

Excessive Use Of Screens and Its Effects on Children Under 2: An Integrative Review

Uso Excessivo de Telas e Seus Efeitos em Crianças Menores de 2 Anos: Revisão Integrativa

Uso Excesivo de Pantallas y Sus Efectos em Niños Menores de Años: Una Revisión Integradora

RESUMO

Objetivo: analisar as repercussões acerca do uso excessivo de telas em crianças menores de 2 anos de idade. **Método:** Trata-se de um estudo de revisão integrativa da literatura, com buscas nas bases de dados LILACS, via BVS, MEDLINE e Scielo, através de artigos publicados entre 2019 a 2023. A coleta de dados ocorreu em agosto de 2024. Por se tratar de uma revisão integrativa, não foi necessário à submissão ao Comitê de Ética em Pesquisa com seres humanos. **Resultados:** Foram encontrados 683 artigos, porém apenas 17 foram selecionados para análise final. Os principais efeitos adversos encontrados, foram nos domínios de comunicação, motricidade, sócio-emocional, cognitivo e distúrbio visual. **Conclusão:** O uso de telas em idade precoce afeta o desenvolvimento pleno dessas crianças, sendo indispensável ações integradas multiprofissionais, nas dinâmicas familiares. Fazendo-se necessário, a realização de novas pesquisas para compreender o impacto da tecnologia na rotina das crianças.

DESCRIPTORES: Aplicativos móveis; Crianças; Tempo de tela.

ABSTRACT

Objective: to analyze the repercussions of the excessive use of screens in children under 2 years of age. **Method:** This is an integrative literature review study, with searches in the LILACS, via BVS, MEDLINE and SCIELO databases, through articles published between 2019 and 2023. Date collection took place in august 2024. As this an integrative review, it was not necessary to submit it to the Human Research Ethics Committee. **Results:** 683 articles were found, but only 17 were selected for final analysis. The main adverse effects found were in the areas of communication, motor skills, socio-emotional, cognitive and visual impairment. **Conclusion:** The use of screens at an early age affects the full development of these children, and integrated multi-professional actions in family dynamics are essential. Further research is needed to understand the impact of technology on children's routines.

DESCRIPTORS: Mobile Applications; Children; Screen Time.

RESUMEN

Objetivo: Analizar las repercusiones del uso excesivo de pantallas em niños menores de 2 años. **Método:** Se trata de um estudio de revisión bibliográfica integradora, con búsquedas em las bases de datos LILACS, vía BVS, MEDLINE y Scielo, a través de artículos publicados entre 2019 y 2023. La recolección de datos se realizo em agosto de 2024. Por tratarse de uma revisión integrativa, no fue necesario someterla al Comité de Ética em Investigación con Seres Humanos. **Resultados:** Se encontraron 683 artículos, pero sólo se seleccionaron 17 para el análisis final. Los principales efectos adversos encontrados fueron em las áreas de comunicación, habilidades motoras, socioemocionales, cognitivas y deterioro visual. **Conclusión:** El uso de pantallas a edades tempranas afecta al pleno desarrollo de estos niños, por lo que son imprescindibles actuaciones multiprofesionales integradas em la dinámica familiar. Es necesario seguir investigando para conocer el impacto de la tecnología em las rutinas de los niños.

DESCRIPTORES: Aplicaciones móviles; Niños; Tiempo de pantalla.

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Excessive Use Of Screens and Its Effects on Children Under 2: An Integrative Review

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INTRODUCTION

Early childhood (0 to 6 years) is considered to be a crucial phase in child development, since the predominance of brain maturation begins in the first 1000 days of life, changing structurally and functionally in the face of internal and external influences. It is a period that is not limited to the creation of new neuronal connections, but also to an increase in brain plasticity and new connections between neurons⁽¹⁾.

It is well known that multimedia devices, which include televisions, cell phones, tablets and computers, are becoming increasingly widespread in the routines of families and children, influencing the increase in indicators of accessibility and consumption of screens by this age group. They are used by parents to calm or entertain children, as they offer a variety of content that can hold their attention for a long period of time⁽²⁾.

The American Academy of Pediatrics (AAP) and the World Health Organization (WHO) recommend that children <2 years of age should not be exposed to any type of screen.

For children aged between 2 and 5, use should be limited to 60 minutes a day, with age-appropriate educational programming and under parental supervision⁽³⁻⁴⁾.

On the national scene, a cross-sectional study that analyzed the screen exposure time of children aged 0 to 60 months, according to WHO guidelines, found that 69% of children had excessive exposure to screens (0 to 23 months when exposed to screens and 24 to 60 months exposure > 1 hour per day). 1 hour per day), children aged 0 to 12 months made up 41.7%, 73.6% aged 13 to 24 months, 68.3% children aged 25 to 36 months, 76.8% aged 37 to 48 months and 85.2% children aged 49 to 60 months⁽⁵⁾.

That said, studies have investigated the association between excessive screen time in early childhood with negative consequences for children's physical health, such as obesity, deficits in executive functions, visual problems, as well as behavior, emotions (sleep disturbance, stress, anxiety), social and cognitive (speech delay)^(2, 5-6).

The aim of this study was to analyze scientific publications on the re-

percussions of excessive screen use in children under 2 years of age.

METHOD

This is an integrative literature review, which was guided by six stages: (1) identification of the theme and elaboration of the guiding question; (2) literature search; (3) data collection; (4) critical analysis of the studies included; (5) interpretation of the data; and (6) final presentation of the course completion work⁽⁷⁾. To ensure greater methodological rigor, the recommendations contained in the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) checklist were followed⁽⁸⁾.

To help formulate the study's guiding question, the PICO strategy was used - P: population, I: interest and Co: context. In this sense, we considered: P - children under the age of 2, I - repercussions and Co: excessive use of screens. Thus, the research question was: "What are the repercussions of excessive screen use for children under the age of 2?"

The literature search was carried out in August 2024 in the following

databases: Latin American and Caribbean Health Sciences Literature (LILACS) via BVS, Scientific Electronic (SciELO), Medical Literature Analysis and Retrieval System Online (Medline) and Pubmed. The descriptors correlated to guide the searches were consulted in the Health Sciences Descriptors (DeCS) and Medical Subject Heading (MeSH), which comprised: child, screen time, mobile applications and infant combined with the Boolean operators "AND" and "OR".

In order to make the study authentic and valid, the inclusion criteria were: publications between 2019 and 2023; articles in Portuguese, English and Spanish; available in full and from primary sources. In addition, the age range of 0 to 2 years was established for this study. Articles that did not meet the research objective and duplicate articles were excluded from the analysis.

It should be noted that the period selected (2019-2023) is justified by the desire to reflect the most current and relevant information on the subject. The use of screens in children is an issue that is constantly changing, influenced by recent events such as the COVID-19 pandemic, which have intensified the use of electronic devices. In addition, prioritizing recent studies allows us to understand more contemporary practices and impacts, avoiding the inclusion of potentially outdated information or information that no longer applies to the current context.

After reading the title and abstract, a pre-selection was made based on the inclusion and exclusion criteria. There were no discrepancies in the article selection process and there was no need for a third researcher. The data from the studies was extracted, organized and characterized in Google Sheets spreadsheets using the following variables: title, authors, journal of publication, year of study,

geographical origin, objective, type of study, number of participants, results and conclusion. After this stage, the data was analyzed and systematized so that it could be contrasted with the existing literature.

As this is an integrative review, in which the data extracted is based on articles already published in databases and does not involve human beings, it was not necessary to submit it to the Human Research Ethics Committee or obtain a Free and Informed Consent Form (FICF).

RESULTS

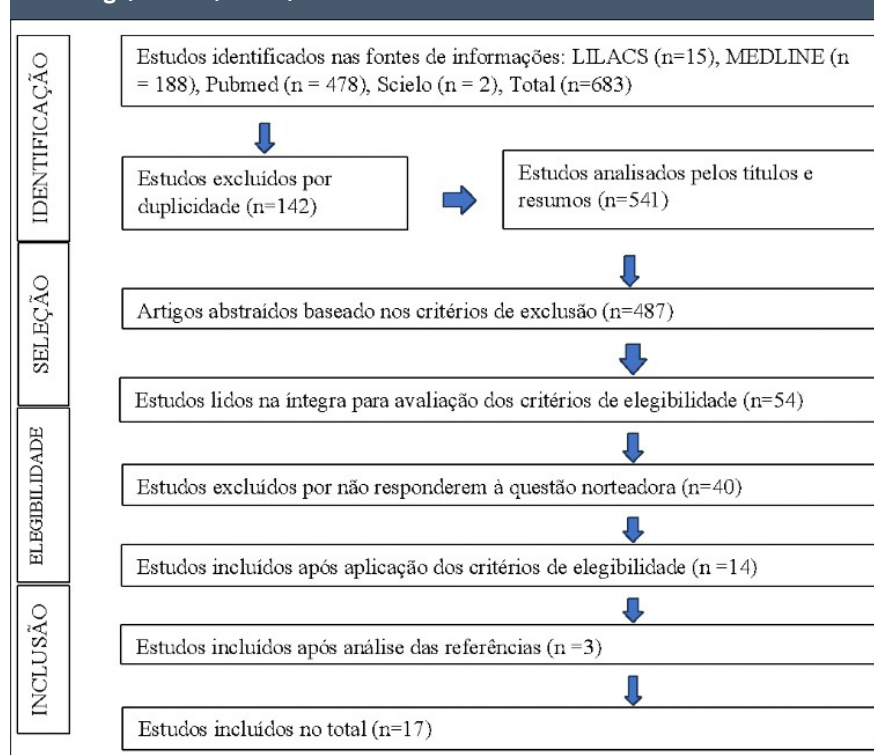
A total of 683 articles were identified in the MEDLINE (n = 188), LILACS (n = 15), Pubmed (n = 478) and SciELO (n = 2) databases. Of these, 142 articles were excluded due to duplication, resulting in 541 articles to be read in full. The titles and

abstracts were then read, leading to the removal of 487 articles, of which 484 did not meet the inclusion criteria and 3 were excluded due to lack of access to the full version.

Considering the aim of this research, of the 54 articles selected for eligibility assessment, 27 were excluded because they did not cover the predetermined population of children and 12 because they did not deal with the adverse effects of screen use in children under 2 years old. Finally, 14 articles remained.

The references of the articles in the final sample were examined in order to identify additional studies that aligned with the objectives of this research. In this process, three studies proved to be eligible. The research thus consisted of 17 articles, as shown in Figure 1.

Figure 1 - Flowchart of the selection of studies for the integrative review, Maringá, Paraná, Brazil, 2024.



Source: prepared by the author, 2024.

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Of these 17 articles, three were published in 2019 (17.6%), six in 2020 (35.3%), one in 2021 (5.9%), two in 2022 (11.8%) and five in 2023 (29.4%). Regarding the country where the research was carried out, there was a predominance of studies in the United States, with 23.5% (n = 4). Among the countries with the lowest number of studies were Brazil, Australia, Thailand, Sweden, Israel, Canada and Italy, each accounting for 5.9% (n = 1) of the sample.

The sample size ranged from 72 to 57980 children. The age range of the children included in the study was according to the inclusion criteria of "0 to 2 years", with a predominance of 1 year olds. The studies analyzed used different methodological designs, including cohort studies (n = 12) and cross-sectional studies (n = 5).

With regard to children's exposure to screens, 58.9% (n = 10) of the studies showed that the average daily use of media devices in children aged

between 1 and 2 years was more than 50 minutes. Among the 17 articles examined, the device that stood out the most was the TV, which accounted for 27.8% (n = 5). Among the consequences associated with early screen use, the majority of studies (n = 16) portrayed delays in child development. Of these, seven studies dealt with the socio-emotional domain, two studies focused on the cognitive domain and two dealt with the communication domain (Chart 1).

Quadro 1 - Distribuição dos artigos incluídos segundo número de participantes, faixa etária, objetivo, metodologia e principais resultados, Maringá, Paraná, Brasil, 2024.

Nº	Number of participants	Track age	Objective	Type of study	Main results
A1 ⁽⁹⁾	152	6 to 24 months	To investigate the trajectory of screen time and its association with children's development.	Prospective cohort study	Excessive screen time in the first years of life is associated with poor cognitive and socio-emotional development.
A2 ⁽¹⁰⁾	7097	1 to 2 years	To examine the association between exposure to screen time in children and domains of developmental delay.	Cohort study	Around 51.5% of 1-year-olds spent between 1 and more than 4 hours exposed to screens. This exposure time was associated with delays in the development of communication, gross motor, fine motor, problem solving and personal and social skills at the age of 2.
A3 ⁽¹¹⁾	57980	1 to 2 years	To investigate the association between TV/DVD screen time and performance in development tests.	Longitudinal cohort study	Between the ages of 1 and 2, children watched TV/DVD for at least 2 hours a day. Children with more screen time had lower ASQ-3 scores at 1 year. At 2 years of age, there was a negative association between TV/DVD screen time and the communication domain.
A4 ⁽¹²⁾	89	3 to 24 months	To examine the relationship between mothers' and babies' screen time and children's growth and development.	Prospective cohort study	Screen time increased between 12 and 24 months, with higher averages among girls. This increase was associated with impairments in motor skills (at 12 months) and cognitive skills (at 24). In boys, screen time at 3 months was associated with lower language scores, as well as higher FMI values at 12 months and IMG at 24 months. For girls, not complying with the guidelines at 3 months was associated with higher IMF at 24 months.
A5 ⁽¹³⁾	229	12 to 24 months	Determine the relationship between screen time, social skills and behavioral traits.	Prospective cohort study	Screen time at 12 and 18 months was associated with restricted patterns of behavior and interests at 18 and 24 months, respectively.
A6 ⁽¹⁴⁾	470	0 to 18 months	To evaluate the association between screen time and cognitive development in children.	Cross-sectional study	33.0% of the children had two or more hours of screen time a day. It was found that children exposed to screens for 2 hours or more a day had low scores for cognitive development.

A7 ⁽¹⁵⁾	714	0 to 24 months	To evaluate the association between screen time and cognitive development in children.	Cross-sectional study	33.0% of the children had two or more hours of screen time a day. It was found that children exposed to screens for 2 hours or more a day had low scores for cognitive development.
A8 ⁽¹⁶⁾	235	2 to 24 months	To examine the development of television viewing behaviors over the first 2 years of life in a low-income, racially and ethnically diverse cohort, and to identify caregiver and child predictors of early TV viewing.	Longitudinal cohort study	The proportion of children who did not actively watch TV fell from 53.6% at 2 months to 12.0% at 2 years. On the other hand, the proportion of children who watched more than 60 minutes of TV increased from 9.4% at 2 months to 30.2% at 2 years. Early introduction to TV predicted greater amounts of active viewing time at 2 years, with an average of 93 minutes for children who started at 2 months, 64 minutes between 4 and 6 months, and 42 minutes after 6 months. In addition, it was observed that girls watched 27 minutes more TV per day at the age of 2, compared to boys.
A9 ⁽¹⁷⁾	1074	2 weeks to 18 months	To examine the moderating role of age on the relationship between touch screens and television with sleep, using autovideosonography in a big data sample of babies.	Cross-sectional study	For 13-month-old babies, every 1 minute of touchscreen use resulted in a loss of 1 minute of nighttime sleep, as well as a reduction in sleep quality. In comparison, 3-month-old babies exposed to touchscreens during the day was associated with fewer nocturnal awakenings, but negatively correlated with daytime sleep duration. Exposure to TV during the day was negatively associated with daytime sleep duration and total 24-hour sleep in younger babies, but not in older ones.
A10 ⁽¹⁸⁾	26433	0 to 2 years	To explore the association between exposure to screens in early childhood and myopia in preschoolers.	Longitudinal cohort study	Exposure to screens in the first two years of life was associated with a higher risk of myopia, especially when exposure began in the first year. Children of parents with good eyesight were only at risk when exposed in the first year, while children of myopic parents had an elevated risk regardless of the time and age at which exposure began.
A11 ⁽¹⁹⁾	893	18 months	To examine the association between the use of mobile media devices and communication delays in 18-month-old children.	Cross-sectional study	The prevalence of delay in expressive speech was 6.6%, and of other communication delays was 8.8%. A significant association was observed between the use of media devices and delay in expressive speech, with the odds of delay increasing with each additional 30 minutes of use.
A12 ⁽²⁰⁾	291	6 months to 2 years	To examine whether the age of onset of media exposure, the cumulative effect of high media exposure and verbal interaction during screen time were associated with children's cognition.	Longitudinal cohort study	Between 6 months and 2 years, 89.0% of the children were exposed to television, with programs aimed at children/adults being the most common. Verbal interaction between caregivers and children during screen time decreased over time, and 21 children (7.8%) had no verbal interaction with their caregivers in the first 2 years of life. In addition, early onset of exposure to digital media was indirectly associated with lower T-scores in all developmental domains at 2 years.

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A13 ⁽²¹⁾	72	10 months to 2 years	To analyze the longitudinal relationship between children's vocabulary development and exposure to screen media.	Longitudinal cohort study	It was noted that average screen time increased from 31.2 minutes per day at 10 months of age to 78.5 minutes per day at 2 years. Significant negative associations were found between screen use at all time points analyzed and vocabulary development at 2 years.
A14 ⁽²²⁾	183	18 months	To examine links between media use to regulate and emotional negativity (EN) during childhood and to explore whether children with initially high EN are more sensitive to the effects of this strategy.	Longitudinal cohort study	The use of media by mothers to calm or distract their children was associated with greater screen time in 18-month-olds (T1), but this practice was not related to the development of emotional negativity (ED) or to total screen exposure time. It was observed that children with low initial levels of NE at 18 months showed an increase in this trait over time (T2) when frequently exposed to screens. This pattern was not observed in children who initially had medium or high levels of NE.
A15 ⁽²³⁾	2152	12 months to 2 years	To determine the association of factors, including social activities and screen use, perinatal factors and demographic factors, with ASD-like symptoms and risk on the Modified Autism Checklist.	Cohort study	It was found that exposure to television and/or video at 12 months of age, compared to no exposure, was significantly associated with greater ASD-like symptoms by the total score of the M-CHAT-R. However, the M-CHAT did not show a significant association with the risk of ASD. When the risk of ASD was assessed at 18 months of age, screen viewing for 4 hours or more, compared to 3 hours or less per day, was not significantly associated with ASD-like symptoms at 2 years of age.
A16 ⁽²⁴⁾	558	3 to 12 months	To determine the associations between screen use and sleep during infancy (3 to 12 months).	Prospective cohort study	Screen time increased between 3 and 12 months of age, from 50.2% to 72.9%, with a predominance of traditional TV and DVDs/ videocassettes (>70%). More screen time was associated with shorter nighttime and total sleep duration, with babies with 60 minutes of TV/DVD daily sleeping, on average, 24.4 minutes less at night and 29.1 minutes less in 24 hours, compared to those with no exposure.

Source: prepared by the author, 2024.

DISCUSSION

The results found in this study showed that the time spent exposed to screens in children aged 1 year, 0 to 18 months and 0 to 2 years, respectively, was more than 1 hour per day. ⁽¹⁰⁻²⁵⁾ These findings contradict the guidelines recommended by the WHO and the AAP, which state that children under 2 years of age should not be exposed to any type of screen ⁽⁴⁾ In this context, the handling of screens by these children can be attributed to the importance that parents are currently giving to electronic equipment, which is being used as a mediator for education, behavior management, entertainment and as a "babysitter" while carrying out house-

hold chores. ⁽¹³⁻¹⁵⁾

⁽¹⁶⁻¹⁷⁾ This finding is in line with previous studies. The adverse effects associated with early screen use discussed in this review permeated child development in various aspects, including the domains of communication, motor skills, socio-emotional, cognitive and visual disturbances. ⁽¹⁸⁻¹⁹⁾

With regard to language, the studies showed that increased exposure to screens had a significant negative correlation with the acquisition of language skills at 2 years of age and expressive speech. ⁽²⁰⁻²²⁾ This limitation, in isolation, was observed in boys at 3 months of age. ⁽¹²⁾ In disagreement with these results, a study carried out in Brazil found that children aged 23 to 42 months who used interactive

media scored higher on the language scale. ⁽²³⁾ It should be emphasized that the use of TV was not assessed in this sample.

The language development of young children depends largely on face-to-face interactions and verbal stimulation. ⁽²⁴⁾ That said, TV is characterized as a passive activity. Thus, interaction occurs between the child and the device, restricting direct communication with adults. Previous studies have shown the importance of interaction between children and adults in the acquisition and improvement of children's language skills, compared to the amount of words they are exposed to. ⁽²⁵⁻²⁷⁾

With regard to the adverse effects on motor functions, delays in the development of fine and gross motor

skills have been identified in children exposed to screens. Specifically, girls showed poor motor performance at 12 months of age, according to an isolated analysis.⁽¹²⁾ Similarly, a study carried out in Brazil found that 33.3%, 27.3% and 16.6% of children aged four, five and six, respectively, showed delays in gross motor skills. However, this study did not agree with the data obtained in this review regarding fine motor skills.⁽²⁸⁾

The daily practice of physical activity and play provides children with fundamental experiences that contribute to the maturation of motor performance, which is reduced by exposure to screens.⁽²⁹⁾ It should be emphasized that there is controversy in the literature about the benefits of using screens, with the exception of television, in the development of fine motor skills. This stems from the difference in media use, with TV being a passive device that predominantly uses audiovisual skills, while interactive media, such as smartphones and tablets, mostly involve children's manual skills.^(6, 24)

Based on this idea of long-term recurrences, a study included in this review found that children who did not follow the WHO guidelines for screen time at 3 and 12 months had a higher obesity body mass factor (BMF) and body mass index (BMI) compared to those who followed the guidelines at 12 and 24 months. Anthropometric changes in children are a significant risk factor for the development of cardiometabolic disorders⁽³⁰⁾ which are characterized by high blood pressure, dyslipidemia and high glucose levels. In 2020, the global prevalence of metabolic syndrome was 2.8% for children and 4.8% for adolescents⁽³⁰⁻³¹⁾

As for the cognitive domain, the findings converge with the competencies described above. Impairment in cognitive functions, such as problem-solving and in general, were

highlighted in this review^(10-11, 17). The girls at 24 months showed this alteration in isolation.⁽¹²⁾ Cognition is an adaptive mechanism that helps to process information (coding, categorization, storage, retrieval and use), which contributes to the formation of intelligence and the development of individual responses.⁽³²⁾ The activities that comprise the process of cognitive maturation are related to perception, attention, memory, reasoning and imagination, among others.⁽¹¹⁾ Similar findings were found in a study carried out in the United States, in which it was observed that 6-month-old children who were excessively exposed to media showed lower cognitive development at 14 months. In the study, an analysis was made of the programs to which the children were subjected, where it was found that 23.0 minutes were dedicated to viewing age-appropriate educational content.⁽³³⁾ Although the content consumed was aimed at education, recent research has found that the quality of the interactive resources present in the most installed educational program applications was low.⁽³⁴⁾ Executive functions, which are made up of impulse inhibition skills, working memory, attention and flexibility of reasoning, also seem to be impaired by the use of screens, since they depend on various sensory stimuli to develop.⁽¹¹⁾

With regard to the adverse effects on the socio-emotional domain resulting from the early use of media, we highlight the impairment of social and personal activities and the presence of restricted patterns of behavior and interest.^(10,13) This phenomenon occurs because children replace play activities, which require the integration of various skills, with the use of screens that do not require any physical or intellectual effort, prioritizing the virtual space that allows information to be available more quickly.⁽³³⁾

It should be noted that the lack of management of screen time favors ad-

diction, thus facilitating the establishment of a vicious cycle. These findings corroborate the data identified in this review, according to which early exposure to TV at 2, 4 or 6 months was a predictor of an increase in the amount of screen viewing at 2 years of age, with an average time of 93, 64 and 42 minutes, respectively.⁽¹⁶⁾

A study carried out in the United States with children aged 15 to 36 months showed that those with socio-emotional difficulties had a higher prevalence of exposure to mobile technology, mediated by their parents. This differs from another study, in which the devices were used by parents in order to control children's dysfunctional behaviors.^(27, 35)

Among these disorders, this study also found that excessive exposure to TV and/or video at 12 months of age was associated with the development of symptoms similar to autism spectrum disorder (ASD), when compared to children who were not exposed, according to the total score of the M-CHAT-R.⁽²³⁾

In terms of vision-related disorders, a study integrated into the current research identified that excessive exposure to screens in the first and second year of life was associated with a significantly higher risk of developing myopia, in which the length of exposure time was a determining factor in this increase. In contrast, when comparing children whose parents had good vision and those whose parents had myopia, it was found that the risk increased exponentially in children whose parents already had myopia, regardless of average exposure time, starting age and total years of exposure.⁽¹²⁾

Bearing in mind that child development occurs predominantly in early childhood, the period between 0 and 6 years of age⁽¹⁾ this study examined the adverse effects of prolonged use of screens by children in the first years of life. The results indicated that limit-

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ing these children to screens can have significant implications for various developmental domains, preventing an optimal learning process. At this stage, learning should be mediated by interpersonal interactions and the availability of toys and materials, such as books and puzzles, which provide experiences that will be fundamental for practicing and mastering these children's social, cognitive, language and emotional skills. These activities differ from screen use, which is predominantly passive⁽²⁴⁾, which increase

the duration of sedentary activities.

CONCLUSION

The results indicated that the use of screens in children under the age of 2 was predominantly more than one hour, with TV being the most used device. Excessive exposure to these media has a negative impact on communication skills, social, emotional and cognitive aspects, as well as increasing the risk of visual disorders. This impact can be detrimental to

children's development and can be reflected in their adult lives. In the face of technological advances, intersectoral actions are needed to make families aware of the importance of limiting the use of devices and promoting interpersonal interaction.

The study thus reveals the need for more research into the adverse effects of early screen use and strategies to balance their use, as well as investments in educational programs to prevent early exposure.

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