in reducing potential harm The protective role of engaged parenting is futher supported by research from middle income countries. A study in China and Kenya found that co use of digital content or the use of educational apps was associated with better developmental outcomes, while passive or entertainment centered use correlated with negative behaviors (23)(22–24)(25).

In this study, Kindergarten X serving higher SES families showed a non significant trend toward better emotional development when screens were used for educational purposes. In contrast, kindergarten Y (low SES) did not show this benefit. A study in Findland echoes this pattern, reporting that educational use buffered screen time effects in high SES families, but provided little protection for children in lower SES settings where parental mediation was weaker (7). Taken together, these finding suggest that while content matters, parental engagement and the broader socioeconomic context crtitically determine whether digital media use supports or hinders childrens emotional development. Additionally, studies in middle-income countries reinforce that co-use or educational content can mitigate harm, whereas passive or entertainment driven use yields inconsistent outcomes. The non significant trend we observed in kindergarten X toward better outcomes with educational use supports such nuance. Yet, in low sosial economic settings (kindergarten Y), the same chi square showed no beneficial trend, emphasizing that content alone may offer limited protection in contexts of socioeconomic disadvantage.

These contextual dynamics highlight the need for differentiated public health strategies, particularly in tailoring screen time interventions to family and community resources. Given these disparieties, these is a pressing need for public health policies that bridge the gap between recommended practices and the socioeconomic realities

faced by families. From a practical perspective, these results underline the importance of targeted guideline and intervention program that are sensitive to SES differences, especially for low income populations. The American Academic of Pediatrics and Canadian 24-hours movement guidelines both emphasize limiting preschool screen time to 1 hour with active adult management (6). However, our data suggest that common strategies such as encouraging co-viewing and educational content, may be more effective in well resourced enviroments (kindergarten X), and insufficient where structural barriers exits. Among children using screens for entertainment or boredom, especially in kindergarten Y, this was associated with worse emotional profiles. This is consistent with Madigan et al. (2022), who found that preschoolers exceeding recommended screen time thresholds showed more externalizing and internalizing behaviors (e.g. anxiety, aggression) (26). A large longitudinal study spanning over 290.000 children identified a cycle whereby screen time and behavioral problems exacerbate each other, particularly in low SES families. Parental supervision emerged as a protective buffer, with active co-viewing supporting learning and emotional regulation. Chi Square analysis revealed a slight positive trend for educational content in kindergarten X, but this trend was absent in kindergarten Y, suggesting that high quality parental mediation may be less accessible in resource limited setting.

Beyond behavioral patterns, physiological mechanisms such as sleep disruption also warrant attention. Excessive screen time has been shown to impair sleep quality, marked by shorter duration and increased night awakenings, which in turn mediate behavioral issues in preschoolers. Susilowati et al. (2021), conducted during Covid 19, found that excessive screen use significantly impaired sleep quality and complicated routine establishmend in Indonesia preschoolers (10). These results suggest that screen time not only adds sedentary exposure but also displaces restorative sleep. Consequently, interventions should combine media literacy, caregiver co- viewing, structured bedtime routines, and non screen alternatives like reading or play, with special adaptations for low SES communities to ensure accessibility and cultural sensitivity.

Overall, this study's comparative design across socioeconomic contexts enhances its external validity, offering nuanced insights into how digital engagement interacts with emotional development. Future longitudinal research employing objective measures-such as screen time tracking applications and sleep quality monitors- would be instrumental in establishing causal pathways. Expanding the sampling framework to encompass diverse geographic and socioeconomic backgrounds will enhance the generalizability of findings and support the development of equitable, context-sensitive intervention strategies.

CONCLUSION

This study explored how screen time measured by duration, frequency, type of content, and whether children were supervised relates to emotional development in preschoolers from two different socioeconomic settings: Kindergarten X (high SES) and Kindergarten Y (low SES). The findings showed that children who spent more time and engaged more frequently with screens tended to have lower emotional development scores, especially in the lower-income group. Parental supervision was linked to better outcomes, and using screens for educational purposes appeared more beneficial among children in the higher SES group. These results highlight the importance of both what children watch and the context in which they use digital media.

These insights emphasize the need to guide screen use in early childhood, particularly by involving parents and supporting families with fewer resources. While the study adds to our understanding of how screen habits may influence emotional growth, there are a few limitations. The data were based on self-reports, the study was cross-sectional, and it did not account for important factors like sleep or the quality of screen content. Future research should follow children over time, use objective tools like screen-tracking and sleep monitors, and develop targeted programs that help families use digital media in healthy and meaningful ways.

AUTHOR'S CONTRIBUTION STATEMENT

Widia Sari contributed substantially to the conception and design of the study, provided overall supervision throughout the research process, and was primarily responsible for drafting, critically revising, and finalizing the manuscript.

Riskiya was involved in the development of data collection instruments, coordinated participant recruitment, and contributed to the acquisition data.

Adam Astrada performed statiscal analysis, interpreted the findings, and contributed significantly to the preparation and refinement of the results section.

Visya Septiana conducted an in-depth literature review, assisted in the synthesis of related studies, and contributed to the writing and critical review of the discussion section.

Rian Adi Pamungkas supported field implementation, managed data entry and organization, and participated in the editorial review and final approval of the manuscript.

All authors have read and approved the final version of the manuscript and agree to be accountable for the integrity and accuracy of all aspects of the work.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest – financial, professional, or personal, that could be perceived to influence the findings or interpretation of this research. No funding or support was received from any organization that could potentially benefit from the outcomes of this study. This declaration affirms the authors commitment to research integrity, transparency, and objectivity.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the authors used generative AI tools, specifically ChatGPT (OpenAI), to assist in language refinement, improve clarity, and enchance the overall readability and structure of the text. The use of AI tools was limited to editorial purposes and did not involve content generation related to data analysis, interpretation of findings, or authorship contributions. All intelectual content, critical interpretation, and final approval of the manuscript remain the sole responsibility of the authors. The authors affirm adheherence to ethically authorship practices and confirm that the use of AI tools does not compromise the originality or integrity of the research presented.

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BIBLIOGRAPHY

1. Qi J, Yan Y, Yin H. Screen time among school-aged children of aged 6–14: a systematic review. Glob Heal Res Policy. 2023;8(1).
2. Lakicevic N, Manojlovic M, Chichinina E, Drid P, Zinchenko Y. Screen time exposure and executive functions in preschool children. Sci Rep. 2025;15(1):1839.
3. Liu J, Riesch S, Tien J, Lipman T, Pinto-Martin J, O'Sullivan A. Screen Media Overuse and Associated Physical, Cognitive, and Emotional/Behavioral Outcomes in Children and Adolescents: An Integrative Review. J Pediatr Heal Care. 2022;36(2):99–109.
4. Rathnasiri A, Rathnayaka H, Yasara N, Mettananda S. Electronic screen device usage and screen time among preschool-attending children in a suburban area of Sri Lanka. BMC Pediatr. 2022;22(1):1–8.
5. Huang P, Chan SY, Ngoh ZM, Ong ZY, Low XZ, Law EC, et al. Screen time, brain network development and socio-emotional competence in childhood: Moderation of associations by parent-child reading. Psychol Med. 2024;
6. Kerai S, Almas A, Guhn M, Forer B, Oberle E. Screen time and developmental health: results from an early childhood study in Canada. BMC Public Health. 2022;22(1):1–9.
7. Mustonen R, Torppa R, Stolt S. Screen Time of Preschool-Aged Children and Their Mothers, and Children's Language Development. Children. 2022;9(10).

8. Bonifacci P, Compiani D, Vassura C, Affranti A, Peri B, Ravaldini V, et al. Home Learning Environment and Screen Time Differentially Mediate the Relationship Between Socioeconomic Status and Preschoolers' Learning and Behavioural Profiles. Child Psychiatry Hum Dev. 2024;(0123456789).
9. Männikkö N, Ruotsalainen H, Miettunen J, Marttila-Tornio K, Kääriäinen M. Parental socioeconomic status, adolescents' screen time and sports participation through externalizing and internalizing characteristics. Heliyon. 2020;6(2).
10. Susilowati IH, Nugraha S, Alimoeso S, Hasiholan BP. Screen Time for Preschool Children: Learning from Home during the COVID-19 Pandemic. Glob Pediatr Heal. 2021;8.
11. Sari, Widia,; Dewi, Ratna,; Pamungkas, Rian Adi,; Novardian. KORELASI DURASI DAN FREKUENSI SCREEN TIME TERHADAP STATUS PERKEMBANGAN ANAK USIA PRASEKOLAH. Prepotif J Kesehat Masy. 2024;8:7304–9.
12. Fitzpatrick C, Binet MA, Cristini E, Lopes MA, Bégin M, Frizzo G. Reducing harm and promoting positive media use strategies: new perspectives in understanding the impact of preschooler media use on health and development. Psicol Reflex e Crit. 2023;36(1).
13. Oktaviana M, Wimbarti S. Validasi Klinik Strenghts and Difficulties Questionnaire (SDQ) sebagai Instrumen Skrining Gangguan Tingkah Laku. J Psikol. 2014;41(1):101.
14. Liu W, Wu X, Huang K, Yan S, Ma L, Cao H, et al. Early childhood screen time as a predictor of emotional and behavioral problems in children at 4 years: a birth cohort study in China. Environ Health Prev Med. 2021;26(1):1–9.
15. Raj D, Zulkefli NM, Shariff ZM, Ahmad N. Determinants of Excessive Screen Time among Children under Five Years Old in Selangor, Malaysia: A Cross-Sectional Study. Int J Environ Res Public Health. 2022;19(6).
16. Keat OB, Alaqad MH, Mustaqim A, Hakemah M, Rehman S, Rajaretnam M. The connection between screen time and emotional trauma : A case study of Bruneian 3-year-old Children. J Posit Sch Psychol. 2022;6(12):643–52.
17. Nguyen NT. The Lived Experiences of Preschool Children Ages 3–4: The Practices of Independence in the Case Some Pre School in Vietnam. J Educ Soc Behav Sci. 2023;36(9):94–103.
18. Madigan S, McArthur BA, Anhorn C, Eirich R, Christakis DA. Associations between Screen Use and Child Language Skills: A Systematic Review and Meta-analysis. JAMA Pediatr. 2020;174(7):665–75.
19. Xie G, Deng Q, Cao J, Chang Q. Digital screen time and its effect on preschoolers' behavior in China: Results from a cross-sectional study. Ital J Pediatr. 2020;46(1):1–7.
20. G CS, V H, Tumati KR, Ramisetty UM. The Impact of Screen Time on Sleep Patterns in School-Aged Children: A Cross-Sectional Analysis. Cureus. 2024;16(2):1–8.
21. John JJ, Joseph R, David A, Bejoy A, George KV, George L. Association of screen time with parent-reported cognitive delay in preschool children of Kerala, India. BMC Pediatr. 2021;21(1):1–8.
22. Gebremariam MK, Henjum S, Terragni L, Torheim LE. Correlates of screen time and mediators of differences by parental education among adolescents. BMC Pediatr. 2020;20(1):1–8.
23. Okenwa-vincent EE, Opiyo R, Gauthier B, Ngyah-etchutambe IB, Ramírez-benítez Y, Abidi S Al, et al. Associations Between Screen Exposure , Home Media Environments , and Indicators of School Readiness in Toddlers and Preschoolers from Kakamega County , Kenya. 2025;
24. Uzundağ BA, Altundal MN, Keşşafoğlu D. Screen Media Exposure in Early Childhood and Its Relation to Children's Self-Regulation. Hum Behav Emerg Technol. 2022;2022:15–20.
25. Chong SC, Teo WZ, Shorey S. Exploring the perception of parents on children's screentime: a systematic review and meta-synthesis of qualitative studies. Pediatr Res. 2023;94(3):915–25.
26. Madigan S, Browne D, Racine N, Mori C, Tough S. Association between Screen Time and Children's Performance on a Developmental Screening Test. JAMA Pediatr. 2019;173(3):244–50.