Electronic media device usage and screen time among children in a tertiary care hospital in Western Uttar Pradesh, India: A cross-sectional study

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Abstract

***Background**:* Increased use of electronic media devices has become a significant health problem in the paediatric population worldwide. Excessive use of these devices in children is associated with several health-related hazards.

Objectives: To describe the media device usage, screen time, and factors associated with their uses among children in a tertiary care hospital in Western Uttar Pradesh, India.

Method: A cross-sectional study was conducted in the department of Paediatrics of a tertiary care hospital, in Moradabad, Western Uttar Pradesh, India. All children aged 6 months to 8 years were recruited. A questionnaire in English that was converted into Hindi was used to collect data. Exposure to electronic device usage, average time spent on each device, and factors associated with device usage were analysed.

Results: Exposure to audio-visual media devices among 6 months to 8-year-old children was 92.5%; 27 (7.5%) children had no screen exposure; 62.5% had a daily screen time more than two hours, whereas 57 (17.4%) had screen time less than 1 hour. Children from nuclear families (67.3%) and those born with first order of birth were found to be more media-indulgent. Most popular audio-visual media device was the smartphone, which was used by 162 (45.6%) children, followed by television (22.8%), laptop (19.7%), tablet (11.3%), and desktop (8.4%). There was a significant correlation ($p<0.05$) between screen time and different age groups, as well as between age group and types of shows watched. Screen time of more than one hour per day was independently associated with male gender and children living in urban areas.

Conclusions: Majority of children were exposed to daily screen time that exceeds recommended limits as per AAP and Indian guidelines. Smartphones were the most commonly used audio-visual media devices. Screen time of more than one hour per day was independently associated with male gender and children living in urban areas

(Key words: Media devices, Screen time, Exposure, Children)

Introduction

Increased use of electronic media devices has become a significant health problem in the paediatric population worldwide[1]. Excessive use of these devices in children is associated with several health-related hazards, including a negative impact on language development, cognition, social interactions, sleep, learning, behaviour and non-communicable diseases[2,3]. Several guidelines have been developed in recent years to set limits for screen device use by children. World Health Organisation recommends that children of 3–4 years limit screen time to less than 60 min per day[4]. Indian psychiatry association issued recommendations for media use in children and adolescents up to 18 years of age and advised zero screen time in children less 2 years. Between 2 to 5 years viewing for specific purposes like educational games or teaching aid for a limited period (not longer than 30 minutes per session, and not more than two sessions per day, under supervision - a shared media use), rather than for entertainment was advocated[6]. Most recent guideline issued in 2016 by the American Academy of Paediatrics also recommends a maximum of one hour of screen time per day in children aged between 2–5years[6]. Several studies in western countries have evaluated screen time among pre-school children[7]. However, studies evaluating conformity of screen time in preschool children belonging to low and middle-income countries to these guidelines are sparse[8]. Recent appliances, such as smart phones,

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tablets etc. can be positioned effortlessly in a child's room, thereby encouraging more media exposure according to the social cognitive theory[9,10]. As shown by a recent study by Common-Sense Media, 2013, young children show increased use of handheld devices such as cell phones mainly due to increase in accessibility and usage of technology[11]. Children are being more and more detached from parents, as parents are being more and more attached to the technology[12].

Objectives

Present study was undertaken to assess the electronic media device usage, screen time and factors associated with their uses among children of North India.

Method

A descriptive, cross-sectional study was conducted in the department of paediatrics of a tertiary care hospital, in Moradabad, Western Uttar Pradesh, India over a period of one year on children aged 6 months - 8 years, belonging to the Moradabad District, Uttar Pradesh.

Sample size: Minimum sample size (n=355) was calculated using the formula n= (Z1- α/2)2 ×p q / d2. Purposive sampling technique was used for selection of children**.**

Inclusion criteria*:* Children aged 6 months to 8 years who visited the paediatric outpatient department (OPD) or the immunisation clinic were enrolled.

Exclusion criteria*:* The parents who did not give consent to participate & children with neurological or intellectual disability were excluded from the study.

Study procedure: A questionnaire made in English that was converted into Hindi was used to collect data from respondents. This questionnaire (which was pre-validated on the sample population) included demographic and socio-economic details, availability and usage of electronic screen devices, type of media devices, and time spent on media devices. Data on the availability and usage of electronic devices were gathered using separate questions to be answered "yes" or "no" for individual devices: television, smartphone, tablet, desktop, and laptop. Data on time spent on each device was gathered as the average time per day for each device to be filled by the parent. Yes-or-no questions were used to collect data on the types of programmes viewed, including cartoons, adult programming, movies, educational programming, and nursery rhymes. The age at first exposure was captured by a question with a single choice to be selected from multiple choices of predetermined age ranges. The questionnaires and participant information sheets were filled out by the parents of children who visited the paediatric OPD.

Ethical issues: The study was approved by the Institutional Ethics Committee of Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India (No. TMMC&RC/IEC/19-20/045) dated 19.12.2019. Written informed consent was obtained from a parent or legally acceptable caregiver.

Statistical analysis: The data were entered into the Microsoft Excel sheet and the statistical analysis was performed by SPSS software version 25.0. Categorical variables were present in the form of frequency and percentage. Mean and standard deviation were used for analysing the continuous variables. Fisher's exact test and Chi-Square test were used to analyse the categorical variables. Evaluation of predictive factors was done by multivariate and bivariate regression, which was followed by assessment of the fit of model. p-value < 0.05 was taken as significant.

Results

A total of 384 children were recruited for this study, among whom 8 were sick and 21 were ones whose parents were not willing to give consent. Finally, 355 children were included in the study. Table 1 shows the general characteristics of the study population. Mean age of the study population was 46.1 ± 4.8 months. Usage of screen devices by children showed a distribution parallel to their availability at home. Study also showed that a higher caregiver's screen time per day was associated with a higher child's screen time.

The present study found exposure to an audio-visual media device among 6- to 8-year-old children to be 92.5%. Only 27 (7.5%) children did not have any screen time at all. Table 2 shows the correlation of screen time in different age groups. Screen time and different age groups of children were found to have a significant correlation (p value = 0.0023).

Among shows watched, cartoons were the most popular. A significant (p value = 0.012) correlation was discovered between the types of shows watched and the age group of the children (Table 3).

Factors associated with screen time exceeding one hour per day in children are shown in Table 4. More than one hour of screen time per day was significantly associated with the male gender (p= 0.001) and children living in urban areas (0.022).

Table 1: ***General characteristics of study population (n=355)***

Variable		Frequency (%)
Informant	Mother	246 (69.2)
	Father	60 (16.9)
	Other	49 (13.9)
Gender	Male	191 (53.8)
	Female	164 (46.2)
Age group of child	6 months to 2 years	145 (40.8)
	More than 2 years to 5 years	116 (32.7)
	More than 5 years to 8 years	94 (26.5)
Socio-economic status	Upper	121 (34.1)
	Middle	143 (40.3)
	Lower	91 (25.6)
Number of children	1	189 (53.3)
	2-3	119 (33.5)
	>3	47 (13.2)
Type of family	Nuclear	239 (67.3)
	Joint	116 (32.7)
Order of child	First	200 (56.2)
	Second	105 (29.5)
	Third	50 (14.3)
First exposure	6 months to <1 year	69 (19.4)
	1 to 3 years	181 (51.0)
	More than 3 years	105 (29.6)
Type of media device available at home	Smartphone	324 (91.3)
	Television	310 (87.3)
	Tablet	87 (24.5)
	Laptop	85 (23.9)
	Desktop	67 (18.9)
Media device used by children	Smartphone	162 (45.6)
	Television	81 (22.8)
	Tablet	42 (11.9)
	Laptop	40 (11.3)
	Desktop	30 (08.4)

Table 2: ***Correlation of screen time in different age groups (n=328).***

Age group	Screen time						Total
	Less than 1 hour		1 hour to 2 hours		>2 hours		
	n	%	n	%	n	%	
6 months to 2 years	28	21.5	22	16.9	80	61.6	130
More than 2 years to 5 years	17	16	38	35.8	61	48.2	106
More than 5 years to 8 years	12	13	16	17.4	64	69.6	92
Total	57	17.4	66	21.1	62.5	205	328
p- value	**0.0023 (Significant)**						

Table 3: ***Correlation of age group and type of show watched (n=328).***

Type of program	Age group		
	6 months to 2 years	More than 2 years to 5 years	More than 5 years to 8 years
Cartoon	86	18	19
Adult programs	13	35	10
Educational	26	36	19
Entertainment shows	12	20	34
Total	137	109	82
p- value	**0.012 (Significant)**		

Table 4: ***Predictive factors of increased screen time(>1hour) in children***

Variable		OR: 95% CI	p- value
Age group	6 months to 2 years	Referent	
	More than 2 years to 5 years	7.1 (2.3, 17.5)	0.020
	More than 5 years to 8 years	2.1 (0.8, 5.7)	0.443
Gender	Boys	Referent	
	Girls	15.3 (5.2, 39.5)	0.001
Residence	Rural	Referent	
	Urban	18.4 (4.1, 72.6)	0.022
Paternal education	Illiterate	Referent	
	Up to 5th	0.62 (0.12, 3.8)	0.351
	6th to higher Secondary	0.44 (0.13, 4.3)	0.428
	Graduate	0.27 (0.03, 3.1)	0.431
	Postgraduate	0.13 (0.01, 3.3)	0.299
Maternal education	Illiterate	Referent	
	Up to 5th	1.9 (0.5, 8.4)	0.117
	6th to Higher Secondary	0.8 (0.02, 7.1)	0.339
	Graduate	0.5 (0.01, 3.8)	0.824
	Postgraduate	0.19 (0.02, 2.9)	0.713

Discussion

In today's fast-changing and evolving information technology, media devices, because of their portability, diversity of information, and interaction have quickly become popular. In this study population, the commonly used electronic media device were smartphone, television and laptop. The present study found exposure to audio-visual media device among 6 months to 8 years old children to be 92.5%. In a similar study in Sri Lanka, Rathnasiri A, *et al*[12] reported that 96% of children aged between 36 and 49 months had exposure to media devices. Kabali HK, *et al*[13] reported that 96.6% of children were using media devices as compared to 75.6% in a study by Kilic AO, *et al*[14]. A similar study in Western India by Shah RR, *et al*[15] reported that only 10 participants had zero hours of screen time on a typical weekday. Guedes SDC, *et al*[16] found that the incidence of interactive media use among children of early childhood was 67.2%, much less than the findings of our study.

In our study, 32.7% of the children using media devices were between 2 to 5 years. Kilic AO, *et al*[14] reported that among children who had used mobile devices, 20.6% were aged between 1 and 12 months and 24.5% were aged between 13 and 24 months. Varadarajan S, *et al*[17] showed that 72.8% children were more than 24 months old. Chang HY, *et al*[18] reported that 42.1% of the children were 4 years old and 30.8% were 3 years old with a mean age of 3.84 years. Kabali HK, *et al*[13] reported that 14.7% were infants, 43.9% were 1 to 2 years old and 41.7% were 3 to 4 years. In the Indian study by Meena SK, *et al*[19] mean age of the children was 3.96 years.

Of the subjects 53.8% were boys and 46.2% were girls. In a study by Varadarajan S, *et al*[17], 49.7% were boys and 50.3% were girls. Meena SK, *et al*[19] reported that 56.5% were males. In our study, nuclear type of family was found in 67.3% of the children and the joint type in 32.7%. A study by Varadarajan S, *et al*[17] found that 61.3% of families were nuclear, similar to ours.

We found that more than 80% of children had screen time exposure that exceeded the AAP recommendations. This proportion is comparable to the figures reported by various studies from high-income countries[20,21]. In a study by Guedes SDC, *et al*[16], mean screen time among children of early childhood was 69.2 minutes/day. Excessive screen time has been associated with a negative impact on language development, cognitive development, social interactions, sleep, learning, behaviour, and non-communicable diseases[2,3]. Therefore, it is likely that the majority of our children are at risk of developing these health hazards.

A study done by Chang HY, *et al*[18] showed that 65% of children were exposed to TV, compared to 31.3% of children who were exposed to smartphones. In our study, 19.5% of children aged 6 months to 1 year, 51% aged 1 to 3 years and 29.5% over the age of three had their first screen experience. Varadarajan S, *et al*[17] reported that the first exposure to screens occurred among 60.8% of children between 7 and 12 months, 13.8% between 19 and 23 months, and 8.5% less than 6 months of age. Chang HY, *et al*[18] showed that children who were exposed to television before 24 months of age comprised 65%. In our study 12.2% of children below 12 months of age were using smartphones for the very first time. The smartphone was the most commonly used audio-visual media device, which was used by 45.6% of children, followed by television (22.8%).

Our findings on the types of screen media device usage by Indian children were comparable to the usage by children from many other countries[13,16]. The findings were similar to a study by Guedes SDC, *et al*[16] which reported that smartphones were found to be children's most commonly used media device. While studies by Rathnasiri A, *et al*[12], Shah RR, *et al*[15], Chang HY, *et al*[18], Skvarc DR, *et al*[22], and John JJ, *et al*[23] reported that television was the most commonly used screen device, Kabali HK, *et al*[13] reported that tablets were the most commonly used media device among children. The access to desktops, laptops, and tablets was very limited in this study as compared to studies from western countries[24,25]. This can be attributed to economic differences between developing and developed countries.

In our study, cartoons, educational programmes, entertainment shows, and adult programmes were seen by 34.7%, 24.5%, 24.5%, and 16.3% of the children, respectively. The age group, gender, and place of residence all had a substantial impact on the duration of media device viewing. Our study found that male gender and urban residence were significant predictors of increased screen time (>1 hour) in children that exceeded the recommended limit. Our findings were comparable to those of Anand B, *et al*[26]. Children aged 2–8 years, female gender, and children from an urban background watched much more television in their study. Higher father's education, according to Rathnasiri A, *et al*[12], was a predictor of increased screen time in children.

The study had some limitations. Children attending this hospital cannot reflect the whole situation in western Uttar Pradesh. Future research should include all children belonging to different institute of Uttar Pradesh in order to estimate the electronic media device usage, screen time and factors associated with their uses among children in North India.

Conclusions

The electronic media devices were used by the majority of children, and over 80% used them for more than the recommended daily upper limit of one hour. Smartphones were found to be the most popular electronic media devices. Higher socio-economic status, maternal employment, nuclear family size, and the firstborn child were significantly associated with electronic device use.

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