

# Strategies for minimizing screen time in early childhood: a scoping review

Estratégias para minimizar o tempo de tela na primeira infância: uma revisão de escopo

Estrategias para minimizar el tiempo frente a la pantalla en la primera infancia: una revisión del alcance

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## Abstract

The objective of this study was to investigate in the literature strategies developed to reduce screen time in early childhood. This is a scoping review carried out between September and December 2023 in the PubMed®, Virtual Health Library, Scopus and Web of Science databases, which investigated studies from the last five years. The search strategy and selection process were supported by Rayyan®. Seven articles were included in the review and two categories were identified: parental education of caregivers and training of educators and health professionals. Strategies in face-to-face and virtual formats stood out, with the use of digital resources, such as animation videos, infographics, counseling sessions, group sessions and dramatizations. The duration and frequency of interventions varied. Therefore, the importance of investing in the training of family members, early childhood educators and health professionals was highlighted, through interventions that minimize exposure to screens in early childhood.

## Resumo

O objetivo deste estudo foi investigar na literatura estratégias desenvolvidas para redução do tempo de tela na primeira infância. Trata-se de revisão de escopo realizada entre setembro e dezembro de 2023 nas bases de dados PubMed®, Biblioteca Virtual em Saúde, Scopus e Web of Science, que investigou estudos dos últimos cinco anos. A estratégia de busca e o processo de seleção se deram com o suporte do Rayyan®. Foram incluídos sete artigos na revisão e identificadas duas categorias: educação parental de cuidadores e formação de educadores e profissionais da saúde. Destacaram-se estratégias nos formatos presenciais e virtuais, com a utilização de recursos digitais, como vídeos de animações, infográficos, sessões de aconselhamento, sessões em grupos e dramatizações. A duração e a frequência das intervenções foram variadas. Evidenciou-se, portanto, a importância de se investir na capacitação de familiares, educadores infantis e profissionais de saúde, por meio de intervenções que minimizem a exposição às telas na primeira infância.

## Resumen

El objetivo de este estudio fue investigar estrategias desarrolladas en la literatura para reducir el tiempo frente a una pantalla en la primera infancia. Se trata de una revisión de alcance realizada entre septiembre y diciembre de 2023 en las bases de datos PubMed®, Virtual Health Library, Scopus y Web of Science, que investigó estudios de los últimos cinco años. La estrategia de búsqueda y el proceso de selección estuvieron respaldados por Rayyan®. Se incluyeron siete artículos en la revisión y se identificaron dos categorías: educación de los padres de los cuidadores y formación de educadores y profesionales de la salud. Se destacaron estrategias en formatos presencial y virtual, con el uso de recursos digitales, como videos de animación, infografías, sesiones de asesoría, sesiones grupales y dramatizaciones. La duración y frecuencia de las intervenciones variaron. Por lo tanto, se destacó la importancia de invertir en la capacitación de familiares, educadores de primera infancia y profesionales de la salud, a través de intervenciones que minimicen la exposición a pantallas en la primera infancia.

## Keywords

Screen time; Child; Systematic review; Health promotion

## Descritores

Tempo de tela; Criança; Revisão sistemática; Promoção da saúde

## Descriptores

Tiempo de la pantalla; Niño; Revisión sistemática; Promoción de la salud

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## Introduction

Technology has brought benefits to society, such as globalization, access to information, practicality and agility in everyday life. However, it also presents risks to health and well-being, for instance, when the use of screens goes beyond safe measures and compromises human development at different stages of life. It is known that early childhood, a period from conception to children's 6<sup>th</sup> birthday, is a time of intense neuropsychomotor and cognitive development, where learning patterns, skills and experiences are established that will shape their behavior throughout life.<sup>(1)</sup>

Recent studies indicate that excessive exposure to screens at this stage of life is related to problems with lack of attention,<sup>(2)</sup> obesity, sedentary lifestyle and sleep problems in children under 5 years of age.<sup>(3)</sup> Therefore, the World Health Organization (WHO) published recommendations on appropriate screen time for each age group. The document defines screen time as time spent passively watching on-screen entertainment (TV, computer and mobile devices) and recommends that children under 24 months of age should not be exposed to the screen. From the age of 2, children can be exposed to screens for a maximum of 60 minutes during the day.<sup>(4)</sup>

Parental screen time and self-efficacy to limit its use are important influences on children's screen time.<sup>(5)</sup> In situations of social vulnerability, such as unemployed parents and immigrants, children have greater exposure to screen time compared to other groups.<sup>(6)</sup> Reducing parents' screen time and increasing their confidence to limit screen time may be an effective strategy to prevent excess weight in Brazilian preschoolers.<sup>(5)</sup>

There is a lack of studies in the literature that point out effective strategies for interventions with families, educators and healthcare professionals that promote the healthy use of screens in early childhood. A study with families to survey strategies for managing screens showed that families want screen time management programs that take a virtual approach and incorporate health information, alternative activities, cybersecurity information, and screen monitoring tools.<sup>(6,7)</sup> A review of the strategies adopted to support families in managing their children's screens showed that knowledge and awareness regarding screen time, restrictive practices and offering alternative activi-

ties to parents, and removing screens from children's rooms were the strategies most used by studies.<sup>(8)</sup>

Considering early childhood as a window of opportunities for human development, in which interventions carried out at this stage have a lifelong impact, caregivers', educators' and healthcare professionals' education is a promising strategy for children to achieve child development in its fullness. This study is justified by elucidating important questions about dealing with a contemporary problem related to screen exposure in a crucial period for human neurodevelopment. Therefore, this study aims to investigate strategies developed in the literature to reduce screen time in early childhood.

## Methods

This is a systematic scoping review that used the JBI methodology to formulate the research question according to the acronym PCC, where P refers to the population, C to the context and C to the setting. Therefore, the following question was created: What strategies were developed to reduce screen time in early childhood? Studies that brought strategies to reduce screen time in children, without changes in neurodevelopment, during early childhood, were included. Studies that did not address actions/strategies that minimize exposure to screens in early childhood were excluded. The research was carried out in the PubMed<sup>®</sup>, Virtual Health Library (VHL), Scopus and Web of Science databases, in English, Spanish and Portuguese, over the last five years, from September to December 2023. For the search strategy, the following descriptors were used: "Time"; "Parents" and "Child, Preschool", from PubMed<sup>®</sup>; "Tempo de Tela", "Pré-Escolar", "Cuidadores" and "Pais", from VHL; "Screen Time", "Parents", "Children" and "Interventions", from Scopus; "Screen Time", "Parents" and "Children", from Web of Science. The Boolean operator AND was used, as described in chart 1.

Two independent researchers, using Rayyan<sup>®</sup> software, selected articles included in the review and resolved possible discrepancies in the inclusion process. Articles were excluded because they addressed hospitalized children, did not present interventions, due to the difficulty in accessing the article, were in-

**Chart 1.** Database search strategy

Database	Combination of descriptors/keywords (AND)	Results retrieved
PubMed®	"Time"[Mesh]; AND "Parents"[Mesh] AND "Child, Preschool"[Mesh]	103
VHL	"Tempo de Tela"; AND "Pré-Escolar"; AND "Cuidadores"	7
	"Tempo de Tela"; AND "Pré-Escolar"; AND "Pais"	104
Scopus	"Screen Time" AND "Parents" AND "Children" AND "Interventions"	628
Web of Science	"Screen Time" AND "Parents" AND "Children"	15

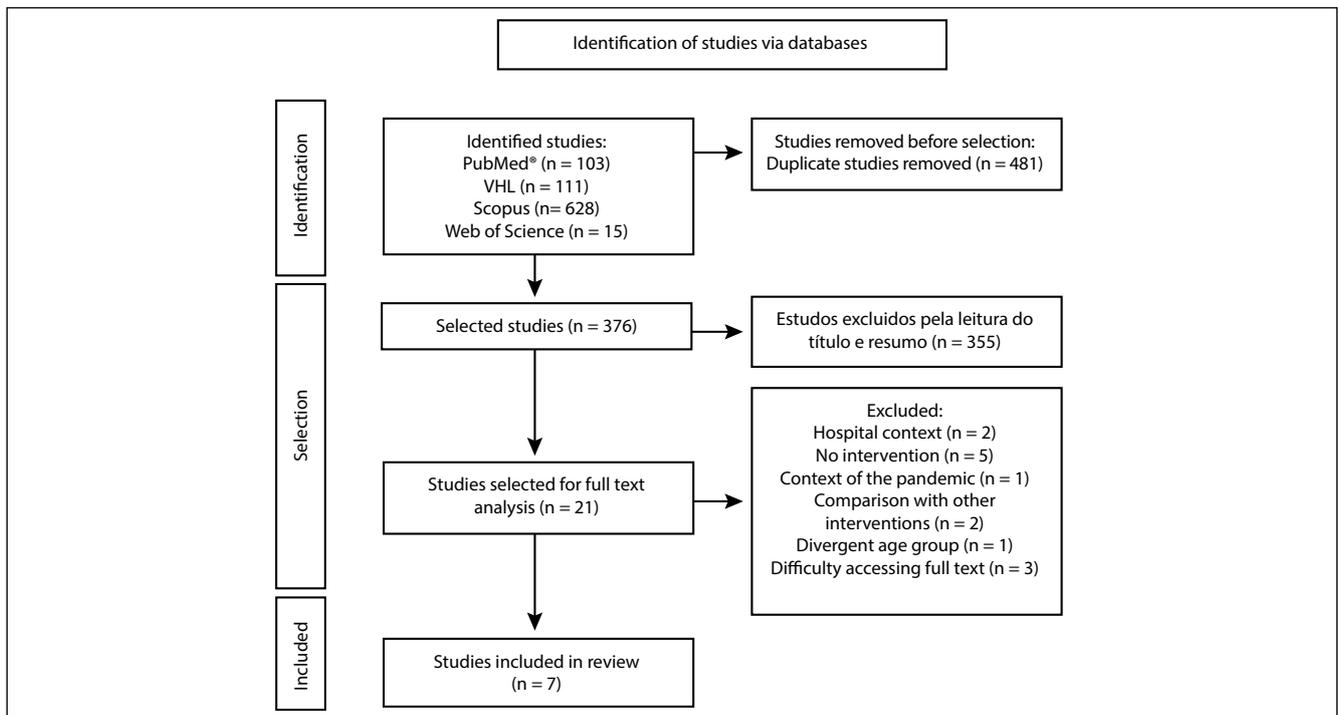
serted in the context of the pandemic, compared with other interventions or addressed an age range different from early childhood (Figure 1).

## Results

A total of 857 articles were retrieved from the databases. After excluding repetitions and applying filters, 376 articles remained. After reading the titles and abstracts, 355 articles were excluded. The full texts of 21 articles were analyzed, 14 were excluded and seven were included in the review.<sup>(9-15)</sup> Chart 2 shows the characteristics of the seven studies included in the review. The

studies were predominantly from Asia, Oceania and North America. The study population was mostly the caregiver-child dyad, also including educators and healthcare professionals. As for study design, there were four clinical trials, one methodological study, one observational study and one scoping review. Chart 3 presents information regarding the study objectives, operating setting, intervention delivery method, material and activity carried out and duration/frequency. The studies aimed to examine the effects of counseling programs for parents and caregivers, propose conceptual models on parental styles and the use of screens, and reflect on technical guidelines. As for the setting, the studies mostly took place in health centers and schools. Regarding the delivery method, online questionnaires, group sessions, infographics and informative videos were used. Concerning duration, the majority of studies were organized into sessions.

The analysis of the articles included in the review made it possible to organize them into two categories: a category of strategies related to caregivers' education on exposure to screens in early childhood and another related to healthcare and education professionals' training on the subject.



Source: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71

**Figure 1.** PRISMA flowchart

**Chart 2.** Study participants and characteristics

Author, country	Sample (n)	Study design	Results	Conclusion
Nyström et al., <sup>(9)</sup> Australia	262 mother-child dyads of children aged 0 to 6 years	Clinical trial	At the 2 and 3.5 year follow-ups, the positive impacts of InFANT on maternal knowledge about screen exposure were maintained. An indirect effect of the intervention on reducing children's screen time was observed at the 2 and 3.5 year follow-ups through better maternal knowledge about screen exposure.	The positive impacts of InFANT on maternal knowledge about screen exposure were maintained in both follow-ups, with better maternal knowledge associated with less screen time for children. These results have implications for pediatricians and healthcare professionals, as educating new parents early on about screen time can lead to the development of healthier habits that are maintained well into the preschool years.
Raj et al., <sup>(10)</sup> Malaysia	360 mother-child dyads of children aged 3 to 4 years	Randomized controlled clinical trial	The intervention group showed a significant reduction in children's screen time compared to the control group. Mothers' knowledge increased significantly while perception about the influence of screen time on children's well-being decreased. There was also an increase in mothers' self-efficacy to reduce screen time and increase physical activity, with mothers' screen time decreasing	The Stop and Play intervention was effective in reducing screen time among preschool children from low socioeconomic status families while improving associated parental factors.
Boonmun et al., <sup>(11)</sup> Thailand	Parent-preschooler dyads (2 to 5 years)	Quasi-experimental study	The results revealed that the screen time of children in the experimental group decreased significantly more 1 week and 2 months after completing the intervention than that of the control group. The mean scores of parental attitudes and behaviors in the experimental group were significantly more positive than those in the control group immediately after the intervention.	The program may reduce children's screen time after intervention compared to control. Therefore, nurses and teachers who work with young children should encourage parents to understand the impacts of reducing screen time. Nurses and teachers can apply this program to parents to reduce their children's screen time. However, further testing of the program in other settings with randomized clinical trials is needed before it can be widely used.
Morawska et al., <sup>(12)</sup> Australia		Methodological study	An integrated conceptual model was proposed that brings together related factors relevant to the early childhood context (parental screen use attitudes and motivations, parental practices, parental screen use knowledge, parental example, children's screen time, parental self-efficacy, home screen environment, mental health and parental stress, parental self-regulation, child care and other caregivers, sibling and other caregiver screen use, parental screen use conflict, education, financial security and employment), identifying parenting practices and related parental factors as an important focus for future work.	Ultimately, a better understanding of these relationships will support the development of socioecologically valid evidence-based interventions to help parents develop thoughtful, self-regulated activities, and competent screen use practices that are consistent with their goals for themselves and their children and support early childhood development.
Hewitt et al., <sup>(13)</sup> Australia	80 doctors and early childhood educators and 272 medical records	Observational study	Most clinicians and early childhood educators had a solid understanding of the content of the guidelines. Counseling programs provided to parents were consistent with current children's guidelines regarding amount of physical activity, screen time, and sleep. Medical record documentation regarding the specificity of counseling provided was missing.	More support is needed regarding the negative effects of screen time and efficient strategies for documentation.
Bahadur et al., <sup>(14)</sup> Turkey	105 children aged 2 to 5 years	Clinical trial	There was a statistically significant decrease in screen time in both groups after the intervention. The impact was greater in the group with neurodevelopmental disorders. The increase in co-exposure percentages, as well as the increase in time playing with children, was statistically significant in the neurodevelopmental disorder group.	The study demonstrated that three in-office pediatric counseling sessions, including recommendations for use from the American Academy of Pediatrics, are effective in decreasing screen time in children who are typically developing or have a neurodevelopmental disorder.
Heller, <sup>(15)</sup> United States		Scoping review	Develop a set of recommendations to reduce harm caused by excessive use of screens in childhood and regarding motor delays, risk of obesity and sleep difficulties.	Most families do not follow the American Academy of Pediatrics guidelines for children's media use. Experts recognize the pros and cons of using screens, and the debate continues about the risks and benefits for child development. A solution to the disparity between the American Academy of Pediatrics guidelines and babies' actual screen time habits may be to learn about babies' screen time, update and widely disseminate the American Academy of Pediatrics guidelines, and help families take decisions that take advantage of known benefits and avoid risks associated with advancing technology.

**Chart 3.** Strategies/actions included in the study

Author	Objective	Setting and delivery mode	Material and activity used in the intervention	Duration and frequency
Nyström et al. <sup>(9)</sup>	Investigate potential mechanisms related to maintained intervention effect on television viewing across two long-term follow-ups in the Melbourne Infant Feeding Activity and Nutrition Trial (InFANT).	Setting: maternal and child health services Delivery mode: group sessions	All data were collected using questionnaires completed by mothers and in the same way at each time point.	Duration: 15 months Frequency: 6 sessions
Raj et al. <sup>(10)</sup>	Develop, implement, and assess the effectiveness of Stop and Play, a digital parental health education intervention to reduce excessive screen time.	Setting: preschool Delivery mode: YouTube for delivery of materials and WhatsApp for answering questions	Whiteboard-style animation videos, infographics, and problem-solving session.	Duration: 4 weeks
Boonmun et al. <sup>(11)</sup>	Investigate the effectiveness of counseling in a family-based child development clinical setting in reducing screen time in typically developing children and compare them to children with neurodevelopmental disorders.	Setting: doctor's office Delivery mode: in-person sessions	Counseling sessions with recommendations from the American Academy of Pediatrics on screen exposure, information about the effects of screen time on child health and development, strategies for reducing screen time (by reading books or playing games together), and an explanation of harmful effects from background exposure to TV.	Duration: 3 to 12 months Frequency: 3 sessions lasting 15 minutes each
Morawska et al. <sup>(12)</sup>	Propose a conceptual model that links aspects of parenting and the socio-ecological environment to screen use by young children. The proposed model could be used to design longitudinal studies of predictors and outcomes of screen use and inform intervention development.	-	-	-
Hewitt et al. <sup>(13)</sup>	Determine what advice is given to parents regarding child care.	Setting: health center in Australia Delivery method: email	Invitation to complete an online survey was sent to doctors, nursing staff, allied health staff and early childhood educators.	Frequency: punctual
Bahadur et al. <sup>(14)</sup>	Examine the effects of a newly developed parental screen time reduction program for preschoolers, a training program for parental planned behaviors, and reduce children's screen time.	Setting: daycare Delivery mode: in-person sessions	Sessions with group discussions, role play, feedback and session summary.	Duration: 2 weeks Frequency: 3 sessions lasting 3 hours each
Heller <sup>(15)</sup>	Suggest adaptations to the American Academy of Pediatrics guidelines for children's media engagement using a harm reduction framework.	-	-	-

## Strategies for caregivers' parental education

In this category, four articles that described the strategies and results obtained with interventions carried out directly with caregivers (fathers, mothers and family members) were included.

Authors of a study carried out in Australia with 262 mother-child dyads carried out a follow-up for 15 months, with six in-person sessions and delivery of materials to the home where recommendations were provided on screen time and the possible harm caused by its use as well as ideas alternatives to non-screen-based activities and strategies to limit screen time. This study showed that maternal knowledge about screen exposure was maintained in the long term, with better maternal knowledge associated with less screen time

for their children. This result has implications for pediatricians and healthcare professionals, as educating new parents early on about screen time can lead to the development of healthier habits that are maintained well into the preschool years.<sup>(9)</sup>

Authors of a study carried out in Malaysia with 360 mother-child dyads in a school environment and using virtual and interactive material for 15 months and with three to six sessions showed that the Stop and Play intervention, which consists of strategies to reduce screen time and increase physical activity, through the delivery of educational videos and online problem-solving sessions, was effective in reducing screen time among preschool children while improving associated parental factors.<sup>(10)</sup>

Authors of a clinical trial carried out in a school environment with 67 caregiver-child dyads used three

three-hour sessions over the course of two weeks as a strategy, the first being instructional, with recommendations and suggestions about screen time; the second with the establishment of rules for this reduction and a parental model; and the third with interaction between guardians and children with alternative activities to screens. This study showed that screen time of children in the experimental group decreased significantly two months after completing the intervention than that of the control group.<sup>(11)</sup>

Authors of a study developed a methodological study carried out in Australia using a conceptual integrated model that brings together factors related to screen use in early childhood, such as parents' attitudes and motivations for screen use, parental practices, parental screen use knowledge, parental example, children's screen time, parental self-efficacy, home screen environment, mental health and parental stress, parental self-regulation, child care and other caregivers, sibling and other caregiver screen use, parental screen use conflict, education, financial security, and employment. This model uses a socio-ecological approach that can help in the development of interventions to support child development and parents in the practice of using screens.<sup>(12)</sup>

## Strategies for training educators and healthcare professionals

This category included studies that developed strategies for healthcare and education professionals who are in close contact with children and their families and have the potential to convey consistent information on the topic.

Authors of a study from Australia with 80 doctors and early childhood educators and 272 medical records, using a health establishment as the setting and using a virtual form as material, showed that, despite the majority of doctors and early childhood educators having a solid knowledge of the content of the guidelines, these professionals are unaware of effective interventions to inform caregivers about the topic. This justifies the importance of training and implementing protocols to support documentation by healthcare professionals.<sup>(13)</sup>

Authors of a clinical trial demonstrated the effect of pediatric counseling in offices based on the Amer-

ican Academy of Pediatrics recommendations on the use of screens in children with typical development or with neurodevelopmental disorders. The strategy consisted of, during consultations, using between 10 and 15 minutes to advise guardians about recommendations on screen time, the effects caused and strategies used to reduce it. In both groups, there was a reduction in screen time and an increase in time playing with their children. It is concluded that in-office counseling is effective and promotes changes in the behavior of families and children in relation to exposure to screens in childhood.<sup>(14)</sup>

Authors of a review proposed to develop a set of recommendations to reduce the damage caused by excessive use of screens in childhood and regarding motor delays, risk of obesity and sleep difficulties. The study concluded that a solution to the disparity between American Academy of Pediatrics guidelines and babies' actual screen time habits could be understanding babies' screen time, updating and widely disseminating the American Academy of Pediatrics guidelines and helping families make decisions that take advantage of the known benefits and avoid the risks associated with advancing technology.<sup>(15)</sup>

## Discussion

The results of this review showed that strategies on the use of screens in early childhood are aimed at training caregivers, healthcare and education professionals. Approaches were diverse, highlighting in-person and virtual formats with the use of digital resources, such as animation videos, infographics, counseling sessions, group sessions and dramatizations. The duration and frequency of interventions were varied and according to the objectives of each study.

It is known that exposure to screens during this period of life impacts neurodevelopment and contributes to the incorporation of behaviors, such as a sedentary lifestyle, which can compromise child health in the long term.<sup>(16)</sup> Furthermore, the global prevalence of children under 5 years of age who comply with guidelines on screen use has shown that only one in four children meets screen time, which reinforces initiatives for the healthy use of screens in early childhood.<sup>(17)</sup>

Strategies for training caregivers on screen use have demonstrated promising results, not only in terms of children's screen time, but also in caregivers' parental capacity and in expanding knowledge on the topic.<sup>(9-11)</sup> A study with 789 caregiver-child dyads in Malaysia, which investigated aspects related to barriers to reducing children's screen time by parents, showed that the majority of parents attributed the need to dedicate time to household chores, unpredictable weather and lack of a safe neighborhood that restricts outdoor play, such as barriers to limit children's exposure to screen time. Another barrier highlighted was the parents' perception of considering exposure to screens beneficial for their children's development.<sup>(18)</sup>

Approaching caregivers about children's screen time involves reflecting on the parenting style adopted by caregivers. A study of 280 children in early childhood demonstrated that a participative parenting style and greater mother-child interaction at 18 months was related to less screen time between 2 and 3 years of age. Authoritarian, negligent and permissive parenting styles are related to more screen time and caregivers' lower ability to reduce it.<sup>(19)</sup> A study with Hungarian families identified digital parenting styles associated with children's greater screen time, and families with more permissive or authoritarian styles, with low education and with more attachment to cell phones were more related to children with high screen time.<sup>(20)</sup>

Therefore, training healthcare professionals to provide advice on screen use is essential and has demonstrated positive results in caregivers' self-efficacy in managing children's screen time.<sup>(13,14)</sup> The Canadian Pediatric Society has published recommendations on topics that should be covered in this counseling, such as managing screen use, encouraging meaningful use, modeling healthy screen use, and monitoring for signs of problematic use.<sup>(21)</sup>

Training caregivers in managing children's screen time has proven to be an efficient resource for healthy use in childhood. The information is aimed at building a critical sense of the quality of content, caregivers' ability to select materials with educational proposals, children's digital safety and the use of technology as a resource for family integration.<sup>(14)</sup> Moreover, the American Psychological Association also created a

digital guide for parents, as it identified that the official guidelines regarding media use by children were about usage time, but that parents should also consider the content of this media and the context in which they use it.<sup>(22)</sup>

The Brazilian National Plan for First Childhood (PNPI - *Plano Nacional pela Primeira Infância*), a political and technical document produced by the Brazilian National First Childhood Network between 2009 and 2010, discusses in one of its chapters how to avoid early exposure of children to the media and the use of digital screens, citing among the main aspects the role of the State in relation to this problem, highlighting the need for continuous improvement of current legal frameworks as well as the implementation of public policies aimed at combating the excessive use of screens.<sup>(23)</sup>

The scarcity of this type of information in operational technical documents can make it difficult for professionals to make decisions and incorporate counseling into routine care for families. The Brazilian National Policy for Comprehensive Child Healthcare (*Política Nacional da Atenção Integral à Saúde da Criança*), a guiding document for child healthcare in the Brazilian Health System (SUS - *Sistema Único de Saúde*), does not make reference, among its thematic axes, to a healthy use of screens in childhood.<sup>(24)</sup>

However, the Child Health Record, material widely used to monitor child development in Primary Healthcare, has shown an evolution over the years on the topic.<sup>(25,26)</sup> In its 2018 edition, the only recommendation made about screen time was within the ten steps to a healthy diet, recommending use for less than two hours, without specifying age group. From the 2021 edition onwards, the record started to present a topic aimed at caring for using electronics, exposing the implications of excessive use, recommending exposure time by age group and content to be accessed.

The findings of this review showed that training caregivers on the healthy use of screens contributes to more responsive parental behavior, with the incorporation of positive parenting practices. Regarding the format of the strategies formulated, there is no clarity on the model that is most appropriate. The studies showed a vast methodological diversity, such as variations in frequency, target audience and means of conveying information.

The study's limitations were the selection of some databases to compose the study, the time frame of the last five years and language selection. However, the review findings provide recommendations for future research and care practice as they present strategies that were effective in minimizing screen time for children in early childhood and expanding caregivers', educators' and healthcare professionals' ability to intervene in the problem.

## Conclusion

The findings of this review point to interventions that targeted caregivers, educators and healthcare professionals and demonstrated promising results in raising awareness about the need to manage children's screen time. The formats of the interventions were diverse, which demonstrates the need to mature methodologies that prove effectiveness on the topic. The importance of investing in the training of family members, early childhood educators and healthcare professionals is highlighted, through interventions that minimize exposure to screens in early childhood. Public policies and practice guidelines that raise awareness on public opinion regarding the risks of child development with prolonged exposure to electronic devices are also necessary, in addition to deepening studies on related topics beyond use time, such as children's cybersecurity and the quality of content consumed. This review may raise awareness of caregivers to minimize screen time, whether in healthcare professionals' offices, in health promotion initiatives for schoolchildren or in campaigns aimed at child health in different territories.

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