Reciis – Revista Eletrônica de Comunicação, Informação & Inovação em Saúde, Rio de Janeiro, v. 18, n. 4, p. 803-819, out.-dez, 2024
[www.reciis.icict.fiocruz.br] e-ISSN 1981-6278

https://doi.org/10.29397/reciis.v18i4.4088

ORIGINAL ARTICLES

Influences of screen time on children's quality of life

Influências do tempo de tela na qualidade de vida infantil

Influencias del tiempo de pantalla en la calidad de vida de los niños

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ABSTRACT

With the increase in screen use in the pediatric population, this research aims to assess the influence of screen use patterns and screen time on children's quality of life. This is an observational, cross-sectional, and analytical study conducted with mothers, fathers, and other guardians of preschool children (aged from 2 to 4 years old) in a city in northeastern Brazil, totaling 198 children. Data collection was performed via Google Forms and quality of life was assessed using the PedsQL 4.0 instrument. Most children use screens for over an hour a day (69.19%), more than that recommended by medical organizations. The influence of digital media use on children's quality of life was verified: worse usage patterns were related to damage to physical health (p=0.012) and emotional health (p between 0.006 and 0.046). High screen time correlated with impacts on the social dimension of the child's life (p=0.043).

Keywords: Audiovisual media; Screen time; Child; Quality of life; Child health.

RESUMO

Com o aumento do uso de telas na população pediátrica, esta pesquisa objetiva avaliar a influência do padrão de uso e tempo de tela na qualidade de vida infantil. Trata-se de estudo observacional, transversal e analítico realizado com mães, pais e outros responsáveis por crianças em idade pré-escolar (de 2 a 4 anos) em uma cidade do nordeste brasileiro, totalizando 198 crianças. A coleta de dados foi realizada via Google Forms e a qualidade de vida verificada usando o instrumento PedsQL 4.0. A maioria das crianças utiliza as telas por mais de uma hora por dia (69,19%), acima do recomendado pelas entidades médicas. Verificou-se a influência do uso de mídias digitais na qualidade de vida infantil: piores padrões de uso estavam relacionados a prejuízos na saúde física (p=0,012) e emocional (p entre 0,006 e 0,046). O tempo de tela elevado correlacionou-se com impactos na esfera social da vida da criança (p=0,043).

Palavras-chave: Mídias audiovisuais; Tempo de tela; Criança; Qualidade de vida; Saúde infantil.

RESUMEN

Con el aumento del uso de pantallas en la población pediátrica, esta investigación tiene como objetivo evaluar la influencia del patrón de uso y el tiempo de pantalla en la calidad de vida de los niños. Se trata de un estudio observacional, transversal y analítico realizado con madres, padres y responsables de niños en edad preescolar (de 2 a 4 años) en una ciudad del noreste de Brasil, totalizando 198 niños. La recolección de datos se realizó mediante Google Forms y la calidad de vida se verificó mediante el instrumento PedsQL 4.0. La mayoría de los niños utiliza pantallas más de una hora al día (69,19%), por encima de lo recomendado por las entidades médicas. Se verificó la influencia del uso de medios digitales en la calidad de vida de los niños: peores patrones de uso se relacionaron con pérdidas en la salud física (p=0,012) y emocional (p entre 0,006 y 0,046). El elevado tiempo de pantalla se correlacionó con impactos en la esfera social de la vida del niño (p=0,043).

Palabras clave: Medios audiovisuales; Tiempo de pantalla; Niño; Calidad de vida; Salud infantil.

ARTICLE INFORMATION

Author's contributions:
Study conception and design: Beatriz Andrade Vasconcelos; Antonia Iracilda and Silva Viana.
Data acquisition, analysis, or interpretation: Beatriz Andrade Vasconcelos; Antonia Iracilda and Silva Viana.
Manuscript drafting: Beatriz Andrade Vasconcelos.
Critical review of intellectual content: Antonia Iracilda and Silva Viana

Conflict of interest declaration: none.

Funding sources: none.

Ethical considerations: The study was approved by the Research Ethics Committee of the Federal University of Maranhão, under certificate number 61505422.9.0000.5087, via Plataforma Brasil.

Additional thanks/Contributions: none.

Article history: submitted: 4 Dec. 2023 | accepted: 1 Sep. 2024 | published: 19 Dec. 2024.

Previous submission: none.

INTRODUCTION

It is undeniable that the use of digital media has grown exponentially, especially among those born into the "digital age." According to data from a survey carried out in Brazil in 2022, 92% of Brazilian children and adolescents are connected to the internet. Virtual connection has become intrinsic to the daily lives of children and adolescents (Cetic.br, 2023; SBP, 2016).

At an increasingly early age, children are being exposed to televisions, smartphones, tablets, computers and various other forms of screens, a term used in pediatrics to refer to any and all media and electronics. In many instances, this technology is used as a form of passive distraction for the child, creating the illusion of quietude in their viewing behavior (SBP, 2019).

However, child development requires active participation. Exploring the environment, through play and activities that encourage the child's body to move, is essential for motor, cognitive, emotional, and linguistic development. This influence is even more prominent in early childhood (0-6 years), when brain plasticity - neuronal adaptability to environmental stimuli - is intense, representing the core of development, the connection between the environment, the body and the mind (Abud; Lucchese; Zimmermann, 2012; Buchweitz, 2016; Kliegman *et al.*, 2018; SBP, 2016).

Thus, in addition to the risk of long-term digital addiction, exacerbated exposure to these media can cause various health problems for children: behavioral, visual, auditory, postural, and eating disorders, for example (SBP, 2016, 2019). In addition, studies show that exposure to digital media in early childhood can influence children's cognitive, social and linguistic development, especially when screen time - the total number of hours exposed to screens in a day - is higher than recommended (Aishworiya *et al.*, 2019; Kerai *et al.*, 2022; Madigan *et al.*, 2019; Massaroni *et al.*, 2023; Moreira *et al.*, 2021; Sina *et al.*, 2023).

It has been observed that this exacerbated use contributes to the development of behavioral problems and anxiety disorders, as well as a diminished capacity for self-control. When it comes to the psychosocial dimension, it has been reported that the use of screens is an influential factor in the child's ability to socialize and express their feelings in the environment around them, especially within the family (Aishworiya *et al.*, 2019; Felix *et al.*, 2020; Guerrero *et al.*, 2019; Madigan *et al.*, 2019; Munzer *et al.*, 2018; Skalická *et al.*, 2019).

Faced with these risks to children's health, medical organizations around the world are trying to establish optimal screen time values. The World Health Organization (WHO, 2020) recommends that children under the age of 1 should not be exposed to screens and, from 1 to 4 years, the maximum daily time should not exceed 60 minutes. Meanwhile, the Brazilian Society of Pediatrics (SBP, 2016, 2019) advises: avoid exposing children under 2 to screens; between 2 and 5 years, the maximum daily time is one hour. In addition, parents and guardians must always supervise children's media exposure. Finally, the use of screens during family mealtimes and leisure time is discouraged by the organizations.

This study is therefore justified by the need to investigate the relationship between the use of digital media (pattern of use and time spent) and children's quality of life, a relationship that has not been widely studied in scientific circles. The aim is therefore to assess the influence of the pattern of digital media use and screen time on the quality of life of preschool children aged between 2 and 4 years.

METHODOLOGY

This is an observational, cross-sectional, and analytical study carried out with mothers, fathers, and other guardians of pre-school children (aged 2 to 4), regularly enrolled in eight Municipal Schools of Early Childhood Education in a city in the interior of northeastern Brazil.

The participants were mothers, fathers and other guardians of children aged 2 to 4 enrolled in the Municipal Schools of Early Childhood Education. They all had access to smartphones for the online communication needed to carry out the research. Initially participants signed an Informed Consent Form digitally, on a free online platform (Google Forms). Subsequently, the data was extracted virtually, through a self-administered questionnaire filled in by the participants, which was also accessed through Google Forms. Questionnaires answered incompletely were excluded.

The sample calculation corresponds to the probabilistic type carried out in the open access statistical program R Studio (R Core Team, 2023), based on a confidence level of 95% and a sampling error of 5%, taking as a benchmark a prevalence of 94.5% of exposure to social media during early childhood (Nobre *et al.*, 2021). The population was made up of 707 eligible children, who were enrolled in the eight participating Municipal Schools of Early Childhood Education, and who were in the appropriate age group. The estimated sample was stratified according to the number of schools, so that each institution contributed a similar proportion of the total number of children. The sample size was then set at 94 children, with an additional 20% in case of refusals or losses. Due to intense demand and interest from those surveyed on the topic, the final sample totaled 198 responses.

The questionnaire was divided into four sections: 1) Information about the family; 2) Use of digital media; 3) The child's quality of life; 4) Parents' knowledge about the healthy use of digital media. With the exception of section 3 ("The child's quality of life"), the questions were self-authored, based on the literature. Quality of life was assessed using the PedsQL questionnaire: Pediatric Quality of Life Inventory - parents' report on their son/daughter, in the most current version (4.0), acquired with authorization from the responsible entity (Mapi Research Trust - ePROVIDE) (Varni, 2022).

Information about the family included socioeconomic factors, as well as questions on: the family's relationship with the child; age; gender; color/race; family composition; number of televisions, computers, smartphones, and tablets available in the home.

The use of digital media was analyzed through questions devised by the authors. They referred to the pattern of use and total time spent using these media. The total time spent exposed to the media during a day is known as screen time. We investigated the pattern of children's use of digital media: the age at which contact with digital media began, with and without parental supervision; the use of screens during meals and before bedtime; the use of multiscreens (using more than one digital media at the same time, such as television and smartphone, for example); estimated screen time; parents' assessment of screen time and addiction.

With regard to quality of life, PedsQL 4.0 was used: "parents' report on their son/daughter (2 to 4 years old)". Made up of 21 questions, this questionnaire investigates whether or not the child has experienced any difficulties in the last month in terms of Physical Functioning, Emotional Functioning, Social Functioning and School Functioning. Each question has five possible answers ranging from 0 (best quality of life) to 4 (worst quality of life), translated as: 0 - if it is never a problem; 1 - if it is almost never a problem; 2 - if it is sometimes a problem; 3 - if it is often a problem; 4 - if it is almost always a problem.

When it came to parents' knowledge about the healthy use of digital media, they were asked about the WHO (2020) and SBP (2019) recommendations for ideal screen time and use, as well as self-assessment of their knowledge about screen use, categorized as 0 (very bad), 1 (bad), 2 (average), 3 (good) or 4 (excellent).

Initially, the database was imported from the Microsoft Office Excel spreadsheet editing program (version 365, 2019) into the R Studio program (R Core Team, 2023). Categorical variables were described as absolute (n) and relative (%) frequencies, and continuous variables as medians and interquartile ranges (IQR).

The association between the outcome and the categorical variables was analyzed using the chi-square or Fisher's exact test - the latter was selected when there was a variable category with a proportion of less than 20%. The association between the outcome and the continuous variables was analyzed using the Kruskal-Wallis test. Statistical significance was set at $p < 0.05$.

RESULTS

Of the 198 valid responses, 192 (95.97%) were from the point of view of mothers, four (2.02%) from fathers and two (1.01%) from legal guardians. As for gender, 107 (54.04%) of the children were female and 91 (45.96%) males; their age group was distributed as follows: 2 years - 62 (31.31%); 3 years - 53 (26.77%); 4 years - 83 (41.92%). In addition, the majority of the children were *parda* (multiracial) (138; 69.70%), with a family nucleus made up mostly of three people (71; 35.86%), living in a single house (181; 91.41%).

Figure 1 shows the amount of digital media present in the homes of those surveyed. Televisions, computers, smartphones, and tablets are the types of screens. As for the availability of a device exclusively used by the child, the majority said there was none for: televisions (177; 89.39%), computers (195; 98.48%), smartphones (160; 80.91%) and tablets (175; 88.38%).

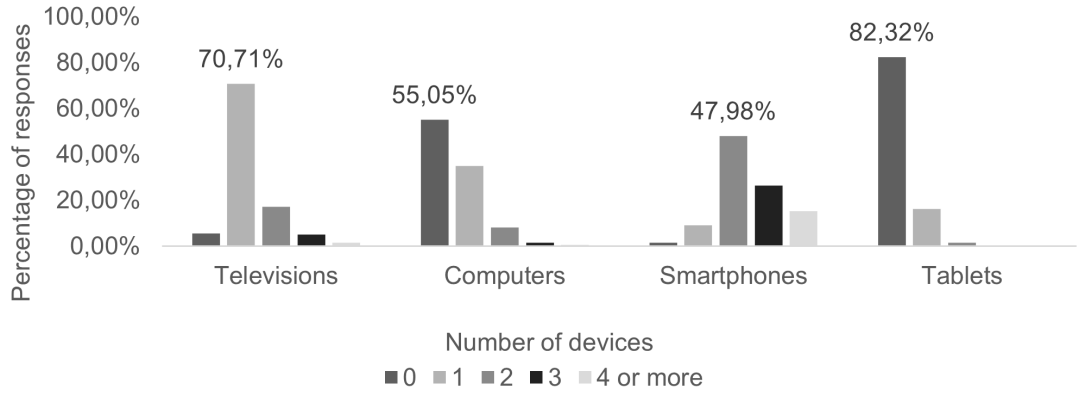

Figure 1 – Number of digital media devices available in the homes of those surveyed, as a percentage of the total sample
Source: Prepared by the authors.

Table 1 shows the pattern of screen use among the children surveyed, as reported by their parents. When asked about their interest in using digital media, 139 (70.20%) answered that the child shows interest in using them when the person responsible makes personal use of such media. In addition, according to the numerical evaluation proposed from 0 to 4, the median response was 1 for dependence on digital media (classified as "not very dependent", according to those surveyed), 1 for appropriate screen time ("not very appropriate") and 2 for pattern of use ("normal").

Table 1 – Pattern of digital media use

Pattern of digital media use	N = 198	
	n	%
Age of first contact with digital media under supervision		
< 6 months	16	8.08
6 months - 1 year	57	28.79
1-2 years	66	33.33
> 2 years	47	23.74
Not applicable	9	4.55
Could not answer	3	1.52
Age of first contact with digital media alone		
< 6 months	2	1.01
6 months - 1 year	16	8.08
1-2 years	41	20.71
> 2 years	62	31.31
Not applicable	71	35.86
Could not answer	6	3.03
Use of digital media during meals		
No	85	42.93
Yes, sometimes	97	48.99
Yes, always	16	8.08
I use digital media before bedtime		
No	71	35.86
Yes, one hour before	80	40.40
Yes, two hours before	45	22.73
Could not answer	2	1.01
Use of multiscreens		
No	164	82.83
Yes	32	16.16
Could not answer	2	1.01
Dependence on digital media, ranked from 0 (not at all dependent) to 4 (very dependent)		
0	38	19.19
1	63	31.82
2	66	33.33
3	22	11.11
4	9	4.55
Appropriate screen time, rated from 0 (not at all appropriate) to 4 (very appropriate)		
0	36	18.18
1	80	40.40
2	60	30.30
3	15	7.58
4	7	3.54
Pattern of use of digital media (habits associated with use), ranked from 0 (very poor pattern of use) to 4 (excellent pattern of use)		
0	21	10.61
1	56	28.28
2	71	35.86
3	36	18.18
4	14	7.07

Source: Prepared by the authors.
N = total sample of children; n = absolute number of children; % = percentage of children.

With regard to screen time, Figure 2 shows this variable by measuring hours per day, revealing that the largest portion of the sample uses screens for more than an hour a day (69.19%), more specifically in the category of between one and two hours (28.79% of the total sample).

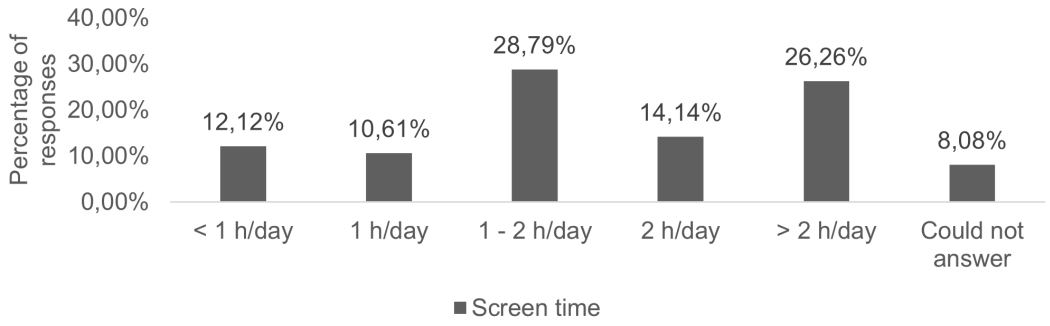

Figure 2 – Screen time in hours per day
Source: Prepared by the authors.

As for the relationship between quality of life - according to the PedsQL - and pattern of use and screen time, Table 2 and 3 show these interactions, respectively. The pattern of use analyzed was based on a self-assessment completed by parents and guardians, which was classified on a numerical scale from 0 (very poor pattern of use) to 4 (excellent pattern of use). A p-value < 0.05 was found for questions relating to Physical Capacity ("Having little energy or drive") and Emotional Functioning ("Feeling sad", "Feeling angry" and "Sleeping badly"). Screen time, in turn, was analyzed by dividing the sample into three groups: less than one hour a day (< 1 h), between one and two hours (1 - 2 h) and more than two hours a day (> 2 h). Significance was also observed in the relation with the child's Social Activities, in the question referring to "Not being able to do things that other children of the same age do."

Table 2 – Quality of life questionnaire (PedsQL) assessing the pattern of use of digital media, classified from 0 (very poor pattern of use) to 4 (excellent pattern of use)

(continued)

Variables	N = 198		p
	Md	IIQ	
PHYSICAL CAPACITY (difficulties...)			
Walking			0.596
Never	1.00	0.00 - 2.00	
Hardly ever	2.00	2.00 - 2.00	
Sometimes	1.00	1.00 - 1.00	
Often	2.00	1.00 - 3.00	
Usually	1.50	1.25 - 1.750	
Running			0.130
Never	1.00	1.00 - 2.00	
Hardly ever	1.00	0.00 - 2.00	
Sometimes	2.00	1.00 - 3.00	
Taking part in active play or physical exercise			0.152
Never	2.00	1.00 - 2.25	
Hardly ever	1.50	1.25 - 1.75	
Sometimes	2.00	1.50 - 2.50	
Often	2.00	1.00 - 3.00	
Usually	1.00	0.00 - 2.00	
Lifting something heavy			0.153
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 2.50	
Often	1.00	0.00 - 2.00	
Usually	3.00	2.50 - 3.00	

(continuation)

Variables	N = 198		p
	Md	IIQ	
Bathing			0.224
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 3.00	
Often	1.00	0.50 - 2.00	
Usually	1.50	0.75 - 2.00	
Helping to pick up the toys			0.182
Never	2.00	1.00 - 2.75	
Hardly ever	2.00	1.00 - 3.00	
Sometimes	2.00	1.00 - 2.00	
Often	2.50	1.25 - 3.00	
Usually	1.00	0.00 - 2.00	
Feeling pain			0.363
Never	2.00	1.00 - 2.00	
Hardly ever	2.00	1.00 - 3.00	
Sometimes	2.00	1.00 - 3.00	
Often	0.50	0.00 - 1.25	
Usually	2.00	2.00 - 2.00	
Having little energy or drive			0.012*
Never	2.00	1.00 - 3.00	
Hardly ever	1.00	0.25 - 1.75	
Sometimes	2.00	2.00 - 2.00	
Often	0.50	0.25 - 0.75	
Usually	3.00	3.00 - 3.00	
EMOTIONAL FUNCTIONING (difficulties...)			
Feeling afraid or scared			0.957
Never	2.00	1.00 - 2.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 3.00	
Often	1.00	1.00 - 2.50	
Usually	2.00	1.00 - 2.50	
Feeling sad			0.046*
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 3.00	
Often	1.00	0.50 - 1.00	
Feeling angry			0.006*
Never	2.00	1.00. 3.00	
Hardly ever	2.00	1.00 - 3.00	
Sometimes	2.00	1.00 - 2.75	
Often	1.00	0.00 - 1.75	
Usually	1.00	0.50 - 1.50	
Sleeping badly			0.024*
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 2.00	
Often	1.00	1.00 - 2.00	
Usually	3.50	3.25 - 3.75	
Feeling worried			0.231
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.50 - 3.00	
Sometimes	2.00	1.00 - 2.00	
Often	0.50	0.25 - 0.75	

(conclusion)

Variables	N = 198		p
	Md	IIQ	
SOCIAL ACTIVITIES (difficulties...)			
Playing with other children			0.499
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	0.75 - 2.00	
Often	1.00	1.00 - 1.00	
Usually	2.00	1.50 - 2.50	
The other children don't want to be friends with them			0.517
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	1.50	1.00 - 2.00	
Often	1.50	1.25 - 1.75	
Usually	2.00	1.50 - 2.50	
Other children pick on your child			0.977
Never	2.00	1.00 - 2.75	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 2.75	
Often	1.50	1.25 - 1.75	
Usually	2.00	1.50 - 2.50	
Not being able to do things that other children of the same age do			0.117
Never	2.00	1.00 - 3.00	
Hardly ever	1.50	1.00 - 2.00	
Sometimes	2.00	1.00 - 3.00	
Often	1.50	0.25 - 2.00	
Usually	1.50	0.75 - 2.25	
Joining in play activities with other children			0.107
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.25 - 3.00	
Often	0.50	0.00 - 1.25	
Usually	1.50	1.00 - 2.00	
SCHOOL ACTIVITY (difficulties...)			
Doing the same school activities as the other children in the class			0.713
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 3.00	
Sometimes	1.00	1.00 - 2.00	
Often	2.00	0.00 - 2.00	
Usually	1.00	1.00 - 1.00	
Missing school or nursery because you don't feel well			0.503
Never	2.00	1.00 - 2.75	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 3.00	
Often	2.00	2.00 - 2.75	
Usually	0.00	0.00 - 0.00	
Missing school or nursery to go to the doctor or hospital			0.177
Never	2.00	1.00 - 3.00	
Hardly ever	2.00	1.00 - 2.00	
Sometimes	2.00	1.00 - 3.00	
Often	2.00	2.00 - 2.00	
Usually	0.00	0.00 - 0.00	

Source: Prepared by the authors.
N = total sample of children; Md = median; IIQ = interquartile range; p = probability of significance; * = p-value of significance < 0.05 (p < 0.05). Results obtained using the Kruskal-Wallis statistical test.

***Table 3 - Quality of life questionnaire (PedsQL) and* screen time**

(continued)

Variables	Screen time (N = 182)			p
	< 1h n = 24	1-2h n = 106	> 2h n = 52	
PHYSICAL CAPACITY (difficulties…)				
Walking				0.248
Never	23 (95.83%)	101 (95.28%)	47 (90.38%)	
Hardly ever	0 (0.00%)	4 (3.77%)	4 (7.69%)	
Sometimes	1 (4.17%)	1 (0.94%)	0 (0.00%)	
Usually	0 (0.00%)	0 (0.00%)	1 (1.92%)	
Running				0.404
Never	22 (91.67%)	97 (91.51%)	43 (82.69%)	
Hardly ever	2 (8.33%)	7 (6.60%)	8 (15.38%)	
Sometimes	0 (0.00%)	2 (1.89%)	1 (1.92%)	
Taking part in active play or physical exercise				0.604
Never	19 (79.17%)	86 (81.13%)	37 (71.15%)	
Hardly ever	3 (12.50%)	10 (9.43%)	9 (17.31%)	
Sometimes	1 (4.17%)	4 (3.77%)	5 (9.62%)	
Often	1 (4.17%)	4 (3.77%)	1 (1.92%)	
Usually	0 (0.00%)	2 (1.89%)	0 (0.00%)	
Lifting something heavy				0.312
Never	12 (50.00%)	68 (64.15%)	27 (51.92%)	
Hardly ever	5 (20.83%)	24 (22.64%)	14 (26.92%)	
Sometimes	6 (25.00%)	9 (8.49%)	8 (15.38%)	
Often	0 (0.00%)	4 (3.77%)	2 (3.85%)	
Usually	1 (4.17%)	1 (0.94%)	1 (1.92%)	
Bathing				0.615
Never	16 (66.67%)	75 (70.75%)	30 (57.69%)	
Hardly ever	4 (16.67%)	14 (13.21%)	14 (26.92%)	
Sometimes	3 (12.50%)	10 (9.43%)	6 (11.54%)	
Often	1 (4.17%)	4 (3.77%)	1 (1.92%)	
Usually	0 (0.00%)	3 (2.83%)	1 (1.92%)	
Helping to pick up the toys				0.477
Never	16 (66.67%)	55 (51.89%)	23 (44.23%)	
Hardly ever	4 (16.67%)	30 (28.30%)	12 (23.08%)	
Sometimes	2 (8.33%)	14 (13.21%)	11 (21.15%)	
Often	1 (4.17%)	2 (1.89%)	1 (1.92%)	
Usually	1 (4.17%)	5 (4.72%)	5 (9.62%)	
Feeling pain				0.058
Never	16 (66.67%)	68 (64.15%)	23 (44.23%)	
Hardly ever	5 (20.83%)	31 (29.25%)	20 (38.46%)	
Sometimes	2 (8.33%)	6 (5.66%)	8 (15.38%)	
Often	0 (0.00%)	1 (0.94%)	1 (1.92%)	
Usually	1 (4.17%)	0 (0.00%)	0 (0.00%)	
Having little energy or drive				0.151
Never	18 (75.00%)	94 (88.68%)	42 (80.77%)	
Hardly ever	5 (20.83%)	5 (4.72%)	6 (11.54%)	
Sometimes	1 (4.17%)	6 (5.66%)	3 (5.77%)	
Often	0 (0.00%)	1 (0.94%)	0 (0.00%)	
Usually	0 (0.00%)	0 (0.00%)	1 (1.92%)	
EMOTIONAL FUNCTIONING (difficulties...)				
Feeling afraid or scared				-
Never	8 (33.33%)	36 (33.96%)	7 (13.46%)	
Hardly ever	11 (45.83%)	32 (30.19%)	13 (25.00%)	
Sometimes	3 (12.50%)	33 (31.13%)	26 (50.00%)	
Often	1 (4.17%)	2 (1.89%)	3 (5.77%)	
Usually	1 (4.17%)	3 (2.83%)	3 (5.77%)	

(continuation)

Variables	Screen time (N = 182)			p
	< 1h n = 24	1-2h n = 106	> 2h n = 52	
Feeling sad				0.536
Never	11 (45.83%)	55 (51.89%)	20 (38.46%)	
Hardly ever	10 (41.67%)	30 (28.30%)	18 (34.62%)	
Sometimes	3 (12.50%)	20 (18.87%)	13 (25.00%)	
Often	0 (0.00%)	1 (0.94%)	1 (1.92%)	
Feeling angry				-
Never	8 (33.33%)	24 (22.64%)	5 (9.62%)	
Hardly ever	8 (33.33%)	25 (23.58%)	22 (42.31%)	
Sometimes	6 (25.00%)	46 (43.40%)	18 (34.62%)	
Often	2 (8.33%)	9 (8.49%)	6 (11.54%)	
Usually	0 (0.00%)	2 (1.89%)	1 (1.92%)	
Sleeping badly				0.116
Never	15 (62.50%)	68 (64.15%)	23 (44.23%)	
Hardly ever	8 (33.33%)	19 (17.92%)	15 (28.85%)	
Sometimes	1 (4.17%)	14 (13.21%)	10 (19.23%)	
Often	0 (0.00%)	5 (4.72%)	3 (5.77%)	
Usually	0 (0.00%)	0 (0.00%)	1 (1.92%)	
Feeling worried				0.112
Never	20 (83.33%)	87 (82.08%)	37 (71.15%)	
Hardly ever	4 (16.67%)	8 (7.55%)	11 (21.15%)	
Sometimes	0 (0.00%)	10 (9.43%)	4 (7.69%)	
Often	0 (0.00%)	1 (0.94%)	0 (0.00%)	
SOCIAL ACTIVITIES (difficulties...)				
Playing with other children				0.688
Never	21 (87.50%)	81 (76.42%)	41 (78.85%)	
Hardly ever	1 (4.17%)	9 (8.49%)	5 (9.62%)	
Sometimes	2 (8.33%)	15 (14.15%)	4 (7.69%)	
Usually	0 (0.00%)	1 (0.94%)	2 (3.85%)	
The other children don't want to be friends with them				0.843
Never	17 (70.83%)	80 (75.47%)	37 (71.15%)	
Hardly ever	6 (25.00%)	22 (20.75%)	11 (21.15%)	
Sometimes	1 (4.17%)	2 (1.89%)	3 (5.77%)	
Often	0 (0.00%)	1 (0.94%)	0 (0.00%)	
Usually	0 (0.00%)	1 (0.94%)	1 (1.92%)	
Other children pick on your child				0.821
Never	18 (75.00%)	66 (62.26%)	37 (71.15%)	
Hardly ever	5 (20.83%)	30 (28.30%)	9 (17.31%)	
Sometimes	1 (4.17%)	7 (6.60%)	5 (9.62%)	
Often	0 (0.00%)	1 (0.94%)	0 (0.00%)	
Usually	0 (0.00%)	2 (1.89%)	1 (1.92%)	
Not being able to do things that other children of the same age do				0.043*
Never	15 (62.50%)	87 (82.08%)	41 (78.85%)	
Hardly ever	8 (33.33%)	8 (7.55%)	4 (7.69%)	
Sometimes	1 (4.17%)	7 (6.60%)	3 (5.77%)	
Often	0 (0.00%)	3 (2.83%)	1 (1.92%)	
Usually	0 (0.00%)	1 (0.94%)	3 (5.77%)	
Joining in play activities with other children				0.334
Never	15 (62.50%)	82 (77.36%)	36 (69.23%)	
Hardly ever	7 (29.17%)	14 (13.21%)	11 (21.15%)	
Sometimes	2 (8.33%)	6 (5.66%)	1 (1.92%)	
Often	0 (0.00%)	1 (0.94%)	1 (1.92%)	
Usually	0 (0.00%)	3 (2.83%)	3 (5.77%)	

(conclusion)

Variables	Screen time (N = 182)			p
	< 1h n = 24	1-2h n = 106	> 2h n = 52	
SCHOOL ACTIVITY (difficulties...)				
Doing the same school activities as the other children in the class				0.656
Never	18 (75.00%)	82 (77.36%)	39 (75.00%)	
Hardly ever	3 (12.50%)	14 (13.21%)	10 (19.23%)	
Sometimes	3 (12.50%)	5 (4.72%)	1 (1.92%)	
Often	0 (0.00%)	4 (3.77%)	2 (3.85%)	
Usually	0 (0.00%)	1 (0.94%)	0 (0.00%)	
Missing school or nursery because you don't feel well				0.240
Never	8 (33.33%)	46 (43.40%)	19 (36.54%)	
Hardly ever	9 (37.50%)	29 (27.36%)	17 (32.69%)	
Sometimes	6 (25.00%)	30 (28.30%)	11 (21.15%)	
Often	1 (4.17%)	1 (0.94%)	4 (7.69%)	
Usually	0 (0.00%)	0 (0.00%)	1 (1.92%)	
Missing school or nursery to go to the doctor or hospital				0.951
Never	11 (45.83%)	43 (40.57%)	21 (40.38%)	
Hardly ever	7 (29.17%)	36 (33.96%)	16 (30.77%)	
Sometimes	5 (20.83%)	25 (23.58%)	13 (25.00%)	
Often	1 (4.17%)	2 (1.89%)	2 (3.85%)	

Source: Prepared by the authors.
N = total sample of children; n = absolute number of children; % = percentage of children; p = probability of significance; * = p-value of significance < 0.05 (p < 0.05); - = p not found. Results obtained via Chi-Square and Fisher's Exact statistical tests.

Parents' and guardians' self-assessment of their own knowledge about the healthy use of digital media showed that 69.70% of the sample were aware of the WHO's screen time recommendations (2020), while 66.16% were aware of the SBP's (2019). When asked about their own knowledge of the subject matter, with ratings ranging from 0 (very bad) to 4 (excellent), the median response was 3, classified as "good knowledge".

DISCUSSION

The number of digital media devices available in the homes of those surveyed indicated a tendency to use televisions and smartphones as screens, in line with research in the area (Aishworiya *et al.*, 2019; Felix *et al.*, 2020; Nobre *et al.*, 2021).

As for screen time, the majority of children use digital media for more than one hour a day (69.19%), with 28.79% of the total sample spending between one and two hours, 14.14% spending two hours and 26.26% more than two hours a day. This data shows the increase in children's exposure to digital media. Excessive exposure was experienced by more than two thirds (69.19%) of the children surveyed. This increase has been reported in the literature worldwide (Felix *et al.*, 2020; Poulain *et al.*, 2019) and nationally (Deslandes; Coutinho, 2020; Nobre *et al.*, 2021; SBP, 2020).

It can therefore be seen that the screen time prevalent in this study goes against the WHO (2020) and SBP (2016, 2019) recommendations, which recommend a maximum daily exposure of one hour per day for the age group surveyed (2 to 4 years). However, the majority of parents or guardians claim to be aware of the WHO (69.70%) and SBP (66.16%) recommendations. Similarly, in a cross-sectional study carried out by Ali and Alma'Aytah (2022) with 2,781 mothers, fathers and other carers of children under the age of 6, it was found that 65% of them exceeded the hours recommended by the WHO, even though the carers

were well-informed about the impact of excessive exposure to screens on children's health. However, the study cited above revealed a lack of knowledge regarding parental control of smartphone use and the safe exposure of babies to these devices.

It is important to note that recent research shows that screen time, both for the family in general and for children, increased during the COVID-19 pandemic, and is linked to higher levels of digital addiction and anxiety (Deslandes; Coutinho, 2020; Drouin *et al.*, 2020; SBP, 2020; Mata *et al.*, 2020).

Research by Tooth *et al.* (2019) also showed elevated levels of screen time, with an average of 50 minutes of daily exposure for children aged 1, 91 minutes for children aged 2 and 94 minutes for children aged 3. Thus, it was observed that children in this age group are more likely to exceed the screen time recommended by medical organizations.

Although there is a distinct lack of studies correlating the use of digital media with children's quality of life, current literature highlights the influence of screen time on children's development, which can have an impact on their quality of life. The high exposure of children to screens can cause damage to cognitive, motor, and linguistic development (Aishworiya *et al.*, 2019; Felix *et al.*, 2020; Madigan *et al.*, 2019). Moreover, behavioral disorders, anxiety disorders and difficulties in socializing and expressing feelings have been observed (Guerrero *et al.*, 2019; Munzer *et al.*, 2018; Skalická *et al.*, 2019). In addition, a recent study showed that preschool children exposed to more media time than recommended lost white matter in areas of the brain related to language, anatomically demonstrating the damage observed in the behavioral sphere (Hutton *et al.*, 2019).

Among all the possible damage caused by longer screen time, the majority of the literature reviewed reported potential harm to children's development. This highlights the importance of active exploration of the environment for proper development, an activity that is hindered by the passive distraction and spectator behavior that screens offer (Abud; Lucchese; Zimmermann, 2012; Buchweitz, 2016; Kliegman *et al.*, 2018; SBP, 2016).

It should also be noted that the sensory and emotional stimuli of touch and attachment (essential for children's development and quality of life) cannot be replaced by the visual and auditory stimuli of videos and games, for example. In fact, the virtual image itself does not contribute to the development of the child's sensorimotor intelligence: the reduced use of other sensations (touch, smell, taste) hinders learning by preventing exploration of the environment through the body (Felix *et al.*, 2020; Fernandes; Eisenstein; Silva, 2018).

With regard to the age at which they started using digital media, most of the children started using it with parental supervision between the ages of 1 and 2 (33.33%) and without supervision from the age of 2 (31.31%). Although 35.86% say that their child does not use screens alone, it is worth highlighting the fact that 61.11% have unaccompanied contact with media, which goes against the SBP's recommendations (2016, 2019, 2020).

With regard to habits associated with use, 57.07% use screens during meals and 63.13% use these media before bedtime. Children's health organizations advise against such uses (WHO, 2020; SBPediatria, 2016, 2019, 2020).

As for the use of multiscreens, 82.83% say they do not do this, which is a positive step towards healthy use of media in the family environment. The influence of family habits on children's behavior can be seen in the fact that 70.20% say that children show an interest in using screens when their parents use such media themselves. This influence is the subject of studies in the field, since the high use of screens by caregivers and the presence of multiscreens are directly related to greater screen time, and may contribute to greater digital dependence in this group (Domoff *et al.*, 2019; Nobre *et al.*, 2021; Poulain *et al.*, 2019; Trinh *et al.*, 2019).

Within this study, screen use patterns and screen time were found to have differing interchanges with children's quality of life. When investigating the pattern of use, classified from 0 (very bad) to 4 (excellent), $p < 0.05$ was found for questions relating to Physical Capacity and Emotional Functioning. Thus, it was observed that the closer the pattern of use was to 0, the more negatively it influenced quality of life, specifically by being associated with a higher prevalence of "Having little energy or drive", "Feeling sad", "Feeling angry" and "Sleeping badly", as seen through the medians and the largest interquartile ranges.

When it comes to physical capacity, this finding can be compared with Felix *et al.* (2020), who show that excessive use of digital media is related to poor motor skills and higher rates of sedentary lifestyles, harming children's health.

Turning our attention to emotional functioning, screen use can be associated with aggressive behavior and problems related to thinking (Guerrero *et al.*, 2019). In addition, similar studies have observed that exposure to digital media is linked to: difficulty in self-regulation, difficult moods (as evaluated by parents) and lower levels of understanding of feelings and emotions in the child's emotional development (Munzer *et al.*, 2018; Skalická *et al.*, 2019).

Meanwhile, screen time influenced quality of life in terms of Social Activities, whereby "Not being able to do things that other children of the same age do" was more prevalent in the groups with screen time of between one and two hours and more than two hours, compared to those with less than one hour a day.

Tooth, Moss and Mishra (2021) presented similar results in their research, showing that longer screen times were correlated with negative impacts on the behavior and quality of life of the children studied. Similarly, Motamed-Gorji *et al.* (2019) point to an inverse relationship between screen time and quality of life, especially in aspects related to school activity and the psychosocial context.

The impacts on Emotional Functioning and Social Activities can be explained from an eco-biodiversity perspective, since up to the age of 6, environmental stimulation is a factor that influences the ability to understand feelings of confidence, autonomy, shame, initiative, and guilt. During preschool age (from 2 to 6 years old), children shape their attitudes and habits based on observation and social approval, so that feedback from mothers, fathers and guardians is a crucial factor in whether certain behaviors are maintained or ceased (Abud; Lucchese; Zimmermann, 2012; Kliegman *et al.*, 2018; Sociedade Brasileira de Pediatria, 2019). This period is therefore an essential time for interaction with the environment, in order to provide emotional and social development, which can be harmed by inadequate exposure to digital media.

As for the limitations of the research, the participants were approached online, using a self-reported questionnaire which may be subject to memory bias and social desirability bias. In turn, these biases may have hindered the understanding of the questionnaire and, therefore, the reliability of the answers. In addition, there may be selection bias, since only children attending public daycare centers and those whose parents and guardians have access to smartphones took part in the survey.

FINAL CONSIDERATIONS

It was found that most of the children surveyed had more than one hour of screen time a day, which goes against recommendations made by medical authorities. This occurs even though parents are aware of these recommendations. Given the growing presence of media devices in all social spaces, such as at home and at school, the use of screens by pre-school children requires special attention, due to the repercussions on child development and quality of life.

In addition, the data presented showed the influence of digital media use on children's quality of life. When parents perceived worse patterns of use, this was related to damage to children's physical and emotional health. In addition, high screen time was correlated with impacts on the child's social life.

Finally, given the scarcity of studies correlating quality of life with the use of screens, it is suggested that more research be carried out in this area, especially given the increase in the use of these media among children. In this way, it is hoped that the relationship between the aforementioned interaction and the digital media use habits of children and their families can be investigated, given the importance of this link to quality of life in childhood.

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