Original Article

Screen time usage among preschoolers aged 2-6 in rural Western India: A cross-sectional study

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Abstract

Aims: We have evaluated screen time usage among preschool-aged (≤6 years) children in rural Western India. In addition, we have evaluated various lifestyle factors and their impact on the screen time of these children. **Materials and Methods:** English-medium schools in the locality were chosen based on convenience. A self-report survey requesting family information and screen usage information was distributed to the parents. Daily screen time was categorized as a three-category variable. Ordered logistic regression with multivariable regression was performed to examine the association of risk factors with screen time. **Results:** Average screen time among the 379 (208 males, 171 female) children amounted to 2.7 hours (SD: 1.7), with average daily television screen time of 1.6 hours (SD: 1.1). Most children (87.2%) started screen use by the age of 3. Only 65 (17.2%) participants met AAP recommendation. Households with three devices and smartphone usage by mothers increased the odds of screen time by 60% and two-folds, respectively. Compared to weekdays, children had increased screen time exposure (3.5 vs 2.7 hours, $P < 0.001$), outdoor activity time (2.3 vs 1.6, $P < 0.001$), and reading hours (1.2 vs 1.1, $P = 0.03$) on weekends. No association was observed between screen time and mother's occupation. **Conclusions:** More than 80% of children exceeded the advised screen time with television and smartphone being the major contributors. This issue has to be dealt with at both individual and societal levels. Increased awareness about the high prevalence of inappropriate use of screen time use within the Indian context is needed to inspire attention and interventions for this emerging public health problem in India.

Keywords: Children, exposure, preschool, screen time, technology

Introduction

With the surge of new technology in the new millennium, digital screens in the form of televisions, smartphones, tablets, computers, and other portable devices have become ubiquitous across the world. The economic boom has been increasing the middle class's purchasing power of these gadgets. Working mothers and their work stress negatively impact the children and hence they resort to screens in early childhood years. According to one of the initial studies published on this topic nearly a decade ago, almost half of the children have regular screen time exposure by 3 months of age and this number rises to 90% by 24 months.[1] Excess screen time exposure in early childhood is associated with harmful effects such as increased sedentary behavior, obesity, poor sleeping habits, and developmental abnormalities. To prevent these harmful effects, the American Academy of Paediatrics guidelines recommend no more than one hour of daily screen time for children under the age of 5.[2,3] However, most studies of screen time usage among preschool-aged children report that vast majority of the children fail to meet these recommendations.[2,4]

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Although nearly a quarter of the world's children reside in India, there is lack of information on the screen time of children.[5] A search in PubMed and Scopus using the keywords "screen time", "children", and "India" resulted in only 15 studies which have studied the screen time of children, but have not focused on the early childhood period (≤5 years).[6-8]Given the rising epidemiology of child obesity- and lifestyle-related disorders in India, it is therefore important for the researchers, school teachers, and pediatricians to gain a better understanding of the sedentary behavior among children and identify its risk factors. Hence, our study aimed to investigate the screen time use and to assess the associated risk factors among 2- to 6-year-old children living in a suburb of Western India.

Materials and Methods

Data for this cross-sectional study was collected through a self-report, take-home questionnaire distributed to parents of the children attending any of the seven local English-medium preschool programs in our district headquarters. The schools were selected based on convenience and they have approved the survey questionnaire for distribution. The survey was filled by the parent (one survey between the mother and father) or guardian of the child aged ≤6 years. To ensure that only the parents/guardians filled the survey, the teachers were informed to send a note in the students' agenda books and on the survey itself. The survey provided to the parents was designed in both English and the local vernacular language. The parents were allowed to choose the language of the survey questionnaire and also the language of response. The survey questionnaire included an informed consent sheet for the parents to sign and an informational sheet explaining the research project. The 4-page questionnaire collected sociodemographic information about the children in addition to the questions about the screen time usage and related behavior of the children, the parental screen time use, and the number of devices in the house. Parents were asked to self-report the average time their child spent watching TV, playing on smartphone or tablet, using the computer, playing videogames, playing outside, and reading on a typical weekday (Monday–Friday) and a typical weekend (Saturday and Sunday), separately. Descriptive statistics was used to characterize screen time exposure from TV, smart devices, and computers. Differences in screen time exposure between weekday and weekends were assessed using paired two-tailed t-tests. The bivariate ordered logistic regression analysis was used to evaluate the association of risk factors with the three ordered categories of screen time exposure: one hour or less, two hours, and three hours or more. Multivariable, ordered logistic regression was used to examine the association of covariates with screen time while accounting for other covariates. Two variables, mother and father's cell phone usage were found to be collinear and could become a potential source of bias due to over-adjustment if both were included in the multivariable model. Therefore, we only considered mothers' cell phone use because it more closely predicted the screen time outcome among the children. The study was approved by the institutional ethics committee at HM Patel Centre for Medical Care and Education, Pramukhswami Medical College.

Results

A total of 550 forms were distributed across seven preschools and more than two-thirds of the forms (379, 68.9%) were completed and returned. The average screen time among the 379 (208 males, 171 females) children was 2.7 hours (SD: 1.7), with an average daily television screen time of 1.6 hours (SD: 1.1). Half of the parents have introduced screens to their kids before the age of 2 years. Only 10 participants reported zero hours of screen time on a typical weekday. Only 65 (17.2%) participants met the AAP recommendation of 1 hour or less screen time per day and only 75 (19.8%) participants reported sleeping for the AAP recommended 11 hours or more. However, 356 (93.9%) participants reported at least one hour of outdoor activity and 294 (77.6%) participants either read or were read to for one hour on weekdays. Roughly, four out of five children have reported use of smartphones. In addition, nearly all of the parents (90%) related to games or videos as their child's primary activity on a smartphone. The average time of exposure to screen (3.5 vs 2.7 hours, $P < 0.001$), outdoor activity (2.3 vs 1.6, $P < 0.001$), and reading (1.2 vs 1.1, $P = 0.03$) were high during the weekends in comparison to weekdays. Table 1 lists the distribution of risk factors and covariates across different categories of screen time. Older children were more likely to have higher category of screen time exposure while female children were less likely. In comparison to children from households with two or less devices with screens, those from households with three devices demonstrated a 60% increased odds of having high screen time. Even more so, children from households with four devices had almost a three-fold increased odds of high screen time. Cell phone use by mothers was shown to cause a two-fold increase in the odds of high screen time of children. Children who watch TV while eating have almost 80% greater odds of having high categories of screen time exposure. Association of factors such as request to use phone by children and the tactic of parents to give phones to children to calm them with screen time use was attenuated in the multivariable model when accounting for confounding through other covariates. However, there were no discernible differences observed in children's sleeping, reading, or outdoor playing based on their screen time (results not shown).

Discussion

This study represents the first investigation of the screen time of early childhood age children of Western India. We found that more than four out of every five children in our study had screen time exposure that exceeded the AAP recommendations. Half of the parents reported onset of screen time use occurring earlier than AAP recommendation. Our study showed increased screen time among children whose household had three or more devices. In addition, there was increased screen exposure in children whose parents also frequently used smartphones and the children who have their meals while watching television showed greater screen time as well. We also found that television and smartphone accounted for most of screen time exposure and most children used smartphones to watch videos or play games. Remarkably,

Table 1: The distribution of participants' characteristics and risk factors for increased screen time across different categories of screen time use among preschool-aged children

Risk factors		Screen time			Unadjusted		Adjusted	
	n	0-1 hr (%)	2 hrs (%)	3+ hrs (%)	OR*	*P*	OR*	*P*
N	379	65	137	177				
Age	92	27.7	30.7	18.1	reference		reference	
2-3 years								
4 years	116	30.8	32.9	28.8	1.3	0.25	1.7	0.07
5-6 years	171	41.5	36.5	53.1	1.9	0.01	2.6	<0.01
Female	171	55.4	46.7	40.1	0.7	0.03	0.71	0.10
Mother works for pay	54	17.2	14.7	13.0	0.8	0.42	0.70	0.23
Father works 8+hours	221	52.3	64.2	55.9	0.9	0.78	1.22	0.35
First screen exposure	59	12.9	20.4	13.0	reference		reference	
1 yr or less								
1-2 years	137	32.3	33.6	40.1	1.4	0.22	1.4	0.27
3 years or later	10	54.8	46.0	46.9	1.1	0.72	0.8	0.49
Number of devices	151	54.7	42.3	32.8	reference		reference	
2 or less								
3 devices	107	20.3	33.6	27.1	1.5	0.09	1.6	0.05
4 or more	120	25.0	24.1	40.1	2.3	<0.01	2.9	<0.01
Daily frequency of phone requests	104	46.2	28.5	19.8	reference		reference	
Never								
1-2 times	174	44.6	41.6	49.7	2.1	<0.01	1.5	0.25
3 or more times	101	9.2	29.9	30.5	2.8	<0.01	1.7	0.16
Mother Phone Use	48	29.2	11.7	7.3	reference		reference	
Never								
1 hour/day	143	38.5	34.3	40.1	3.1	<0.01	2.2	0.03
2 hours/day	94	13.9	28.5	26.0	3.5	<0.01	2.2	0.03
3 or more hours/day	94	18.5	25.5	26.6	3.5	<0.01	2.2	0.04
Father Phone Use	18	10.8	5.8	1.7	reference		reference	
Never								
1 hour/day	81	27.7	21.2	19.2	2.8	0.04	--	--
2 hours/day	63	12.3	18.3	17.0	3.9	0.01	--	--
3 or more hours/day	217	49.2	54.7	62.1	4.1	<0.01	--	--
Eats while watching TV	206	41.5	45.3	66.1	2.3	<0.01	1.8	0.01
Parents give phone to calm their child	292	58.5	79.6	81.9	2.1	<0.01	1.1	0.72

*OR represents cumulative odds ratio of being in an increased category of screen time exposure for the given conditional distribution of the covariate

these results are very similar to that observed in studies of preschool children conducted in high-income countries.[3,4]

It is important to consider that participants in our study were selected because of their enrolment in a selected network of English-speaking preschool programs and therefore our results are not generalizable to the rest of the region or the country; however, this group represented the most accessible participants to investigate this previously understudied topic. Though screen time usage was based on parent self-report and is susceptible to recall bias, most current studies on this topic, including the ones that have informed AAP guidelines, rely on this method for ascertaining screen time exposure among children. Our study may be limited by the lack of detailed information about the attention deficit challenges and learning in classroom settings, but the primary objective of our study was only to establish the need for studying this topic in India.

Studies have shown how increasing screen time at a young age results in poor family functioning.[3] However, since screen time is taking over parent–child interaction, it is important to consider the content viewed by the children. Our study states how majority of the children use smartphones for playing games and watching videos. We assumed that most parents allow their kids to only play "educational" games, as the app stores give no worthy evidence whether the app is actually beneficial.[3]Furthermore, these apps are not designed based on inputs from actual educators or developmental specialists and do not contain approved curricula.[3] Therefore, skills such as patience, perseverance, emotional control, and complex thinking cannot be developed from digital play.[3]

While preliminary, our results also hint at potential strategies for interventions surrounding use of television during meals and engaging parents to develop a family media use plan to promote co-viewing of high-quality programming. A study conducted in the U.S. evaluated how recommended guidelines were accepted by parents without any interventions but believed increased television time is not a problem and explained how televisions could be used as a "safe and affordable distraction".[9]

The results from the study showed how parents take into consideration the recommended guidelines but never fully establish them due to their own set of standards and habits.[9] In comparison, three out of four parents in our study reported giving their smartphones to their children to placate them, which could be due to the result of the working parents wanting some time off for themselves.

Further, another study done in Canada stated how screen time depended on the home setting such as parental education, household income, and the number of devices present in the home.[10] Since parents screen usage is a major predictor of child media habits, it is suggested parents be the target audience for behavioural change.[3,10] Perhaps, talking to parents about the negative effects of screen time and creating more approachable and feasible plans will help reduce screen time exposure.

Our study exposes the fact that a large number of preschool children exceed screen time recommendations of the AAP in a rural setting. Screen time exposure is more likely to happen in those children who watch television while eating, whose households have three or more devices, and whose parents use technology often. Because of the negative implications, increased screen time exposure can cause, early intervention and counselling needs to be considered.[3]

In conclusion, our study represents a first step for an emerging line of inquiry into the public health problem of screen time usage in India by reporting its prevalence and comparing it to AAP guidelines. Our findings hold the promise to inform future research for understanding the determinants of inappropriate screen time usage and ways to engage parents in enforcing screen time restrictions during early childhood period.

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Conflict of interest

There is no conflict of interest.

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