

## A Study on Screen Time and Its Relationship with Obesity, Mental Health in School Children of Age Group 6-12 Years in Chennai

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### ABSTRACT

**Introduction:** The increasing use of electronic devices has raised concerns about its effects on children's health, including obesity and mental health issues like anxiety and depression. Guidelines recommend that children should limit their exposure to quality programming on television to only two hours per day. Paradoxically, studies reveal that children aged 8-18 years spend an average of 6.5 hours daily engaged in front of TV screens, computers, mobiles and video games surpassing the time spent on any other activity in their lives. The study shows the relationship between screen time and its impact on obesity, mental health in school children aged 6-12 years in Chennai.

**Methods:** The research design is cross-sectional, involving children attending outpatient departments (OPD). The sample size is 200 children, selected using purposive sampling. Data collection includes questionnaires on screen time habits, physical activity, and mental health assessments using standardized tools. Children consenting and willing to participate were included with assent and consent form parents. Anthropometric measurements like height, weight, and BMI were collected to assess obesity risk. The data was collected with SCARED and Strength and Difficulties questionnaire (SDQ) for parent along with demographic details.

**Results:** The study found that 44% of children exceeded the screen time recommended of 2 hours per day. Boys and girls showed similar screen time patterns. Physical activity levels were low, with 57% of children engaging in less physical activity. Additionally, children with fewer physical activity days were more likely to be obese or underweight, and 76% of children who engaged in screen time before sleep had below-average or poor school performance. Obesity was more prevalent among children with higher screen time and lower physical activity.

**Discussion:** The findings show the need of specific interventions to reduce screen time and promote physical activity among children. The study emphasizes on the parental guidance and educational policies to address the health risks which has been associated with screen time excess.

**Keywords:** Screen time, Obesity, Mental health, Cross-sectional study, SCARED (Screen for Child Anxiety Related Emotional Disorders), Strengths and Difficulties Questionnaire (SDQ), Physical activity, Anxiety, Depression, Parental guidance, Intervention strategies

### 1. INTRODUCTION

In today's digital era, children are increasingly immersed in screens, with televisions, computers, smartphones, and tablets becoming integral parts of their lives. This surge in screen usage has sparked concerns about its effects on children's physical and mental health, including links to obesity, attention deficits, and mental health disorders<sup>1, 2</sup>. Prolonged screen time contributes to sedentary behavior, a key factor in the rise of childhood

obesity, a widespread issue affecting both developed and developing nations<sup>3</sup>. Specifically, this excessive screen usage is tied to poor health outcomes such as obesity and mental health problems, with potential long-term consequences.

Health organizations like the American Academy of Pediatrics (AAP) and the Indian Psychiatry Association have set guidelines to limit screen exposure, but children often exceed these recommendations<sup>4</sup>. In India, children average 6.5 hours of screen time daily, contributing to psychological challenges such as sleep disturbances, anxiety, and behavioral issues<sup>5</sup>. Albert Bandura's theory of observational learning also suggests that children's screen habits can influence their behavior<sup>6</sup>.

Despite substantial research in developed countries, the impact of excessive screen exposure on children's academic performance and health in developing nations like India remains underexplored<sup>7</sup>. This study aims to bridge that gap by examining screen time patterns among children aged 6-12 years in India, highlighting the correlation between prolonged screen exposure, obesity, and mental health challenges. The findings emphasize the need for responsible screen use and balanced lifestyle habits to mitigate these risks and will guide educational policies, parental decisions, and public health strategies for children's well-being in an increasingly digital world.

## 2. AIM AND OBJECTIVES

**Aim:** To study the relationship between screen time and risk of obesity, and mental health.

### Objectives:

- To study the relationship between screen time and risk of obesity.
- To study the relationship between screen time and its effect on mental health.

## 3. MATERIALS AND METHODS

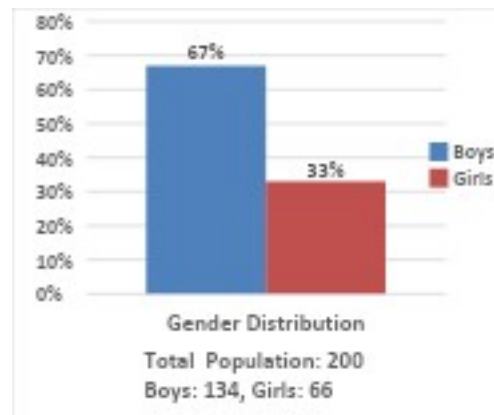
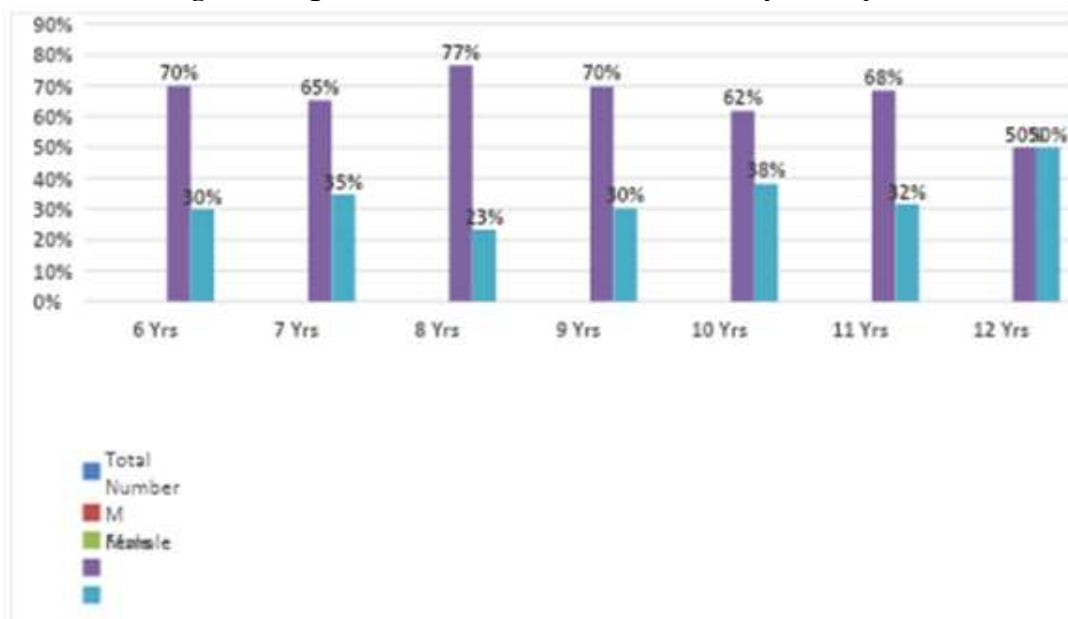
The study employed a cross-sectional research design to examine the association between screen time, obesity, mental health, and academic performance among school children aged 6-12 years. A sample of 200 children attending the Pediatric Outpatient Department (OPD) at SreeBalaji Medical College and Hospital was selected using purposive sampling. Consent was obtained from parents or guardians, and children from both public and private schools were included. Exclusion criteria encompassed children with chronic illnesses and those who refused to participate.

Data were collected through structured questionnaires, covering demographics, screen time habits, and physical activity. Mental health was assessed using the Screen for Anxiety Related Emotional Disorders (SCARED)<sup>8</sup> and Strength and Difficulties Questionnaire (SDQ)<sup>9</sup>. Anthropometric measurements such as BMI were recorded to assess obesity. The collected data were statistically analyzed using chi-square tests, unpaired t-tests, and correlation analyses with a significance threshold of  $p < 0.05$ .

## 4. RESULTS

A total of 200 children attending Pediatric OPD were enrolled in the study between January 2023 and December 2023. Both children and their parents were interviewed, with the children assessed for screen time usage, health impacts, obesity and school performance. Standardized tools, such as the Screen for Anxiety Related Emotional Disorders (SCARED) and the Strength and Difficulties Questionnaire (SDQ), were utilized for mental health assessments.

### ● Socio-Demographic Characteristics:

**Figure 1: Gender Distribution of the Study Population****Figure 2: Age and Gender Distribution of the Study Participants**

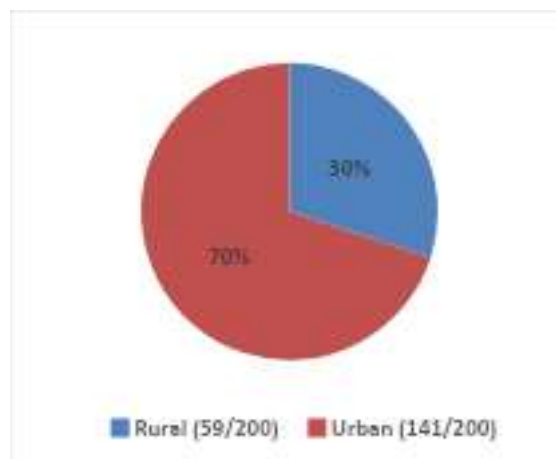
**Observation:** Most children were aged 8-10 years, with boys predominating in all age groups.

**Table 1: Socio-Economic Status of the Study Participants**

| Socio-economic status | Female | Male | Total |
|-----------------------|--------|------|-------|
| Upper Class           | 0      | 0    | 0     |
| Upper middle class    | 13     | 18   | 21    |
| Middle Class          | 11     | 23   | 34    |
| Upper lower class     | 30     | 53   | 83    |
| Lower class           | 12     | 40   | 52    |

**Observation:** Most children belonged to upper-lower and lower-class families.

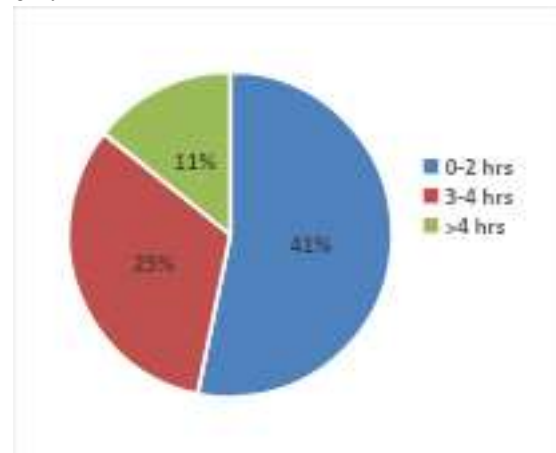
**Figure 3: Geographical Distribution of the Study Participant**



**Observation:** The majority of participants were from urban areas.

- **Screen Time Patterns:**

**Figure 4:** Distribution of Children's Screen Time in Hours



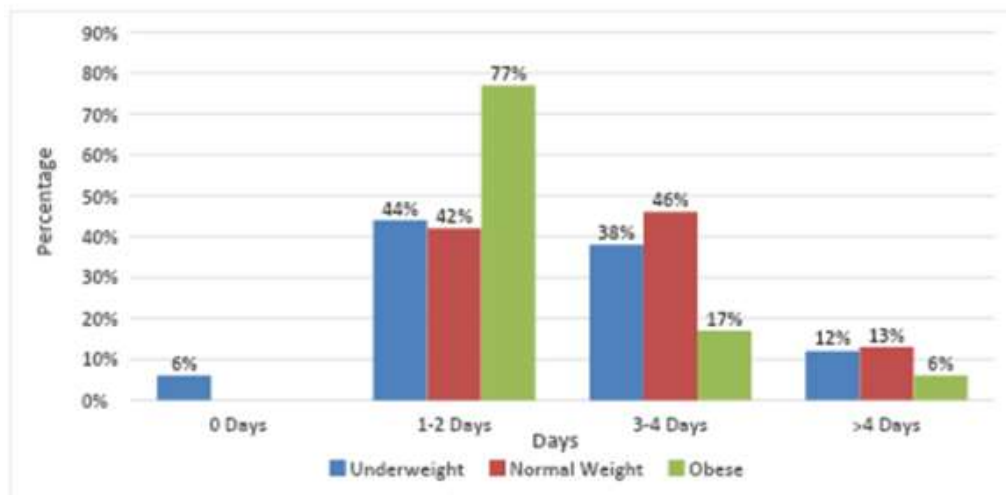
**Observation:** 41% of children had 2 hours or less of screen time, 25% had 3-4 hours, and 11% exceeded 4 hours

**Table 2:** Distribution of Screen Time in Hours with Respect to Gender

| No of hours of Screen time per day | Male     | Female   | Total    |
|------------------------------------|----------|----------|----------|
| 1hr                                | 24 (18%) | 7 (11%)  | 31 (16%) |
| 2hr                                | 51 (38%) | 30 (45%) | 81 (41%) |
| 3hr                                | 30 (22%) | 19 (29%) | 49 (25%) |
| 4hr                                | 13 (10%) | 5 (8%)   | 18 (9%)  |
| 5hr                                | 10 (7%)  | 4 (6%)   | 14 (7%)  |
| 6hr                                | 6 (4%)   | 1 (2%)   | 7 (4%)   |

**Observation:** The average daily screen time for participants was 2.6 hours. 44% of children exceeded the recommended 2-hour daily screen time limit.

- **Physical Activity and Obesity:**

**Figure 5:** Distribution of Study Participants Based on Physical Activity and Body Mass Index

| Physical activity in last week | Under weight | Normal weight | Obese    |
|--------------------------------|--------------|---------------|----------|
| 0 days                         | 7 (6%)       | 0             | 0        |
| 1-2 days                       | 53 (44%)     | 20 (42%)      | 40 (77%) |
| 3-4 days                       | 46 (38%)     | 22 (46%)      | 9 (17%)  |
| >4days                         | 14 (12%)     | 6 (13%)       | 3 (6%)   |

**Observation:** Children with fewer physical activity days were more likely to be obese or underweight. 77% of children who had 1-2 days of physical activity per week were found to be obese.

**Table 3:** Distribution of Study Participants on Growth Chart BMI for Age (WHO graph Z score)

| BMI            | Boys     | Girls    |
|----------------|----------|----------|
| Sever Thinness | 14 (10%) | 7 (11%)  |
| Thinness       | 30 (22%) | 16 (24%) |
| Normal         | 56 (41%) | 25 (38%) |
| Overweight     | 24 (18%) | 16 (24%) |
| Obesity        | 10 (7%)  | 2 (3%)   |
| Total          | 134      | 66       |

**Observation:** Severe thinness was seen in 10% of boys and 11% of girls. Obesity was more common in boys (7%) compared to girls (3%).

- Screen Time and Health Outcomes:**

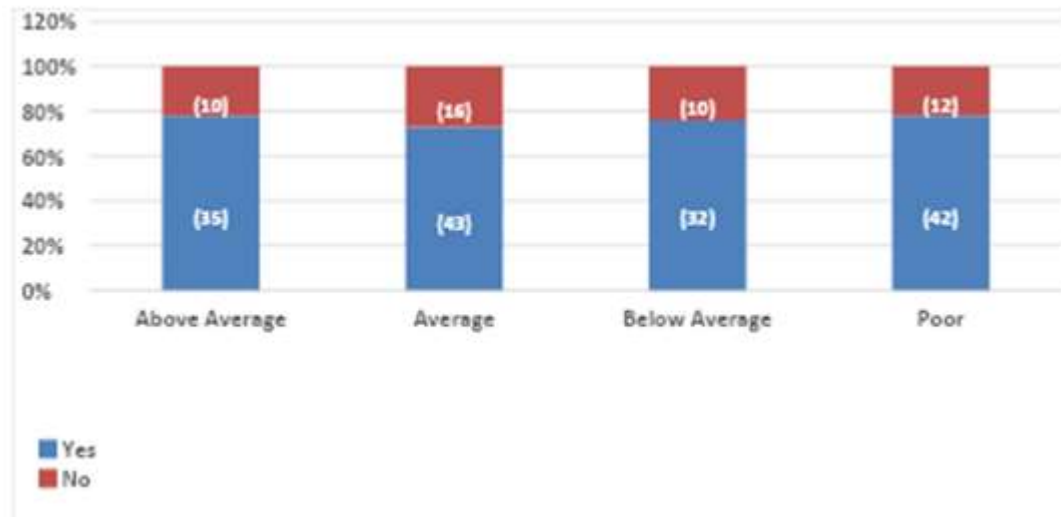
**Table4:** Association between Screen time and Risk of Obesity.

| BMI<br>(WHO graph z<br>scores) | Screen time      |                 | Total |
|--------------------------------|------------------|-----------------|-------|
|                                | <2hrs<br>(N=102) | >2hrs<br>(N=98) |       |
| Severe Thinness                | 6(5.8)           | 10(10.2)        | 16    |
| Thinness                       | 21(20.5)         | 14(14.2)        | 35    |
| Normal                         | 47(46)           | 32(32.6)        | 79    |
| Overweight                     | 22(21.5)         | 25(25.5)        | 47    |
| Obesity                        | 6(5.8)           | 17(17.3)        | 23    |
| P value-0.043                  |                  |                 |       |

**Observation:** P Value of **0.043** indicates statistically significant correlation suggesting that there is relation between screen time and risk of obesity.

● **School Performance and Screen Time:**

**Figure 8:** Distribution of Study Participants Based on School performance and BMI



| Performance at school | Screen time before sleep |          | Total |
|-----------------------|--------------------------|----------|-------|
|                       | Yes                      | No       |       |
| Above average         | 35 (78%)                 | 10 (22%) | 45    |
| Average               | 43 (73%)                 | 16 (27%) | 59    |
| Below average         | 32 (76%)                 | 10 (24%) | 42    |
| Poor                  | 42 (78%)                 | 12 (22%) | 54    |
| Grand total           | 152 (76%)                | 48 (24%) | 200   |

**Observation:** No significant correlation was found between screen time and school performance. However, 76% of children who engaged in screen time before sleep had below-average or poor school performance.

● **Mental Health and Screen Time:**

**Table 5:** Association of Duration of Screen Time and Dry Eyes among Study Participants

| No. of hours of Screen time per day | Dry Eyes |           |          |          | Total |
|-------------------------------------|----------|-----------|----------|----------|-------|
|                                     | Often    | Sometimes | Rarely   | Never    |       |
| 0-2 hrs                             | 12 (10%) | 14 (11%)  | 34 (28%) | 62 (51%) | 122   |
| 2-4 hrs                             | 7 (10%)  | 11 (16%)  | 20 (30%) | 29 (43%) | 67    |
| 4-6 hrs                             | 6 (29%)  | 8 (38%)   | 05 (24%) | 02 (10%) | 21    |
| >6hrs                               | 0        | 0         | 0        | 0        | 0     |

**Observation:** The occurrence of dry eyes increased with higher screen time, with 29% of children with 4-6 hours of screen time experiencing frequent dry eyes.

**Table 6:** variables and their association with anxiety disorder

| Variables                       | Score less than 25 | Score more than 25 | P value      |
|---------------------------------|--------------------|--------------------|--------------|
| Gender (Male)                   | 128                | 6                  | 0.28         |
| Age                             | 8.9 (1.62) yrs     | 9,14 (1.57) yrs    | 0.89         |
| BMI                             | 21.16 (3.04)       | 26.57 (0.53)       | <b>0.001</b> |
| Physical activity (days a week) | 2.27 (1.062)       | 1.7 (0.53) days    | <b>0.001</b> |

|                                         |                 |                |              |
|-----------------------------------------|-----------------|----------------|--------------|
| Average screen time per day (hrs)       | 2.52 (1.19) hrs | 4.6 (0.69) hrs | <b>0.001</b> |
| School performance (below average/poor) | 91              | 5              | 0.3          |
| Screen time before sleep                | 147             | 5              | 0.77         |
| Dry eyes                                | 21              | 1              | 0.7          |

**Observation:** The occurrence of dry eyes increased with higher screen time, with 29% of children with 4-6 hours of screen time experiencing frequent dry eyes.

**Table 7:** Strength and Difficulty Questionnaire (SDQ) Scoring Answered by Parents

| SDQ score answered by parents | Boys (Mean±SD) | Girls (Mean±SD) | p-value |
|-------------------------------|----------------|-----------------|---------|
| Score less than 25            | 11.62±5.94     | 10.60±4.80      | 0.348   |
| Score more than 25            | 14.50±6.44     | 12.50±5.50      | 0.098   |

**Observation:** Abnormal scores in conduct and peer problem domains were more prevalent among children with higher screen time and mental health issues.

**Table 8:** Behavioral Health Problems among Early and Mid-Adolescent Age Group

| Variables            | Boys (F) | Boys (%) | Girls (F) | Girls (%) | Total (F) | Total (%) |
|----------------------|----------|----------|-----------|-----------|-----------|-----------|
| <b>Emotions</b>      |          |          |           |           |           |           |
| Normal               | 87       | 62%      | 48        | 66%       | 135       | 63%       |
| Borderline           | 27       | 19%      | 15        | 21%       | 42        | 20%       |
| Abnormal             | 27       | 19%      | 10        | 14%       | 37        | 17%       |
| <b>Conduct</b>       |          |          |           |           |           |           |
| Normal               | 20       | 14%      | 12        | 16%       | 32        | 15%       |
| Borderline           | 32       | 23%      | 12        | 16%       | 44        | 21%       |
| Abnormal             | 89       | 63%      | 49        | 67%       | 138       | 64%       |
| <b>Hyperactive</b>   |          |          |           |           |           |           |
| Normal               | 81       | 57%      | 44        | 60%       | 125       | 58%       |
| Borderline           | 30       | 21%      | 12        | 16%       | 42        | 20%       |
| Abnormal             | 30       | 21%      | 17        | 23%       | 47        | 22%       |
| <b>Peer Problems</b> |          |          |           |           |           |           |
| Normal               | 48       | 34%      | 22        | 30%       | 70        | 33%       |
| Borderline           | 30       | 21%      | 19        | 26%       | 49        | 23%       |
| Abnormal             | 63       | 45%      | 32        | 44%       | 95        | 44%       |
| <b>Prosocial</b>     |          |          |           |           |           |           |
| Normal               | 51       | 36%      | 29        | 40%       | 80        | 37%       |
| Borderline           | 36       | 26%      | 16        | 22%       | 52        | 24%       |
| Abnormal             | 54       | 38%      | 28        | 38%       | 82        | 38%       |

**Observation:** 3.5% of participants reported symptoms of stress, anxiety, or depression. Higher screen time (average 4.6 hours) was associated with increased anxiety and mental health issues.

#### 4. DISCUSSION

The study highlighted that 41% of children reported 2 hours or less of screen time daily, while 11% exceeded 4 hours, surpassing recommended guidelines. A correlation was found between prolonged screen time and obesity, with 77% of children engaging in less than 2 days of physical activity per week classified as obese<sup>10</sup>. Boys demonstrated a higher prevalence of obesity (7%) compared to girls (3%).

Screen time before sleep was notably associated with higher rates of overweight and obesity<sup>12</sup>. Additionally, no significant link was found between screen time and school performance, though 76% of children who

engaged in screen time before sleep exhibited below-average academic results. Mental health assessments revealed that increased screen time was linked to elevated anxiety, conduct problems, and peer difficulties, with abnormal SDQ scores observed in 64% of participants<sup>9, 13</sup>.

Comparatively, these results align with findings from studies in other countries, such as Australia and Bangladesh, which similarly reported elevated screen time among children<sup>14, 15</sup>. The correlation between high screen exposure and negative mental health outcomes, including anxiety and conduct disorders, was consistent with prior research. However, the study also highlighted regional variations, with Indian children demonstrating higher screen usage compared to global averages<sup>16, 17</sup>.

## 5. CONCLUSION

This study underscores the detrimental impact of excessive screen time on both physical and mental health among children. With a significant portion of the sample exceeding recommended screen time limits, the results point to the need for targeted interventions. Strategies promoting physical activity and mental well-being, alongside limiting screen exposure, are essential for mitigating the risk of obesity and psychological disorders in children. The findings contribute valuable insights for public health policies and parental guidance in managing screen time to improve the holistic well-being of school-aged children.

## 6. REFERENCES

1. Twenge JM, Campbell WK. Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Prev Med Rep.* 2018 Oct 18;12:271-283. doi: 10.1016/j.pmedr.2018.10.003. PMID: 30406005; PMCID: PMC6214874.
2. Mineshita Y, Kim HK, Chijiki H, Nanba T, Shinto T, Furuhashi S, Oneda S, Kuwahara M, Suwama A, Shibata S. Screen time duration and timing: effects on obesity, physical activity, dry eyes, and learning ability in elementary school children. *BMC Public Health.* 2021 Feb 28;21(1):422. doi: 10.1186/s12889-021-10484-7. PMID: 33639912; PMCID: PMC7916284.
3. Braithwaite I, Stewart AW, Hancox RJ, et al. The worldwide association between television viewing and obesity in children and adolescents: cross sectional study. *Plos one.* 2013 ;8(9):e74263. DOI: 10.1371/journal.pone.0074263. PMID: 24086327; PMCID: PMC3783429.
4. Canadian Paediatric Society, Digital Health Task Force, Ottawa, Ontario. Screen time and young children: Promoting health and development in a digital world. *Paediatr Child Health.* 2017 Nov;22(8):461-477. doi: 10.1093/pch/pxx123. Epub 2017 Oct 9. Erratum in: *Paediatr Child Health.* 2018 Feb;23(1):83. doi: 10.1093/pch/pxx197. PMID: 29601064; PMCID: PMC5823000.
5. 95% of Homes in South have TV: BARC India. News article in The economic Times. Available at: <https://economictimes.indiatimes.com/industry/media/entertainment/95-of-homes-in-south-have-tv-barc-india/articleshow/65601494.cms?from=mdr>. Accessed on 05 July 2024.
6. Schunk, D. H., & DiBenedetto, M. K. (2023). Albert Bandura's legacy in education. *Theory Into Practice*, 62(3), 205–206. <https://doi.org/10.1080/00405841.2023.2226560>
7. Adelantado-Renau M, Moliner-Urdiales D, Cavero-Redondo I, Beltran-Valls MR, Martínez-Vizcaíno V, Álvarez-Bueno C. Association Between Screen Media Use and Academic Performance Among Children and Adolescents: A Systematic Review and Meta-analysis. *JAMA Pediatr.* 2019 Nov 1;173(11):1058-1067. doi: 10.1001/jamapediatrics.2019.3176. PMID: 31545344; PMCID: PMC6764013.
8. Birmaher B, Khetarpal S, Brent D, Cully M, Balach L, Kaufman J, et al. The screen for child anxiety related emotional disorders (SCARED): Scale construction and psychometric characteristics. *J Am Acad Child Adolesc Psychiatry* 1997;36:545-53.

9. Theunissen MH, de Wolff MS, Reijneveld SA. The strengths and difficulties questionnaire self-report: a valid instrument for the identification of emotional and behavioral problems. *Academic pediatrics*. 2019 May 1;19(4):471-6.
10. Raju A, Bharanidharan S; SCREEN EXPOSURE TIME AND ITS IMPACT ON BEHAVIORAL HEALTH IN CHILDREN DOI: 10.5530/ijmedph.2024.1.67
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. Hysing M, Pallesen S, Stormark KM, Jakobsen R, Lundervold AJ, Sivertsen B, et al. Sleep and use of electronic devices in adolescence: Results from a large population- based study. *BMJ Open* 2015;5:e006748.
13. Zink, J.; Belcher, B.R.; Kechter, A.; Stone, M.D.; Leventhal, A.M. Reciprocal associations between screen time and emotional disorder symptoms during adolescence. *Prev. Med. Rep.* 2019, 13, 281–288. [CrossRef]
14. LeBlanc AG, Katzmarzyk PT, Barreira TV, Broyles ST, Chaput JP, Church TS, et al. Correlates of Total Sedentary Time and Screen Time in 9-11 Year-Old Children around the World: The International Study of Childhood Obesity, Lifestyle and the Environment. *PloS One* 2015;10:e0129622
15. Khan A, Burton NW. Screen-based behaviors of adolescents in Bangladesh. *J Phys Act Health* 2016;13:1156-63.
16. Kaur N, Gupta M, Malhi P, Grover S. Screen Time in Underfive Children. *Indian Pediatr.* 2019 Sep 15;56(9):773-788.
17. 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.