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SEÇÃO: ARTIGO

Electronic media use during COVID-19 pandemic: effects on the behavioral/emotional functioning of Brazilian children

Uso de mídia eletrônica durante a pandemia de COVID-19: efeitos no funcionamento comportamental/emocional de crianças brasileiras

Uso de medios electrónicos durante la pandemia COVID-19: efectos sobre el funcionamiento conductual/emocional de niños brasileños

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Abstract: During COVID-19 pandemic an increase electronic media (e-media) usage time was reported correlated to behavioral problems. This study verified the associations between e-media and behavioral/emotional problems in children in the context of the pandemic. Sample: Parents of 277 children aged 7-11 years old. Instruments: socioeconomic questionnaire; MAF-P and CBCL/6-18. Spearman's correlation analyses showed positive associations between the MAF-P and CBCL/6-18 scales. Adult games were correlated with 12 scales; websites for information/entertainment were associated with 6 scales, gambling online with one scale; electronic games and watching YouTube videos were associated with all 17 scales. In conclusion, overall, the results indicate the need of supervising children's e-media access considering the number and frequency of use and the elevated number of emotional and behavioral problems found among the evaluated group.

Keyword: electronic media, behavioral problems, COVID-19

Resumo: Durante a pandemia da COVID-19 verificou-se aumento no tempo de uso de mídias eletrônicas (e-media) relacionado a problemas comportamentais. Este trabalho avaliou associações entre tempo de uso de e-media e problemas comportamentais/emocionais em crianças no contexto da pandemia. Contou com uma amostra de 277 responsáveis por crianças de 7-11 anos. Os instrumentos utilizados foram questionário socioeconômico, MAF-P e CBCL/6-18. As análises de correlação de Spearman apontaram associações positivas entre as e-media na MAF-P e escalas do CBCL/6-18. Os jogos adultos correlacionaram-se a 12 escalas; sites para informação/diversão foram associados a seis; apostar na internet a um; e jogos eletrônicos e ver vídeos no YouTube associaram-se a 17 escalas. Conclui-se, de modo geral, que os resultados indicam a necessidade de supervisão para acesso a e-media por crianças, considerando o número, a frequência de uso e o elevado número de problemas emocionais e comportamentais verificados no grupo estudado.

Palavras-chave: mídias eletrônicas, problemas comportamentais, COVID-19

Resumen: Durante la pandemia de COVID-19, hubo un aumento en el tiempo dedicado al uso de medios electrónicos (e-media) relacionados con problemas de comportamiento. Este trabajo evaluó las asociaciones entre el tiempo de uso de los medios electrónicos y los problemas conductuales/emocionales en niños en el contexto de la pandemia. Muestra: 277 tutores de niños de 7 a 11 años. Instrumentos: socioeconómico, MAF-P y CBCL/6-18. Los análisis de correlación de Spearman mostraron asociaciones positivas entre los medios electrónicos en las escalas MAF-P y CBCL/6-18. Juegos para adultos correlacionados con 12 escalas; sitios de información/diversión asociados a 6; apostar en internet a las 1; los juegos electrónicos y ver videos en YouTube se asociaron con 17 escalas. Se concluye, en general, que los resultados indican la necesidad de supervisión para el acceso a e-media por parte de los niños, considerando el número y la

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frecuencia de uso y el elevado número de problemas emocionales y conductuales verificados en el grupo estudiado.

Palabras-clave: medios electrónicos, problemas conductuales, COVID-19

The use of electronic media (e-media) refers to time spent engaging with screens, portable electronic devices and/or games, using the Internet, social media or communicating via text message (Oswald et al., 2020). The Brazilian Society of Pediatrics (SBP, 2020) emphasizes that parents and caregivers of children must provide a favorable environment for development, with positive stimulation and monitoring of the use of e-media and the time spent on these activities. The American Pediatric Association (AAP, 2016) highlights the need to establish a family plan for e-media use, as research evidence shows that there is an association between the uncontrolled use of e-media and problems in child development, with a higher frequency of behavioral problems among those who use screens for longer and with less parental control.

The Achenbach System of Empirically Based Assessment (ASEBA) is a comprehensive evidence-based assessment system developed through decades of research and clinical practice and established a classification of emotional and behavioral problems, adopted in this study (Achenbach et al., 2016). The terms "internalizing" and "externalizing" are widely used to describe 2 broad-band groupings of behavioral, emotional, and social problems (Achenbach et al., 2016). Achenbach and Edelbrock (Achenbach & Edelbrock, 1978) are two pioneering researchers who originated the scientific effort to define emotional and behavioral problems that may be indicative of mental health problems in childhood. To achieve this, they developed a model classifying behavior into two broad categories: (a) *internalizing* emotional and behavioral problems, composed of signs and symptoms predominantly affecting the individual itself, such as anxiety, withdrawal, somatic-emotional complaints, and depression, among others; and (b) *externalizing* emotional and behavioral problems, which predominantly comprise behaviors that affect other people, such as

hetero-aggression, rule breaking, and substance abuse, among others (Achenbach et al., 2017).

With the increasing access to e-media, there is growing concern about the psychological effects of prolonged use, particularly in children and adolescents (Bilgrami et al., 2017). This concern has been intensified by the integration of digital technologies in school curriculum (Chauhan, 2017), with their use no longer only be restricted to leisure time. Some studies show correlations between the use of e-media, particularly social media, and depressive symptoms (AAP, 2016; Boers et al., 2019; Lemola et al., 2015). Boers et al. (2019) also point out that the use of social media is associated with an increase in the severity of depressive symptoms and a decrease in self-esteem. In addition to depressive symptoms, the time spent using electronic media has been associated with impaired mental health indicators (Dennison-Farris & Dickens, 2017), emotional and conduct problems (Mundy et al., 2017), negative affect, insomnia, and somatic complaints (Nakamura et al., 2012).

To mitigate the spread of the virus during the period of COVID-19 pandemic, social isolation measures have led to a reduction in face-to-face social interactions and physical activity (Jiao et al., 2020), and increased exposure to e-media including remote learning (Nagata et al., 2020; Xiang et al., 2020). The effects of this period on mental health and child development are still unclear; however, authors point to losses involving, for example, a decrease in educational opportunities, an increase in anxiety symptoms (Courtney et al., 2020) and frustration (Duan et al., 2020). In face of this situation, the APA made recommendations for the use of e-media during the pandemic, suggesting that parents should supervise the type of media used and the time spent, while encouraging positive interactions during social distancing (Wiederhold, 2020).

The American Psychological Association/APA published recommendations for parents/ caregivers to ME use in childhood adopting evidence-based recommendations (APA, 2019). In the guideline, the media is defined as any interaction

with a screen, including watching television/content, internet, social media and app use, gaming, etc., on any platform (phones, tablets, computers, television, etc.). For the recommendations when parenting a child in the face of technology the APA uses the American Academy of Pediatrics (AAP) recommendations. Resuming: a set of guidelines for media use based on a child's developmental stage which are highlighted below. For instance: age 2 and under: avoid media use (except video chatting); preschoolers: no more than one hour of high-quality programming per day; Grade-schoolers/Teens: don't let media displace other important activities such as quality sleep, regular exercise, family meals, "unplugged" downtime. All ages: be a media mentor. Co-view media with your kids.

The increasing amount of time that children have been spending using e-media for educational, entertainment and personal interaction purposes was a growing concern even before the COVID-19 pandemic (Wiederhold, 2020). There are disagreements about the consequences of this new reality; for example, Nagata et al. (2020) point to benefits of e-media for socialization, and contact with friends and family, while others point to losses associated with a more sedentary lifestyle (Xiang et al., 2020) and depression (Courtney et al., 2020).

Even if the possible effects of increasing use of e-media are not considered, the joint effect of lifestyle changes and the psychosocial stress resulting from isolation can affect mental health, resulting in emotional and behavioral problems (Wang et al., 2020). Epidemiological studies argue that children are particularly vulnerable, expressing greater behavioral difficulties during pandemics and disasters, including hyperactivity, conduct problems, externalizing problems, and general psychological distress (Clark et al., 2020; Wang et al., 2020). Evidence from different countries, in respect of the current pandemic, shows possible psychological impacts on children, such as anxiety (Chen et al., 2020), depression (Duan et

al., 2020), panic attacks (Saurabh & Ranjan, 2020), inattention (Jiao et al., 2020; Spinelli et al., 2020; Zhang et al., 2020), and irritability (Orgilés et al., 2020; Pisano et al., 2020).

The objective of this study was to verify the association between the daytime e-media use and emotional/behavioral problems of children during the period of social isolation of Pandemic. Our hypotheses were that e-media use for long periods would be associated with emotional and behavioral problems, and that different types of problems would be associated with different types of e-media.

Method

Participants

The participants comprised a community sample of parents of children aged between 7 and 11 years old from Brazil. The inclusion criterion for the study was a declared statement that the children was in social isolation (remaining isolated from other households, getting out of the house just for necessities, to reduce spread of new cases of COVID-19) during the COVID-19 pandemic. The initial sample included 421 participants, from which 144 were excluded due to incomplete or duplicate questionnaires, and parents declaring that the children was not in social isolation.

The survey was designed to take approximately 40 minutes to complete. The database was generated through an online questionnaire made using Google Forms and was available from June 10th to August 10th, 2020. The link was posted on social media such as Facebook, Instagram, and WhatsApp, which characterizes the sample as non-probabilistic. The study was approved by the Ethics Committee for Research with Human (Process CAAE 3.584.187).

Table 1 shows the final sample composition, after applying the exclusion criteria, which comprised 277 participants with valid data.

Table 1 – Sociodemographic characteristics of the sample (n = 277)

Variables	N (%)	
Age of the children		
Median	9 years	
Minimum and maximum age	7-11 years	
7	48 (17.3%)	
8	64 (23.1%)	
9	57 (20.6%)	
10	54 (19.5%)	
11	54 (19.5%)	
Gender of the children- n (%)		
Male	143 (51.6%)	
Female	134 (48.4%)	
Education - n (%)		
1st grade	22 (7.9%)	
2nd grade	53 (19.1%)	
3rd grade	73 (26.4%)	
4th grade	48 (17.3%)	
5th grade	55 (19.9%)	
6th grade	26 (9.4%)	
Gender - n (%)		
Male	143 (51.6%)	
Female	134 (49.4%)	
Relationship with the child - n (%)		
Biological mother	260 (93.9%)	
Biological father	5 (1.8%)	
Others	12 (4.3%)	
Socioeconomic level * - n (%)		
Class A	Higher income (R\$ 25,554.33) *	25 (9.02%)
Class B1	Middle-High income (R\$11,276.14) *	52 (18.77%)
Class B2	Middle income (R\$5,641.64) *	142 (51.26%)
Class C1	Middle-Low income (R\$3,085.48) *	39 (14.07%)
Class C2	Low income (R\$1,748.59) *	16 (5.77%)
Class D/E	Low and Very-low income	3 (1.08%)

Description: * per month

Measures

(a) *Sociodemographic data form*: to build a sociodemographic and economic profile of the participants during social isolation. It also collected basic data on the child and guardian such as name, education level, age, and gender (ABEP, 2019).

(b) *Media Activity Form-Parent (MAF-P)* (Achenbach, 2018): to obtain measures of the length of e-media use among children and adolescents aged between

6-18 years-old based on parental report. The items describe the following media activities: texting, creating online content, listening to music, using social media, playing adult games (classified as adult games, with crime/violence, or as games suitable for their age), watching online videos, making calls/video calls, using electronic media for school/work activities, visiting websites for fun/information, watching TV/streaming platforms, and gambling online. The

parents indicated how much time their child used each type of media during weekdays and weekends in terms of hours and minutes.

(c) *Child Behavior Checklist for Ages 6-18 (CBCL/6-18, Brazilian version)*: this instrument was developed by Achenbach and Rescorla (2001) to obtain standardized measures of emotional/behavioral problems in children and adolescents based on reports from parents or caregivers. It comprises 112 items with statements, arranged using a Likert-type scale: "0 = not true", "1 = somewhat or sometimes true", and "2 = very true or often true" in the last six months; for the present study, instead of a period of six months, the questions related to the period from the beginning of the pandemic to the moment of completion. The answers allow a profile to be constructed based on empirically based syndrome scales (Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule Breaking Behavior and Aggressive Behavior); Internalizing, Externalizing and Total problem scales; and DSM-oriented scales (Depressive Problems, Anxiety Problems, Somatic Problems, Attention Deficit/Hyperactivity Problems, Oppositional Defiant Problems and Conduct Problems). Higher scores indicate greater problems. Validity and reliability data have been previously published in respect of the Brazilian version (Bordin et al., 2013; Rocha et al., 2013).

Data analysis

The Kolmogorov-Smirnov and Shapiro-Wilk tests showed that the distribution did not follow the assumptions of normality, so the Spearman Correlation test was used. The criteria for interpreting correlation results were $r \geq |.7|$ strong, $|.3| \leq r < |.7|$ moderate and $0 < r \leq |.3|$ weak. A significance level of $p \leq 0.05$ was adopted.

Results

All statistically significant results showed positive associations (i.e., the longer the time of use of a given electronic media, the higher the score in all scales of the CBCL). Table 2 shows the data obtained from the Spearman correlation between the MAF-P scores and the CBCL empirically based syndrome scales. Playing adult games (with violence or crime) was associated with withdrawn/depressed ($p = .019$), social problems ($p = .022$), attention problems ($p = .021$), rule-breaking behavior ($p = .018$) and aggressive behavior ($p = .015$). In respect of the length of time spent on games on a computer, cell phone, tablet, iPad, Xbox, PlayStation, all sub-items of the syndromes scale presented associations at the level of $p = .01$ (highest p value = $.010$ and lowest $p < .0001$). Accessing websites for entertainment or information was associated with anxious/depressed ($p = .008$) and thought problems ($p = .040$). Watching videos on YouTube was correlated with all syndrome scales, with the highest value being $p = .047$ and the lowest being $p < .0001$. For internet gambling online, an association with withdrawn/depressed was found ($p = .042$).

Table 2 – Spearman correlation between total time in minutes for each electronic media and empirically based syndrome scales scored from the CBCL/6-18

		Anxious/ Depressed	Withdrawn/ Depressed	Somatic Complaints	Social Problems	Thought Problems	Attention Problems	Rule Breaking Behavior	Aggressive Behavior
Communication by text message	r_s	.026	.065	.029	.003	-.015	.025	-.016	-.019
	p	.666	.281	.627	.965	.800	.684	.788	.755
Creating content for YouTube, blog	r_s	.026	.036	.066	.046	.034	-.005	.102	.043
	p	.663	.547	.277	.449	.577	.933	.091	.475
Listening to radio, MP3, Spotify	r_s	.040	.055	.074	.040	.055	-.072	.049	.031
	p	.506	.358	.216	.512	.363	.232	.416	.612
Playing adult games (with violence)	r_s	.068	.140*	.099	.137*	.089	.139*	.142*	.146*
	p	.258	.019	.102	.022	.139	.021	.018	.015
Using social networks (Facebook, Instagram)	r_s	-.032	-.061	-.011	.007	.039	-.095	.000	-.088
	p	.597	.313	.856	.914	.514	.116	.994	.146
Speaking on phone (Skype, FaceTime, WhatsApp)	r_s	-.044	-.056	-.040	-.030	-.072	-.047	.020	.002
	p	.461	.350	.506	.618	.230	.432	.735	.975
Playing games on computer or cell phone	r_s	.166**	.343**	.155**	.182**	.211**	.199**	.221**	.233**
	p	.006	>.001	.010	.002	>.001	.001	>.001	>.001
Using computer or other electronics at school or work	r_s	-.016	.024	.028	-.059	-.104	-.077	-.015	-.016
	p	.790	.686	.646	.324	.084	.203	.800	.794
Accessing websites for fun or information	r_s	.160**	.099	.009	.100	.124*	.022	.113	.111
	p	.008	.100	.877	.098	.040	.713	.060	.066
Watching movies or series	r_s	.083	-.024	.010	.063	.021	.053	.065	-.003
	p	.167	.689	.869	.295	.724	.381	.281	.959
Watching YouTube videos	r_s	.120*	.224**	.147*	.164**	.210**	.227**	.146*	.206**
	p	.047	>.001	.014	.006	>.001	>.001	.015	.001
Gambling online	r_s	.070	.122*	.070	.114	.100	.083	.078	.016
	p	.248	.042	.247	.059	.095	.168	.198	.790

Description: **significant correlation at the .01 level (p value); *significant correlation at the .05 level (p value).

Table 3 presents the results obtained from the Spearman correlation between the MAF-P scores and the CBCL DSM-oriented scales. Playing adult games (with violence or crime) was a correlation with depressive problems ($p = .048$), attention deficit/hyperactivity problems ($p = .013$), oppositional defiant problems ($p = .022$), and conduct problems ($p = .006$). For computer, cell phone, and games, there was an association with all the DSM-oriented

scales, at a level of $p = .01$ (lowest p -value $< .0001$ and highest $.004$). Accessing websites for fun or information was associated with anxiety problems ($p = .014$) and oppositional defiant problems ($p = .040$). Finally, there was an association between watching videos on YouTube and all sub-items of the DSM-oriented scales, with the highest p value = $.017$ and the lowest $p < .0001$.

Table 3 – Spearman correlation between total time in minutes for each electronic media and DSM-oriented scales

		Depressive Problems	Anxiety Problems	Somatic Problems	Attention Deficit /Hyperactivity Problems	Oppositional Defiant Problems	Conduct Problems
Communication by text message	r_s	.082	-.009	.011	.010	-.008	-.044
	p	.172	.885	.852	.863	.897	.463
Creating content for YouTube, blog	r_s	.046	-.041	.066	-.014	.042	.062
	p	.446	.502	.273	.817	.484	.304
Listening to radio, MP3, Spotify	r_s	.061	-.017	.062	-.039	.008	.026
	p	.308	.776	.302	.519	.890	.666
Playing adult games (with violence)	r_s	.119*	.105	.098	.149*	.137*	.166**
	p	.048	.082	.105	.013	.022	.006
Using social networks (Facebook, Instagram)	r_s	-.015	-.033	-.024	-.080	-.102	-.038
	p	.808	.586	.685	.185	.089	.524
Speaking on phone (Skype, FaceTime, WhatsApp)	r_s	-.018	-.038	-.063	-.011	.015	.005
	p	.769	.532	.295	.854	.800	.937
Playing games on computer or cell phone	r_s	.323**	.179**	.174**	.221**	.222**	.225**
	p	>.001	.003	.004	>.001	>.001	>.001
Using computer or other electronics at school or work	r_s	-.012	-.063	.024	-.104	.010	-.034
	p	.849	.296	.694	.085	.865	.573
Accessing websites for fun or information	r_s	.107	.148*	-.006	.039	.124*	.081
	p	.075	.014	.920	.522	.040	.180
Watching movies or series	r_s	.029	.053	-.007	.069	-.019	.062
	p	.629	.381	.914	.254	.758	.305
Watching YouTube videos	r_s	.276**	.156**	.144*	.207**	.198**	.158**
	p	.000	.009	.017	.001	.001	.008
Gambling online	r_s	.108	.111	.062	.087	.000	.062
	p	.073	.066	.306	.147	.999	.307

Description: **significant correlation at the .01 level (p value); *significant correlation at the .05 level (p value).

Table 4 shows the results of the Spearman's Correlation between total time in minutes for each e-media from the MAF-P and the internalizing, externalizing and total problem scales. For adult games (with violence, crime), there was a correlation with externalizing ($p = .013$) and total problems ($p = .015$). As for computer, cell phone, iPhone,

and tablet games, there was an association with all scales, p values $< .0001$. Accessing websites for entertainment or information was associated with internalizing ($p = .026$) and total ($p = .038$) problems. Finally, watching videos on YouTube was associated with all scale, with the highest p value = $.001$ and the lowest p value $< .0001$.

Table 4 – Spearman correlation between total time in minutes for each electronic media and Internalizing, Externalizing, Total Problems scales

		Internalizing Problems	Externalizing Problems	Total Problems
Communication by text message	r_s	.028	-.016	.022
	p	.639	.795	.715
Creating content for YouTube, blog	r_s	.036	.057	.044
	p	.556	.341	.467
Listening to radio, MP3, Spotify	r_s	.066	.041	.035
	p	.275	.496	.561
Playing adult games (with violence)	r_s	.112	.149*	.145*
	p	.063	.013	.015
Using social networks (Facebook, Instagram)	r_s	-.047	-.068	-.034
	p	.439	.262	.570
Speaking on phone (Skype, FaceTime, WhatsApp)	r_s	-.064	.009	-.033
	p	.286	.878	.587
Playing games on computer or cell phone	r_s	.254**	.241**	.265**
	p	>.001	>.001	>.001
Using computer or other electronics at school or work	r_s	.010	-.006	-.040
	p	.868	.926	.507
Accessing websites for fun or information	r_s	.134*	.115	.125*
	p	.026	.057	.038
Watching movies or series	r_s	.044	.012	.041
	p	.465	.845	.493
Watching YouTube videos	r_s	.190**	.198**	.239**
	p	.001	.001	>.001
Gambling online	r_s	.088	.024	.100
	p	.146	.696	.097

Description: **significant correlation at the .01 level (p value); *significant correlation at the .05 level (p value).

Discussion

The present study aimed to evaluate a possible association between total time spent using different electronic media and behavioral/emotional problems in a sample of Brazilian children aged 7 to 11 years old from the perspective of their

parents. This was one of the first studies, with a Brazilian sample of children, to consider so many types of e-media for this age group, and one of the first to assess the correlation between behavioral problems and screen time among Brazilian

children during the COVID-19 Pandemic. Although most of the correlations were significant, even if weak, the results support our initial hypotheses and findings in the field that the increased use of e-media is correlated with increased behavioral problems, especially in respect of depression (Dennison-Farris & Dickens, 2017; Domingues-Montanari, 2017), difficulty in focusing, attention deficit hyperactivity disorder (Domingues-Montanari, 2017), anxiety (Fors & Barch, 2019) and conduct problems (Mundy et al., 2017).

In a systematic review study, statistically significant associations were found between screen exposure time and unfavorable psychological (emotional and behavioral) outcomes in 16 studies (Oswald et al., 2020); in general, similar results were also shown in the present study. Playing video games (appropriate for age) was associated with all CBCL scales, corroborating international studies that indicate that this type of media is associated with internalizing problems (Milani et al., 2020), externalizing problems, aggressive behavior, conduct problems and rule breaking behavior (Anderson et al., 2017; Milani et al., 2020), indicating that parents and health professionals need to pay attention to this type of use. In addition, it is important to emphasize that according with previous studies this use may have increased during the COVID-19 pandemic (Nagata et al., 2020; Xiang et al., 2020), as children spend less time performing activities such as sports and other outdoor activities (Jiao et al., 2020), and more time using e-media. Given this situation and the fact that many types of e-media do not promote social contact in person, their negative effects on child behavior may have been increased, but further studies are needed to confirm these hypotheses.

In the present study, most of the sample was concentrated in the middle class (B1 and B2 classification). It is likely that, due to this social condition, the children of this sample have access to the Internet through different devices. This socioeconomic advantage can further enhance high use and behavioral repertoires of exaggerated habits above what is recommended by experts

(APA, 2019). However, in the lowest socioeconomic classification, this study had 20.92% of the sample. Despite being a smaller percentage, if compared to socioeconomic classes A, B1 and B2 (79.05%), parents should keep alert about monitoring their children's mental health. We do not verify the association between financial income and access to types of e-media configuring a limitation of this study. However, the correlations verified between the use of e-media and emotional and behavioral problems, regardless of socioeconomic classification, warn of possible mental health impairments in the evaluated group according with the parents.

The correlation found between the time spent on websites for fun or information with anxiety problems requires careful analysis, because anxiety problems may frequently be present as a co-occurring problem with different mental health conditions (APA, 2014). The COVID-19 pandemic and lockdown has brought about a sense of fear and anxiety in the global population (Singh et al., 2020). It is likely that the variety of stimuli to which these children are exposed through websites trigger various states associated with anxiety such as a fear response and excessive worry, or equally possible that children who are anxious might spend more time looking at websites. In this study, we did not control the parent supervision during the use of EM; however, if parents do not actually monitor their children's use of EM, there is a probability that these anxiety problems will increase, with serious consequences for mental health. The results found in this study highlight an emotional problem that can make children more vulnerable during the pandemic and in the post-pandemic period.

No correlations were found between the time spent on social networks and depressive symptoms, which was not in line with our initial hypothesis or the literature in the area whose use of social networks was associated with depressive symptoms (Boers et al., 2019; Lemola et al., 2015). This may have happened because, by promoting contact between distant friends and family during the COVID-19 pandemic, the harmful effects

commonly found in the literature were mitigated. Although no negative correlations were found between the use of social networks and behavioral problems, this does not mean that they can be protective against behavioral problems for this age group, even in the pandemic period.

The study did not evaluate exposure to e-media before the pandemic: however, it is likely that the high use of e-media recorded during the lockdown period reflect increased e-media usage habits and an effect the behavioral repertoires of the children. These repertoires must be analyzed with new situations of socialization and presential return to school. The results of our study support the conclusions of previous studies (Rollè et al., 2019; Welsh et al., 2016) about the need for supporting positive parenting based on diverse stimulations, that do not involve the use of e-media, even in such adverse conditions as the COVID-19 pandemic.

Although the study produced some significant and valuable results, it is necessary to emphasize the limitations of the study. First, as it used a non-probabilistic sample, it does not represent the Brazilian population in relation to its socio-economic characteristics, and cannot, therefore, be extrapolated to other groups. Second, the results rely on the perspective of a single informant, the parent or caregiver. Third, as this is a correlational study, it is not possible to infer causality in the correlations found. Finally, the statistically significant associations found were weak. We suggest that future studies: use regression analysis to check the impact of e-media on behavioral and emotional problems; assess possible differences in the use of electronic media by age group and sex; use randomized controlled studies and cross-cultural studies; and include multiple informants (such as parents/caregiver and teachers).

The sample of this study was composed by 277 children and our results suggested that a high-dose use of e-media in children can be a risk factor for the development of the child, mainly during the pandemic. The e-media must not replace the parent-child interaction in person because it might cause other problems in children's social-emotional development, even

after the pandemic.

In conclusion, this study shows associations between type and time spent using e-media and behavioral and emotional problems among children aged 7 to 11 years old, living in Brazil. It expands knowledge in the area and highlights the need for parents, health professionals and researchers to pay attention to the use of specific media, such as online games and videos. Furthermore, some correlations seem to be characteristic of the pandemic period, such as those found in respect of the use of electronic media for entertainment and information, allowing a better understanding of this new reality among children. Our results draw attention to a relationship between the use of e-media and emotional problems that can make children more vulnerable during the pandemic, as well as in the post-pandemic period.

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