

Family Caregiver Factors Predicting Excessive Smartphone Use of Thai Preschool Children: A Cross-Sectional Study

Ruksanudt Budda, Thanee Kaewthummanukul, Decha Tamdee, Jutamas Chotibang*

Abstract: Smartphone overuse among preschoolers is a growing concern globally. Although several studies have explored these contributing factors, the evidence specific to family-related factors influencing excessive smartphone use during preschool age remains limited. These family-related factors included parents' screen time, attitudes, mediation approach, education, employment status, family income, and household chaos. This cross-sectional study aimed to examine family-related factors that predict excessive smartphone use among preschool children. Multistage random sampling was employed to recruit 647 family caregivers. The instruments used for data collection included the Demographic Data Form, the Screen Time Questionnaire, the Mediation Scale, the Attitudes toward Smartphone Use Questionnaire, the Home Chaos Environment Questionnaire, and the Children's Smartphone Usage Habits Questionnaire. All data were collected by telephone or LINE calling interview. Descriptive statistics, correlation, and logistic regression were applied to analyze the data.

The findings indicated that caregiver educational level, caregivers' weekday and weekend screen time, and caregivers' affective attitudes were significant predictors of excessive use habit, with 95% CI. The model's predictive accuracy was 56.10%. Nurses can use this finding to design interventions focusing on caregiver support strategies to promote healthy smartphone use habits among preschoolers, with further testing needed.

Keywords: Excessive smartphone use, Family caregivers, Predicting factors, Preschool children

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Introduction

Excessive smartphone use has emerged as a concern in early childhood and is increasingly recognized as part of the broader phenomenon of problematic media use (PMU).¹ Preschool children, often described as digital natives, are growing up in an environment where digital media is embedded in daily life. However, excessive smartphone use during this critical developmental stage may pose significant risks.¹ Restricting screen time for children under five to less than one hour per day, with appropriate content and caregiver supervision, has been recommended by

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the World Health Organization and the American Academy of Pediatrics.^{2,3} Despite these guidelines, compliance remains limited worldwide.^{2,3}

A global analysis, including European data, found that about three-quarters of 3 and 4-year-olds exceed recommended screen time benchmarks, with only a small proportion meeting the guidelines.⁴ A cross-sectional survey of 300 preschool children aged 4–6 years in Kuala Lumpur found a high prevalence (65.7%) of screen media dependency, with smartphone use and prolonged weekend screen time.⁵ The situation is particularly concerning in Thailand, where national surveys indicate that 52.8% of preschoolers exceed this threshold.⁶

The consequences of excessive smartphone use among preschool children are wide-ranging. Physically, it has been associated with obesity, musculoskeletal discomfort, visual strain, and poor sleep quality.^{7–9} Psychologically, it is linked to anxiety, aggression, inattention, and a heightened risk of problematic or addictive use.^{9,10} Cognitively, it can impair executive function, disrupt learning processes, and increase susceptibility to attention deficit hyperactivity disorder or ADHD.^{11–13} These adverse outcomes underscore the urgent need for empirically grounded, evidence-based strategies to mitigate risks during early childhood.

Despite awareness of the issue, caregivers often perceive smartphones as beneficial for early learning, particularly in language development, or as practical tools to manage children's behavior—for example, to calm, entertain, or occupy them during household tasks.^{5,6,14} This duality illustrates the complex role of caregivers in shaping media use behaviors. Prior studies have shown that children's limited self-regulatory capacity, coupled with parents' smartphone ownership, attitudes, and authority over device access, are significant determinants of smartphone use patterns. In addition, broader socioeconomic conditions further intensify the risks associated with excessive use.^{14–16}

Although prior studies have identified multiple determinants of excessive smartphone use, important gaps in the literature persist. Limited evidence is available on how family and household environments, particularly caregiver characteristics, are associated

with excessive smartphone use among preschool-aged children. Clarifying these associations is crucial for developing an ecological understanding of early digital media exposure during the preschool age.

Review of Literature and Conceptual Framework

To explain the ecology of media problematic use in early childhood (including the smartphone), “the Interactional Theory of Childhood Problematic Media Use” or IT-CPU Model¹⁷ conceptualizes problematic media use as the result of interactions across multiple ecological media systems.¹⁷ This framework, proposed by Domoff et al.,¹⁷ is theoretically informed by Bronfenbrenner's bioecological theory and the Process–Person–Context–Time (PPCT) model.¹⁷ The IT-CPU emphasizes how family dynamics, parental attitudes, peer influences, and broader cultural contexts jointly shape children's media behaviors.¹⁷

To clarify the mechanisms underlying problematic media use, the IT-CPU framework conceptualizes problematic media use in early childhood as the result of interactions among proximal, distal, and maintaining factors.¹⁷ Proximal factors are immediate influences that initiate and shape excessive smartphone use and include child-related characteristics, parent-related attributes, and social influences. Unlike distal or maintaining factors, proximal factors directly interact with other factor groups and represent the starting point of the development of problematic media use. For preschool children, smartphone use is largely shaped by family caregivers, particularly through their screen time, attitudes, and mediation practices.¹⁷

Family caregivers' screen time refers to their smartphone use in the presence of children and often models behaviors that children imitate.^{17–19} Caregiver attitudes, conceptualized as evaluative orientations toward smartphone use encompassing affective (emotional), cognitive (belief-based), and behavioral

components, play a critical role in determining smartphone accessibility and structuring the home media environment.^{17,19–21} Mediation practices describe the degree of control, participation, and responsiveness caregivers exercise over children's smartphone use, reflecting media-specific parenting efficacy.^{17,22} Prior studies show that greater parental screen time is associated with increased smartphone use among their children, and positive attitudes toward smartphone use further reinforce this behavior.¹⁸ Higher levels of mediation have also been associated with an increased risk of smartphone overuse among preschool children, although mediation practices may vary according to caregiver characteristics.^{23,24}

Distal factors are antecedent influences that indirectly shape children's excessive smartphone use by affecting proximal factors, such as parental attitudes and practices.¹⁷ These broader contextual conditions—including socioeconomic status (e.g., family income and parental education) and household chaos—shape the environment in which proximal factors operate and contribute to problematic media use among preschool children.¹⁷ Prior research indicates that lower socioeconomic status may be associated with reduced smartphone use among preschoolers due to limited access.^{25–28} Family income and parents' educational attainment also influence family decisions about providing smartphones to young children.^{25–27} However, other studies have reported no significant association between family income and excessive smartphone use in preschool children.²⁸ Additionally, a greater chaotic household has been associated with higher levels of smartphone use, potentially because children engage with digital media as a means of coping with stress from such home environments.^{29,30}

The final factor group within the IT-CPU model is the maintaining factors, which promote the persistence of screen media use over time.¹⁷ These include parent-child dynamics (e.g., parental use of negative reinforcement or children's receipt of positive reinforcement), children's media-related

behaviors (such as using media to build self-confidence or regulate emotions and behavior), and peer-related influences (e.g., friends encouraging gaming or participating together on online platforms).¹⁷ Only one qualitative study has suggested that parent-child relationship factors and children's media behaviors may be associated with problematic smartphone use in early childhood, but not specifically within the preschool age group.³¹ Therefore, maintaining factors were not incorporated into this study.

In this study, the IT-CPU framework informed the study design by systematically incorporating individual, family, and context-level variables to achieve a holistic understanding of problematic smartphone use during the early-childhood.¹⁷

Study Aims

This study aimed to 1) describe patterns of family caregivers' screen time, mediation practices regarding preschoolers' smartphone use, caregivers' attitudes, family socioeconomic characteristics (education level, working status, and family income), and household chaos, and 2) examine the direct and indirect predictive associations of these factors with high levels of smartphone use among preschool children in Thailand.

Methods

Study Design: This study employed a cross-sectional, predictive correlational design and is reported here in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Sample and Setting: The accessible population included family caregivers of preschool-aged children recruited from 15 child development centers located in provinces identified as having the highest rates of excessive media use among children in Thailand.

Inclusion criteria were: 1) being the mother, father, or primary caregiver of Thai preschool children; 2) residing with the child for more than

6 months; 3) having experience using a smartphone in daily life; 4) holding Thai nationality; 5) being at least 18 years old; 6) being able to communicate in Thai; and 7) providing informed consent. Caregivers of children with developmental delays or cognitive impairments were excluded to minimize confounding effects on caregiver perceptions.

The required sample size was estimated using the G*Power program (ver. 3.1.9.7). Because no previous studies had specifically examined the relationships between family caregiver-related factors and smartphone

use among preschool children, a medium effect size,^{32,33} a statistical power of 0.80,^{32,33} and a significance level of 0.05^{32,33} were selected in line with Cohen's recommendations.^{32,33} This yielded a sample size of 473 participants. To compensate for possible attrition, the target sample was increased by 30%, resulting in a final planned sample of 675 participating caregivers. Participants were randomly recruited through a multistage sampling procedure across 15 sub-district child development centers located in areas with a high prevalence of media use among children (**Figure 1**).

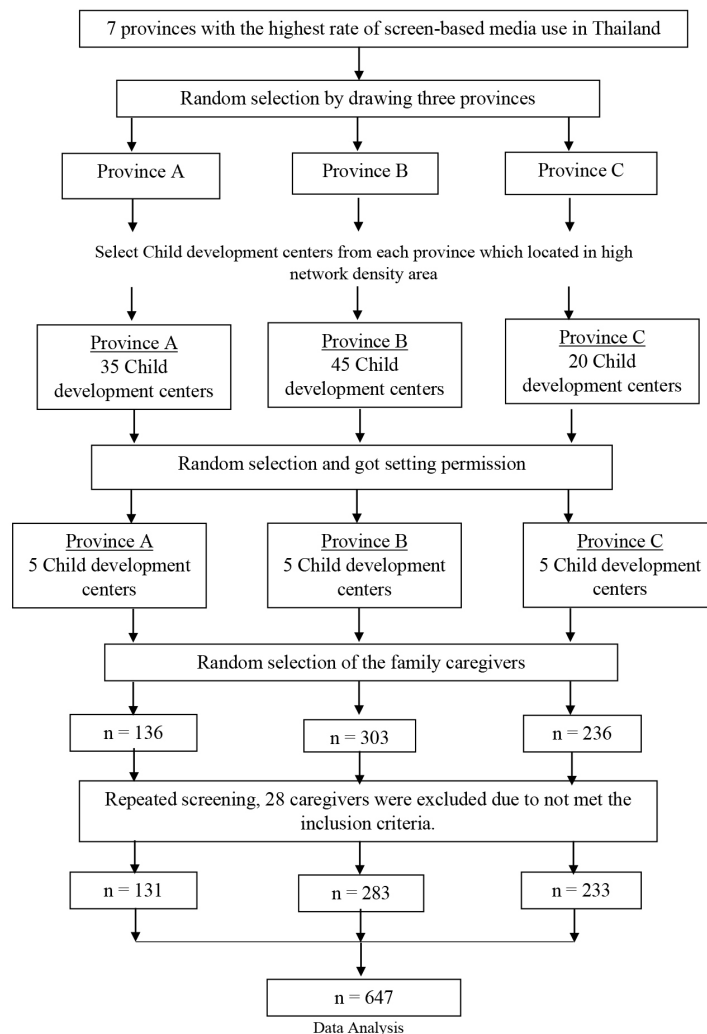


Figure 1. Multi-stage sampling process for family caregiver recruitment

Ethical Considerations: Ethical approval for this study was granted by the Research Ethics Committee of the Faculty of Nursing, Chiang Mai University (COA No. 034/2023; Study Code: 2566-EXP005), covering the research protocol, data collection instruments, and ethical procedures. Permission to carry out the study was also obtained from the relevant sub-district administrative authorities. All participants received detailed information about the study aims, procedures, and ethical safeguards. Written informed consent was obtained from each participant prior to enrollment.

Instruments: The data collection instrument comprised six questionnaires, including a demographic questionnaire. Permission to use the original instruments was obtained from the original developers. The instruments were translated from English to Thai and linguistically validated in accordance with the World Health Organization back-translation guidelines (WHODAS 2.0 protocol).³⁴ Content validity was assessed by six experts, including a child psychiatrist, a pediatric psychologist, an occupational therapist, a pediatric nursing expert, and two experts in nursing research instrumentation. The instrument descriptions, content validity indices, and internal consistency are presented below:

The Demographic Data Questionnaire was developed by the researchers to collect information on family caregivers. The data included gender, age, educational attainment, average monthly family income, employment status, the caregiver's relationship to the preschool child, and the child's age at first use of a smartphone.

The Screen Time Questionnaire, developed by Lauricella et al.,¹⁹ was used to assess family caregivers' daily smartphone use by recording the estimated number of minutes spent on weekdays and weekends.¹⁹ The Thai version was translated by an expert at the Language Institute, Chiang Mai University (LICMU). The instrument demonstrated good content validity (CVI = 1.00). As the questionnaire measures

time-based usage rather than latent constructs, internal consistency reliability was not applicable. Participants reported their average daily smartphone use, in minutes, separately for weekdays and weekends. Overall daily screen time was computed using the formula as $([\text{weekday} \times 5] + [\text{weekend} \times 2]) \div 7$.¹⁹ Caregiver screen time was analyzed as a continuous variable (minutes/day). For descriptive purposes, screen time was further categorized as low (< 120 min/day) or high (≥ 120 min/day).¹⁹

The Attitudes toward Smartphone Use Questionnaire, originally developed by Lauricella et al.,¹⁹ was used to assess family caregivers' perceptions of the advantages and disadvantages of screen media use by preschool children. The Thai version, translated by the English-Thai language expert at the LICMU, demonstrated strong content validity (CVI = 0.91) and good internal consistency (Cronbach's α = 0.84). The instrument comprises 22 items across three domains— affective, cognitive, and behavioral—rated on a 4-point Likert scale.¹⁹ Total scores range from 22 to 88.¹⁹ A sample item is "Using screen media helps my child learn new things."¹⁹

The Parental Mediation Scale, developed by Nimrod et al.,²² was used to assess four caregiver mediation strategies: restrictive, supervision, instructive, and co-use, with each domain measured by two items.²² Responses are recorded on a 5-point Likert scale,²² yielding subscale scores between 2 and 10. A sample item for the restrictive domain is 'I limit the amount of time my child is allowed to use a smartphone.' Examples for the instructive, supervision, and co-use domains include 'I explain to my child how to use a smartphone appropriately,' 'I monitor what my child does while using a smartphone,' and 'I use a smartphone together with my child,' respectively. Higher scores reflect a stronger endorsement of the corresponding mediation strategy. The Thai version, translated by the English-Thai language expert at the LICMU, showed good content validity (CVI = 0.96), and the reliability demonstrated good internal consistency (Cronbach's α = 0.92).

The Chaos Environment Questionnaire, originally developed by Evans et al., was used to assess the characteristics of chaos in the household environment.³⁰ The questionnaire comprises 22 dichotomous items (Yes = 0, No = 1) across four domains: confusion, disorganization, hurriedness, and routines/rituals.³⁰ An example item from the hurriedness domain is “We are usually rushing to get things done in our household.”³⁰ Example items from the confusion, disorganization, and routines/rituals domains include “It is often noisy and chaotic in our home,” “Our home is cluttered and disorganized,” and “Our family follows regular daily routines,” respectively.³⁰ The scale yields scores between 0 and 22. The original version demonstrated acceptable content validity (CVI = 0.79),³⁰ whereas the Thai version (was translated by the English-Thai language expert at the LICMU) showed stronger content validity (CVI = 0.95). The KR-20 indicated high internal reliability, with a value of 0.90 in the present study.

The Children’s Smartphone Usage Habits Questionnaire or the SCREENS-Q, developed by Klakk et al.,³⁵ is a 14-item measure designed to evaluate preschool children’s screen media use across four domains: access (availability and ownership of smartphones), usage frequency, content, and family co-viewing.³⁵ Items related to smartphone access and content are scored dichotomously (Yes/Agree = 0; No/Disagree = 1),³⁵ while the remaining items are rated on a Likert-type scale.³⁵ An example item from the access domain is “Does your child have access to a smartphone in the household?”³⁵ Example items from the usage frequency, content, and family co-viewing domains include “How often does your child use a smartphone on a typical day?,” “I talk with my child about the content he or she watches on a smartphone,” and “I watch smartphone content together with my child,” respectively. Total scores range from 0 to 14 and were dichotomized using the median, with values below the median indicating non-excessive smartphone use and values at or above the median indicating excessive smartphone use. In this study, the Thai version, translated by the English-Thai language expert at the LICMU, showed strong content validity (CVI = 0.97) and good internal reliability (Cronbach’s α = 0.86).

Data Collection: Data were collected from August 2023 to March 2024. After obtaining ethical approval, the primary investigator (PI) contacted the heads of child development centers to explain the study objectives and request access to family caregiver databases. Eligible participants were provided with comprehensive information about the study and received a package of documents that included consent forms and prepaid return envelopes. Completed consent forms were returned by mail. Subsequently, interviews were scheduled and conducted via telephone or the LINE calling application, according to participant preference, lasting 15–20 minutes and allowing participants to pause or discontinue at any time. Upon completion, all completed questionnaires were collected for subsequent data analysis.

Data Analysis: All missing data were eliminated, and the confounding was controlled. All statistical analyses were performed using SPSS software, version 22 (SPSS Inc., Chicago, IL, USA). A significance threshold of 0.05 was applied. Descriptive analyses were conducted to characterize the sample and the study variables. Spearman’s rank-order correlation was used to examine associations among the study variables. Binary logistic regression was applied to assess the predictive contribution of each factor. After verifying that all model assumptions were met, a stepwise regression was used to select variables that best predicted excessive smartphone use.

Results

Data obtained from 647 caregivers across 15 child development centers in Thailand were analyzed. The caregiver sample was predominantly female, with most participants being mothers of preschool-aged children. Regarding educational attainment, a large proportion of family caregivers held a bachelor’s degree. Most caregivers were employed. According to caregivers’ reports, most preschoolers were first introduced to smartphone use between the ages of 2 and 3 (**Table 1**).

Table 1. Demographic characteristics

Demographic data	n	(%)
Family caregivers (n = 647)		
Gender		
Female	553	85.50
Male	94	14.50
Age (years), Max-Min = 19-76		
18-35	480	74.20
36-59	141	21.80
≥ 60	26	4.00
Relationship with preschool children		
Mother	456	70.50
Father	74	11.50
Grandparent	65	10.00
Other (Aunt/Uncle/Stepmother/Stepfather)	52	8.00
Education		
No education	3	0.50
Primary education	50	7.70
Secondary education	113	17.50
High school or vocational certificate	131	20.10
Diploma	95	14.70
Bachelor's degree	232	35.90
Postgraduate degree	23	3.60
Working status		
Employed	572	88.40
Unemployed	75	11.60
Average family income		
≤ 30,000 Thai baht/month*	505	78.10
> 30,000 Thai baht/month*	142	21.90
Preschool Children (n = 647)		
Age at start of smartphone use (year)		
≤ 1	66	10.20
2-3	510	78.83
4-5	71	10.97

Note. *30,000 Thai baht = 960 USD

Caregivers reported higher daily smartphone use on weekends than on weekdays, and nearly 75% used smartphones daily while caring for their children. Approximately half of the caregivers were classified as having high smartphone use. Instructive and supervisory mediation strategies were the most frequently reported.

Caregivers' attitudes toward preschool children's smartphone use varied across the three measured domains. The cognitive domain had the highest mean score, followed by the behavioral domain, while the affective domain had the lowest. The families reported the highest mean household chaos score in the routines and rituals domain (**Table 2**).

Table 2. Family caregivers' screen time, attitudes toward smartphone use, mediation strategies, and household chaos (n = 647)

Variables	n	%	Mean	SD
Average screen time				
Weekdays (mins/day), Mean = 73.17, SD = 71.61				
1-60	451	69.7		
61-119	61	9.40		
≥ 120	135	20.9		

Table 2. Family caregivers' screen time, attitudes toward smartphone use, mediation strategies, and household chaos (n = 647) (Cont.)

Variables	n	%	Mean	SD
Weekends (mins/day), Mean = 93.00, SD = 88.92				
1–60	453	70.00		
61–119	11	1.70		
≥ 120	183	28.3		
Frequency (days per week)				
1–3	62	9.60		
4–6	194	29.9		
7	391	60.4		
Screen time level				
High (≥ 120 mins/day)	330	51.00		
Low (<120 mins/day)	317	49.00		
Attitude toward smartphone use by preschool children				
Affective			12.42	3.27
Cognitive			16.53	3.50
Behavioral			15.65	3.03
Mediation				
Restrictive approach			6.98	2.32
Instructive approach			7.16	2.02
Supervision approach			7.06	2.24
Co-use approach			6.86	2.13
Household chaos				
Confusion			2.85	1.42
Disorganization			2.00	1.70
Hurriedness in the home			3.00	0.95
Routines and rituals in the home			6.15	1.18

As shown in **Table 3**, more than half of preschoolers used smartphones daily at home and before bedtime. The majority of preschool children exceeded the WHO-recommended daily screen time limit of 60 minutes, and 25% frequently engaged in double-screen use. Inside the content domain, the

entertainment content was most frequently accessed, followed by social media platforms and games. Most caregivers reported being present during their children's smartphone use (78.20%). After applying the median cutoff, 50.70% of preschool children were identified as excessive users.

Table 3. Preschool children's smartphone usage domains (n = 647)

Domains	n	(%)
Smartphone access		
Home accessibility:		
Number of smartphones in family (Mean = 2.57, SD = 0.85)		
1	25	3.90
2–3	511	78.90
≥ 4	111	17.20
Preschool children's screen media ownership		
No	337	52.09
Yes	310	47.91
Smartphone	181	28.00
Tablet/iPad/ Laptop or Desktop computer	129	20.00

Table 3. Preschool children's smartphone usage domains (n = 647) (Cont.)

Domains	n	(%)
School accessibility:		
No or never	647	100.00
Usage frequency		
Daily usage frequency (days/week)		
6-7	405	62.60
4-5	168	26.00
2-3	64	9.90
Use immediately after waking up (days/week)		
6-7	242	37.40
4-5	138	21.30
2-3	240	37.10
1	27	4.20
Use before sleep time (days/week)		
6-7	406	62.80
4-5	136	21.00
2-3	96	14.80
1	9	1.40
Average duration of smartphone usage		
< 60 mins/day	16	2.50
≥ 60 mins/day	631	97.50
Use smartphone together with other screen media (Double screen habit)		
Always	71	11.00
Often	162	25.00
Sometimes	110	17.00
Rarely	91	14.10
Never	213	32.90
Content		
Activities-based smartphone content		
Entertainment content (Movies/Cartoons/YouTube)	613	94.70
Social media (Facebook/TikTok)	144	22.60
Games	134	20.70
Drawing apps/Cap Cut	117	18.10
Line VDO calling/FaceTime	115	17.80
School-related tasks/Homework	103	15.90
Smartphone co-viewing		
Person accompanying preschool children during smartphone use		
Parents/grandparents	506	78.20
Children use alone	88	13.60
Siblings	44	6.80
Peers	9	1.40

Correlation among variables

Preschool children's excessive smartphone use showed positive correlations with caregiver employment status, household income, caregiver education, caregivers' weekday and weekend screen time, and instructive and restrictive mediation, as well as

affective attitudes toward smartphone use. Conversely, behavioral attitudes were negatively related to excessive smartphone use. No significant relationships were found between excessive smartphone use and household chaos, supervisory mediation, co-viewing behaviors, or caregivers' cognitive attitudes (**Table 4**).

Table 4. Correlation coefficients (n = 647)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Excessive smartphone use	1.00													
2 FC screen time on weekdays	0.10*	1.00												
3 FC screen time on weekends	0.09*	0.79**	1.00											
4 Restrictive	0.11**	0.14**	0.12**	1.00										
5 Instructive	0.12**	0.09*	0.04	0.68**	1.00									
6 Supervision	0.08	0.16**	0.15**	0.58**	0.66**	1.00								
7 Co-view	0.05	0.06	0.08	0.60**	0.65**	0.70**	1.00							
8 Household chaos	0.03	0.18**	0.16**	0.03	0.01	-0.01	0.08*	1.00						
9 Attitude-affective	0.08*	-0.13**	-0.05	0.09*	0.06	-0.03	0.10*	0.04	1.00					
10 Attitude-cognitive	0.05	-0.16**	-0.16**	0.04	-0.03	-0.13**	0.01	-0.10*	0.58**	1.00				
11 Attitude-behavior	-0.09*	-0.24**	-0.20**	-0.08*	-0.08*	0.02	0.04	-0.07	0.17**	0.23**	1.00			
12 Parent education	0.11**	-0.01	0.00	0.21**	0.16**	0.17**	0.15**	-0.19**	-0.11**	-0.10*	0.03	1.00		
13 Family income	0.08*	0.07	0.09*	0.16**	0.11**	0.13**	0.12**	-0.15**	-0.21**	-0.08*	-0.02	0.72**	1.00	
14 Occupational status	0.08*	0.06	0.06	0.09*	0.08*	0.15**	0.07	-0.18**	-0.07	-0.06	-0.06	0.36**	0.43**	1.00

Note. * Significance at the 0.05 level (2-tailed), ** Significance at the 0.01 level (2-tailed), FC = Family caregiver

Binary logistic regression analysis

In the multivariable binary logistic regression analysis, the 95% CI showed that caregiver educational level and affective attitudes, as well as smartphone use

on weekdays and weekends, were independently related to excessive smartphone use among preschool-aged children. Applying a $\geq 50\%$ threshold, the model achieved a classification accuracy of 56.10% (Table 5).

Table 5. Binary regression analysis (n = 647)

Factors	Excessive smartphone use				
	B	SE	Wald	OR	95% CI
Education level	0.141	0.057	6.042	1.151*	1.029–1.288
Family caregivers' screen time on weekdays	–0.003	0.001	4.765	0.997*	0.994–1.000
Family caregivers' screen time on weekends	0.004	0.002	4.128	1.004*	1.000–1.007
Affective attitude	0.061	0.025	5.953	1.063*	1.012–1.117

Note. * $p < 0.05$, OR = Odds ratio, CI = Confidence interval

Discussion

This cross-sectional study examined associations and predictors of excessive smartphone use among Thai preschool children, focusing on family caregivers' screen time, attitudes, mediation practices, caregiver education, family income, and household chaos. The findings indicate that both proximal caregiver-related behaviors and selected distal socioeconomic factors contribute to smartphone overuse, consistent with the IT-CPU framework.

Family caregivers' screen time was positively associated with and significantly predicted excessive smartphone use among preschoolers. Most caregivers exceeded the recommended daily screen time limits. These findings are consistent with previous studies showing strong associations between parental screen engagement and children's weekday and weekend screen use, as well as increased child screen exposure in the presence of parental media use.^{2,16,18,26,36} Notably, evidence from a quasi-experimental intervention targeting parental screen time reduction among families with preschool children has shown significant decreases in screen time for both parents and children.³⁷ These findings lend support to the interpretation of the present results by highlighting the potential role of parental behavioral modeling as an underlying mechanism influencing children's smartphone use.

Caregivers' attitudes toward smartphone use were associated with children's excessive use but showed limited predictive power after adjustment for other factors. Positive affective attitudes toward smartphone use were linked to higher levels of excessive use, suggesting greater permissiveness. In contrast, behavioral attitudes toward regulation were associated with lower excessive use, indicating a protective effect. However, attitudes did not independently predict excessive smartphone use in the final model, implying that favorable attitudes alone may not translate into healthier screen behaviors without corresponding behavioral changes. This interpretation aligns with findings from a quasi-experiment study, which showed that changes in parental awareness and attitudes were most effective when accompanied by concrete strategies to reduce screen exposure.³⁷ Together, these two correlation studies found that caregiver attitudes function as enabling factors, but behavioral regulation remains essential for meaningful reductions in children's screen use.^{18,38}

Parental mediation practices were associated with preschoolers' smartphone use, with instructive mediation emerging as a significant predictor of excessive use. Although instructive and supervisory mediation strategies were commonly reported, instructive mediation was associated with higher odds of excessive smartphone use, suggesting that

guidance during use may unintentionally extend screen time when not accompanied by explicit limits. Similar inconsistencies in mediation effectiveness have been reported in one prior research, indicating that mediation strategies vary in impact depending on their structure and implementation.²³ In contrast, the intervention study by Boonmun et al.³⁷ emphasized structured parental regulation and goal setting rather than passive guidance, resulting in significant reductions in children's screen time. This contrast highlights the importance of combining mediation with clear boundaries and time limits, particularly in early childhood.

Caregiver education level emerged as the only distal socioeconomic factor that significantly predicted excessive smartphone use, with higher educational attainment associated with a greater likelihood of overuse. This finding reflects increased access to digital devices, greater digital literacy, or stronger beliefs in the educational value of smartphones. Previous studies have reported mixed associations between caregiver education and children's screen use, ranging from protective effects to no association.^{27,39,40} However, one study found that higher education does not automatically confer protective behaviors unless accompanied by intentional screen management strategies.³⁷ Thus, caregiver education alone may be insufficient to mitigate excessive smartphone use without targeted guidance on appropriate screen practices.

Although earlier studies have linked household disorganization to greater screen exposure, household chaos was not significantly associated with excessive smartphone use among preschoolers in this study.²⁹ This discrepancy may reflect contextual factors in which caregiver regulation and attitudes exert a stronger influence on children's smartphone use than overall household organization. Consistent with the IT-CPU Model, technology-specific parenting practices may represent more proximal determinants of preschoolers' smartphone use than distal environmental conditions

such as household chaos.¹⁷ As the findings from Boonmun et al.³⁷ indicate, caregiver-driven behavioral changes may outweigh environmental factors in influencing preschool children's screen behaviors. Nevertheless, household chaos remains an important contextual factor and should be further explored using longitudinal designs to clarify its role over time.

Overall, the final model indicated that caregivers' smartphone use on both weekdays and weekends, educational attainment, and affective attitudes toward smartphone use were significantly associated with excessive smartphone use among preschool children, with caregiver screen time representing the most robust and consistent predictor. These findings align with intervention studies showing that reductions in caregiver screen time are accompanied by corresponding decreases in children's screen exposure.³⁷ Collectively, the results support the IT-CPU framework by underscoring the predominant role of proximal caregiver behaviors relative to more distal contextual influences.

Limitations

This study has some limitations. First, given the cross-sectional, predictive correlational design, the findings are interpreted as theoretical and statistical associations rather than causal mechanisms. Second, the potential mediating factors and their pathway were not examined. A future longitudinal and causal relationship is warranted to better understand the mechanisms underlying excessive smartphone use in early childhood.

Conclusions and Implications for Nursing

This study highlights significant determinants of excessive smartphone use among preschool children and emphasizes the role of family caregivers in shaping early screen-related behaviors. The findings support

the need for multilevel strategies that incorporate caregiver education, community-based initiatives promoting balanced smartphone use, and targeted support for families experiencing high daily screen exposure. Collectively, these approaches underscore the importance of caregiver engagement, intersectoral collaboration, and supportive policies to mitigate excessive smartphone use in early childhood.

Conflict of Interest

The authors report no conflicts of interest associated with this manuscript.

Author Contributions

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Data analysis and interpretation: R.B., T.K., D.T., J.C.

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ปัจจัยด้านผู้ดูแลในครอบครัวที่ทำนายการใช้สมาร์ทโฟนเกินของเด็กไทยวัยก่อนเรียน : การศึกษาแบบภาคตัดขวาง

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บทคัดย่อ : การใช้สมาร์ทโฟนเกินในเด็กวัยก่อนเรียนเป็นปัญหาที่เพิ่มมากขึ้นทั่วโลก แม้ว่าจะมีการศึกษาปัจจัยที่มีส่วนเกี่ยวข้อง แต่หลักฐานเชิงประจักษ์ที่มีความเฉพาะเจาะจงเกี่ยวกับปัจจัยด้านครอบครัวที่มีอิทธิพลต่อการใช้สมาร์ทโฟนเกินในเด็กวัยก่อนเรียนยังมีจำกัด ปัจจัยด้านครอบครัวเหล่านี้ ได้แก่ เวลาในการใช้หน้าจอของผู้ปกครอง ทักษะคิดของผู้ปกครอง การมีส่วนร่วมและการกำกับดูแลของผู้ปกครอง สถานะทางสังคมและเศรษฐกิจ (การศึกษา สถานะการทำงาน รายได้ครอบครัว) และความวุ่นวายในครัวเรือน การศึกษาแบบภาคตัดขวางนี้เป็นการวิจัยเชิงทำนาย มีวัตถุประสงค์เพื่อศึกษาปัจจัยด้านครอบครัวที่ทำนายการใช้สมาร์ทโฟนเกินในเด็กไทยวัยก่อนเรียนตามการรับรู้ของผู้ดูแลในครอบครัว กลุ่มตัวอย่าง คือ ผู้ดูแลในครอบครัวของเด็กวัยก่อนเรียน จำนวน 647 คน กลุ่มตัวอย่างคัดเลือกโดยการสุ่มแบบหลายขั้นตอน เครื่องมือที่ใช้ในการเก็บข้อมูลประกอบด้วย 1) แบบบันทึกข้อมูลประชากร 2) แบบสอบถามเวลาการใช้หน้าจอของผู้ดูแล 3) แบบวัดทัศนคติของผู้ดูแลต่อการใช้สมาร์ทโฟนในเด็ก 4) แบบวัดการกำกับดูแลของผู้ดูแลในการใช้สมาร์ทโฟนของเด็ก 5) แบบสอบถามสภาพแวดล้อมที่สับสนวุ่นวายภายในบ้าน และ 6) แบบสอบถามการใช้หน้าจอในเด็ก ข้อมูลทั้งหมดถูกรวบรวมโดยการสัมภาษณ์ทางโทรศัพท์หรือผ่านแอปพลิเคชัน LINE วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา สถิติสหสัมพันธ์แบบสเปียร์แมน และการวิเคราะห์ถดถอยโลจิสติกทวิภาค

ผลการศึกษาที่ระดับความเชื่อมั่นร้อยละ 95 พบว่า สมการทำนายการใช้สมาร์ทโฟนเกินในเด็กวัยก่อนเรียนประกอบด้วยปัจจัยทำนาย ได้แก่ ระดับการศึกษาของผู้ดูแล ระยะเวลาการใช้หน้าจอของผู้ดูแลในวันธรรมดา ระยะเวลาการใช้หน้าจอของผู้ดูแลในวันหยุดสุดสัปดาห์ และทัศนคติทางอารมณ์ของผู้ดูแล โดยสมการทำนายมีความแม่นยำในการพยากรณ์ ร้อยละ 56.10 ผลที่ได้จากการศึกษาดังนี้สามารถนำไปใช้ในการออกแบบกิจกรรมทางการพยาบาลและกลยุทธ์การสนับสนุนผู้ดูแลเพื่อส่งเสริมพฤติกรรมการใช้สมาร์ทโฟนอย่างเหมาะสมในเด็กวัยก่อนเรียน

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คำสำคัญ : การใช้สมาร์ทโฟนมากเกินไป ผู้ดูแลในครอบครัว ปัจจัยทำนาย เด็กวัยก่อนเรียน

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