



Original Article

Study The Effect of Screen Time on the Development of Nutritive, Cognitive and Sleep Pattern in Children

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ABSTRACT

Background: Increasing screen time among children and adolescents has become a growing public health concern due to its potential impact on nutrition, cognition, physical activity, and sleep patterns. Excessive use of digital devices may adversely affect the overall health and well-being of children.

Aim & Objectives: To study the effect of screen time on nutritive, cognitive, and sleep patterns among early and mid-adolescent children in urban and OPD settings.

Methodology: A hospital-based cross-sectional study was conducted among 200 children aged 10–15 years at Muzaffarnagar Medical College from October 2024 to September 2025. Data regarding screen time, dietary habits, cognitive behavior, physical activity, and sleep patterns were collected using a structured questionnaire. Statistical analysis was performed using SPSS version 26.0, and $p < 0.05$ was considered significant.

Results: The mean age of participants was 11.47 years. Most children (61.5%) reported screen time of 2–4 hours/day, while 22.5% had screen exposure exceeding 4 hours/day. Higher screen time was significantly associated with increased junk food consumption ($p=0.008$), irritability ($p=0.0176$), reduced interest in physical activity ($p < 0.0001$), shorter sleep duration ($p=0.0016$), and greater prevalence of sleep-related problems ($p < 0.0001$). No significant association was observed between screen time and meal consumption during screen use, screen use before bedtime, or device presence in the bedroom.

Conclusion: Excessive screen time negatively influences nutritional habits, cognitive behavior, physical activity, and sleep patterns among adolescents. Increasing awareness regarding regulated device use and healthy lifestyle practices is essential to reduce these adverse effects.

Keywords: Screen time, adolescents, nutrition, cognitive behavior, sleep pattern, physical activity, sedentary lifestyle.

INTRODUCTION

The increasing inclusion of electronic devices and the internet in the current lifestyle has made the impact on children's daily experiences inevitable. ^[1] The rapid increase in screen time exposure among young children has become a growing concern worldwide. Screen time, defined as time spent using digital devices such as smartphones, tablets, televisions, and computers, is a common activity even in early childhood. ^[2]

Although high-quality screen activities meet some education and entertainment needs, exposure to digital screens may be detrimental for children's physical health, cognitive skills, and psychosocial development. ^[3] Emotional reactivity and aggression are two significant concerns, as excessive screen time has been linked to increased emotional reactivity, aggression, and externalizing behaviours in children. ^[4] This can lead to difficulties in social interactions and relationships, as well as increased risk of many behavioural problems. ^[5]

Research has shown negative associations between screen time, particularly television viewing, and the development of physical and cognitive abilities. Additionally, screen time has been linked to obesity, sleep problems, depression, and anxiety. [6] Screen time-induced poor sleeps, night time use of digital devices, and dependency on mobile phones have been associated with depressive symptoms. [7] The Centres for Disease Control and Prevention (CDC) and other organizations/studies have indicated that parental restrictions on screen time and the absence of screens in bedrooms both significantly lower screen time. [8,9]

Ideal discretionary screen time limits are 0.5-1 hour/day for three to seven-year-olds, one hour for 7-12-year-olds, 1.5 hours for 12-15-year-olds, and two hours for 16+-year-olds. Role modelling is also another crucial element. The amount of screen time parents and kids watch is closely associated; kids who live in homes where watching TV is encouraged (e.g., meals eaten in front of the TV and the TV is on when the child gets home from school) are more likely to engage in binge-watching themselves. If parents watch television for more than four hours every day, their sons and daughters will, respectively, have a 10.5-fold and a three-fold increased likelihood of doing the same. [10]

Aim & Objectives

1. To study the effect of screen time on the development of nutritive, cognitive and sleep pattern among rural and urban OPD and ward going early and mid- adolescent age group.
2. To determine the relationship between screen time and nutritive development in children.
3. To assess the association between screen time and cognitive development in children.
4. To examine the correlation between screen time and sleep patterns in children.

MATERIAL AND METHODS:

Study design: Hospital based cross-sectional study.

Study area: OPD and ward children as per the inclusion criteria in Muzaffarnagar Medical College, Muzaffarnagar.

Study population: Early and mid adolescent children in the age group of 10-15 years.

Sample size: A total of 200 children were taken.

Study duration: 1 year i.e. October, 2024 to September, 2025.

Study method: A questionnaire regarding screen time, eating habits, sleep pattern and cognitive behaviour was prepared and used.

Data collection: Questions were asked from early adolescents using parental questionnaire and by providing assistance to mid adolescent children.

Statistical analysis: Data was entered in MS-Excel sheet and analysed using the software SPSS 26.0. p- value was calculated and $p < 0.05$ was considered significant.

Inclusion criteria:

- Early and mid-adolescent age group children.
- Children who gave consent to answer the questions from questionnaire.

Exclusion criteria:

- Children >15 years and <10 years.
- Children who didn't answer 50% of questions.
- ADHD children or children with other behavioral problems.

RESULTS:

Mean age of patients in the present study was 11.47 years. There was no significant association between screen time and habit of taking meals or snacks during screen use, indicating that eating behaviour during screen time remains similar across all screen-time categories. Snack type showed a significant association, with children having higher screen time being more likely to consume junk food rather than healthy snacks ($p = 0.008$). (Table 1) Children with higher screen time showed a significantly greater tendency toward irritability compared to those with lower screen exposure. A very strong association was observed between increased screen time and reduced interest in physical activity, indicating that higher screen use is linked with lower participation in active play. (Table 2) Children with higher screen time showed significantly shorter sleep duration, with those spending more hours on screens more likely to sleep only 6–7 hours ($p = 0.0016$). Sleep issues were strongly associated with increased screen time, with children having higher screen exposure reporting more sleep-related problems ($p < 0.0001$). (Table 3)

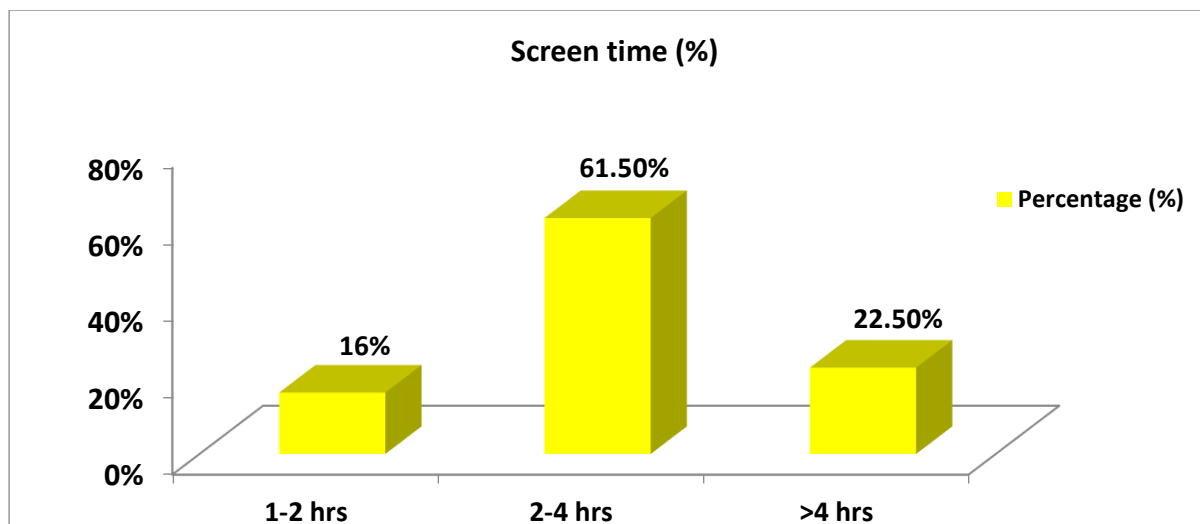


Figure 1: Distribution of participants according to screen time: (N=200)

Table 1: Association of screen time with nutritive pattern in participants:

Screen time	1-2 hrs	2-4 hrs	>4 hrs	p value
Meals during screen				
Always	09	46	18	0.63
Often	12	44	16	
Sometimes	11	33	11	
Snacks eating during screen				
Always	13	58	19	0.73
Often	19	65	26	
Snack type				
Junk food	23	66	35	0.008
Healthy	09	57	10	
Appetite change				
Disagree	13	61	22	0.66
Agree	19	62	23	

Table 2: Association of screen time with cognitive pattern in participants:

Screen time	1-2 hrs	2-4 hrs	>4 hrs	p value
General Mood				
Irritable	10	69	28	0.0176
Normal	22	54	17	
Overall mental being				
Anxious	08	51	23	0.20
Sad	12	35	13	
Normal	12	37	09	
Interest in physical activity				
Less	04	66	40	<0.0001
Normal	28	57	05	
Behaviour with same age children				
Aggressive	12	48	20	0.78
Well	20	75	25	

Table 3: Correlation between screen time and sleep pattern in participants

Screen time	1-2 hrs	2-4 hrs	>4 hrs	p value
Sleep duration				
6-7 hrs	28	65	25	0.0016
7-8 hrs	04	58	20	

Screen before bed				
Never	04	12	06	0.78
Always	06	41	15	
Often	18	56	19	
Sometimes	04	14	05	
Device in bedroom				
Yes	14	55	21	0.96
No	18	68	24	
Sleep issues				
Yes	04	47	32	<0.0001
No	28	76	13	

DISCUSSION:

Mean age of patients in the present study was 11.47 years. In a study done by Rocka A et al in 2022, the mean age of the children was 12.10 3.40 years old; the median was 12 years old. ^[11] In present study, 61.5% reported using screens for 2–4 hours per day, 22.5% had more than 4 hours of daily screen time, and only 16% reported a 1–2 hour screen-time duration. In a study done by Zablotsky B, approximately half (50.4%) of all teens had 4 or more hours of daily screen time. ^[12] A very strong association was observed between increased screen time and reduced interest in physical activity. Children with higher screen time showed a significantly greater tendency toward irritability compared to those with lower screen exposure. Similarly in a study done by Zablotsky B et al, teens with high daily screen time were more likely to have infrequent physical activity (45.6% vs 32.1%) and infrequent strength training (23.0% vs 13.3%). Teens with high daily screen time were more likely to have depression symptoms (25.9% vs 9.5%) and anxiety symptoms (27.1% vs 12.3%). ^[12] In our study, snack type showed a significant association, with children having higher screen time being more likely to consume junk food rather than healthy snacks ($p = 0.008$). Similar finding was observed by Rocka A et al in 2022 who reported 2410 (77%) children eating snacks between main meals. ^[11]

Children with higher screen time showed significantly shorter sleep duration, with those spending more hours on screens more likely to sleep only 6–7 hours ($p = 0.0016$). Sleep issues were strongly associated with increased screen time, with children having higher screen exposure reporting more sleep-related problems ($p < 0.0001$). Similar finding were observed by Hartstein et al. (2024) who further highlighted that teens who participate in interactive activities like late-night texting and gaming have a markedly higher rate of nighttime awakenings. ^[13] Gull and Sravani (2024) found that extended screen time, regardless of the activity, led to self-reported sleep problems, such as difficulty falling and staying asleep. ^[14] In a study done by Reddy TR et al in 2025, children with screen time of <2 h/day reported the longest sleep duration (8.3 ± 0.6 h), whereas those with screen time exceeding 4 h/day had the shortest sleep duration (6.5 ± 0.8 h). ^[15]

CONCLUSION:

The present study demonstrates that increased screen time has a significant adverse impact on multiple aspects of nutritive, cognitive, and sleep-related behaviors among early and mid-adolescent children. Higher screen exposure was associated with a greater preference for junk food and reduced engagement in physical activity, reflecting unhealthy nutritional and lifestyle patterns. Cognitive and emotional effects were also evident, with children spending more time on screens showing higher irritability and diminished interest in active play. Sleep was markedly affected, as higher screen time correlated with shorter sleep duration and a substantially greater prevalence of sleep-related problems. In contrast, behaviors such as meal consumption during screens, snack frequency, screen use before bed, and device presence in the bedroom did not show significant associations. Overall, the findings highlight that excessive screen use detrimentally influences children's health and well-being, underscoring the need for parental guidance, regulated device use, and increased awareness to promote healthier habits in adolescents.

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