Research Square

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Excessive Screen Time and Associated Factors Among Under Five Children in Debre Berhan City Administration Ethiopia

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Abstract

Background

Excessive screen time (EST) in early childhood is linked to developmental delays. As urbanization shifts behaviors in Ethiopia, localized evidence in industrial hubs like Debre Berhan remains scarce.

Objective

To assess EST prevalence and associated factors among children under five in Debre Berhan City, Ethiopia, 2026.

Methods

A community-based cross-sectional study was conducted among 451 parents using multi-stage sampling. Data collected via face-to-face interviews were analyzed using logistic regression. EST was defined by WHO guidelines: any exposure for children < 24 months and > 1 hour/day for those aged 2–5 years.

Results

The prevalence of EST was 39.7% (95% CI: 35.2%, 44.3%). Significant predictors included children aged ≥ 24 months (AOR = 2.51; 95% CI: 1.6–3.9), paternal screen use > 2 hours/day (AOR = 3.05; 95% CI: 1.9–4.9), presence of a screen in the child's bedroom (AOR = 2.24; 95% CI: 1.4–3.6), and maternal education of college or above (AOR = 3.18; 95% CI: 1.6–6.3).

Conclusion

Nearly four in ten children exceed recommended screen limits. Paternal modeling, bedroom device access, and high maternal education are primary drivers. Interventions should prioritize parental counseling on digital hygiene and "screen-free zones".

Introduction

Screen time (ST) refers to the duration an individual spends engaging with any screen-based device, including televisions (TV), computers, tablets, and smartphones (1). The first five years of life represent a critical "window of opportunity" characterized by rapid neuroplasticity, language acquisition, and the establishment of foundational behavioral patterns (2). During this period, the developing brain requires high-quality, reciprocal human interactions often called "serve and return" to develop essential cognitive

and social-emotional pathways(3).However, the global digital revolution has fundamentally altered the early childhood environment, making digital media ubiquitous and often displacing essential physical play and social engagement(4).

Recognizing these developmental risks, the World Health Organization (WHO) released global guidelines in 2019 stating that for children under two years of age, sedentary screen time is not recommended. For children aged 2 to 4 years, sedentary screen time should be limited to no more than one hour per day, with "less being better."5 Excessive screen time (EST) is defined as any duration exceeding these age-specific limits (5).

Despite these clear international guidelines, the prevalence of EST is alarmingly high. Recent evidence suggests that globally, between 70% and 90% of under-five children exceed recommended screen limits(6, 7). The consequences of this overexposure are multi-faceted; excessive screen use has been strongly linked to delayed language development, reduced attention spans, and poorer executive functioning. Furthermore, EST is a primary driver of sedentary behavior, which contributes significantly to rising rates of childhood obesity and disrupted sleep patterns.(8)

In the context of low- and middle-income countries (LMICs), the "digital babysitter" phenomenon is increasing as urban parents balance work demands with childcare. Studies have shown that screen use is frequently utilized as a feeding aid, which further reinforces sedentary habits and may lead to poor nutritional outcomes(9).This trend is particularly emerging in urban centers where digital technology is becoming the primary form of child entertainment.

In Ethiopia, the transition toward a digital society is moving rapidly. Recent studies in urban centers like Woliso and Addis Ababa have reported EST prevalence rates as high as 75.9% (10). Findings indicate that urban children are significantly more likely to exceed screen limits compared to their rural counterparts, with an Adjusted Odds Ratio (AOR) of 7.31 reported in recent literature (11). Factors such as parental education, lack of supervision, and the presence of devices in the bedroom have been identified as key drivers in these regions(12).

Debre Berhan, a rapidly growing industrial and educational hub in Ethiopia, presents a unique socio-demographic landscape. As urbanization accelerates in the city, household structures and child-rearing practices are shifting. However, there is currently a lack of localized, community-based evidence regarding the prevalence of EST and the specific environmental and behavioral factors that influence it among children in this specific urban administration.

While general trends are known from other Ethiopian cities, the specific drivers in Debre Berhan such as the influence of local employment patterns, the availability of outdoor play spaces, and the role of childcare settings remain largely unexplored. This study is therefore essential to provide the Debre Berhan City Health Office and healthcare providers with the evidence needed to design targeted, culturally appropriate interventions. By identifying the factors associated with excessive screen time, this

research aims to safeguard the developmental health of the next generation in a rapidly modernizing urban setting.

Statement of the Problem

While the developmental risks of excessive screen time (EST) are well-documented globally, a significant evidence gap exists regarding the specific drivers of this behavior in the North Shewa Zone. Current literature in Ethiopia has established a high prevalence of EST in urban hubs like Woliso and Addis Ababa; however, these findings cannot be directly extrapolated to Debre Berhan.

The city's unique status as a rapidly expanding industrial and educational center creates a specific socio-demographic environment characterized by distinct parental employment patterns and shifting childcare structures that remains largely unexamined. Without localized, community-based data, there is no empirical basis for the Debre Berhan City Health Office to design interventions that are culturally and economically relevant to this specific population.

Consequently, there is an urgent need to quantify the prevalence of EST and identify its associated factors within this unique urban administration. Failure to address this localized data void prevents the implementation of evidence-based strategies needed to safeguard the cognitive and social development of children in this rapidly modernizing community

Research Objectives

General Objective

To assess the prevalence of excessive screen time and identify its associated factors among children under the age of five in the Debre Berhan City Administration, North Shewa, Ethiopia, 2026.

Specific Objectives

- To determine the prevalence of excessive screen time among under-five children in Debre Berhan Town.
- To identify the child-related factors associated with excessive screen time in the study area.
- To examine the parental and household-level factors influencing screen time behaviors among children in Debre Berhan.
- To evaluate the environmental and home-media factors (such as device availability and play spaces) associated with excessive screen time.

Significance of the Study

This study is significant on several levels, providing both practical and theoretical contributions to the field of pediatric health in Ethiopia:

- **For Healthcare Providers**: The findings will provide clinicians and community health extension workers with evidence-based data to counsel parents during routine vaccinations and growth monitoring sessions. It highlights the need to integrate "digital hygiene" into standard pediatric care.
- **For Policy Makers**: Results from this study can be used by the Debre Berhan City Health Office to develop public health campaigns or community-based interventions that encourage physical play and limit early childhood sedentary behavior.
- **For Parents and Caregivers**: By identifying the "associated factors" (like using screens as feeding aids), the study will help identify specific behaviors that parents can modify to improve their child's developmental outcomes.
- **For the Scientific Community**: This research fills a critical geographic and contextual gap. It provides a baseline for future longitudinal studies in Ethiopia regarding the long-term effects of early screen exposure on school readiness and childhood obesity.

METHODS

Study design, period and setting

A community-based cross-sectional study design will be employed to simultaneously assess the prevalence of screen time and identify various associated socio-demographic and behavioral factors. This design is particularly suited for this research as it allows for a comprehensive "snapshot" of the population within a natural community setting.

The study will be conducted in Debre Berhan City, the administrative center of the North Shewa Zone in the Amhara Region, Ethiopia. Located approximately 130 km northeast of Addis Ababa, the city comprises nine administrative kebeles. Data collection is scheduled to take place from May to June 2026.

Population and Eligibility Criteria

The source population for this study will consist of all children under the age of five residing in Debre Berhan City. The study population will include parents or guardians of under-5 children selected from the sampled households within the city's administrative kebeles.

To be eligible for the study, participants must be parents or guardians of a child under five years old and must be permanent residents of the selected household, defined as having lived in the area for at least six months. Conversely, families who do not own or have access to any screens or digital devices (such as televisions, smartphones, or tablets) within their homes will be excluded from the study, as the primary objective is to assess screen-based behaviors.

Patient and public involvement

No patients or members of the public were directly involved in the design, conduct or reporting of this study.

Sample Size Determination and Sampling Technique

The sample size (n) is calculated using the single population proportion formula

$$n = \frac{(Z\alpha/2)^2 . P\ (1\text{-}p)}{d^2}$$

The calculation was based on the following assumptions: a 75.9% prevalence (P) of excessive screen time (taken from a similar study conducted in Woliso, Ethiopia, in 2026), a 95% confidence interval (Zα/2 = 1.96), and a 5% margin of error (d = 0.05). To account for the multi-stage sampling approach, a design effect (DEFF) of 1.5 was applied. After incorporating a 10% non-response rate, the final calculated sample size is approximately 464 households.

A multi-stage sampling technique will be employed to select the study participants from the administrative kebeles of Debre Berhan City, ensuring that the sample is representative of the community at large.

Sampling Procedure

A multi-stage sampling technique will be employed to select the study participants. In the first stage, 5 kebeles will be selected from the total of 9 in Debre Berhan using a simple random sampling (lottery) method. During the second stage, the total sample size will be proportionally allocated to each of the selected kebeles based on the number of households with children under five, utilizing data obtained from health extension worker registries. Finally, in the third stage, individual households will be selected through systematic random sampling. A specific sampling interval (K) will be calculated for each kebele, and the process will begin with the selection of a random starting household, followed by every (K^{th}) household until the required sample size is achieved (Fig. 1).

Figure 1: *A diagrammatic illustration of the sampling technique used to assess excessive screen time and associated factors among under-5 children in Debre Berhan (n = 451)*

Study variables

ST was the outcome variable. Independent variables included the child's sociodemographic characteristics,the parent's sociodemographic characteristics, child care, the parent's media related factors, physical activity, the home media environment and neighbourhood environment related factors.

Study Measures and Outcomes

Data will be collected using a structured, interviewer-administered questionnaire organized into eight distinct sections, adapted and localized from validated pediatric and behavioral literature (13–15).

Part 1 and 2 focus on the socio demographic characteristics, comprising 10 questions for parents (e.g., age, education, income) and six questions for the children (e.g., age, sex, birth order). Part 3 includes two questions regarding the child's primary care arrangements(13).

Part 4 assesses Screen Time (ST) usage, the study's primary outcome. Parents will report the duration children spend on various digital devices during both weekdays and weekends. The average daily ST will be calculated using the formula:

$$\text{Daily ST} = \frac{\text{Weekday ST} \times 5) + (\text{Weekend ST} \times 2)}{2}$$

Based on WHO guidelines, excessive ST is defined as any screen exposure for children under 2 years, and more than one hour per day for children aged 2–5 years(5). This section also measures parental screen time habits to assess behavioral modeling.

Part 5 measures physical activity by assessing average daily outdoor playtime, dichotomized as < 1 hour/day or ≥ 1 hour/day(16). Part 6 evaluates a comprehensive range of parental factors using Likert scales, including:

- Parental Self-Efficacy: Confidence in limiting screen time.
- Attitude and Perception: Parental views on the impact of screen time on a child's physical, cognitive, and social well-being.
- Barriers and Practices: Perceived obstacles to reducing screen time and the use of restrictive mediation practices (e.g., household rules).

Part 7 and 8 address environmental and household factors, including the total number of screen devices, the presence of a TV in the child's bedroom, and the availability of play materials. Additionally, these sections evaluate community-level factors such as the availability of public playgrounds and parental perceptions of neighborhood safety (crime and pedestrian safety), which may influence the time children spend indoors using screens.

Data Collection Tool and Quality Control

Data will be collected using a structured, interviewer-administered questionnaire, which will be adapted from standardized pediatric screen-time assessment tools and localized to the Ethiopian context. To ensure linguistic accuracy and conceptual equivalence, the instrument will be developed in English, translated into Amharic, and then back-translated into English by independent language experts.

To maintain high data quality, a pre-test will be conducted on 5% of the total sample size in a non-selected Kebele to assess the tool for clarity, logical flow, and participant comprehension. Furthermore, data collectors specifically BSc Nurses and supervisors will undergo a comprehensive two-day training session. This training will focus on the study's specific objectives, standardized data collection techniques, and the rigorous application of ethical protocols to ensure the integrity of the information gathered.

Data Processing and Analysis

The collected data will be cleaned and entered into EpiData version 4.6 to ensure accuracy and minimize entry errors. For the statistical analysis, the data will be exported to SPSS version 17.0 (or STATA). Initially, a bivariable analysis using binary logistic regression will be conducted to assess the association between each independent variable and the primary outcome. Variables demonstrating a p-value of less than 0.25 in the bivariable analysis will be considered candidates for the final model and entered into a multivariable logistic regression analysis.

In the multivariable model, variables with a p-value of less than 0.05 will be identified as factors independently associated with excessive screen time. The strength of these associations will be reported using Adjusted Odds Ratios (AOR) accompanied by 95% Confidence Intervals (CI). Finally, the model's fitness and reliability will be verified using the Hosmer-Lemeshow goodness-of-fit test to ensure the data appropriately fits the statistical model.

RESULT

Parents' sociodemographic characteristics

A total of 464 parents or guardians of under-5 children were sampled for this study, and 451 provided complete responses, yielding a strong response rate of 97.20%.

In terms of household composition, the majority of respondents (n = 338, 75.0%) lived in families with 4 to 6 members, while n = 68 (15.0%) resided in larger households of 7 or more. The age profile of the parents indicated that n = 271 (60.0%) of mothers and the vast majority of fathers (n = 406, 90.0%) were aged 30 years or older.

The study population demonstrated a high educational level; over half of the mothers (n = 253, 56.0%) and a significant majority of fathers (n = 379, 84.0%) had completed college or higher education. Regarding maternal occupation, n = 203 (45.0%) were government employees, n = 158 (35.0%) were housewives, and n = 90 (20.0%) were merchants. Economically, most households (n = 361, 80.0%) reported an annual income of 75,000 ETB or above (Table 1).

Table 1
Sociodemographic characteristics of parents in Debre Berhan (n = 451)

Variables	Category	Frequency (n)	Percent (%)
Family members	≤ 3	45	10.0
	4–6	338	75.0
	≥ 7	68	15.0
Mother's Age	< 30 years	180	40.0
	≥ 30 years	271	60.0
Father's Age	< 30 years	45	10.0
	≥ 30 years	406	90.0
Mother's Education	Primary or below	63	14.0
	Secondary school	135	30.0
	College and above	253	56.0
Father's Education	Primary or below	27	6.0
	Secondary school	45	10.0
	College and above	379	84.0
Mother's Occupation	Housewife	158	35.0
	Merchant	90	20.0
	Government employee	203	45.0
Annual Income	< 75,000 ETB	90	20.0
	≥ 75,000 ETB	361	80.0

Sociodemographic Characteristics of Children

The study included a total of 451 children under the age of five. Regarding age distribution, n = 276 (61.2%) of the children were aged 24 months or older, while n = 175 (38.8%) were younger than 24 months. The gender distribution was nearly equal, with n = 228 (50.5%) females and n = 223 (49.5%) males.

In terms of family position, more than two-thirds of the children (n = 307, 68.0%) had a birth order of second or higher, whereas n = 144 (32.0%) were first-born. Additionally, the vast majority of the children (n = 368, 81.5%) lived with siblings, while only n = 83 (18.5%) were the only child in the household (Table 2).

Table 2
Child characteristics and caregiver profile in Debre Berhan (n = 451)

Variables	Category	Frequency (n)	Percent (%)
Age	< 24 months	175	38.8
	≥ 24 months	276	61.2
Sex	Male	223	49.5
	Female	228	50.5
Birth order	1	144	32.0
	≥ 2	307	68.0
Sibling	Yes	368	81.5
	No	83	18.5

Parent's Media-Related Factors

The study evaluated the screen time habits and the amount of time parents spent directly engaged with their children. More than half of the mothers (n = 237, 52.5%) and a substantial majority of the fathers (n = 320, 71.0%) reported spending more than two hours per day on screens.

Regarding direct parental engagement, the data revealed a significant disparity between mothers and fathers. While most mothers (n = 309, 68.5%) spent more than two hours per day with their children, the vast majority of fathers (n = 370, 82.0%) spent two hours or less in direct interaction with their children (Table 3).

Table 3
Parent's screen time and time spent with child (n = 451)

Variables	Category	Frequency (n)	Percent (%)
Mother's ST	≤ 2 hours	214	47.5
	> 2 hours	237	52.5
Father's ST	≤ 2 hours	131	29.0
	> 2 hours	320	71.0
Mother with child	≤ 2 hours	142	31.5
	> 2 hours	309	68.5
Time Father with child	≤ 2 hours	370	82.0
	> 2 hours	81	18.0

Parental Perceptions and Screen-Related

The study found that parental supervision of children's screen use in Debre Berhan was relatively low. Only 173 (38.4%) of parents supervised their children at least five days per week, while 15.5% (n = 70) reported that they never provided supervision (Fig. 2).

Regarding parental awareness, only a small minority 19 (4.2%) perceived that children under five should have no screen exposure (0 min). In contrast, more than half of the participants (n = 235, 52.1%) perceived that the maximum allowable daily screen time for this age group should exceed one hour (Fig. 3).

Household (HH) management of media was present in 68.7% (n = 310) of homes. Among those with established rules, the most common restrictions included:

- 30.3% (n = 94) limited the total duration of screen use.
- 18.1% (n = 56) required adult supervision during use.
- 15.5% (n = 48) enforced physical distance from the television screen.

Psychological assessment of the caregivers showed that 197 (43.8%) had low self-efficacy in limiting their child's screen requests, and 43.2% (n = 195) held negative attitudes toward their child's screen usage.

The mean (± SD) scores for parental perceptions of screen time's impact on physical wellbeing, cognitive development, and social well-being were 6.82 ± 2.15, 8.12 ± 2.94, and 5.94 ± 2.11, respectively. Furthermore, the mean score for perceived barriers was 4.21 ± 0.88, indicating that parents in Debre

Berhan face significant practical difficulties in reducing screen time, while the mean score for restrictive practices was 21.45 ± 5.72.

Figure 2: *Distribution of parental supervision of under-5 children while using screen devices per week in Debre Berhan (n = 451)*

Figure 3: *Distribution of parent's perception towards maximum daily ST of their under-5 children in Debre Berhan (n = 451)*

Home Media Environment and Prevalence of EST

The home media environment in Debre Berhan was characterized by a high density of electronic devices, reflecting the rapid digital transition within the urban community. The vast majority of surveyed households, 91.5% (n = 413), owned three or more digital gadgets, while only 8.5% (n = 38) owned fewer than three. Furthermore, over half of the children, 55.0% (n = 248), had direct access to a screen device within their sleeping area or bedroom.

Regarding the primary outcome of this study, the overall prevalence of excessive screen time (EST) among children under the age of five was 39.7% (n = 179) [95% CI: 35.2%, 44.3%]. Conversely, the majority of the children, 60.3% (n = 272), were found to have screen time levels within the recommended normal limits. While this prevalence is lower than some global estimates, it remains a significant public health concern given the established risks associated with early sedentary behavior (Table 4).

Table 4
Home media environment in Debre Berhan (n = 451)

Variables	Category	Frequency (n)	Percent (%)
Total gadgets	< 3	38	8.5
	≥ 3	413	91.5
Screen in room	Yes	248	55.0
	No	203	45.0
Prevalence of EST	**Excessive**	**179**	**39.69%**
	Normal	272	60.31%

Factors Associated with Excessive Screen Time (EST)

Factors associated with excessive screen time among under-5 children were identified using both bivariable and multivariable logistic regression analyses. In the final multivariable model, child's age,

father’s daily screen time, presence of a screen in the child's room, and maternal educational level remained significantly associated with EST (Table 5).

Children aged 24 months and older were 2.5 times more likely to experience excessive screen time compared to those younger than 24 months (AOR = 2.51; 95% CI: 1.6–3.9, p < 0.001). The domestic media environment also played a critical role; children who had a screen device in their bedroom had over twice the odds of EST compared to those who did not (AOR = 2.24; 95% CI: 1.4–3.6, p = 0.001).

Parental habits and demographics were also strong predictors. Children whose fathers spent more than 2 hours per day on screen media were three times more likely to have excessive exposure (AOR = 3.05; 95% CI: 1.9–4.9, p < 0.001). Additionally, maternal education showed a significant positive association; children of mothers with a college education or higher were 3.18 times more likely to have EST compared to children of mothers with only a primary education (AOR = 3.18; 95% CI: 1.6–6.3, p < 0.001).

Table 5
Bivariate and multivariable analysis results of factors associated with screen time among under-5 children in Debre Berhan (n = 451)

Variables	Category	COR (95% CI)	AOR (95% CI)	P-value
Child Age	< 24 months	1	1	
	≥ 24 months	**3.12 (2.0–4.8)**	**2.51 (1.6–3.9)**	**< 0.001**
Father’s ST	≤ 2 hours	1	1	
	> 2 hours	**3.85 (2.4–6.1)**	**3.05 (1.9–4.9)**	**< 0.001**
Screen in Room	No	1	1	
	Yes	**2.65 (1.7–4.1)**	**2.24 (1.4–3.6)**	**0.001**
Mother’s Edu	Primary	1	1	
	College+	**4.10 (2.2–7.5)**	**3.18 (1.6–6.3)**	**< 0.001**

DISCUSSION

This study assessed excessive screen time (EST) among under-5 children in Debre Berhan and identified its associated factors. Accordingly, 39.7% (95% CI: 35.2% to 44.3%) of participants had an excessive ST. The factors significantly associated with EST were found to be the child’s age, father’s daily screen time, presence of a screen in the child’s room, and maternal educational level.

In this study, 39.7% of under-5 children in Debre Berhan had an excessive ST. This prevalence is lower than the 75.9% reported in Woliso (10), Ethiopia, and the 73% found in India (7).However, it is higher than reports from Addis Ababa (36.5%) (17),and comparable to the Latin American population (47%)(18). The variation in prevalence compared to Woliso may be due to differences in urban infrastructure, parental awareness, or the specific definitions of "excessive" used in different study periods. Despite these

variations, the figure of nearly 40% underscores that excessive ST is a growing public health concern even in secondary urban centers of Ethiopia.

This study found a significant association between ST and a child's age. Children ≥ 24 months old were 2.51 times more likely to have an excessive ST compared with children younger than 24 months. This finding is interesting when compared to the Woliso study, which found a negative association (where younger children were at higher risk). In Debre Berhan, the higher risk among older toddlers may be explained by the difference in the WHO daily recommended ST: 0 min for children under 24 months and less than 60 min for those older (5).As children grow, they develop stronger cognitive interests in animated content and interactive gadgets, and parents may become more permissive as the child reaches preschool age.

Maternal education showed a significant positive association with EST. Children of mothers with a college education or higher were 3.18 times more likely to have EST compared to children of mothers with only a primary education. This mirrors findings from Malaysia (13), where higher socioeconomic status and maternal professional involvement often lead to increased gadget accessibility. In Debre Berhan, where 45% of mothers are government employees, the use of screens as a "digital babysitter" may be a coping strategy to manage professional responsibilities and household demands simultaneously.

The father's daily screen time was also a strong predictor. Children whose fathers spent more than 2 hours per day on screens were 3.05 times more likely to have excessive exposure. This is consistent with Social Cognitive Theory, suggesting that children imitate the sedentary behaviors of their fathers(19). Unlike the other study, which focused on the father's age, our findings suggest that the father's actual behavior and modeling are more critical than age alone in determining a child's media habits(7, 10).

Placing screen devices in the child's bedroom increased the likelihood of excessive ST (AOR = 2.24). This is congruent with studies in Colombia(20) and Ireland (21), which found that having a TV in the bedroom or dining area was linked to higher ST. This is likely due to the "easy accessibility" of devices; when screens are readily available in private sleeping or playing areas, children are less inclined to engage in active play and parents find it more difficult to monitor or restrict total duration.

Strengths and limitations

This study contributes to the limited body of evidence in Ethiopia regarding early childhood media habits. Its community-based approach ensures that the findings are representative of the Debre Berhan population. The use of face-to-face interviews minimized ambiguity in the responses. However, the study is subject to parental recall bias, which may lead to an underestimation of actual screen time. Furthermore, the cross-sectional nature of the design means we cannot establish a definitive cause-and-effect relationship between the identified factors and EST.

Conclusion

In summary, this study established that the prevalence of excessive screen time (EST) among children under the age of five in Debre Berhan is 39.7% (95% CI: 35.2%, 44.3%). The domestic media environment serves as a critical driver for this exposure, with several key predictors identified through multivariable analysis.

Children are significantly more likely to exceed recommended screen limits if they have a screen device in their bedroom (AOR = 2.24) or if their fathers spend more than two hours per day on screens (AOR = 3.05), highlighting the powerful role of behavioral modeling. Furthermore, higher maternal education (college and above) was positively associated with EST (AOR = 3.18), potentially reflecting the "digital babysitter" phenomenon in professional households.

To mitigate the long-term developmental and sedentary risks associated with early overexposure, public health interventions must prioritize parental counseling. These strategies should emphasize the establishment of "screen-free zones," the reduction of paternal media use during family time, and improved digital hygiene practices within the home.

Abbreviations

AAP: American Academy of Pediatrics **AOR**:Adjusted Odds Ratio **CI**:Confidence Interval **COR**:Crude Odds Ratio **EST**:Excessive Screen Time **ETB**:Ethiopian Birr **HH**:Household **SD**:Standard Deviation **ST**:Screen Time **WHO**:World Health Organization

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the Institutional Review Board (IRB) of Debark University. All methods and human-related procedures were performed in accordance with the relevant guidelines and regulations (such as the Declaration of Helsinki). Written informed consent was obtained from the parents or legal guardians of all participating under-5 children before data collection.

Consent to publish

Not applicable.

Auteurs Contributions

Tsegaamlak Kumelachew Derse: Conceptualization; Methodology; Formal analysis; Investigation; Data Curation; Writing - Original Draft; Writing - Review & Editing; Visualization; Project administration.

Asaye Worku Agegn: Conceptualization; Methodology; Supervision; Writing - Review & Editing.

Declaration of Generative AI and AI-assisted technologies in the writing process

The authors used Gemini to polish the English language and ensure the manuscript meets journal formatting and word count guidelines. All research and data analysis were conducted by the authors.

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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author Contribution

Tsegaamlak Kumelachew Derse: Conceptualization; Methodology; Formal analysis; Investigation; Data Curation; Writing - Original Draft; Writing - Review & Editing; Visualization; Project administration. Asaye Worku Agegn: Conceptualization; Methodology; Supervision; Writing - Review & Editing.

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Data Availability

All data supporting the findings of this study are available within the paper

References

1. Zayyad ZA, Maunsell JH, MacLean JNJP. Normalization in mouse primary visual cortex. 2023;18(12):e0295140.

2. Chopra G. Systems Approach to Early Childhood Development: Bridging Theory, Policy and Practice. Springer Nature; 2025.
3. Mualem R, Morales-Quezada L, Farraj RH, Shance S, Bernshtein DH, Cohen S et al. Econeurobiology and brain development in children: key factors affecting development, behavioral outcomes, and school interventions. 2024;12:1376075.
4. Boczkowski PJ, Mitchelstein E. The digital environment: How we live, learn, work, and play now. MIT Press; 2021.
5. Organization WH. Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. World Health Organization; 2019.
6. Carson V, Kuzik NJBPH. Demographic correlates of screen time and objectively measured sedentary time and physical activity among toddlers: a cross-sectional study. 2017;17(1):187.
7. Varadarajan S, Govindarajan Venguidesvarane A, Ramaswamy KN, Rajamohan M, Krupa M, Winfred Christadoss, SBJPo. Prevalence of excessive screen time and its association with developmental delay in children aged < 5 years: A population-based cross-sectional study in India. 2021;16(7):e0254102.
8. Kaur N, Gupta M, Malhi P, Grover SJI. Screen time in under-five children. 2019;56(9):773–88.
9. Screen time and young children. Promoting health and development in a digital world. Oxford University Press US; 2017.
10. Demeke A, Gezimu W, Endashaw G, Estifanos W, Bante AJBPO. Excessive screen time and its associated factors among under-5 children in Woliso City Administration, Central Ethiopia: a community-based cross-sectional study. 2026;10(1).
11. Asplund KM, Kair LR, Arain YH, Cervantes M, Oreskovic NM, Zuckerman KEJCO. Early childhood screen time and parental attitudes toward child television viewing in a low-income Latino population attending the special supplemental nutrition program for women, infants, and children. 2015;11(5):590–9.
12. Panjeti-Madan VN, Ranganathan PJMT, Interaction. Impact of screen time on children's development: cognitive, language, physical, and social and emotional domains. 2023;7(5):52.
13. Raj D, Mohd Zulkefli N, Mohd Shariff Z, Ahmad NJIJER, Health P. Determinants of excessive screen time among children under five years old in Selangor, Malaysia: A cross-sectional study. 2022;19(6):3560.
14. Carson V, Janssen IJB. Associations between factors within the home setting and screen time among children aged 0–5 years: a cross-sectional study. 2012;12(1):539.
15. Kaur N, Gupta M, Kiran T, Malhi P, Grover SJP. Development and evaluation of the digital-screen exposure questionnaire (DSEQ) for young children. 2021;16(6):e0253313.
16. Dos Santos MM, Kruger P, Mellors SE, Wolvaardt G, Van Der Ryst, EJBph. An exploratory survey measuring stigma and discrimination experienced by people living with HIV/AIDS in South Africa: the People Living with. HIV Stigma Index. 2014;14(1):80.

17. Abdeta C, Cliff D, Kariippanon K, Deksisa A, Garoma S, Tesfaye D et al. Adherence to the WHO physical activity, screen time and sleep guidelines and associations with socio-demographic factors among Ethiopian preschool children: The SUNRISE study. 2024;3(1):22.
18. Malhotra S, Kant S, Rath R, Ahamed F, Sathiyamoorthy R, Gupta SKJIJPH. Excess screen time and its associated factors among young men in a rural community of North India. 2022;66(3):327–30.
19. Ramirez E, Kulinna PH. Cothran DJPos, exercise. Constructs of physical activity behaviour in children: The. usefulness Social Cogn Theory. 2012;13(3):303–10.
20. González SA, Sarmiento OL, Florez-Pregonero A, Katzmarzyk PT, Chaput J-P. Tremblay MSJIjoph. Prevalence and associated factors of excessive recreational screen time among Colombian children and adolescents. 2022;67:1604217.
21. Bassul C, Corish CA, Kearney JMJIJER, Health P. Associations between home environment, children's and parents' characteristics and children's TV screen time behavior. 2021;18(4):1589.

Figures

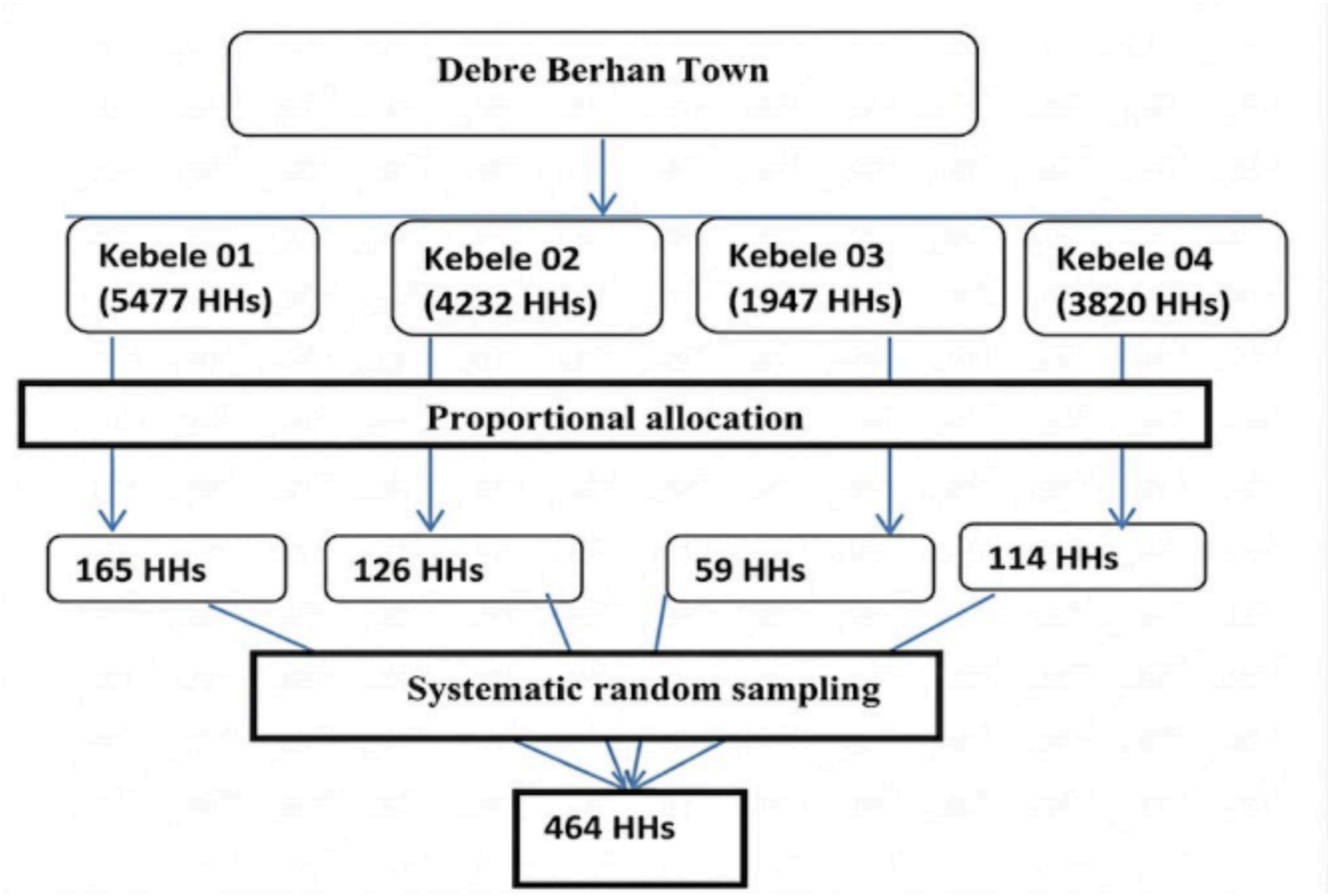


Figure 1

A diagrammatic illustration of the sampling technique used to assess excessive screen time and associated factors among under-5 children in Debre Berhan (n=451)

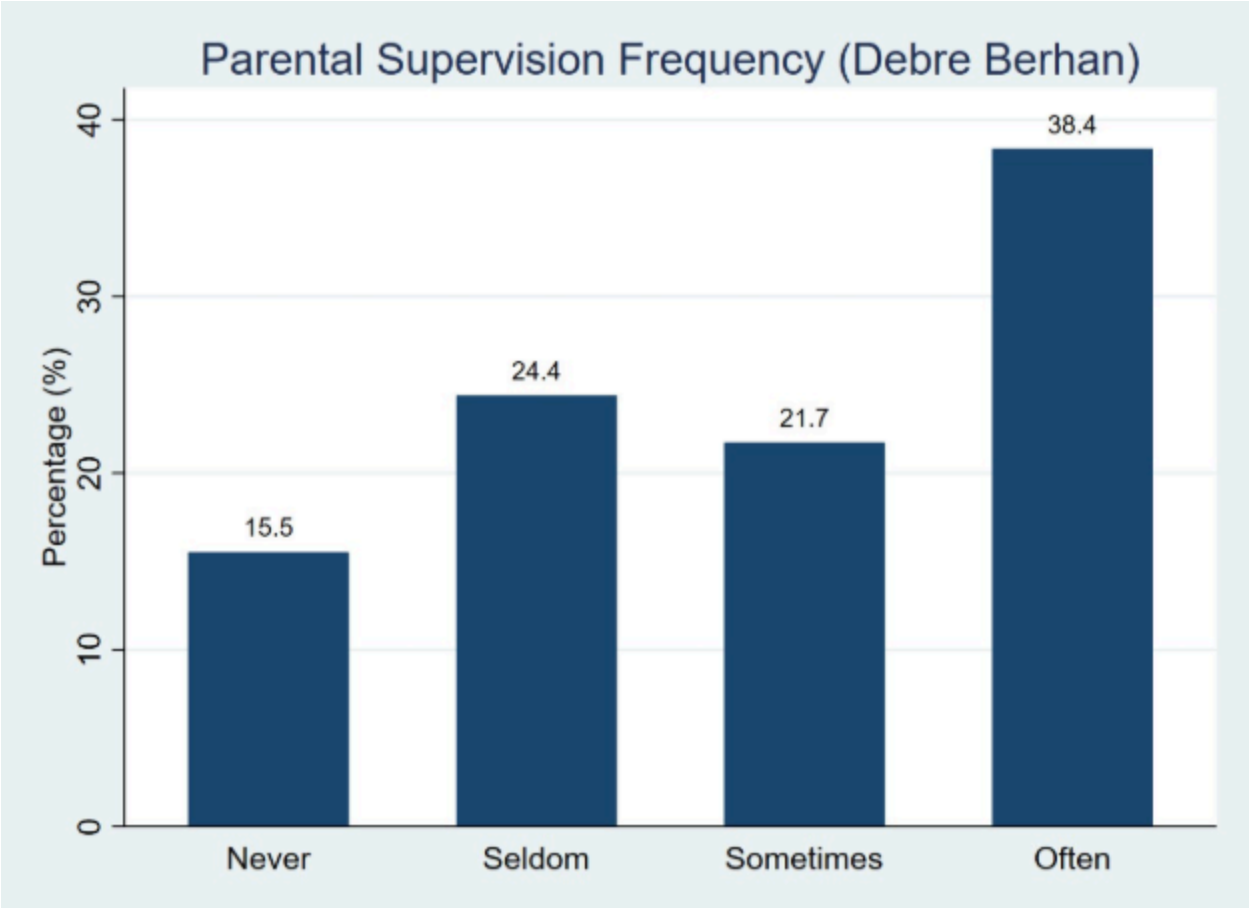


Figure 2

Distribution of parental supervision of under-5 children while using screen devices per week in Debre Berhan (n=451)

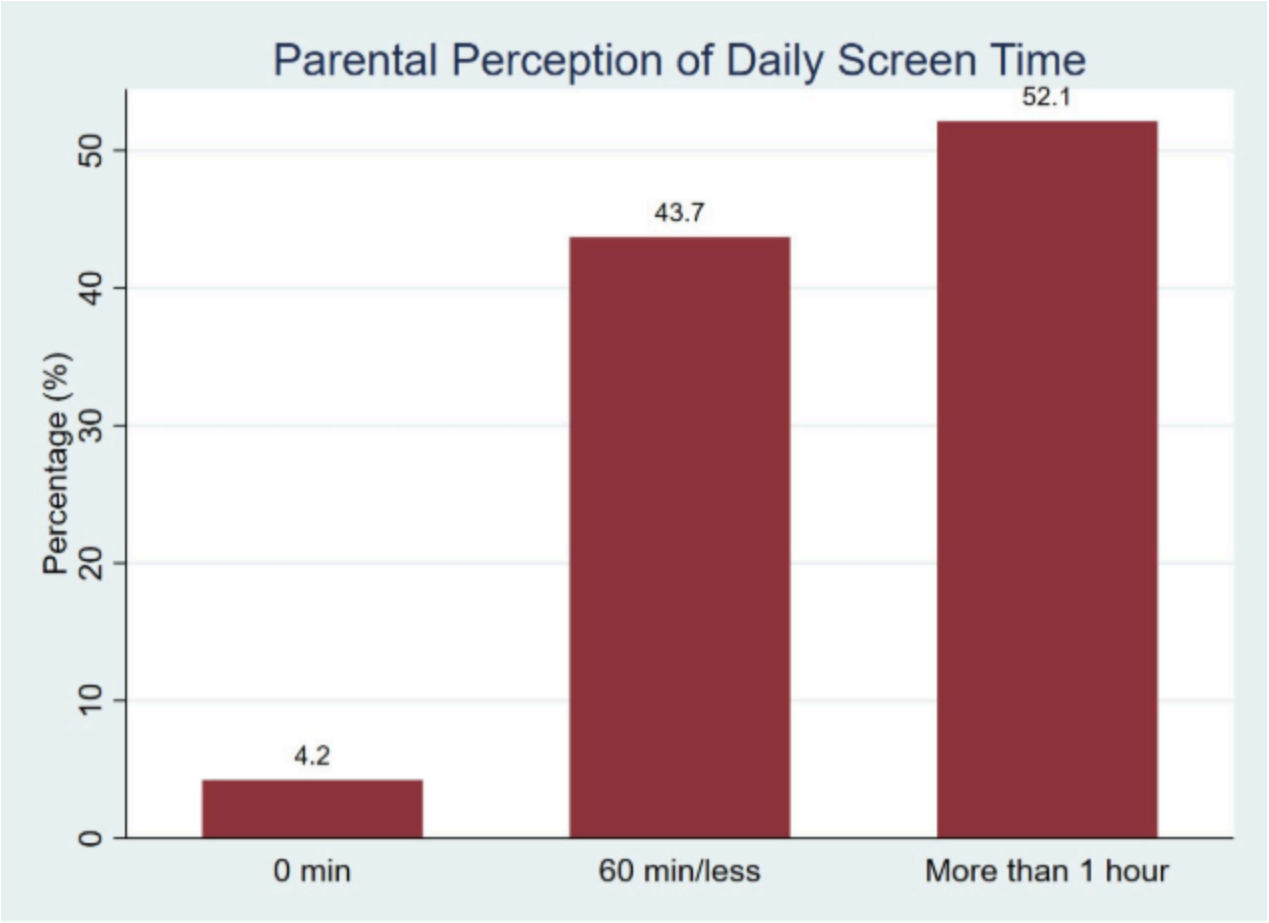


Figure 3

Distribution of parent's perception towards maximum daily ST of their under-5 children in Debre Berhan (n=451)