

Influences of digital screen use on early childhood social development: review study

Influências do uso de telas digitais no desenvolvimento social na primeira infância: estudo de revisão

Influencias de la utilización de pantallas digitales en el desarrollo social de la primera infancia: estudio de revisión

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ABSTRACT

Objective: to identify scientific knowledge about the influences of digital screen use on early childhood development. **Method:** this five-stage integrative literature review surveyed five databases (CINAHL, MEDLINE, PsycInfo, Scopus and Web of Science), selecting studies published between 2010 and 2020 on the use of digital screens (computers, tablets, mobile phones and television) in early childhood. **Results:** the 26 scientific papers selected addressed screen consumption, exposure, and inclusion in children's routines. Routine use showed changes in behavior, the importance of rules for schedules and content, monitoring by parental caregivers, socialization concerns, and risks of early use. **Conclusion:** the integrative synthesis indicated vulnerabilities and potentials, and the need for shared moments and a reconfiguration of social interactions in early childhood. Data on digital screen consumption and exposure in early childhood inform the relational, educational, and communicative dimensions of nursing care and dialogue with good parenting practices.

Descriptors: Nursing; Child; Child Care; Child Development; Screen Time.

RESUMO

Objetivo: identificar os conhecimentos científicos sobre influências do uso de telas digitais no desenvolvimento na primeira infância. **Método:** revisão integrativa da literatura desenvolvida em cinco etapas com levantamento em cinco bases de dados (CINAHL, MEDLINE, PSYCINFO, SCOPUS e *Web of Science*). Foram selecionados estudos sobre uso de telas digitais (computadores, *tablets*, telefones móveis e televisão) na primeira infância, publicados entre 2010 e 2020. **Resultados:** os 26 artigos científicos analisados enfocam consumo, exposição e inclusão de telas na rotina infantil. O uso rotineiro mostra mudanças de comportamentos, importância de regras para horários e conteúdo, acompanhamento de cuidadores parentais, preocupações com socialização e riscos do uso precoce. **Conclusão:** a síntese integrativa indica vulnerabilidades e potencialidades, com necessidade de momentos compartilhados e reconfiguração das interações sociais na primeira infância. Elementos sobre consumo e exposição às telas digitais na primeira infância trazem subsídios às dimensões relacional, educativa e comunicativa do cuidado de enfermagem e na interlocução com boas práticas parentais.

Descritores: Enfermagem; Criança; Cuidado da Criança; Desenvolvimento Infantil; Tempo de Tela.

RESUMEN

Objetivo: identificar el conocimiento científico sobre las influencias de la utilización de pantallas digitales en el desarrollo en la primera infancia. **Método:** revisión integradora de la literatura desarrollada en cinco etapas con encuesta realizada en cinco bases de datos (CINAHL, MEDLINE, PSYCINFO, SCOPUS y *Web of Science*). Se han seleccionado estudios sobre la utilización de pantallas digitales (computadoras, tabletas, teléfonos móviles y televisión) en la primera infancia, publicados entre 2010 y 2020. **Resultados:** los 26 artículos científicos analizados se centran en el consumo, la exposición y la inclusión de las pantallas en la rutina infantil. La utilización rutinaria muestra cambios en el comportamiento, la importancia de las reglas para los horarios y el contenido, el seguimiento de cuidadores parentales, las preocupaciones con la socialización y los riesgos de su utilización temprana. **Conclusión:** la síntesis integradora indica vulnerabilidades y potencialidades, con la necesidad de momentos compartidos y reconfiguración de las interacciones sociales en la primera infancia. Elementos sobre consumo y exposición a pantallas digitales en la primera infancia aportan subsídios a las dimensiones relacional, educadora y comunicativa del cuidado de enfermería y en la interlocución con las buenas prácticas parentales.

Descriptorios: Enfermería; Niño; Cuidado del Niño; Desarrollo Infantil; Tiempo de Pantalla.

INTRODUCTION

Early childhood involves the first 6¹ or 8 years of life², being characterized as the phase of human development that is significant for the formation of brain structures and the improvement of complex cognition, language and socio-emotional interaction skills, which permeate all future life and are related to a range of experiences offered to the child.

Social development is a complex process that involves neural, behavioral and environmental elements to develop skills for interaction and communication in human beings^{1,3}. This process is related to the concepts of individuation and

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socialization, which translate into the individuals' ability to recognize themselves as unique and through establishing and maintaining social interactions³.

The interface between sustaining interactions, socio-emotional skills and early use of electronic devices, especially due to the substantial consumption of electronic media by children under 3 years of age⁴ configures a relevant theme given the transformations of social development at this life stage.

Digital electronic media are encoded in a digital format normally to be transmitted and consumed on electronic devices⁴ such as computers and mobile phones, in addition to being broadcast in audio and video recordings, blogs, instant messages and communication with digital or analog electronic resources. In this sense, a number of research studies have pointed out the concern with contemporary use of electronic devices by children and the need for more studies on the impacts on their well-being and on behavioral and emotional difficulties related to social development, in addition to the cognitive sphere⁵.

Therefore, electronic media have had ubiquitous connectivity, enabled by portable digital devices; however, there are concerns about social learning, its efficacy, the need to be selective, and strategies to address biases in terms of the choices about what, when and from whom to learn⁴. Exposure to a variety of electronic devices and their increased use from an early age⁶ represent major challenges for the health field.

The elements presented and the relevance of scientific knowledge about the use of digital screens and social development in early childhood motivated the current research, to pay attention to their relevance to Nursing care. Thus, the objective of the current research was to identify the diverse scientific knowledge about the influences of the use of digital screens on early childhood development, in search of subsidies for Nursing care in comprehensive child health care.

METHOD

This is an integrative review (IR) about the influences of digital screen use on social development in early childhood.

An IR is a structured process with analysis of the results from scientific studies, aiming to expand understanding about a given topic. It is a methodological approach consisting in five stages: identification of the problem, bibliographic research, data evaluation, data analysis, and presentation with a synthesis of the results⁷.

In the research question, the PICO strategy was used in this study, an acronym designated by P (Population): early childhood; I (Intervention): social development; Co (Context and outcome), use of electronic media and its influence on children. Thus, the following questions was formulated: "Which is the available scientific knowledge regarding the diverse influence of electronic media use on social development in early childhood?"

In the literature search, keywords related to the PICO strategy elements were used, elaborated with the help of a librarian and considering possible variations of terms on the theme, crossing them with Boolean operators and applying truncations, as shown in Figure 1.

Search strategy to select the studies in the databases
"early childhood" or infant* or "young child*" or toddler* or child* or newborn* or baby or babies or preschool* or "preschool*" or kindergarten* or "elementary school*" or "nursery school*" or schoolchild* or boy* or girl* AND "social development" or "child* development" or "social skill*" or "social behavior*" or "social interaction" AND "electronic media" or "media use" or "media usage" or "media influence" or "internet utilization" or "internet use*" or "screen time" or "social media"

FIGURE 1: Search strategy. Ribeirão Preto (SP), Brazil, 2021.

The following databases were consulted: *Cumulative Index to Nursing and Allied Health Literature* (CINAHL), *Medical Literature Analysis and Retrieval System Online* (MEDLINE®), *American Psychological Association* (PSYCINFO), SCOPUS and *Web of Science*. The search was conducted until the last day of January 2021.

The inclusion criteria were as follows: studies of different methodologies available in full, scientific productions published between 2010 and 2020, in Portuguese or English and related to screen time (computers, tablets, mobile phones and television), with emphasis on the early childhood age group, considered a period of strong establishment

of social bonds. Materials from websites, advertisements, comments, editorials, letters to the editor, review studies and articles that had other research subjects or topics unrelated to the social development sphere were excluded.

The process of analysis and selection of articles was conducted by double review, considering the objective and the inclusion criteria of this research, in order to obtain data from the diverse information related to authors, year of publication, country, age group of the population, objective, design, results and main conclusions of the studies.

Figure 2 presents a flowchart corresponding to selection of the studies.

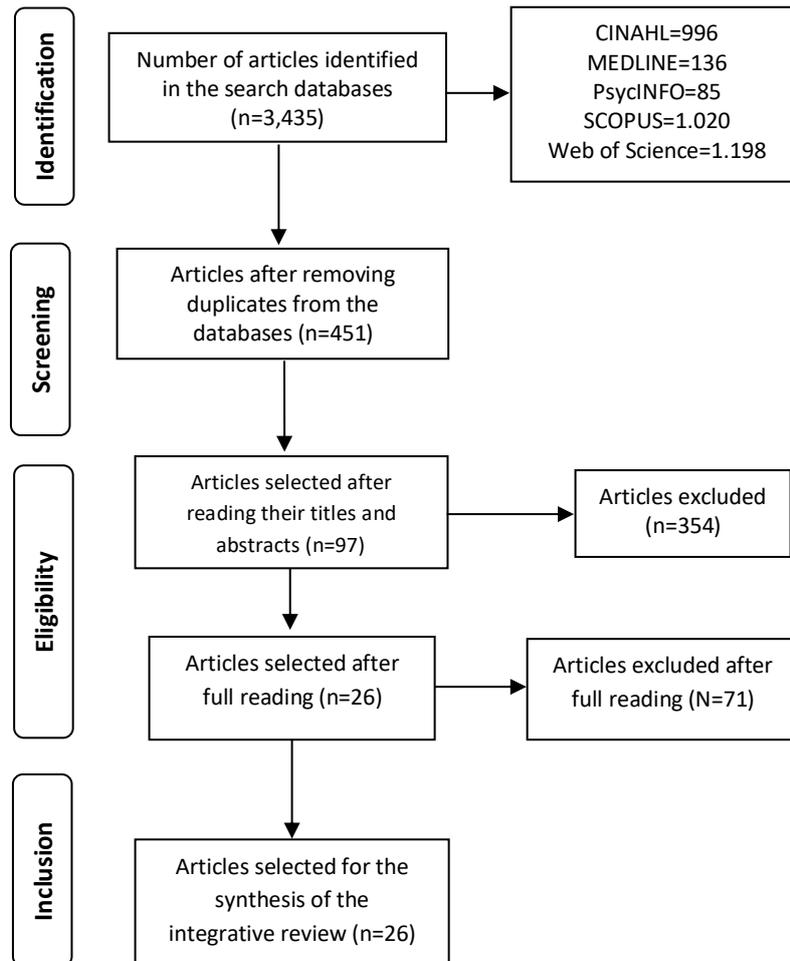


FIGURE 2: Flowchart to detail the searches for studies in the databases selected. Ribeirão Preto, SP, Brazil, 2021.

From a total of 3,435 studies identified and after removing duplicates, 451 articles were forwarded to analyze their titles and abstracts. 97 studies were eligible for full reading and 71 were removed for not contemplating the specificity of the guiding question or the inclusion criteria. Thus, 26 studies were included in the research.

Three structured topics emerged from the studies selected, namely: Presence of digital screens in family and educational environments; Digital screen use by children: specificities of the family context; and Repercussions for children's social development.

RESULTS

Figure 3 presents the characteristics of all 266 scientific articles selected.

Authorship	Country	Study	Age group	Objective
Kuhhirt and Klein ⁸	Scotland	Cross-sectional	2-5 years old	To investigate differences in exposure to television as a result of the countries' education system.
McArthur et al. ⁹	Canada	Cross-sectional	2-5 years old	To verify the association between belonging to the path and behaviors.
Xie et al. ¹⁰	China	Cross-sectional	3-6 years old	To determine effects of exposure to electronic devices.
McNeill et al. ¹¹	Australia	Cohort	3-5 years	To investigate associations between electronic media and executive functions.
Myers et al. ¹²	United States	Experimental	2-3 years old	To test live interactions and promotion of learning.
Jackson ¹³	United States	Cross-sectional	9 months old-2 years old	To explore television watching and social difficulties.
McDonald et al. ¹⁴	Canada	Cross-sectional cohort	2 years old	To identify risk factors for developmental delays.
Poulain et al. ¹⁵	Germany	Cohort	2-6 years old	To explore associations between electronic media and behaviors.
Skaug et al. ¹⁶	Norway	Cross-sectional	2 years old	To examine effects of media use on mother-child interactions.
Chiu et al. ¹⁷	China	Cohort	1 to 6 years	To examine the impact of television on the child's habits.
Khan et al. ¹⁸	United States	Longitudinal cohort	4 years old	To examine the association between media exposure time and shared reading.
Raman et al. ¹⁹	United States	Cross-sectional	1 to 3 years	To associate social development and screen use daily routine.
Huber et al. ²⁰	Australia	Experimental	4-6 years old	To verify the improvement in problem-solving and screen use.
Pempek and McDaniel ²¹	United States	Cross-sectional cohort	1-4 years old	To explore early use of tablets and parental characteristics.
Nabi and Krcmar ²²	United States	Qualitative	6 months old-6 years old	To investigate parental reasons for screen media use.
Sharkins et al. ²³	United States	Exploratory and cross-sectional	3-5 years	To explore parents' and teachers' opinion regarding media use.
Vittrup et al. ²⁴	United States	Exploratory and cross-sectional	2-7 years old	To research parental attitudes on electronic media use during childhood.
Beck et al. ²⁵	United States	Qualitative	6 months old-3 years old	To identify parental beliefs about the effects of television during childhood.
Hinkley et al. ²⁶	Australia	Cross-sectional	2-3 years old	To test the efficacy of programs for families to reduce media use.
Lauricella et al. ²⁷	United States	Cross-sectional	Birth-8 years old	To explore parents' and children's variables on child media use.
Sugawara et al. ²⁸	United States	Cohort	1-5 years old	To examine television exposure time and externalization problems.
Ihmeideh and Shawareb ²⁹	Jordan	Mixed method	2 years old	To examine parental style and views about Internet use.
Christakis et al. ³⁰	United States	Randomized study	6 months old-5 years old	To test the approach to change screen exposure habits.
Lampard et al. ³¹	United States	Cross-sectional	2-6 years old	To identify child sociocognitive predictors and media.
Njoroge et al. ³²	United States	Cross-sectional	3-5 years	To examine parental beliefs, television use and children's race/ethnicity.
Tandon et al. ³³	United States	Cohort	9 months old-4 years old	To assess cumulative daily screen time at home and in day care centers.

FIGURE 3: Characteristics of the studies included in the Integrative review. Ribeirão Preto, SP, Brazil, 2021.

Between 2010 and 2020 the number of articles from 2015 onwards stood out, mostly from the United States. Regarding the type of research, most of the studies are cross-sectional. The most studied children's age group was from two to five years old. Television was the electronic medium most analyzed in the studies selected.

In the analysis of the results, key elements about digital screen use by children and the aspects about child development were analyzed, structured into three topics: Presence of digital screens in family and educational environments: Digital screen use by children: specificities of the family context; and Repercussions for children's social development.

Presence of digital screen in family and educational environments

In family environments, parental caregivers have been active users of technologies such as television, computers, tablets or cell phones, and such behavior was found with proportional consumption of these electronic media by children, aged from zero to 8 years old²⁷.

In the children's routine, television is considered a common practice during early childhood¹⁶. It is worth noting that limited parental knowledge was found regarding the effects of television on children's life and development²⁵.

Electronic devices are seen as a parental support tool, both for parents themselves and to keep the child busy²⁴, as well as an entertainment option³³. In the family context, a study conducted with mothers and infants aged from 12 to 48 months showed that most of the women allow their child to use a touchscreen device on a typical day, and that many families had tablets for routine use²¹.

Other elements outside of the home environment have also provided access to digital screens, such as child education centers, although to a lesser extent when compared to home-based use¹⁷. A number of recommendations for educators and health professionals to discuss cumulative screen time in preschoolers were pointed out, in an effort to advocate for high-quality child care in day care and family settings³³.

The educators mentioned that the use of digital screens can expand children's knowledge and that exposure to media with violent programming is harmful, being extremely important to analyze the social and health harms and their responsibilities in relation to appropriate use in day care centers, for children's development²³.

Digital screen use by children: specificities of the family context

Lifestyle complexities in single-parent environments, whether in a situation of divorce, separation or absence of a partner, were related to the use of digital screens by children, with an increase in exposure and consumption in childhood¹⁸. An authoritarian parenting style was a significant predictor of Internet use by children, involving playing online games and visiting websites²⁹.

Exposure to electronic media can be related to the number of children in the household, where the higher such number, the greater the daily parental demand, which encourages consumption as a form of entertainment^{22,33}.

Another aspect of the family context is that the parents indicate that the electronic devices can be used without the physical and simultaneous presence of the other person with the child²⁰.

Videochat use with other person accompanying the child was studied, and a number of repercussions were identified on the quality of the parental interaction with the children. A study carried out in Norway indicated that mothers interacted more with their children while using tablets than during television shows or using toys, illustrating a possible positive potential of digital screens in the relationships with their children¹⁶.

Use of digital screens by children was also analyzed based on the parental caregivers' schooling level and it was identified that those with less education allowed more exposure hours^{8,17}, with risks for delays in the socio-emotional scope¹⁹. Children aged less than 5 years old had moderate contact with electronic media in the parental group with higher schooling levels²⁸.

The time of exposure to digital screens is an aspect found for establishing or not of daily rules imposed by parental caregivers, in which children who had rules related to the exposure time were less exposed to the media³². Children whose parents were confident in their skills to limit media time and who enjoyed support from their spouse to establish these limits watched significantly less television³².

Interventions and guidelines to reduce digital screen use, focused on parental education about the risks of early use in life by children, are pointed out as important elements²⁶. Interventions are considered necessary, but weaknesses are also pointed out to achieve their expected efficacy in producing behavioral changes in the face of the parental beliefs and attitudes³¹.

Repercussions for children's social development

The concern about digital screen use in childhood is evidenced by the high number of children involved with technology from their first years of life²⁴.

The consequences of exposing preschoolers to daily screen times longer than 60 minutes were studied, with negative effects on temper, character and vulnerability to symptoms of attention deficit hyperactivity disorder being pointed out¹⁰. A number of studies found that young children exposed with no supervision to television contents for adults presented a significant probability of suffering future peer socialization difficulties^{13,15}.

A number of studies highlight that exposure to different types of screens is related to socio-emotional and behavioral difficulties, as well as to increased externalization of problems between two and five years old^{11,14}. Hyperactivity and inattention were detected in the age group from 2 to 6 years old¹⁵. A study identified lower learning efficacy in terms of new words¹².

A survey conducted to examine the time spent by preschoolers watching television indicated that the children who do so are likely to have a lower frequency of parental interaction when compared to shared book reading¹⁸. The more a child watched television, the lower the quality and number of interactions and activities between parental caregivers and children, with concerns about conduct problems and antisocial behavior being pointed out⁸.

The screen use path was analyzed at 24, 36 and 60 months of age in Canadian children, and intense use presented poorer child development results and learning levels below the ideal⁹. Intense screen use, with more than 3 hours a day, was associated with inattention and aggressive behaviors and with a lower probability of adequately reaching developmental milestones (language and motor skills) at 60 months of age⁹, indicating that the digital media use patterns are shaped in the first years of life.

Some beliefs of parental caregivers were identified, claiming that, if children did not use digital screens, they would be at a disadvantage of those who do, with losses from an intellectual point of view and difficulties dealing with devices in the future, for not being familiarized with the media²⁴.

In terms of behaviors, screen use is also seen as a discipline strategy, when parental caregivers offer it in exchange for the children's good behavior, as a way of regulating those with difficult-to-manage tempers²². Problematic temper is a predictor for electronic media use²⁸. Interventions to improve the use habits in terms of electronic devices among preschool children can significantly benefit their social and emotional competencies in general³⁰.

DISCUSSION

The IR results show characteristics of digital screen use by children in their early childhood, with emphasis on the presence of media; consumption in everyday family life and changes in behavior; rules for schedules and content; monitoring or not by parental caregivers during use; concerns about the child's socialization; and risks of early use.

In the current study, consumption in the children's homes was related to the presence of different digital screens, and especially to parental caregivers being active consumers, with a view to inducing use. Such aspects are similar to those of other studies which point out that digital screens in family environments are considered ubiquitous, part of the context in which children's social development occurs and with widespread digital exposure^{34,35}.

In the family environment, consumption of digital screens was also related to the belief that they represent parental support tools for the child's entertainment and to the fragile parental knowledge about the effects of use on social development in early childhood. This apprehension is presented in another study, which found that parental caregivers see media devices as useful in child rearing, to distract and provide relief to the parents in their parenting responsibilities, like a nanny when the parents are unavailable, and to modify the children's behavior³⁶.

The day care environments were also studied, showing access and consumption of digital screens by children in these scenarios with the justification of expanding learning, which refers to concerns about cumulative screen time, when considered as a sort of sum of possible digital screen use time in the home and school environments. There are also concerns regarding the quality of the contents to which children may be exposed, which can result in social and health harms. This emphasis is pointed out in another research study, indicating the need for educators to delimit the use of screens and plan other activities in these scenarios, as well as the relevance of the managers' actions to limit use, expand activities with children and promote community engagement³⁷.

In relation to the specific contexts, in the current IR it was identified that environments with a higher number of children, single parents, low schooling levels, authoritarian style of parental caregivers, and the presence of a television set in the child's room presented an increase in exposure to digital screens, indicating more hours, passive

use and without the need for another person to be with the child. On the other hand, co-watching for mediation and interaction with the child was considered a protective factor, as well as establishing daily rules regarding exposure time, bringing about important limits for children to be less exposed in early childhood. Given these aspects, a study warns about the importance of accompanying the child during use, of avoiding passive activities and of limiting use time, as each additional hour of screen time was associated with less child communication and with fragile interpersonal relationships³⁸.

The current research study found that interventions that work with parental education on early risks are fundamental, paying attention to parental attitudes and beliefs to be effectiveness, and that the shorter the use time of electronic devices by parents, the shorter the use time by the children. Similar results in another study point to the need for public health strategies to educate caregivers as competent mediators for managing use, both for parents and for children³⁹. Interventions that include singular family media use plans for children of all ages are also recommended³⁵.

As for the repercussions on children's social development, daily use of electronic devices in early childhood signals to situations of lower learning of new words, fewer moments of shared book reading with parental caregivers and negative behavioral effects (attention deficit, hyperactivity, aggressiveness, difficulties socializing among peers and difficult-to-manage temper). There were few studies deepening on parental doubts and concerns about triggering of negative effects, with some weight on parental beliefs that early use of digital screens eases the child's learning and future.

However, different research studies show the exponential increase in screen use time and seek to identify the influences of this exposure with negative repercussions such as obsessive behavior and addiction onset⁶, in addition to weaknesses in their cognitive and socio-emotional skills³⁴. Attempts to reduce exposure to screens and to use apps with moderation are recommended to preserve socio-emotional development in childhood⁴⁰.

There is also the challenge for digital citizenship, considering it from an early age, understood as the responsible use of technology in the virtual world⁶, including reflections and conversations about content, developing self-control, and balancing screen and non-screen times to promote positive longitudinal results.

Nursing care in the health of children and their families is faced with the phenomenon of the omnipresence of electronic devices in everyday life during early childhood. It is noted that digital screen use is established in the first years of life, which requires early and appropriate interventions. It is necessary to increase parental caregivers' knowledge, avoiding attitudes that generate adversities and, consequently, in the children's social development process.

In the elaboration of good parenting practices, Nursing plays a fundamental role in identifying, evaluating and intervening in a co-responsibility process with the families, seeking to minimize harms and increase protective factors. Elements regarding consumption and exposure to digital screens in early childhood contribute subsidies to the relational, educational and communicative dimensions of Nursing care and in the dialogue with good parenting practices.

In situations including home visits, Nursing consultations and group consultations, education in health is indispensable, addressing the issue of digital screen consumption, introducing dialogue about the content, use time balance, different stimuli for children's social development, decreasing passive activities, jointly building healthy habits, and advocating for high-quality child care and the needs of early childhood.

It is also necessary to provide longitudinal follow-up with periodic evaluations, performing care management and singular plans, with a view to comprehensive development. In addition, intersectoral actions between the health area and elementary education are extremely relevant for the needs in terms of care, surveillance and promotion of safe development in early childhood.

The current IR pointed out different elements about digital screen use in the everyday life of early childhood, providing subsidies for Nursing care and launching aspects for future studies in the face of challenges inherent to the social and family adversities.

Therefore, Nursing can greatly contribute to reconfiguring social interactions so that they are positive, as development of adequate socialization experiences is essential for the first years and for the entire future life of a human being. In this context, the relevance of permanent education for members of the Nursing team is also noted, in order to increase reflections and revitalize practices for safe interventions and educational processes that enable health care advancement in favor of comprehensive socio-emotional development of children, families and the community.

Study limitations

As for the limitations of the current study, the choice for two languages is pointed out, which may have restricted identification of published knowledge, as well as the age group under study focused on early childhood.

CONCLUSION

The current study identified diverse scientific knowledge that indicates vulnerable aspects and potentialities of digital screen use and its relationship with social development in early childhood, with apprehension of substantial elements to Nursing practice.

The vulnerabilities were centered on excessive screen use, lack of co-watching, low interaction, few proposals of other types of interactive activities with the children, and low parental knowledge about the far-reaching effects of using electronic devices on children's social development. The potentialities were linked to the positive interventions from establishing limits and balancing digital screen use time, management of the parental caregivers' use time, encouragement of other shared activities, and parental education on the risks of early use in early childhood.

In health care, exploring the habits of children and families, identifying their characteristics, apprehending vulnerable elements and visualizing strengths in the routine of parenting practices are important Nursing care objectives for the integrality of child and family health.

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