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## Screen time habits in Pediatric age: An intervention in the context of health education

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### Abstract

**Introduction and Objectives:** Inadequate screen exposure habits in pediatric age are associated with negative health outcomes. This study aimed to evaluate the effectiveness of an intervention program in modifying screen exposure habits among adolescents in Portugal.

**Methods:** A sample of 107 students participated in the study. Pre- and post-intervention questionnaires were used to collect data on screen exposure patterns and habits.

**Results:** The findings revealed a high prevalence of inadequate screen exposure habits among the participants. The intervention program resulted in positive changes in screen exposure habits. Participants reported a decrease of the screen devices in their bedrooms, reduced usage of multiple social networks, and increased adherence to rules at home.

**Discussion:** These results underscore the importance of interventions aimed at promoting healthier screen habits. This work contributes to the existing knowledge on evidence-based strategies for promoting healthy screen exposure.

**Keywords:** Adolescent, health, impact, intervention, school community, screen device

### Introduction

The increasing prevalence of digital media in the lives of today's children and adolescents [1] has become increasingly evident in recent times. The advent of new technologies has led to instant and easy access to screen devices, raising concerns about screen exposure. The COVID-19 pandemic has further exacerbated the situation, with increased screen usage due to isolation and restrictions on other leisure activities [2].

While screen devices can be useful tools for communication, education, and information, their early or excessive use for recreational purposes or during inappropriate times of the day [3-5] has been associated with negative health outcomes for children and adolescents. Extensive research supports these findings, highlighting the impact on neurodevelopment, physical and mental health, and family life [6-8]. The literature documents various issues such as sleep disorders, attention and problem-solving difficulties, cognitive impairment, language disorders, behavioral changes, decreased executive function, lack of self-regulation, impaired empathy and social skills, as well as depression, anxiety, and obesity [7-14]. Therefore, it is crucial to investigate and address screen exposure habits.

In response to the adverse effects of inadequate screen exposure, several international organizations, including the World Health Organization (WHO) [4], American Association of Pediatrics (AAP) [1], American Association of Child and Adolescent Psychiatry (AACAP) [5], and the Society of Canadian Pediatrics (SCP) [15], have released guidelines between 2016 and 2020. Screen time is defined as the total daily hours of recreational screen device use [1, 15]. The AAP recommends limiting screen time to two hours a day for children over the age of five and advises turning off the television when not in use to mitigate the risks associated with background TV [1]. The AACAP emphasizes avoiding screen use during meals and dedicated reading time, as well as the significance of screen-free periods, particularly within a family context [5]. The SCP recommends avoiding screens for at least one hour before bedtime and prohibits recreational screen use in the bedroom [11]. Additionally, the AAP highlights the importance of making screen time a shared activity, encouraging co-viewing with adults and engaging in discussions about the content, especially with adolescents [1].

The existence of guidelines from reputable international bodies underscores the recognized significance of addressing healthy screen exposure habits.

Adolescents are particularly vulnerable to the opportunities and risks presented by new devices [16]. According to the WHO definition, adolescents are aged between 10 and 19 years [17]. A study conducted in Slovakia and the Czech Republic revealed that 57.2% and 42.6% of adolescents, respectively, spend more than six hours engaged in screen-related activities. Similar trends are observed in Portugal [10]. Currently, approximately three-quarters of adolescents own a smartphone, and it is common for them to engage in multiple forms of media simultaneously [18]. Early adolescents (10 to 12 years old) often struggle with managing their device usage, especially considering the high ownership rates of smartphones and/or tablets. International organizations emphasize the importance of helping adolescents learn to effectively manage their time, ensuring that these devices do not replace other activities. Moreover, exposure to unsafe content and contacts is common, often compromising privacy and confidentiality, and social network privacy settings do not guarantee content privacy. Adolescents should be made aware of control modes and privacy settings to help ensure online safety [12].

Establishing limits is necessary and expected by adolescents in the virtual environment [9]. The Society of Canadian Pediatrics suggests that health professionals can promote healthy screen use [12], and the AAP advocates for their involvement in assisting families in planning their screen exposure habits [1]. However, these recommendations published by international bodies are not widely disseminated in Portugal. Many parents, caregivers, teachers and even healthcare professionals may not be fully aware of the guidelines. The recommendations are not included in the national plan guiding the surveillance of pediatric age, and thus, they are not routinely addressed in primary care visits. This knowledge gap necessitates research to raise awareness and provide evidence-based recommendations. In this context, an intervention project was developed within a school community to evaluate the impact on screen exposure habits after implementing the intervention.

## Materials and Methods

The intervention was conducted using a convenience sample of 156 students in the 2nd cycle of Basic Education, encompassing nine classes, at a school in Vila Nova de Famalicão, Portugal, spanning from April to June 2022.

Two sessions were administered within in each class, with a two-week interval between them. Each session entailed an oral presentation aimed at enlightening the students about the adverse health consequences linked to inadequate screen exposure habits, along with an exposition of the prevailing international guidelines. After the presentation, a group didactic activity devoid of screens was carried out (Jenga game during the first session, Mikado game during the second session).

An identical questionnaire was administered to the students both prior to (pre-I) and after the intervention (post-I). Participants were requested to complete a non-validated, yet suitable for their educational level, questionnaire. This survey encompassed demographic details such as age,

gender, type of residence, age of initial screen usage, and information concerning screen exposure habits. In accordance with the AAP guidelines [1], excessive screen time was defined as two or more hours per day.

The collected data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26 (IBM SPSS Statistics, Inc, Chicago, IL, USA). Descriptive statistics were presented as means and standard deviations for continuous variables and frequencies and percentages for categorical variables. The McNemar test was applied for to pairwise comparisons of categorical dichotomous variables. A p-value of less than 0.05 was considered statistically significant.

This study received approval from the ethics committee. Informed consent was obtained from parents or caregivers, who signed the consent forms.

## Results

A sample of 107 students participated in the study. The mean age of participants was  $11.0 \pm 0.8$  years, ranging from 10 to 14 years. Male participants constituted the majority (59%) [Table 1].

Most adolescents resided in a particular house. Twelve percent of participants did not have access to a garden or park near their residence for outdoor activities, and among of these participants, 86% reported excessive screen time. Mostly, adolescents reported receiving their first screen device at the age of 8 or earlier (55%). Almost all adolescents were aware of the negative health effects of excessive screen time in pre-intervention (97%).

The authors highlight the decreased percentage of students having a screen device in their bedroom in the post-I period, including televisions (58% vs. 68%;  $p < 0.001$ ) and computers (33% vs. 44%;  $p < 0.001$ ). Additionally, after the intervention, fewer adolescents reported using four or more social networks or chat applications (31% vs. 39%;  $p = 0.004$ ). After the intervention, more students reported excessive screen time on weekdays (54% vs. 37%;  $p < 0.001$ ), with a particular increase in participants with screen time exceeding five hours ( $p = 0.002$ ). There was an increase in the percentage of adolescents who reported screen exposure during meals (48% vs. 31%;  $p = 0.004$ ). We found close to significance results regarding the increased percentage of participants who did not use screen devices during class breaks in the post-intervention period (37% vs. 33%;  $p = 0.063$ ). Results close to significance were also found on the increased percentage of adolescents who reported rules in home (70% vs. 63%;  $p = 0.008$ ) [Table 2].

**Table 1:** Sociodemographic characteristics of participants.

Gender (n, %)	
Female	50 (41.1)
Male	63 (58.9)
Outro	3 (0.0)
Age	
Mean $\pm$ SD	$11.0 \pm 0.8$
Range	10-14
Type of residence (n, %)	
Apartment	53 (49.5)
Particular	63 (50.5)

**Table 2:** Screen exposure habits data of participants in post-intervention period compared with pre-intervention period.

	Pre-intervention period	Post-intervention period	p value
<b>Devices in the room (n/frequency (%))</b>			
Without devices	19 (17.8)	21 (19.6)	0.500
Any device	97 (82.2)	86 (80.4)	0.500
Television	73 (68.2)	62 (57.9)	<0.001
Computer	47 (43.9)	35 (32.7)	<0.001
<b>Rules in home (n/frequency (%))</b>			
Absent	40 (37.4)	32 (29.9)	0.008
Present	76 (62.6)	75 (70.1)	0.008
<b>Regular co-view (n/frequency (%))</b>			
Absent	10 (9.3)	9 (8.4)	1.000
Present	106 (90.7)	98 (91.6)	1.000
<b>Exposure during study (n/frequency (%))</b>			
Absent	50 (46.7)	46 (43.0)	0.125
Present	66 (53.3)	61 (57.0)	0.125
<b>Exposure during meals (n/frequency (%))</b>			
Absent	74 (69.2)	56 (52.3)	<0.001
Present	42 (30.8)	51 (47.7)	<0.001
<b>Exposure in class breaks</b>			
Absent	35 (32.7)	40 (37.4)	0.063
Present	81 (67.3)	67 (62.6)	0.063
<b>Excessive screen time (n/frequency (%))</b>			
<b>Weekday</b>			
Absent	67 (62.6)	49 (45.8)	<0.001
Present	49 (37.4)	58 (54.2)	<0.001
2-3 hours	18 (16.8)	24 (22.4)	0.031
3-4 hours	14 (13.1)	13 (12.1)	1.000
4-5 hours	13 (7.5)	7 (6.5)	0.031
>5 hours	4 (0.0)	14 (13.1)	0.002
<b>Weekend</b>			
Absent	37 (34.6)	32 (29.9)	0.063
Present	79 (65.4)	75 (70.1)	0.063
2-3 hours	28 (26.2)	23 (21.5)	0.063
3-4 hours	16 (15.0)	14 (13.1)	0.500
4-5 hours	15 (14.0)	13 (12.1)	0.500
>5 hours	20 (10.3)	25 (23.4)	0.063

## Discussion

This work was built upon the existing guidelines and aimed to assess the impact of an intervention program on screen exposure habits among a group of students in Portugal, by conducting a pre- and post-intervention assessment.

The findings provided several important observations. The majority of participants reported having their first device at a young age, emphasizing early exposure to screens, which aligns with previous research identifying early and prolonged screen exposure as a risk factor for negative health outcomes. There was a high prevalence of excessive screen time and other inadequate screen exposure habits among the adolescents, consistent with the literature [19]. Almost all adolescents were aware of the negative health effects of excessive screen time in pre-intervention assessment, yet they still engaged in these habits, highlighting the need for interventions to promote healthier habits.

The intervention program implemented in this work demonstrated promising results, with significant changes observed in various screen exposure habits following the intervention. Participants reported statistically significant decreased televisions and computers in their bedrooms. Another important finding was the statistically significant increased adherence to rules at home, highlighting the effectiveness of this type of intervention.

Fewer participants reported using multiple social networks or chat applications after the intervention, suggesting a more

focused and controlled usage of online platforms. The percentage of adolescents with screen exposure during class breaks and during study were decreased and the percentage of participants with regular co-viewing with adults was augmented. These variations were not statistically significant but revealed encouraging.

By conducting this study, it is possible to identify areas of success and areas that require further attention. Despite the positive changes observed, there was statistically significant higher reported excessive screen time on weekdays, which could be explained by the undervaluation of reality and the underestimation of screen time in pre-intervention assessment. An increase in screen exposure during meals was also reported, emphasizing the need for continuous reinforcement of healthy habits and the importance of addressing specific contexts and situations where screen time can be easily mismanaged.

The intervention program was an innovative community project that, in addition to disseminating recommendations, has resulted in findings that contribute to the existing knowledge base and effective strategies to develop and may have practical implications. This work serves as an alert for health professionals, parents, caregivers, and policymakers, emphasizing the importance of implementing evidence-based strategies to improve the management of screen use effectively and improve health outcomes.

The present study had some limitations. One is related to the use of a non-validated questionnaire, as preexistent

validated questionnaires are very long and detailed, making them impractical for participants in this age group. However, this decision may not impact the generalizability of the results. Other limitation is related to self-reported screen time, which may provide inaccurate data.

### Conclusion

The intervention demonstrated promising results in promoting healthier screen exposure habits. While guidelines already exist, the research work contributes to the existing knowledge base and effective strategies for promoting healthy screen usage, with potential practical implications. A collaborative effort between concerned agencies is essential to ensure the healthy development and well-being of the current generation of adolescents in the digital age. Further research is needed to assess the long-term effectiveness of interventions and explore innovative approaches in an ever-evolving digital landscape.

**Conflict of Interest:** Not available

**Financial Support:** Not available

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