

Original Research Article

SCREEN EXPOSURE TIME AND ITS IMPACT ON BEHAVIORAL HEALTH IN CHILDREN

Arunkumar Raju¹, Bharanidharan S²

¹Associate Professor, Department of Paediatrics, Annapoorana Medical College & Hospitals, Salem, India.

²Professor, Department of Paediatrics, Annapoorana Medical College & Hospitals, Salem, India.

Received : 15/11/2023
Received in revised form : 08/01/2024
Accepted : 24/01/2024

Corresponding Author:

Dr. Arunkumar Raju

Associate Professor, Department of Paediatrics, Annapoorana Medical College & Hospitals, Salem, India
Email: arunkmrr@gmail.com

DOI: 10.5530/ijmedph.2024.1.67

Source of Support: Nil,

Conflict of Interest: None declared

Int J Med Pub Health

2024; 14 (1); 368-371

ABSTRACT

Background: Screen exposure is increasing among children nowadays. The cognitive and emotional development is not fully mature in young children. Violent and mature content can lead to aggressive behavior and psychological disturbances in children. This study aimed to analyze the association between screen exposure time and behavioral health of 6 – 10-year-old children using Strength and Difficulties questionnaire.

Material and Methods: This cross-sectional study was done in 400 children attending paediatric OPD. Data was collected from parents regarding screen time during weekdays and weekends. The average screen time was calculated and children were categorized in two groups as those with < 2 hours and those with > 2 hours of screen time. The cut-off of 2 hours was based on IAP screen time and digital wellness guidelines for children more than 5 years. Behavioral health was assessed using Strength and Difficulties score (SDQ) questionnaire completed by parents. Children were categorized as four bands viz. close to average, slightly raised, high, very high. The association between screen exposure time and SDQ scores were analyzed.

Results: 172 (43%) of children had screen exposure more than 2 hours. 13% of children had abnormal scores (high and very high band) in SDQ. Children with screen exposure time of more than 2 hours had 3.46 times higher odds of having very high SDQ scores (OR 3.46, 95% CI 1.07 – 11.21, p = 0.03). The association of excessive screen time with very high scores was significant.

Conclusion: Screen exposure time was more than the recommended time limit in most of the children. Children with higher screen time > 2 hours had high SDQ scores indicating poor behavioral health.

Keywords: Screen exposure time, Strength and Difficulties score, behavioral health.

INTRODUCTION

Modern day world is getting digitized and everyone's life is dependent of digital gadgets. Children are no exception. The amount of digital screen exposure has risen exponentially following COVID pandemic.^[1] The availability of televisions and smartphones is increasing among Indians. The internet penetration and digitization of education during pandemic has increased smartphone usage among children.^[2]

The cognitive and emotional development are not fully mature in young children. Peer to peer interaction helps them to develop language and socio-adaptive milestones. Presence of television or

digital device interrupts parent child interaction at home. Viewing of violent and mature content can lead to psychological disturbances in young children.^[3] This can lead to aggressive behavior and subsequent change in personality. These media contents create an addictive behavior among children leading to impairment in social interaction and sleep.^[4]

Excessive screen exposure in children < 5 years had been associated with delayed language development.^[5] Few studies had found out that these children exhibit symptoms of attention deficit hyperactivity disorder.^[6] It has shown causing psychological disorders including depression,

aggressive behavior and poor school performance in adolescents.^[4]

Indian academy of Pediatrics released Screen time and Digital wellness in Infants, Children and Adolescents guidelines in 2022. It had recommended no screen exposure in children less than 2 years, a maximum of one hour of supervised screen time per day for children 2-59 months age, and less than two hours per day for children 5-10 years age.^[7]

American Academy of Pediatrics had suggested 1 hour of screen time for children between 2 – 5 years.^[8] For older children, they had suggested limited screen time though time limit was not specified.

This study was conducted with primary objective of assessing screen time in children between 6 and 10 years and association of excessive screen time of more than 2 hours with behavioral problems.

MATERIAL AND METHODS

This cross-sectional analytical study was done at Annapoorana Medical College & Hospitals, a tertiary care teaching hospital in Salem, Tamilnadu, India between October and December 2023. Institutional Ethics Committee approval was taken. 400 children attending paediatric OPD along with parents for minor ailments were included in the study. Children with developmental delay, psychiatric illness, ADHD, Autism and those on chronic medications were excluded. After getting informed consent, demographic details like age, sex, educational qualification of parents were collected. Details of electronic devices and gadgets in home like television, smartphone, tablets, computer, laptop were enquired. Parents were asked about total time spent on all devices on weekdays and weekends. Total screen time per day was calculated as (screen time on weekday *5 + screen time on weekend * 2) / 7. This was categorized into 5 groups of screen exposure time viz. none, up to 1 hour, 1 – 2 hours, 2 – 3 hours, > 3 hours.

The behavioral problems in children were assessed using Strength and Difficulties questionnaire. The Strengths and Difficulties Questionnaire (SDQ) is a brief behavioral screening questionnaire about 2–17-year-olds.^[9] 25 questions related to emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behavior were asked. Only prosocial behavior was considered as strength and rest were considered as difficulties.

Parent completed questionnaire was used in this study. The scores for four attributes of difficulties were summed up and total difficulty score was calculated. Then they were categorized in four bands as close to average, slightly raised, high, very high.

For analyzing the impact of screen time on behavior in children, children were grouped into two as those with screen time more than 2 hours and less than 2 hours. The 2 hours cut off for children aged between 6 and 10 years was taken from Indian Academy of Pediatrics guidelines on Screen Time and Digital Wellness in Infants, Children and Adolescents. The odd's ratio of association between screen exposure time and behavioral problems were calculated.

RESULTS

Out of 400 children studied, 208 (52%) were boys and 192 (48%) were girls. Table 1 shows the demographic details of the children in study group. All parents were educated. 28% of fathers and 19% of mothers had college education. 23% of children were in joint family along with grandparents.

All families (100%) had television at home. 86% of children had access to smartphone. 17% of children had tablet like electronic devices. 7% of children had smartphone for themselves, while rest were using their parents' smartphone.

Table 2 shows the screen exposure time in children. All children had TV or smartphone device exposure during both weekdays and weekends. More than half (57%) of the children had screen exposure less than 2 hours. 172 (43%) of children had screen exposure more than 2 hours.

SDQ score of all children was calculated from questionnaire filled by parents. They were categorized into four bands as shown in Table 3. 13% of children studied had abnormal scores (high and very high band) in SDQ.

The association between excessive screen time more than 2 hours and SDQ score bands was analyzed as in Table 4. Children with screen exposure time of more than 2 hours had 3.46 times higher odds of having very high SDQ scores (OR 3.46, 95% CI 1.07 – 11.21, p = 0.03). The association of excessive screen time with very high scores was significant. Children with screen exposure time of more than 2 hours had 1.73 times higher odds of having high SDQ scores (OR 1.73, 95% CI 0.88 – 3.38, p = 0.11) but the association was not significant.

Table 1: Demographic details of children studied

		n	%
Sex distribution	Boys	208	52
	Girls	192	48
Parent education	Father < 10 th std	72	18
	Higher secondary	216	54
	Undergraduate	104	26
	Postgraduate	8	2

	Mother < 10 th std	88	22
	Higher secondary	236	59
	Undergraduate	72	18
	Postgraduate	4	1
Type of family	Joint	308	77
	Nuclear	92	23
Families with screen devices at home	Television	400	100
	Smartphone	344	86
	Tablets and others	68	17
Sharing of devices	Shared with family members	372	93
	Individual device	28	7

Table 2: Screen exposure time among study population

Screen time	n	%
None	0	0
Up to 1 hour	48	12
1 – 2 hours	180	45
2 – 3 hours	132	33
> 3 hours	40	10

Table 3: SDQ scores categorization of study population

SDQ score category	n	%
Close to average	262	65.5
Slightly raised	86	21.5
High	38	9.5
Very high	14	3.5

Table 4: Association of SDQ scores with screen exposure time

SDQ score category	Screen time < 2 hours	Screen time > 2 hours	Odds' ratio (95% CI)	p value
Close to average	157	105	0.71 (0.47-1.07)	0.10
Slightly raised	50	36	0.94 (0.58-1.53)	0.81
High	17	21	1.73 (0.88-3.38)	0.11
Very high	4	10	3.46 (1.07-11.21)	0.03

DISCUSSION

43% of children in study group had screen exposure time more than the recommended 2 hours. Kaur et al analyzed 14 cross-sectional studies from various countries and found that prevalence of excess screen time varied from 10 to 93.7%.^[10] Kaul et al studied screen time in 8 – 15-year-old children and found that 97.4% had screen time more than 60 minutes. The mean screen time in study population was 195.49 minutes per day.^[11] Moitra et al studied adolescents in Mumbai and the mean screen time was 172.41 minutes per day. Around 85% of adolescents studied had screen time of more than 2 hours per day.^[12] However, 50.6% of adolescents in Manipur used smartphone less than 1 hour a day and 29.6%, 36.4%, and 36.4% of the students spent around 61–120 min watching TV, using the laptop/computer, and using the Internet, respectively.^[13] An online survey by Kale et al showed 52.73% of children had screen time > 2 hours/day.^[14] A study in Chennai by Varadarajan S et al in under 5 children showed excess screen time in 73% of children with mean screen time of 2.39 hours per day.^[15] Overall various studies across India shows that screen time in Indian children is

beyond recommended age in all age groups. The difference between various studies may be due socio-cultural and economic variations among the study population.

Only 7% of children in the study group had their own smartphone as against 30.2% as noticed by a pan India survey conducted in 2021 by National Commission for Protection of Child Rights.^[16] The smartphone ownership may be low because of rural and semi-urban nature of study participants and also economic status of family members.

Children having screen exposure of more than 2 hours had higher odds of very high SDQ scores in this study. Very high SDQ scores suggest that children were having behavioral problems. In a study done by A Khan et al demonstrated that the combination of insufficient physical activity and high recreational screen time was positively associated with concurrent psychosocial difficulties.^[17] Prolonged screen exposure promotes loneliness and reduces social interaction, problem solving skills and self-development. In a study in Japan by Arai Y et al, found that the high difficulties assessed by the SDQ were associated with increased screen time among Japanese elementary and junior high school students.^[18] In a similar study in Spain by Cartanya-Hueso et al found that children

spending 180 minutes or more on leisure time screen activity were more likely to be at the risk of developing emotional and behavioral problems.^[19] Choi Y studied 7 to 10 year old children in Korea using Child Behavior Checklist score and found that the screen overuse group had significantly higher scores than the control group, especially for social problems and rule-breaking behavior.^[20] Our study results were consistent with findings observed in various studies.

It is postulated that behavioral problems in children were due to their exposure to adult directed content which influences anti-social and aggressive behavior. Studies done on children with screen addiction had shown structural changes in frontal lobe.^[21] Social well-being is strongly related to face-to-face communication. Hence lack of such communication in children with excessive screen time affects their prosocial behavior.

Excessive screen exposure at younger age was found to have behavioral and psychosocial effects in adulthood. A study on 2 year-olds found that only one hour of daily TV exposure is related to aggression expression, social difficulties, and increased peer victimization at age 13.^[3] Also, studies have found out that exposure to violent content were linked to reduced prosocial behavior, empathy and reduced inhibition.^[22]

Hence most studies suggest that excess screen time is associated with behavioral problems in children.

CONCLUSION

The study revealed that children were having high screen time than the recommended time limit. Children with excessive screen time were having behavioral problems than those with lesser screen time. This study reveals the negative impact of screen time on behavior health of children. Screen time guidelines must be stressed to parents for long term mental wellbeing of children.

REFERENCES

1. McClain C. How parents' views of their kids' screen time, social media use changed during COVID-19. Pew Research Center. 2022. Available from: <https://www.pewresearch.org/short-reads/2022/04/28/how-parents-views-of-their-kids-screen-time-social-media-use-changed-during-covid-19/>
2. Social media, OTT, online gaming usage rises: 60% urban kids spend 3 hours daily. The Hindu. 2023 Sep 28 [cited 2023 Nov 26]; Available from: <https://www.thehindu.com/data/social-media-ott-online-gaming-usage-rises-60-urban-kids-spend-3-hours-daily-data/article67352974.ece>
3. Pagani, L.S., Lévesque-Seck, F., Fitzpatrick, C., 2016. Prospective associations between televiewing at toddlerhood and later self-reported social impairment at middle school in a Canadian longitudinal cohort born in 1997/1998. *Psychiatr. Med* 46 (16), 3329–3337
4. Lissak G. Adverse physiological and psychological effects of screen time on children and adolescents: Literature review

and case study. *Environmental Research*. 2018 Jul;164(1):149–57.

5. Karani NF, Sher J, Mophosho M. The influence of screen time on children's language development: A scoping review. *South African Journal of Communication Disorders*. 2022 Feb 9;69(1):7.
6. Liu H, Chen X, Huang M, Yu X, Gan Y, Wang J, Chen Q, Nie Z, Ge H. Screen time and childhood attention deficit hyperactivity disorder: a meta-analysis. *Rev Environ Health*. 2023 May 11.
7. Gupta P, Shah D, Bedi N, Galagali P, Dalwai S, Agrawal S, et al. Indian Academy of Pediatrics Guidelines on Screen Time and Digital Wellness in Infants, Children and Adolescents. *Indian Pediatrics*. 2021 Dec 29 [cited 2022 May 21];59(3):235–44.
8. AAP council on communications and media. Media and Young Minds. *Pediatrics*. 2016;138(5): e20162591
9. Sdqinfo.org. 2016[Internet]. Available from: <https://www.sdqinfo.org/>
10. Kaur N, Gupta M, Malhi P, Grover S. Screen Time in Under-five Children. *Indian Pediatr*. 2019 Sep 15;56(9):773–788.
11. Kaul A, Bansal N, Sharma P, et al. (October 25, 2023) Association of Screen Time Usage and Physical Activity with Overweight and Obesity Among School-Going Children in Uttar Pradesh. *Cureus* 15(10): e47690
12. Moitra P, Madan J, Verma P. Independent and combined influences of physical activity, screen time, and sleep quality on adiposity indicators in Indian adolescents. *BMC Public Health*. 2021 Nov 15;21(1).
13. Lyngdoh M, Akoijam BS, Agui RK, Sonarjit Singh Kh. Diet, physical activity, and screen time among school students in Manipur. *Indian J Community Med* 2019; 44: 134-7.
14. Kale N, Maheshwari AR, Kaley V, Rathi N. Screen-Time in Indian Children — An Online Survey Study. *Indian Journal of Pediatrics*. 2021 Jan 4;88(4):384–5.
15. Varadarajan S, Govindarajan Venguidesvarane A, Ramaswamy KN, Rajamohan M, Krupa M, Winfred Christadoss SB (2021) Prevalence of excessive screen time and its association with developmental delay in children aged <5 years: A population-based cross-sectional study in India. *PLoS ONE* 16(7): e0254102.
16. Effects (Physical, Behavioural and Psycho-social) of using Mobile Phones and other Devices with Internet Accessibility by Children a Study by the National Commission for Protection of Child Rights (NCPCR) [Internet]. Available from: https://ncpcr.gov.in/uploads/165650458362bc410794e02_effect1.PDF
17. Khan A, Uddin R, Burton NW. Insufficient physical activity in combination with high screen time is associated with adolescents' psychosocial difficulties. *International Health*. 2018 Mar 22;10(4):246–51.
18. Arai, Y., Sasayama, D., Suzuki, K., Nakamura, T. Kuraishi, Y. Washizuka, S. Association between Children's Difficulties, Parent-Child Sleep, Parental Control, and Children's Screen Time: A Cross-Sectional Study in Japan. *Pediatr. Rep*. 2023, 15, 668–678.
19. Cartanyà-Hueso À, Lidón-Moyano C, González-Marrón A, Martín-Sánchez JC, Amigo F, Martínez-Sánchez JM. Association between Leisure Screen Time and Emotional and Behavioral Problems in Spanish Children. *J Pediatr*. 2022 Feb; 241:188-195.e3.
20. Choi Y, Lee DY, Lee S, Park EJ, Yoo HJ, Shin Y. Association Between Screen Overuse and Behavioral and Emotional Problems in Elementary School Children. *Soa Chongsongyon Chongsin Uihak*. 2021 Oct 1;32(4):154-160.
21. Brand, M., Young, K.S., Laier, C., 2014. Prefrontal control and Internet addiction: a theoretical model and review of neuropsychological and neuroimaging findings. *Front. Hum. Sci*. 8 (375), 1–13.
22. Anderson, C.A., Shibuya, A., Ihori, N., Swing, E.L., Bushman, B.J., Sakamoto, A., Saleem, M., 2010. Violent video game effects on aggression, empathy, behavior in eastern and western countries: a meta-analytic review. *Psychol. Bull*. 136 (2), 151–173.