Screen Time and its Determinants in Infants and Toddlers: Results from a Metropolitan Area of Istanbul

Bebek ve Küçük Çocuklarda Ekran Süresi ve Belirleyicileri: İstanbul'un Bir Metropol Bölgesinden Sonuçlar

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Abstract
Objective: This cross sectional study aimed to assess screen time and associated factors in infants and toddlers under the age of 3 years in a metropolitan area.
Method: Data were collected from 269 mothers registered in a family health center using a questionnaire. The questionnaire examines the demographic characteristics of families, the time spent by infants and toddlers with screen devices, and factors that may affect screen time, such as income status, education level and resources.
Results: Three-quarters of infants and toddlers in this sample used screen devices (n=202, 75.1%). Total screen time ranged from 20 to 270 min/day, with a mean of 101.8±56.2 min/day. Infants and toddlers spent an average of 71.9 min/day watching television, 63.1 min/day using tablets, and 36.85 min/day using mobile phones. Total daily screen time exceeded World Health Organization (WHO) recommendations in 36.3% of infants aged 0-12 months, 84.3% of toddlers aged 13-24 months, and 49.4% of toddlers aged 25-36 months. Age of infant and toddler, maternal education level, and family income were identified as factors associated with risky screen exposure.
Conclusion: Families can be educated about the potential consequences of screen time and strategies to reduce screen use. In trainings, families in the risk group should be given priority in terms of factors affecting screen time such as income status, education level and age.
Keywords: Infant, toddler, screen time, technology addiction

Öz
Amaç: Bu kesitsel çalışma, bir metropol bölgesindeki bebek ve 3 yaş altı küçük çocuklarda ekran süresini ve ilişkili faktörleri değerlendirmeyi amaçlamıştır.
Yöntem: Veriler bir aile sağlığı merkezine kayıtlı 269 anneden bir anket kullanılarak toplanmıştır. Anket, ailelerin demografik özelliklerini, bebeklerin ve küçük çocukların ekranlı cihazlarla geçirdikleri süreyi ve gelir durumu, eğitim düzeyi ve kaynaklar gibi ekran süresini etkileyebilecek faktörleri incelemektedir.
Bulgular: Bebeklerin ve küçük çocukların dörtte üçü ekranlı cihazlar kullanmıştır (n=202, %75,1). Toplam ekran süresi 20 ila 270 dakika/gün arasında değişmekte olup, ortalama 101,8±56,2 dakika/gündür. Bebekler ve küçük çocuklar ortalama 71,9 dakika/gün televizyon izleyerek, 63,1 dakika/gün tablet kullanarak ve 36,85 dakika/gün cep telefonu kullanarak geçirmiştir. Toplam günlük ekran süresi 0-12 aylık bebeklerin %36,3'ünde, 13-24 aylık küçük çocukların %84,3'ünde ve 25-36 aylık küçük çocukların %49,4'ünde Dünya Sağlık Örgütü (DSÖ) tavsiyelerini aşmıştır. Bebeğin ve yeni yürümeye başlayan çocuğun yaşı, annenin eğitim düzeyi ve aile geliri riskli ekran maruziyeti ile ilişkili faktörler olarak belirlenmiştir.
Sonuç: Aileler, ekran süresinin potansiyel sonuçları ve ekran kullanımını azaltmaya yönelik stratejiler konusunda eğitilebilir. Eğitimlerde, risk grubundaki ailelere gelir durumu, eğitim düzeyi ve yaş gibi ekran süresini etkileyen faktörler açısından öncelik verilmelidir.
Anahtar kelimeler: Bebek, küçük çocuk, ekran süresi, teknoloji bağımlılığı

Introduction

The period between birth and 3 years is one of the most sensitive periods in human life, and any harmful exposure that occurs during this time can have lasting consequences later in life (1-2). The increase in time spent using screen devices has led to changes in the daily activities of these infants and toddlers (3). The main change associated with screen use in infants and toddlers is inactivity. However, infants and toddlers need physical activity to maintain their health and development (4-5).

When the time spent by children in front of screen devices increases, the risk of screen addiction also increases. When children are given the opportunity to use smartphones, particularly during the pre-school period, the chances of exposure to gaming and screen addiction are higher (6). In a study, parents indicated that the use of mobile phones and tablets could create deficiencies in children's socialization, set an example for negative behaviors, and create addiction (7). Rao et al. (8) emphasized that there is a strong relationship between increased screen time in the young population and the development of screen addiction.

Due to the potential risks outlined above, international organizations have recommended limiting early screen exposure in children. The American Academy of Pediatrics (AAP) Council on Communications and Media (9) declared that infants under 18 months of age should not be exposed to screen devices other than video chatting with adult family members. As this period is critical for development and learning, it is imperative that infants interact directly with other people. For toddlers aged 18-24 months, the AAP recommended that if parents want to use screen media, they should watch quality programs together with their children instead of leaving them alone in front of a screen. For toddlers and preschoolers aged 2-5 years, screen time should not exceed 1 hour per day (9). The World Health Organization (WHO) released similar guidelines in 2019, recommending zero screen time for infants and toddlers under the age of 2 years and no more than 1 hour for toddlers and preschoolers aged 2-4 years (10). According to the reports of Yeşilay, an organization combating addiction in Türkiye, it is recommended that babies should have very limited or no screen time at all, while preschoolers aged three to six should have no more than 30 minutes of screen time (11).

Studies examining factors associated with screen exposure have focused more on adolescents and school-age children and less on infants and toddlers (12-14). Moreover, there might be similarities and differences between cultures in terms of screen use among infants and toddlers (15). In Türkiye specifically, there are no studies in the literature that comprehensively examine the factors associated with infant and toddler screen time for all screen types. One study (16) investigated exposure to "mobile" devices in infants, toddlers, and preschoolers. However, today, in addition to mobile phones, screen devices such as tablets, televisions, game consoles and computers are widely used in homes. Therefore, this study aimed to assess screen time for different devices and associated factors in infants and toddlers in a metropolitan area of Istanbul-Türkiye.

Method

Sample

This cross-sectional study was conducted in a family health center in the Kadıköy district of Istanbul. The study population consisted of the mothers of 900 infants and toddlers aged 0-3 years who were registered in this center. Mothers with psychiatric illnesses were not included in the study. Using the sampling formula of Salant & Dillman (17), assuming a prevalence of 50% in the population, the required sample size with ±5% sampling error within a 95% confidence interval for this non-homogeneous population was calculated as 269 participants.

Simple random selection was used to prevent selection bias, increase the power of the selected sample to represent the population, and ensure equal probability of inclusion in the sample using the Microsoft Excel program.

Procedure

Prior to the study, approval was obtained from the Health Sciences University Hamidiye Non-invasive Clinical Research Ethics Committee (Date:26.10.2018, number 18/64) and institutional permission was received from the directorate. All mothers who participated in the study were informed about the study and signed an informed voluntary consent form before data collection. The study was carried out in accordance with the principles of the Declaration of Helsinki.

Data were collected in face-to-face interviews with the selected mothers in the family health center. Before the study, a pilot survey was conducted with 15 mothers to evaluate whether the questions were understood or not. As no changes were made to the questionnaire after this pilot survey, these results were also included in our analysis. Data collection continued from February to June 2019.

Measure

The study was conducted using a questionnaire developed by the authors in line with the literature. The questionnaire included 64 items regarding the demographic characteristics of the infants, toddlers and families, screen time of infants and toddlers, and factors that may be associated with screen time. For the purpose of this study, screen devices were defined as all digital media devices with screens, including phones, tablets, televisions, computers, and game consoles. While developing the questionnaire, expert opinions were obtained from five faculty members in the departments of pediatric nursing and public health nursing.

Statistical Analysis

Statistical analyses were performed using NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) software. The data were summarized using descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum) and Pearson's chi-square test. Quantitative data were tested for normal distribution using the Shapiro-Wilk test and graphical analyses. The Mann-Whitney U test was used for comparisons of non-normally distributed quantitative data between two groups. Kruskal-Wallis test with Dunn-Bonferroni test were used for comparisons of non-normally distributed quantitative data between more than two groups. Spearman and Pearson correlation analyses were used to evaluate relationships between variables. Statistical significance was accepted at $p < 0.05$.

Results

The mothers participating in the study ranged in age from 19 to 42, with a mean age of 29.24±4.05 years. Only 21.2% of the families were in the upper income group. 51.3% of the families were medium income and 27.5% were low income. According to the mothers, tools that contribute to child development are books (89.6%), toys (76.2%), telephones/tablets (31.2%), and television (5.6%). Daily activities of infants and toddlers included play (80.3%), using screen devices (75.1%), going to the playground (68.8%), reading books with the mother (28.6%), and coloring/painting (24.5%). Nearly half (48.3%) of the mothers stated that they used screen devices to occupy their children while doing housework, 24.9% to calm their children, 23.7% to help put them to sleep, and 17.5% to help with feeding. The infants and toddlers were most commonly first introduced to screens by the mother (48.0%), followed by siblings (30.9%).

The total daily screen time of infants and toddlers aged 0-3 years varied between 20 and 270 minutes, with a mean of 101.75±56.21 minutes. Screen time exceeded WHO recommendations for 36.3% of infants aged 0-12 months, 84.3% of toddlers aged 13-24 months, 49.4% of toddlers aged 25-36 months, and 52.0% of toddlers 0-36 months (Figure 1).

The analysis of daily screen time according to family, infant and toddler characteristics is shown in Table 1. Total screen time varied significantly between age groups (p=0.001). Pairwise comparisons using Dunn test with Bonferroni correction showed that infants aged 0-12 months had significantly higher mean screen time

than toddlers aged 13-24 months and 25-36 months (p=0.001 and p=0.018, respectively). However, total screen time did not differ significantly according to the gender of infant and toddler (p=0.231).
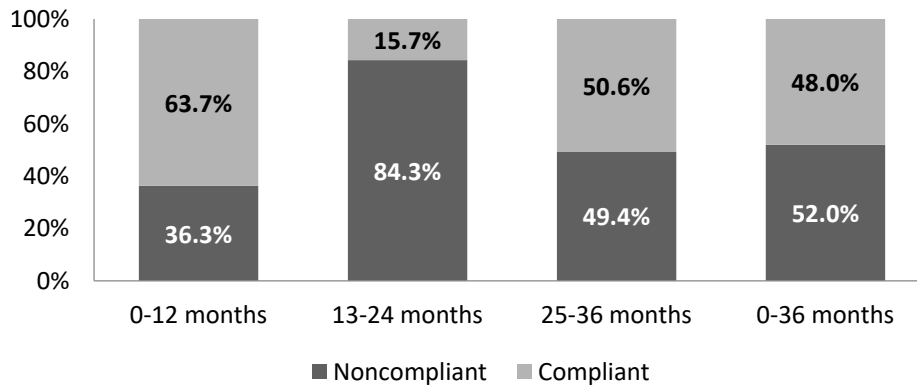

Figure 1. Compliance with WHO recommendations for screen time in children aged 0-3 years

Table 1. Daily total screen time (min/day) according to family, infant and toddler characteristics

Variable (n=202)		Screen time Min-Max (Median)	Statistics
Child's age	0-12 months	45-210 (135)#	KW=15.94
	13-24 months	30-270 (105)	p= [b].001*
	25-36 months	20-225 (75)	
Child's sex	Women	20-210 (90)	Z=1.19
	Men	30-270 (90)	p=[a].231
Maternal education level	No formal education	30-225 (80)	KW=14.8
	Primary education	20-225 (120)#	p=[b].005**
	Secondary education	30-270 (112.5)	
	Associate degree	20-225 (60)	
	Undergraduate degree	30-195 (60)	
Maternal employment status	Working	30-195 (60)	Z=2.31
	Not working	20-270 (105) #	p=[a].021*
Family monthly income (TL)***	≤1999	30-210 (65)	KW=5.4
	2000-6499	20-225 (120) #	p=[b].048*
	≥6500	30-270 (90)	
Type of residence	Rental	20-270 (75)	Z=2.07
	Own home	20-225 (120)	p= [a].038*
Playground close to home	Yes	20-270 (90)	Z=2.00
	No	225-105 (202)#	p=[a].013*
Mother reads to child	Yes	20-270 (60)	Z=4.39
	No	20-225 (120) #	p=[a].001**

[a]Mann-Whitney U test   [b]Kruskal-Wallis test   *p< .05 **p< .01   #Significantly longer/longest screen time compared to the other groups

A large proportion of the mothers (29.4%) were primary school graduates, 11.5% never went to school, 25.3% were high school graduates, 14.1% had an associate degree and 19.7% had a bachelor's degree. The pairwise comparisons showed that mean screen time was significantly longer among the infants and toddlers of mothers with primary and secondary education compared to those with undergraduate education (p=0.011; p=0.016). In addition, 80.7% of the mothers were the primary child care provider and did not work outside of the home. Only 1.5% of children go to nursery, and the others (%17,8) were looked after by grandparents or caregivers. The infants and toddlers of these mothers had significantly more screen time

than the infants and toddlers of working mothers (p=0.021). The presence of a playground near the house of infant and toddler was associated with significantly less total screen time (p=0.013). The majority of mothers (71.4%) did not read books with their children. However, mothers who read books to their children reported significantly less screen time (p=0.001) (Table 1).

Table 2. Relationship between screen device time (min/day) and maternal age and number of siblings

Variable	Number of Siblings	
	r	cp
Tablet usage time	.43	.0001**
Computer-based screen usage time	.37	.001**
	Maternal age	
	r	dp
Tablet usage time	.25	.046*
Mobile phone usage time	.21	.025*

$^c p$ = Spearman's correlation $^d p$ = Pearson's correlation *p<.05 **p<.01

Tablet screen time was significantly correlated with maternal age (r=0.253; p<0.05) and number of siblings (r=0.433; p<0.01). Maternal age was also correlated with mobile phone screen time (r=0.210; p<0.05) (Table 2).

Table 3. Logistic regression analysis of factors associated with risky screen exposure

Variable	p	Odds Ratio	95% CI for Odds Ratio	
			Lower	Upper
Child age (25-36 months)	0.046*	Reference		
Child age (0-12 months)	0.039*	10.465	1.125	97.38
Child age (13-24 months)	0.609	0.810	0.361	1.81
Family income (<1999 TL/month)	0.006**	Reference		
Family income (2000-6499 TL/month)	0.001*	8.951	2.354	34.03
Family income (>6500 TL/month)	0.041*	2.942	1.093	8.71
Maternal education (undergraduate degree)	<.001**	Reference		
Maternal education (no formal education)	0.163	2.851	.655	12.41
Maternal education (primary education)	0.001**	10.960	2.758	43.55
Maternal education (secondary education)	0.744	1.257	0.319	4.96
Maternal education (associate degree)	0.119	0.327	0.080	1.33
Housing (apartment)	0.525	1.976	0.242	16.12
Playground near house (no)	0.048*	2.316	1.099	5.371
Reading with mother (no)	<.001**	8.172	2.696	24.76
Maternal age	0.457	1.040	0.938	1.15
Siblings (none)	0.602	0.794	0.334	1.88

*p<.05   **p<.01

Based on the WHO criteria, risky screen exposure was determined as any screen time in infants and toddlers aged 0-24 months and more than 1 hour per day for toddlers older than 24 months. Factors associated with risky screen exposure were evaluated using logistic regression analysis (Table 3).

The results of the logistic regression analysis, in which we evaluated the effects of variables associated with risky screen exposure using the results of Table 1, are shown in Table 3. Significant variables in Table 1 were included in the model used in the analysis.

Table 4. Tablet, television, and mobile phone usage times (min/day) according to family, infant and toddler characteristics (N=202)

Variable		Tablet		Television		Mobile Phone	
		Min-Max (Median)	Statistics	Min-Max (Median)	Statistics	Min-Max (Median)	Statistics
Child's age	0-12 months	20-120 (60)	KW=2.17 p= [b].337	30-150 (120)	KW=13.910 p= [b]0.001**	15-120 (30)	KW=1.84 p= [b].398
	13-24 months	30-120 (60)		30-180 (45)		15-100 (20)	
	25-36 months	20-120 (60)		10-150 (45)		15-150 (20)	
Child's sex	Female	20-120 (45)	Z=2.18 p= [a].029*	10-180 (45)	Z=0.437 p= [a]0.662	15-150 (20)	Z=.89 p= [a].370
	Male	30-120 (60)		30-180 (45)		15-120 (30)	
Child's birth order	First	20-120 (45)	KW=11.83 p= [b].003**	10-150 (45)	KW=1.911 p= [b]0.385	15-120 (20)	KW=2.95 p= [b].228
	Second	30-120 (60)		10-180 (45)		15-150 (20)	
	Third	30-120 (90)		30-150 (60)		15-60 (37,5)	
Sibling(s)	Yes	30-120 (60)	Z=3.22 p= [a].001**	10-180 (45)	Z=1.911 p= [a]0.264	15-150 (30)	Z=1.44 p= [a].148
	No	20-120 (45)		10-150 (45)		15-120 (20)	
Maternal education level	No formal education	20-120 (90)	KW=10.60 p= [b].031*	30-120 (45)	KW=21.868 p= [b]0.001**	15-120 (60)	KW=9.03 p= [b].060
	Primary education	30-120 (45)		10-180 (120)		15-100 (30)	
	Secondary education	20-120 (60)		30-180 (45)		15-120 (20)	
	Associate degree	30-45 (30)		30-180 (45)		15-150 (30)	
	Undergraduate degree	20-120 (60)		30-150 (30)		15-30 (20)	
Family monthly income (TL)	≤1999	20-60 (45)	KW=7.04 p= [b].030*	30-180 (45)	KW=8.533 p= [b]0.014*	15-60 (15)	KW=6.74 p= [b].034*
	2000-6499	20-120 (60)		10-150 (45)		15-120 (30)	
	≥6500	30-120 (90)		30-150 (30)		15-150 (30)	

[a]Mann-Whitney U test, [b]Kruskal-Wallis test; *$p < .05$, **$p < .01$

When we evaluate the effects of child age, income level, mother's education, mother's age, place of residence, reading to the child, having a playground nearby and sibling status on risky screen exposure with Enter Logistic regression analysis; It was seen that the model was found to be significant (F=57,344; p=0,001; Nagelkerke R Square:0,375) and the explanatory coefficient (% 83,7) of the model was at a good level. When the child age of 25-36 months is taken as reference in the model, the screen time risk of children aged 0-12 months is seen to be ODDS: 10.465 (%95 CI:1,125-97,38) (p<0,05). Children 13-24 months are not significant compared to the reference. Considering the low income level as a reference, the risk of looking at the screen for a long time in those with medium income is ODDS: 8,951 (%95 CI:2,354-34,034) times; At high income level, ODDS: 2.942 (%95 CI:1,093-8,713) times higher. Regarding the mother's education level, when undergraduate education is taken as a reference; The ODDS risk was found to be 2.851 in the uneducated, although it was not significant; The ODDS of primary school graduates is 10,960 (%95 CI:2,75-43,55) times higher, while secondary education and associate degree are not significant. It appears that not having a playground nearby increases the risk of screen exposure by ODDS 2.316 (95% CI: 1.099-5.371) times. If a mother does not read a book to her child, it increases screen exposure ODDS 8.172 (95% CI: 2.69-24.76) times. Mother's age, place of residence and sibling status do not affect the risk of screen exposure.

Evaluation of tablet, television, and mobile phone usage times according to characteristics of family, infant and toddler are presented in Table 4. When compared between age groups, only television viewing time differed significantly (p=0.001). Tablet usage time varied significantly according to the gender of infant and

toddler, birth order, and presence of siblings. Tablet time was significantly longer in boys than girls (p<0.029) (Table 4).

Tablet usage and television viewing time in infants and toddlers aged 0-3 varied significantly by maternal education level (Table 4). According to pairwise comparisons, tablet usage time was significantly higher only among the children of uneducated mothers compared to children of mothers with primary school education (p=0.011), with no other significant differences (p>0.05).

Discussion

The types of screen devices used, duration of their use, and related factors were analyzed according to the characteristics of the child, mother, and family. Our results indicated that most of the 0-3 year age group had higher than recommended screen time. In addition, screen time was found to be significantly associated with certain child- and family-related characteristics.

Our results indicate that most children in the 0-3 year age group have higher than recommended screen time. In our study, the average daily total screen time reported for infants and toddlers was found to be 101.75 minutes, and screen time exceeded WHO recommendations for more than half of this age group. To the best of our knowledge, there is no study in Türkiye in relation to screen time in 0-3 age group. Studies conducted in the USA, Brazil, India, and Korea show that excessive screen exposure in infants and toddlers is a major problem in other countries as well (18-21). These findings show that excessive screen exposure in the 0-3 age group has become a public health problem in many societies and indicate that preventive/mitigating interventions are needed. One reason for the excessive screen time in infants and toddlers observed in our study is likely that a substantial proportion of the mothers expressed a belief that phones, tablets, and television contribute to their child's development and stated that they used screen devices to assist in child care.

In the study conducted by Gökçen (22), it was determined that there was a significant difference in children's tendencies towards digital game addiction based on their screen time. Children who use screens for 2 hours or more were found to have higher tendencies towards digital game addiction compared to those who use screens for less than 1 hour or for 1-2 hours. In İlvan's (23) study, it was found that children who spend less than one hour a day using screen devices to play games have lower levels of addiction tendency compared to those who use them for one to two hours or more. Additionally, it was observed that as children's digital game playing time increases, their level of digital game addiction tendency also increases. As emphasized in the existing literature, prolonged use of screen devices has been reported to increase the risk of addiction. This suggests that the consequences of heightened screen exposure in early stages could be significant.

According to the reports of the mothers who participated in our study, the majority of 0-3 age group spent time with screen devices, and more than half were able to use screen devices on their own. Similarly, Liu and Li (24) found that 30-month-old toddlers were able to accurately identify the emojis that represented emotions portrayed by an actor in a video. It is thought that the reason why such a young age group can understand and use these screened devices on their own is that these devices are designed to be user-friendly even for babies. Archer et al. (25) noted that as many of these devices have touch screens, infants can easily learn to use them through trial and error. Ease of use in screened devices increase access content of them and can make children more prone to screen addiction.

According to our findings, infants and toddlers spent the most time using television, tablets, and mobile phones, in that order. On the other hand, in a study (15) involving Norway, Portugal, and Japan, the most commonly used screen devices in this age group were smartphones, followed by iPads, other tablets, and Kindles. Similar to our study, Nobre et al. (26) reported that television was the most used screen device by toddlers in Brazil. Beside this, television and smartphones were found to be the leading screen devices used by toddlers and preschoolers in India (18). These findings show that the type of screen infants and toddlers are exposed to varies from country to country. There may be three reasons for these results. The first and most important reason is that play and activity opportunities for the 0-3 age group might be limited in

developing countries because of insufficient playground areas. Since television can be found in every home recent days, it might be used as a source of entertainment for children. The second reason is that opportunities for leisure activity might also be limited for adults in developing countries, resulting in television becoming a fixture in society's entertainment culture, and children are also exposed to television while adults watch. It is noteworthy that although all three countries included in the abovementioned study by Dardanou et al. (15) were classified as developed countries, the screen tools used by children in these countries differed. As screen devices such as tablets and iPads may be imported in some developing countries and limited access may results in less use. This finding pointed to the influence of each country's own culture and conditions in device preferences for infants and toddlers.

According to our findings, it is mostly mothers who first introduce infants and toddlers to screen devices. Research has shown that mothers in other countries have similar views (19, 27). In one example, Dardanou et al. (15) found that parents in Norway, Portugal, and Japan believed that touch-screen technologies benefited infant and toddlers in terms of having fun, passing time, learning new information, acquiring new skills, developing creativity, and preparing for school. These findings reveals that mothers are one of the most significant individuals in the lives of infants and toddlers who determine screen exposure. Therefore, interventions regarding screen time cannot be made by neglecting mothers' views. However, in today's world, it may not be easy to get children away from screens. Archer et al. (25) stated that because touch screens are rich in sensory stimulation and create various sounds and images when touched, they attract young children's attention and encourage the formation of an ongoing relationship with the screen. After all, a multidimensional approach is needed to implement rules regarding screen time. Some of these may include involving the child's social environment in the process and determining what will replace the screen.

Our findings showed that screen time among infant and toddlers varied depending on the child's age. The daily total screen time and daily television viewing time of infants aged 0-12 months were significantly higher than those of toddlers 13-24 months and 25-36 months of age. Similar to our study, Vandewater et al. (28) reported that the proportion of children whose screen time exceeded AAP recommendations was 68% in the 0-2 age group and decreased to 44% in the 3-4 age group. In our study, compared to toddlers aged 25-36 months, the risk of screen exposure for infants younger than 12 months was 10.465 times higher and for those aged 13-24 months was 0.81 times higher. These findings are very important because the first years of life are critical for language development. It has been reported in the literature that excessive screen exposure during these years negatively affects language development. For instance, Chonchaiya and Pruksananonda (29) found in their case-control study of children under 2 years of age that language development was negatively affected in children with over 2 hours of screen time per day. Although the AAP and WHO recommend no screen time at all for children aged 0-12 months, our study showed that children in this age group have considerable television exposure. The developmental characteristics of infants suggest that their screen time is primarily determined by their parents. The closer compliance to screen time recommendations in toddlers aged 13-36 months may be related to increasing mobility and activity levels (30). These results implies that infants should be handled more carefully in terms of screen exposure, keeping in mind the negative effects of excessive screen exposure on language development.

In our study, screen time did not differ statistically according to the children's sex. However, tablet usage was significantly higher among boys than girls. In addition, the number of boys who had tablets was significantly higher. This finding may be related to the societal trend of providing more opportunities for boys in our country (31), because purchasing a tablet for a young child represents an economic burden to the family due to the high prices of imported products. Previous studies have reported contradictory results regarding the relationship between screen exposure and sex in early childhood. Rideout and Robb (19) found that boys aged 0-8 years used screen media for 35 minutes more, watched television and video for 17 minutes longer, and played video games for 17 minutes longer per day on average compared to girls in the United States. However, Carson and Kuzik (32) reported that 19-month-old girls had 27.1 minutes more screen time than boys of the same age and spent more time in front of television in Canada. All these findings show that the screen time of girls and boys varies in different countries and indicate that more research is needed to determine the cause of international differences.

Our findings show that maternal education level is an important factor in screen exposure. In our study, the children of mothers with an undergraduate education spent less time watching television, while the children of mothers with no education had higher tablet use time than the children of mothers with primary education. The literature data also show that higher maternal education is associated with less screen time in children (33-34). With more education, knowledge and access to new information increases. As a result, it is believed that highly educated mothers are more aware of the harmful effects of screen exposure for children and are therefore more likely to avoid it. Specifically, it is predicted that screen time in babies increased because a significant portion of the mothers in our sample group had low education levels, were not in school environments where they can obtain information about the negative effects of excessive screen exposure on babies, or did not have sufficient qualification to access information channels.

In our study, we observed that total screen time was significantly less in the children of working mothers compared to the children of non-working mothers. Our findings support those reported Certain and Kahn (35), who determined that television viewing time among children aged 13-23 months was 1 hour longer if the mother did not work. Working mothers represented only about one-fifth of our sample group and were generally employed in positions that required postgraduate education. Because of the high education level of the working mothers, we believe they take care to ensure their children have less screen time because they know the potential harm it can cause. In addition, the desire of working mothers to spend quality time with their children in their free time may have contributed to the lower amount of time spent with screen devices.

Our study findings show that for all type of screen devices, the children of families at the lowest income level and those who live in rented accommodations have the least screen time. However, the longest tablet usage time was in the highest income group, while television viewing time was higher in the low- and middle-income families. Radesky et al. (3) found that families with higher education and income levels more frequently purchased iOS tablets and phones than Android devices for their children aged 3-5 years. Similarly, Nobre et al. (26) reported that screen time was positively associated with economic level and family resources. In a qualitative study (36) conducted in the USA among immigrant fathers with children aged 2-5 years, almost all fathers attributed their children's sedentary lifestyle and screen time to low socioeconomic opportunities. These findings show that, financial means influence screen exposure differently depending on the type of screen device. We believe the lower screen time in children at lower economic levels can be generally attributed to the weak purchasing power of this group, whereas the higher tablet use in the high income group is associated with the cost of tablets. Televisions, on the other hand, are present in even the poorest households today. It is estimated that because of the environmental and economic problems they face, low-income families have few opportunities to engage in activities that can serve as an alternative to screen media, and thus try to meet this need by watching television. Specifically, the majority of families in our sample had low and middle income levels. For this reason, it is thought that they have more access to television, but their access to tablets is not that much.

Our findings also showed that tablet usage time in children aged 0-3 years increased with maternal age and number of siblings. Mobile phone use was also positively associated with maternal age. In addition, reported tablet usage was significantly less for first-born children when compared with second and third children. The literature data differ with regards to the relationship between maternal age and screen time. Masur and Flynn (37) reported that in children aged 11-18 months, screen time decreased with older maternal age. However, in a study by Horodynski et al. (38) of children aged 12-48 months, there was no significant relationship between maternal age and television viewing during meals. Older mothers are more likely to have multiple children and more responsibilities, which may partially explain our results. They may give their child a mobile phone or tablet to entertain them when they need time to do other things. These results suggest that the effect of maternal age may vary according to the type of screen device.

It is noteworthy that in our study, there was no correlation between sibling status and screen time, and only the tablet-related findings were significant. As mentioned above, mothers with only one child have more time for child care, which may explain why there is less tablet exposure in first children. Mothers with more

than one child may give tablet to one child while caring for another. We found no previous studies in the literature comparing tablet exposure according to sibling number. However, Carson and Kuzik (32) reported that toddlers' television, video/computer game, and general screen time was not associated with number of siblings. Hish et al. (39) reported that children between 2 months and 2 years of age started watching television earlier if there were fewer children in the home. The different findings in these studies may be related to the type of screen investigated.

In this study, we observed that mobile phone exposure was significantly less if the mother played with her child and total screen time was significantly less if there was a playground close to home. There are few studies on this topic in the literature. In a study of children in Turkey aged 36-47 months, Özkılıç (40) reported that mothers playing with their children or taking them to the park was not associated with the children's tablet, phone, and television time. However, the authors found that the children played significantly less with mobile phones when their fathers played with them or took them to the park. These findings suggest that playing in parks can be beneficial in protecting children from screen exposure.

In our study, mothers who read books to their children reported lower screen times. However, only 28.6% of mothers said they read books to their children. In a similar study conducted in Türkiye examining the television viewing habits of children aged 3-60 months, Akkuş et al. (41) found that 65.8% of the families never read books to their children, 12.2% regularly read books to their children, and 22.0% sometimes read books to their children. Reading books to preschool-age children is essential for their development and future academic success. The WHO recommends reading books and telling stories to children 0-3 years of age (42). Reading aloud improves the parent-child relationship and contributes to literacy development (43). We attribute the low reading rate in our sample to the fact that most mothers in our study did not receive a university education. Presenting the option of reading books instead of using screen media enables children to spend their time more productively. Therefore, in attempts to reduce screen time for infants and toddlers, reading books may be an important option to replace screens.

The findings of this study are limited to the information obtained from mothers registered in a family health center providing services in the metropolitan region of Istanbul. In order to ensure the homogeneity of the study group, data were collected only from mothers and the results do not reflect the views of fathers. This could impact the comprehensiveness of the results regarding parental perspectives on screen time and associated factors. Additionally, detailed data regarding fathers was not collected. Therefore, this situation regarding the gender of the parent should be taken into consideration when interpreting the findings. Secondly, the data collection method relied on face-to-face interviews, which could introduce bias or inaccuracies based on the responses provided by the interviewees.

In conclusion, our results demonstrate that a large proportion of children in the 0-3 age group have more screen exposure than recommended. Some child and family characteristics are associated with increased screen time. Total daily time using screen devices varied significantly according to the child's age, maternal education level and employment status, family income level and reading habits, and access to a playground near home. Child age, maternal education level, and family income level were found to be associated with risky screen exposure. Therefore, families with these risk factors can be educated by nurses about the potential consequences of screen time and strategies to reduce screen use to prevent screen addiction. It is recommended that future studies should be carried out with fathers.

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