Original Article

doi:10.31674/mjn.2026.v18i03.011

MJN

Prevalence and Characteristics of Screen Time Exposure among Preschool Children in Akre City: A Community-Based Cross-Sectional Study

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ABSTRACT

Background: A young child's everyday existence now revolves around new technology like smartphones and digital screens. Children of today are "digital natives," who grew up in a world of technology that is always changing and enriched by digital media. Education, interaction, and the distribution of information have all been transformed by electronic gadgets. However, recent studies suggest screen viewing may have detrimental long-term impacts on children's well-being, making this an urgent worldwide health issue. **Objectives:** The study aims to determine the prevalence of screen time exposure and its characteristics among preschool children in Akre City. **Methods:** A descriptive cross-sectional study was conducted at the community-based level in the center of Akre City on preschool children. A multi-stage random sampling method was used to select the required samples from each quarter. A structured questionnaire was used by the researcher for data collection. **Results:** The prevalence of screen time exposure among 830 preschool children was 75.1%, and the most used device was smartphones, with 88.4%. However, eye strain or fatigue was the most common symptom, with 23.1% of preschoolers experiencing it. Also, 50.6% of preschoolers were using a smart device before bed. Additionally, 92.9% of preschool children use smart devices to watch cartoons or other entertainment videos. **Conclusion:** According to this study, a significant portion of preschoolers in Akre City are exposed to screen time, which is in contrast to the recommendations from the World Health Organization and the American Academy of Pediatrics. The research highlights the immediate necessity for focused public health strategies and educational programs for parents to encourage better screen time practices and assist in the proper growth and development of children.

Keywords: Akre City; Preschool Children; Smart Devices; Screen Time

INTRODUCTION

Screen time is defined by the World Health Organization (WHO) as "time spent passively viewing screen-based media (TV, computer, mobile devices); it excludes active screen-based activities where exercise or mobility is needed." Furthermore, according to the WHO guidelines, children under the age of two are not recommended to be allowed to use screens, and those between the ages of two and five should only spend an hour a day on screens (World Health Organization [WHO], 2019). These WHO recommendations are similar to guidelines by the American Academy of Pediatrics (AAP) and the Royal College of Pediatricians of Thailand, which suggested that children younger than two years can have video chatting but avoid any screen use (Council on Communications and Media, 2016; Royal College of Pediatricians of Thailand, 2020). For children between the ages of two and five, the American Academy of Pediatrics suggests one hour during the week and three hours on the weekends. It is also recommended that unsupervised screen time be prevented for children under the age of two. Moreover, when parents of children aged 18-24 months want to introduce screen viewing, they should co-view with their children and select high-quality programming. Additionally, they should encourage their children to spend time with appropriate activities (Council on Communications and Media, 2016). A young child's everyday existence now revolves around new technology like smartphones and digital screens. Children of today are "digital natives," who grew up in a world of technology that is always changing and enriched by digital media (Muppalla *et al*.,

Received: April 21, 2026 Received in revised form: October 3, 2026 Accepted: October 19, 2026

2023). Therefore, in this study, it will be explored how screen time is common among preschool children in Akre City because, as there are no sufficient studies regarding this problem in the society. Education, interaction, and the distribution of information have all been transformed by electronic gadgets. However, recent studies suggest that screen viewing may have permanent, detrimental effects on children's health, making this an urgent worldwide health issue (Liu *et al*., 2022). Parents' screen habits should be evaluated by pediatric nurses and other medical professionals, who should then offer specific advice on age-appropriate screen limits and healthy media practices. Risk-based education techniques targeted at young parents, particularly at socioeconomic and educational levels, should be part of nursing care. Guidance that promotes children's healthy and developmental media use in line with their developmental lives should be a major responsibility of nurses (Özalp Gerçeker *et al*., 2026).

A cross-sectional study of 200 samples in Baghdad city to assess sleep habits regarding digital screen addiction in preschool children concluded that more than half of the study sample scored at a moderate level on digital screen addiction (Neamat *et al*., 2022). Youngsters' screen usage—which involves viewing TV and engaging in gaming—has nearly doubled over the last 20 years (Chen & Adler, 2019; Madigan *et al*., 2020). According to research done in Heevie Hospital in Duhok City, preschoolers are very likely to come into contact with mobile devices (Ismail *et al*., 2024). Another study conducted in Erbil City claimed that when infants are exposed to child-directed programs between the ages of 0 and 2, high screen usage—over two hours daily, on average, five days a week—has a detrimental impact on preschoolers' language acquisition. Additionally, preschoolers who are heavily exposed to screens for over three hours daily between the ages of 0 and 2 are more likely to be inattentive (Ali, 2024). The main aim of the study is to determine the prevalence of screen time exposure and its characteristics among preschool children in Akre City.

METHODOLOGY

A descriptive cross-sectional study was used. This study was conducted at the community-based level in the center of Akre city, which is a district that belongs to the governorate of Duhok in the Iraqi Kurdistan region.

Data Collection Process

A multi-stage random sampling method was used, as presented in the figure 1. First, the city was divided into clusters (quarters). Then, 21 of the 49 quarters were selected by simple random sampling, and 40 samples were chosen from each quarter, except for one quarter, from which 30 samples were chosen. After that, systematic random sampling was performed in each selected quarter: a central landmark was selected, and a direction was randomly chosen by throwing a pen on the ground. Finally, the first house was selected using a random number taken from a currency note, and every second house was then selected until the required sample size was achieved.

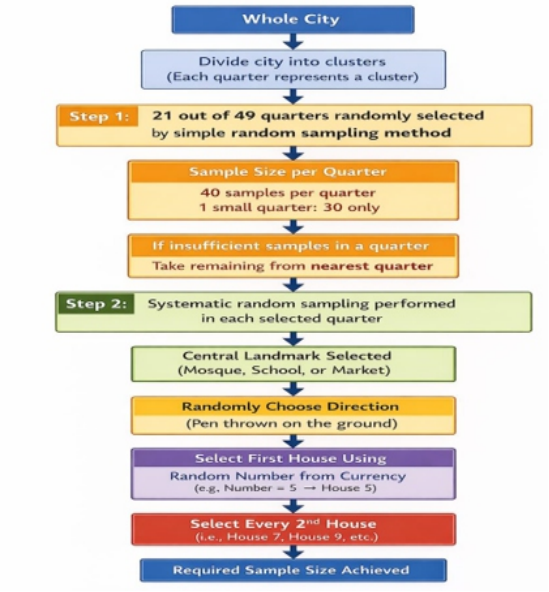


Figure 1: Data Collection Process

Selecting preschool-age children

Calculating the sample size for this research involves several factors, such as the desired level of confidence, margin of error, and the population size. The size of the necessary sample is determined using the following formula: $n = (z)^2 * p\ (1 - p) / d^2$, which (n) is the sample size and (z) being level of confidence according to the standard normal distribution, for this study 95% confidence level was used which correspond to $z = 1.96$ and (p) is estimated proportion of the population that represents the characteristic, because there is no defined census to determine the total number of preschool children in Akre district. Hence, it can be used $p = 0.5$, and (d) is the tolerated margin of error. For this study, the margin of error chosen or the acceptable range of difference between the sample estimate and the true population value used is 5%. As follow:

$$n = (1.96)^2 * 0.5(1 - 0.5) / (0.05)^2 = 384.16$$

As the study design is a multi-stage random sampling method, the number of samples will be multiplied by two.

$$384.16*2 = 768.32$$

Assuming a 10% non-response rate, an estimated sample of 840 preschool children was recruited to be more representative and to enroll more participants in the study. Among 840 preschool children, 10 of them did not agree to participate in the study; 830 of them agreed and completed the questionnaire, and the response rate was 98.8%.

Response Rate = Number of participants who responded/Number of estimated samples × 100

Response Rate = 830/840 × 100

Response Rate = 98.80%

Inclusion Criteria

The inclusion criteria for this study include preschool-age children between 12 months and 6 years. Their parents/caregivers were also included.

Exclusion Criteria

Children were excluded if they were older than five years or younger than twelve months old. However, children diagnosed with chronic health conditions like epilepsy, cerebral palsy, or other neurological disorders, and blindness were excluded. Additional exclusion criteria included children with developmental issues such as attention deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD). Finally, children whose parents/caregivers did not agree to be involved in the study were also excluded.

Questionnaire form

The questionnaire used for collecting data was arranged according to the study's aim, prepared by the researcher, and then forwarded to the expert committee for review to ensure it was more valid and suitable. A pilot study was conducted before starting the real study. A closed-ended questions were used, and data were collected by the researcher through direct interviews with the parents/caregivers who responded to their kid's screen usage habits, symptoms, and behaviors. The questionnaire consisted of nine questions.

Our first question to the parent is whether the child spends their time in front of the screen and the answer will be only one option (yes or no), for this the authors divided the children into five age groups to know which one is mostly exposed to screen time (12-18 months, 18-24 months, 2-3 years, 3-4 years, 4-6 years). The second question is about how many times per day the child uses a smart device, and the answer will be given in minutes according to the child's screen time habits, whether (<60 minutes, 60-180, 180-300, >300). Then what types of devices preschool children mostly use, which contains three options, but the respondents only respond to one of them, which are (smartphone, iPad, TV), and whether they have their own smart device or do they share one with others in the household. Another question is whether the child uses a smart device before bed. After that, parents were asked about the primary types of content their child accesses on smart devices are. In here, parents chose only one option according to the child's screen time habit, which includes watching educational videos and apps, playing games, watching cartoons and other entertainment videos. However, they were asked why they give their child a smart device, and the options were (the mother is busy, child insists to use it, imitating

other families, to be calm and stay in the home, to eating the food) here, parents chose the most common reason. The two final questions are about whether the child experiences any symptoms since being exposed to the smart device, the symptoms were eye strain or fatigue, headache, difficulty falling asleep or staying asleep, neck or back pain. Here, parents freely selected any symptoms experienced by the children. And whether the child experienced any behaviors since being introduced to the smart device, the behaviors were increased aggression, social withdrawal, and irritability.

Statistical Analysis

Data were analyzed using the SPSS (version 23) statistical tool and Microsoft Excel, while a chi-squared test was used to assess whether screen time variations were statistically significant among preschool children. The level of statistical significance was accepted as $p \leq 0.05$.

Ethical Considerations

The study's protocol was accepted by the ethical committee of the General Directorate of Health in the Directorate of Planning, Duhok Governorate, Iraq with reference number 31072024-6-60 on 31st July 2024. The formal permission has also been obtained from the district governorate of Akre, Iraq before starting the data collection process, with reference number 4061-9 on 6th October 2024. Verbal consent was obtained from all participants.

RESULTS

Children Currently Using Smart Devices

There is a significant variation in response rates across different age groups. Children aged 4-6 years have the highest response rate beyond smart device use, making up 35.8%. In contrast, children aged 12-18 months show the lowest response rate, making up 2.9%. Child age groups and the use of smart devices are statistically significantly correlated (Table 1).

Table 1: Children who are Currently Using a Smart Device

Child age groups	Smart device use: Yes (%)	Smart device use: No (%)	Total No. (%)	*P*-value
12-18 months	24 (25.8)	69 (74.2)	93	<0.001
18-24 months	42 (53.8)	36 (46.2)	78	
2-3 years	127 (75.1)	42 (24.9)	169	
3-4 years	133 (83.1)	27 (16.9)	160	
4-6 years	297 (90.0)	33 (10.0)	330	
Total	**623 (75.1)**	**207 (24.9)**	**830 (100.0)**	

Note: Pearson's chi-square test was used to examine associations between categorical variables. A p-value less than 0.05 was considered statistically significant

Duration of smart device use per day (in minutes) among preschoolers

The daily smart device usage indicate that, with the majority, 56.2%, using their devices for 60-180 minutes daily, and the smallest of them, 7.2%, using it for more than 300 minutes (Table 2).

Table 2: Duration of Smart Device Use Per Day (In Minutes) among Preschoolers (n=623)

Duration in minutes	Total No.	Percentage (%)
<60	164	26.3
60-180	350	56.2
180-300	64	10.3
>300	45	7.2
Total	**623**	**100.0**

Most Commonly Used Smart Devices among Children

A substantial majority of participants, 88.4%, primarily use smartphones. In comparison, only 3.4 % of participants use iPads, which is the lowest result as in figure 2.

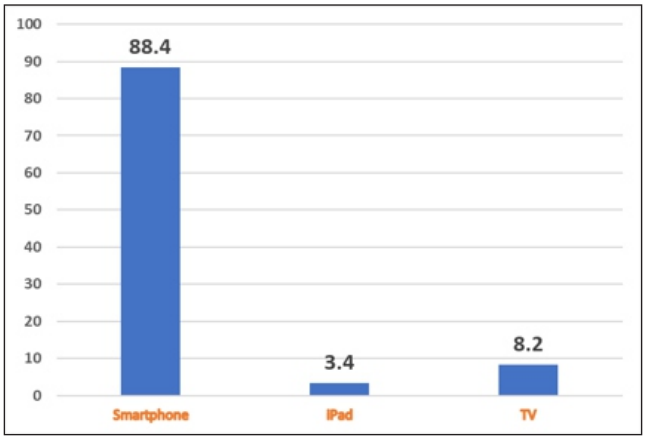


Figure 2: Types of Devices Most Commonly Used by Children (n=623)

Smart device usage before bed

Among 623 preschool children who used a smart device, 315 (50.6 %) used a smart device before bed.

Common types of activities that children watch on their smart devices

Most preschool children, with 92.9 %, use smart devices for watching cartoons or other entertainment videos as per table 3.

Table 3: Common Types of Activities That Children Watch on Their Smart Devices (n=623)

Types of activities	Total no	%
Watching cartoons or other entertainment videos	579	92.9
Watching educational videos and apps	13	2.1
Playing games	31	5.0
Total	**623**	**100.0**

Reasons for Parental Permission of Children's Smart Device Use

The main reason that parents allow their child to access a smart device is that the child insists to use it, with 69.5% as in figure 3.

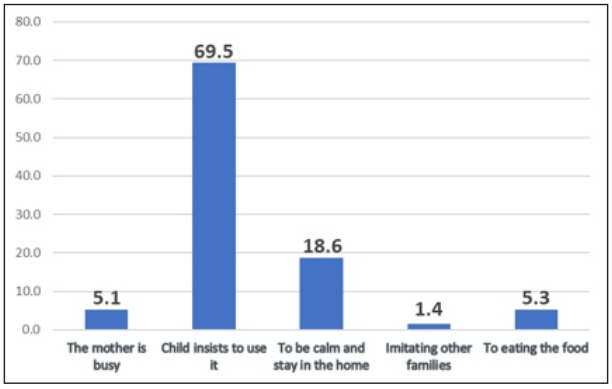


Figure 3: Reasons that Parents allow their Child to Access a Smart Device (n=623)

Symptoms related to smart device use

A total of 623 preschool children who use a smart device and experience symptoms indicating that eye strain or fatigue was the highest symptom, with 23.1% experienced by preschool children, and neck or back pain was the least common one, with 1.4%. This indicates that the prevalence of these symptoms varies statistically significantly among respondents who use smart devices as shown in table 4.

Table 4: Symptoms Related to Smart Device Use (n=623)

Symptoms	Yes, Number (%)	No, Number (%)	Total, Number (%)
Eye strain or fatigue	144 (23.1)	479 (76.9)	623 (100)
Headache	26 (4.2)	597 (95.8)	623 (100)
Difficulty falling asleep or staying asleep	94 (15.1)	529 (84.9)	623 (100)
Neck or back pain	9 (1.4)	614 (98.6)	623 (100)

Smart Device Use-Related Behaviors

A total of 623 preschool children, since the introduction of smart devices, irritability was the most common behavior experienced by preschool children (52.2%). While social withdrawal was the least common (1.6%). There is a statistically significant difference between the occurrence of these behaviors since the introduction of smart device use as shown in table 5.

Table 5: Behaviors Related to Using Smart Devices (n=623)

Behaviors	Yes, Number (%)	No, Number (%)	Total, Number (%)
Increased aggression	291 (46.7)	332 (53.3)	623 (100)
Social withdrawal	10 (1.6)	613 (98.4)	623 (100)
Irritability	325 (52.2)	298 (47.8)	623 (100)

DISCUSSION

In the current study, it was found that three-quarters of preschool children were using screen time, with 38.6% of users being under two years old and 89.5% falling within the 2- to 6-year age range. These high rates of screen time use in Akre City suggested that parents were unaware of the harmful impacts of smart devices on their children. It also identifies a critical "nursing assessment gap," where nurses must intensify family-centered education during infant wellness checks. Whereas a meta-analysis that looked at 89,163 people discovered that just 24.7% of children younger than two adhered to the recommended time on screen, and for kids aged 2 to 5, about 35.6% followed the guidelines on average (McArthur *et al*., 2022). In contrast, a study conducted among 964 parents in Kuwait reported that 53.2% of kids younger than 2 years old and 86.3% of kids aged 2 to 5 years had exposure to screen time (Shamsah *et al*., 2022). These high rates of electronic device use in kids under two years old may be linked to income levels, given that Kuwaiti households with more earnings are more likely to provide their children with access to screens. However, the study was carried out among various families in Akre City, where income levels differ from those in Kuwait.

Furthermore, a cross-sectional study involving 399 preschoolers in kindergartens in Makkah City found that 91.5% of the children had screen time (Al-Mehmadi *et al*., 2024), which is higher than the study. This difference might be because the study was done at a community level, covering 21 out of 49 quarters in Akre City. Some families in these areas may not have enough money to buy smart devices for their children. On the other hand, that study was done in a specific area with only five kindergartens. Another reason could be that the study included more families, covering a wider range of economic levels. However, similarly, there have also been reports of prolonged exposure to screens in Turkey, with 96% of people using screens a lot (Kristo *et al*., 2021), and in Malaysia, where 95.9% of people have prolonged screen time (Nathan *et al*., 2022).

Using over an hour of media each day has worse cognitive, vocabulary, and emotional-social skills in preschoolers (Schwarzer *et al*., 2021). These results highlight the necessity of nurses to prioritize "screen-time history" as a standard vital sign in pediatric nursing assessments. Research shows that too much and regular use of screens when children are very young can lead to problems in their development before they start school. Screen time has been connected to worse personal and social growth. Using digital devices too early, using them before bedtime, and using them alone were also linked to negative results. Moreover, too much time spent looking at screens can harm how kids learn to talk, do schoolwork, and g*et al*ong with friends (Gath *et al*., 2026; Nurhidayah *et al*., 2026; Selak *et al*., 2025). In the current study, the majority of preschoolers use their devices for 60 to 180 minutes each day. Nurses should interpret this duration as a behavioral risk factor for physical ailments like obesity or hyperactivity. This means the majority of the preschool children are likely to develop these health problems.

In another study, more than 5000 preschoolers in New Zealand, Indonesia, and Hong Kong were found to have almost the same amount of screen time, with each child spending about 1 to 2 hours daily on screens (Susilowati *et al*., 2021; Lan *et al*., 2020). In contrast, a study in Saudi Arabia found that preschool children there mostly used technology for 2 to 3 hours a day (Almuaigel *et al*., 2021). This difference in screen time might be because the majority of the kids in that study had constant internet access without any limits (Almuaigel *et al*., 2021). However, in the study, children may not have free access to the internet, which could be a barrier, making it harder for them to use screens whenever they want. Based on the study findings, more than three-quarters of preschool children use a smartphone along with any other smart devices. Similarly, a study involving 580 kids in Duhok City also revealed that smartphones were the most frequently used device (Mohammed, 2025).

In contrast, earlier research conducted in Canada, New Zealand, Sri Lanka, and Turkey highlighted that the most frequently used screen device by preschoolers is the TV (Kristo *et al*., 2021; Canadian Paediatric Society, 2017; Rathnasiri *et al*., 2022; Skvarc *et al*., 2021). While in two other studies, up to 75% of young children and up to 81% of their parents own a smart device (Kabali *et al*., 2015; Lurie Children's Hospital, 2025), the authors trust that this device ownership among preschool children is linked to the socio-economic status of their families and a lack of awareness among parents regarding the harmful impacts of prolonged screen time. Children who own their smart devices typically use screens for longer periods of time than those who do not have their own devices.

The majority of preschoolers in the current study were found to be using a smart device shortly before going to sleep. This presents a clear clinical implication for sleep hygiene education. Nurses should educate parents on the physiological impact of blue light on melatonin production, which leads to the sleep disturbances noted in recent reviews. Additionally, a study involving 316 Canadian preschoolers discovered that 56% were exposed to media within an hour before going to bed (Fitzpatrick *et al*., 2022). Whereas, another study involving 611 preschoolers found that 80% of 30-month-olds were observed using screens in the hour before bedtime (Staples *et al*., 2021). This high level of screen exposure before sleep suggests that parents should be more cautious and avoid giving their children smart devices before bedtime. In such cases, preschool children are at a higher risk of experiencing harmful effects, such as delayed bedtimes, longer sleep onset times, and less time in bed, more nighttime awakenings, and increased sleep problems reported by parents, as noted in two recent systematic reviews (Janssen *et al*., 2020; Newton *et al*., 2020).

Children often use smart devices for various reasons. In the present study, most preschool children use a smart device to watch cartoons or other entertainment videos. However, two studies, one conducted in Greece involving 325 parents of kindergarten children and another in Thailand, found that children primarily use apps for entertainment purposes (Kumruangrit *et al*., 2022; Papadakis *et al*., 2022). Whereas, a study involving 340 preschoolers in Sri Lanka revealed that the most commonly watched programs were cartoons, which were

viewed by 75.3% of the children (Rathnasiri *et al*., 2022). Another study involving 145 preschoolers in Malaysia found that 37.4% of them used smart devices for educational reasons (Nathan *et al*., 2022). Although educational programs can positively impact children's linguistic and cognitive growth, it is important for parents to actively engage by watching content with their children and discussing what they see. Parents should also follow guidelines from organizations such as the WHO and AAP, which recommend restricting preschoolers' daily screen usage to only one hour. Reducing overall screen time can help lower the risks linked to excessive use, such as attention difficulties and sleep issues.

There are several reasons that parents give smart devices to their young preschoolers. The main result of the study shows that the most frequent reason is the child's continuous requests, as 69.5% of parents say their child keeps asking to use a smart device and often wants to spend time looking at a screen. Nursing support for parenting styles is essential here; nurses can provide alternative "distraction techniques" or "calming strategies" that do not involve screens. This pattern aligns with results observed in other research studies. For example, Kabali *et al*. (2015) found that 70% of parents in their study provided smart devices to their children while they were performing chores at home. However, Shah and Phadke, (2023) discovered that parents most frequently gave their children smartphones during feeding times. A Turkish study found that 18% of children were provided with phones while they were eating or crying (Dinleyici *et al*., 2016). Furthermore, Meena *et al*. (2020) noted that in 95% of the situations, screen devices were used to calm children or keep them amused while caregivers were busy.

However, these parenting approaches could lead to problems in how the family functions and how the child grows. Carson and Kuzik (2021) discovered that smart devices can disrupt parent-child relations as often as 12 to 16 times each day. Additionally, Lee and Kim (2022) found a clear link between negative parenting styles, including overprotectiveness, permissiveness, rejection, and neglect, and the excessive reliance of young children on smart devices (Lee & Kim, 2022).

Recent studies show that using too much media in ways that are not controlled can hurt children's cognitive, emotional, and physical development. Parents should be involved, follow rules about screen time, and think carefully about how media is used so that technology helps children grow healthily instead of causing problems (Gomes *et al*., 2026). The current study revealed that the majority of preschool children suffer from eye strain or tiredness as a result of using smart devices. This study follows a 2024 review, which points out that digital eye strain is a common result of prolonged exposure to digital media in children, in addition, it is connected to symptoms such as eye fatigue and blurred vision (Bozzola *et al*., 2024). It highlights the importance of educating families about screen time and regularly monitoring children's use of screens to avoid eye-related issues.

A study conducted in a hospital setting in India revealed that 85% of children who used smartphones experienced headaches, indicating the physical impact of mobile phone usage on young children (Gupta *et al*., 2023). In this study, it was also discovered that irritability was the most frequently observed behavior in preschool children as a result of using smart devices Digital eye strain" and irritability should be viewed as nursing diagnoses requiring immediate parental counseling. While Cheng and Cao (2023) discovered that extended use of screens by preschool children is connected to emotional difficulties like higher anxiety levels, depression, and social withdrawal, they also found that how parents manage their own emotions plays a key role in influencing these outcomes. Also, A study involving 277 children in Taiwan indicates that heavy use of smart devices during early childhood is linked to negative behavioral effects, such as internalizing behaviors, externalizing behaviors, physical complaints, social withdrawal, and aggressive tendencies. It is especially clear in children who had less interaction with their mothers (Chakranon *et al*., 2024). However, according to a study, emotional reactivity, aggressive conduct, and externalizing behaviors were associated with increased television exposure between the ages of six and eighteen months (Oswald *et al*., 2020).

Limitations

Determining the causal links between screen time and developmental outcomes is challenging because this cross-sectional study only records screen time exposure at one particular point in time. However, parental information was used to gather data on kids' screen time, which could be skewed by recall bias.

Future Scope

Future studies should concentrate on carrying out protracted research to track the long-lasting developmental consequences of screen usage and evaluating the effectiveness of educational programs within neighborhoods meant to reduce device overuse. However, future research should employ longitudinal study designs to investigate the long-term effects of screen time exposure on the physical, cognitive, behavioral, and social development of preschool children. Also, further studies should also examine the relationship between screen time duration, types of digital content, parental supervision, and children's sleep patterns and developmental outcomes.

CONCLUSION

According to this study, a significant portion of preschoolers in Akre city spend their times on screen time, as three-quarters of the participants use smart devices regularly. It's worth noting that a large number of children younger than two years old are being exposed to screens, which goes against the advice given by international guidelines. The current study results show that children are spending much more time on screens than the recommendations from the World Health Organization and the American Academy of Pediatrics suggest. The research highlights the immediate necessity for focused public health strategies and educational programs for parents to encourage better screen time practices and assist in the proper growth and development of children. Moreover, including the history of screen time as a regular pediatric vital sign might assist in closing the "nursing assessment gap", therefore allowing the discovery of early physical and behavioral signals that call for intervention.

Recommendation

Parents and caregivers need to learn about the detrimental effects of excessive screen time and should follow guidelines from trusted sources like the World Health Organization and the American Academy of Pediatrics to set healthy limits on how much time preschoolers spend using screens. However, to encourage healthier habits, communities should start awareness programs and public health efforts in places like kindergartens, primary healthcare centers, and through the media. These efforts should focus on promoting activities that can replace screen time, such as exercise, reading, talking with others, and spending time with family. Also, nurses need to play a role in educating parents about health and detecting early signs by talking to parents during visits for maternal and child health. They should give advice on how much time children should spend watching screens and recognizing early symptoms that might come from too much screen time use.

CrediT Authorship Contribution Statement

S. M. A.: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Visualization, Writing – Original Draft, and Writing – Review and Editing. **M. A.:** Supervision, Validation, and Writing – Review and Editing. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

AI Assistance Declaration

The authors used ChatGPT (OpenAI) to assist with language improvement, grammatical corrections, and academic writing. AI-assisted image generation was also used to create the sampling procedure flowchart presented in the manuscript. However, Perplexity was used to look for the study's relevance to the article topic.

Conflict of Interest

The authors declare that they have no computing interests.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the General Directorate of Health in Duhok Governorate and the relevant authorities in Akre District for granting the necessary permissions and facilitating the implementation of this study. The authors also extend their heartfelt appreciation to all parents and caregivers who participated in this research and generously contributed their time and valuable information. Their cooperation made this study possible.

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