



# Relationship Between Screen Time And Body Mass Index In Children Aged 2-5 Years: A Correlational Study

Reena<sup>1\*</sup>, Dr. Pooja Kaushik<sup>2</sup>, Prof. Dr. R.K Sharma<sup>3</sup>

<sup>1\*</sup>Master of Occupational Therapy (paediatrics) student,

<sup>2</sup>Assistant Professor, Department of Occupational Therapy, Santosh College of Occupational Therapy Ghaziabad,

<sup>3</sup>Dean Paramedical and Principal Santosh College of Occupational Therapy Ghaziabad

**Citation:** Reena, et. al (2024), Relationship Between Screen Time And Body Mass Index In Children Aged 2-5 Years: A Correlational Study, *Educational Administration: Theory and Practice*, 30(5) 15265 - 15269

Doi: 10.53555/kuey.v30i5.8784

## ARTICLE INFO

## ABSTRACT

**Background:** Increased screen time in young children (ages 2-5) has been associated with adverse health effects, including a higher Body Mass Index (BMI). This study explores the connection between screen time and BMI in preschool-aged children, aiming to better understand how excessive screen use may contribute to childhood obesity.

**Study Design:** A Correlational study.

**Aim:** To identify the relationship between screen time and BMI in children aged 2-5 years.

### Objectives of the Study:

- Measure the average daily screen time of children aged 2-5 years, including time spent on television, tablets, smartphones, and other devices.
- Calculate the BMI of these children using standardized methods and categorize them based on age and sex-specific BMI percentiles (underweight, normal weight, overweight, and obese).

**Participants:** 384 children aged 2-5 years. Participants were included as per inclusion and exclusion criteria after taking Informed consent from parents.

**Methods:** Data were collected from 384 children, recording their screen time (using the DSEQ) and BMI percentiles. Spearman's rho correlation was used to analyze the relationship between screen time and BMI.

**Result:** A positive correlation coefficient of 0.415 was found, with a statistically significant p-value of less than 0.001. This moderate positive correlation suggests that increased screen time is associated with higher BMI percentiles in children.

**Conclusion:** The positive correlation indicates that children who spend more time on screens are more likely to have higher BMI percentiles, highlighting the potential impact of screen time on childhood obesity.

**Keywords:** Childhood, overweight, screen time, childhood obesity, body mass index.

## INTRODUCTION

In recent years, screen time has become an integral part of daily routines, especially among young children. With the increasing availability and use of digital devices, children today are more exposed to screens than ever before. The World Health Organization (WHO, 2019)<sup>1</sup>, the Canadian Pediatric Society (2017)<sup>2</sup>, and the American Academy of Pediatrics (2016)<sup>3</sup> have all set guidelines to limit screen time for young children, highlighting the potential negative impacts of excessive exposure. Specifically, these organizations recommend that children under the age of two should not be exposed to screens at all, while those aged 5 to 10 should have no more than two hours of recreational screen time each day. Despite these guidelines, many children continue to spend much more time on screens due to the pervasive nature of technology and entertainment platforms. This raises concerns about the types of media that children are accessing and the potential implications for their physical, cognitive, and emotional development<sup>3</sup>.

One of the most alarming consequences of increased screen time is the rising prevalence of childhood obesity, a serious public health issue that has gained significant attention in recent years. Globally, the rates of childhood obesity have increased dramatically, especially in communities with lower socio-economic status.<sup>4</sup>

Childhood obesity is a complex condition with wide-ranging effects, influencing not only physical health but also psychological well-being and social functioning. Children who are obese are at higher risk for developing chronic conditions such as type 2 diabetes, cardiovascular diseases, and joint problems. In addition, obesity can have lasting psychological effects, including poor self-esteem, anxiety, and depression. Research also suggests that obese children are more likely to become obese adults, leading to long-term health risks and a persistent burden on healthcare systems. This creates a cycle of higher medical costs and social consequences, making obesity a major public health concern that needs urgent attention<sup>4</sup>.

Body Mass Index (BMI) is a widely used method to assess obesity in both children and adults. It is a quick, non-invasive, and cost-effective screening tool that helps identify individuals at risk for obesity-related health issues. Similar to how mammography is used to detect breast cancer, BMI is used as a first step in identifying those who may require further assessment or intervention<sup>5</sup>. However, it is important to note that BMI is not a perfect measure, as it does not account for factors such as muscle mass or distribution of body fat. Despite these limitations, BMI remains an effective tool for public health surveillance and for identifying populations at risk for obesity-related conditions.<sup>1</sup>

Numerous studies have linked excessive screen time to a variety of negative health outcomes. Increased screen time has been associated with poor sleep quality, which can disrupt the body's natural circadian rhythms and lead to fatigue, irritability, and even weight gain.<sup>5</sup> Moreover, children who spend more time on screens tend to engage in less physical activity, as sedentary behaviors are more common during screen use. This lack of physical activity contributes to weight gain and poor cardiovascular health. Additionally, excessive screen time can negatively affect dietary habits, with children being more likely to engage in unhealthy eating behaviors such as mindless snacking while watching TV or playing video games. These factors combined can lead to an increase in BMI, raising the risk of obesity<sup>5</sup>.

Given the growing influence of digital devices on children's lives, it is essential to better understand the relationship between screen time and BMI, particularly in young children aged 2 to 5 years. This age group is a critical period for physical and cognitive development, making it especially vulnerable to the potential negative effects of excessive screen exposure. Early intervention is crucial to address this issue and ensure that children develop healthy lifestyle habits from a young age<sup>6</sup>.

The purpose of this study is to explore the correlation between screen time and BMI in children aged 2 to 5 years. By investigating this relationship, the study aims to provide valuable insights into how early exposure to screens may influence children's physical health and to identify strategies that can help mitigate the negative effects of screen time, ultimately promoting healthier lifestyles in young children.

## METHODOLOGY

This study was reviewed, discussed and approved by the Santosh Occupational Therapy institutional ethical committee. 384 participants were included from community Bhopura, Ghaziabad and South Delhi. Prior to participate in the study, participants were explained about the study. The written consents were obtained from the participants. As per inclusion criteria, children with age range 2-5year were included in the study. As per exclusion criteria, Children with a history of seizures, younger than 2 years old, or with any recent activity limitations due to orthopedic, neurological, or psychological conditions were excluded.

### Outcome Measures:

#### **Digital Screen Exposure Questionnaire (DSEQ)<sup>8</sup>:**

The Digital Screen Exposure Questionnaire (DSEQ) is a reliable tool used to assess children's daily screen time, including exposure to televisions, smartphones, tablets, and computers. It measures the amount of time spent on digital devices by asking parents to report their child's weekly screen time, which is then averaged to calculate daily exposure. With strong reliability (kappa values of 0.52 to 1.0 and Cronbach's alpha ranging from 0.73 to 0.82), the DSEQ helps evaluate the impact of screen time on children's health, particularly in relation to obesity and physical activity. The formula for calculating average screen time is:

Average ST per day (minutes)= {(weekday ST in minutes×5) + (weekend ST in minutes ×2)}/7

BMI Formula<sup>1</sup>:

BMI is calculated using the following formula:

$BMI = \text{Weight (kilogram)} / \text{Height}^2 (\text{Meter}^2)$

## DATA COLLECTION

Data for this study was collected from 384 children aged 2-5 years in Bhopura (Ghaziabad) and South Delhi. Informed consent was obtained from parents or guardians of each child. The study involved the following key assessments: The children's screen time was assessed using the Digital Screen Exposure Questionnaire (DSEQ), which asked parents to report the average daily screen time over the past week. The questionnaire focused on time spent using various devices such as televisions, smartphones, tablets, and computers and BMI Calculation: Children's height and weight were measured, and BMI percentiles were calculated using age- and sex-specific growth charts provided by the World Health Organization (WHO). Based on these percentiles, each child was categorized into one of the following weight status groups: underweight, normal weight, overweight, or obese.

## DATA ANALYSIS

Upon completion of data collection, the results were entered into a master chart and analyzed using IBM SPSS software. Spearman's rho correlation coefficient was used to assess the relationship between screen time and BMI percentiles. The use of Spearman's rho is appropriate due to the ordinal nature of BMI percentiles and the potential for a non-linear relationship between screen time and BMI.

## RESULT

The study examined the relationship between screen time (measured in hours of DSEQ) and body mass index (BMI) percentiles in children aged 2-5 years. The results were categorized into four BMI percentiles: 0-5 (underweight), 5-84 (normal weight), 84-95 (overweight), and 95-100 (obesity). Of the 384 participants, 44 were classified as underweight, 165 had normal weight, 50 were overweight, and 125 were classified as obese. These findings show a higher prevalence of children in the normal weight and obesity categories.

Regarding screen time, the data revealed that children aged 4-5 years exhibited the highest screen time (198 hours), followed by children aged 2-3 years (108 hours), with the least screen time recorded for children older than 5 years (1 hour). A significant gender difference was observed in screen time, with female children spending more time (222 hours) compared to male children (162 hours).

Table 1 depicts the Spearman's rho correlation analysis revealed a moderate positive correlation between BMI percentiles and screen time ( $\rho = 0.415$ ,  $p < 0.001$ ). This result supports the hypothesis that increased screen time is associated with higher BMI percentiles in children, aligning with previous research linking sedentary behavior to weight gain. These findings underscore the importance of managing screen time as a factor in childhood obesity prevention.

**Table 1. Spearman's Rho Correlation Between BMI and Screen Time of Children Aged 2-5 Years**

Correlations				
			BMI (Percentile)	DSEQ (Hours)
Spearman's rho	BMI (Percentile)	Correlation Coefficient	1.000	.415**
		Sig. (2-tailed)	.	<.001
		N	384	384
	DSEQ (Hours)	Correlation Coefficient	.415**	1.000
		Sig. (2-tailed)	<.001	.
		N	384	384

## DISCUSSION

The present study examined the relationship between screen time and body mass index (BMI) in children aged 2-5 years, with findings showing a moderate positive correlation between screen time and BMI percentile (Spearman's rho = 0.415). This suggests that higher screen time is associated with higher BMI in young children, aligning with previous research linking sedentary behaviors to weight gain. The statistical significance of this correlation, supported by a sample size of 384, underscores the importance of screen time as a factor in BMI management for children.

Supporting this finding, a 2021 study by Nimran Kaur et al., conducted in Chandigarh, found a high prevalence of excessive screen time among children aged 2 to 5 years, with screen time being significantly linked to factors such as daycare attendance, caregivers' screen time, and the educational status of mothers<sup>9</sup>.

Similarly, Rui-Yu Chang et al.'s research in Taiwan (2023) revealed that prolonged screen time in preschool children increased the risk of obesity, with a 60-minute increase in screen time correlating with a 10% increase in the likelihood of obesity<sup>11</sup>.

Furthermore, studies by Chighaf Bakour et al. (2022) have similarly found that Watching TV or playing video games for  $\geq 1$  hour per day is associated with obesity in adolescents who did not meet the guidelines for physical activity. Using computers or handheld devices seems to have a weaker association with BMI compared with TV/video games<sup>12</sup>.

One of the significant findings from a study conducted by Abha Kaul et al. (2023) revealed that the rising prevalence of overweight among children underscores the need for early intervention strategies, emphasizing the importance of reducing screen time and promoting increased physical activity. These measures are critical in addressing the growing challenge of being overweight during childhood and its potential long-term health implications<sup>13</sup>.

Additionally, a study by Suvasish Das Shuvo et al. (2023) The results supports that the total time spent using electronic media was associated with an increased risk of being overweight and obese. Finally, this study strongly suggests the proper use of electronic media may be necessary to reduce the risk of being overweight and obese in early adolescents<sup>14</sup>.

These findings emphasize the need to address screen time as a potential risk factor for childhood obesity. The data support the growing body of evidence that excessive screen time is a significant contributor to sedentary behavior and weight gain, highlighting the need for interventions that promote balanced screen usage, physical activity, and healthy eating habits to prevent obesity in young children.

### CONCLUSION

In conclusion, this study highlights significant associations between BMI distribution and screen time exposure among young children, revealing important patterns that could impact health outcomes. The moderate positive correlation between BMI and screen time adds to growing evidence that increased screen exposure may contribute to higher BMI in children, likely due to associated sedentary behavior and potential dietary influences. Although the statistical significance of this correlation strengthens the case for screen time as a factor in BMI management, it does not establish causation.

### LIMITATIONS

This study had some limitations first, we did not directly observe participants' screen time, which could have led to social desirability bias affecting the results. Additionally, other factors influencing BMI, such as diet, physical activity, sleep, and genetics, were not fully controlled, potentially impacting the correlation. The focus on a specific age range limits the generalizability of the findings to other groups.

### FUTURE RECOMMENDATION

Future research should investigate the mechanisms linking screen time to BMI, particularly how it affects activity levels, sleep, and dietary habits, to inform better interventions. Expanding the study to include diverse age ranges and populations, and using experimental designs, would provide a more comprehensive understanding of screen time's impact on BMI and help in developing strategies to promote healthy weight management in children.

### ACKNOWLEDGEMENT

I express my gratitude to the following individuals for their assistance and involvement in this project: Dr. P. Mahalingam, Chairman and Vice Chairman of Santosh Medical College. Santosh College of Occupational Therapy, Ghaziabad: Dr. R. K. Sharma, Dean, Paramedical & Principal of Occupational Therapy College: Dr. Pooja Kaushik, Assistant Professor and the subjects who participated in the study. Thank you also to my parents and God for their blessings. These people provided direction and encouragement, which made the endeavor possible.

### References

1. Fang K, Mu M, Liu K, He Y. Screen time and childhood overweight/obesity: a systematic review and meta-analysis. *Child Care Health Dev.* 2019; 45:744-53.
2. Hill D, Ameenuddin N, Chassiakos YR, Cross C, Radesky J, Hutchinson J, et al. Media and young minds. *Pediatrics.* 2016 [Cited 10 February 2021];138.
3. Ponti M, Bélanger S, Grimes R, Heard J, Johnson M, Moreau E, et al. Screen time and young children: promoting health and development in a digital world. *J Paediatr Child Health.* 2017;22:461---77 [Cited 10 February 2021].
4. World Health Organization (WHO). Guidelines on physical activity, sedentary behavior, and sleep for children under 5 years of age. World Health Organization. 2019.
5. Ministerio de Sanidad Servicios Sociales e Igualdad. Actividad Física para la Salud y Reducción del Sedentarismo. Recomendaciones para la población. Estrategia de Promoción de la Salud y Prevención en el SNS. Madrid; 2015.
6. Ishtiaq, Annum; Ashraf, Hiba; Iftikhar, Sundus; Baig-Ansari, Naila. Parental perception on screen time and psychological distress among young children. *Journal of Family Medicine and Primary Care* [10\(2\): p 765-772, February 2021.](#) | DOI: 10.4103/jfmpc.jfmpc\_1720\_20
7. Ishtiaq, Annum; Ashraf, Hiba; Iftikhar, Sundus; Baig-Ansari, Naila. Parental perception on screen time and psychological distress among young children. *Journal of Family Medicine and Primary Care* [10\(2\): p 765-772, February 2021.](#) | DOI: 10.4103/jfmpc.jfmpc\_1720\_20
8. Ishtiaq, Annum; Ashraf, Hiba; Iftikhar, Sundus; Baig-Ansari, Naila. Parental perception on screen time and psychological distress among young children. *Journal of Family Medicine and Primary Care* [10\(2\): p 765-772, February 2021.](#) | DOI: 10.4103/jfmpc.jfmpc\_1720\_20
9. Nimran Kaur, Madhu Gupta et al. Prevalence of Screen Time Among Children Aged 2 to 5 Years in Chandigarh, a North Indian Union Territory, May 2021, *Journal of Developmental & Behavioral Pediatrics*, DOI:10.1097/DBP.0000000000000964

10. Àurea Cartanyà-Hueso, Cristina Lidón-Moyano, Juan Carlos Martín-Sánchez, Adrián González-Marrón et al. The association between recreational screen time and excess weight and obesity was assessed with three sets of criteria in Spanish residents aged 2-14 years. 2022 Nov;97(5):333-341. doi: 10.1016/j.anpede.2021.09.004. Epub 2022 Sep 13.
11. Chang RY, Chen TL, Yeh CC, Chen CH, Wang QW, Toungh T, Liao CC. Risk of Obesity Among Children Aged 2-6 Years Who Had Prolonged Screen Time in Taiwan: A Nationwide Cross-Sectional Study. Clin Epidemiol. 2023 Feb 13;15:165-176. doi: 10.2147/CLEP.S382956. PMID: 36817560; PMCID: PMC9936874.
12. Bakour C, Mansuri F, Johns-Rejano C, Crozier M, Wilson R, Sappenfield W. Association between screen time and obesity in US adolescents: A cross-sectional analysis using National Survey of Children's Health 2016-2017. PLoS One. 2022 Dec 1;17(12):e0278490. doi: 10.1371/journal.pone.0278490. PMID: 36454793; PMCID: PMC9714705.
13. 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. DOI 10.7759/cureus.47690
14. Shuvo SD, Biswas BK (2023) The degree of association between overweight and obesity with the use of electronic media among Bangladeshi adolescents. PLoS ONE 18(1): e0280544. <https://doi.org/10.1371/journal.pone.0280544>