



Original Article

Investigating The Relationship Between Screen Time and Behavioral Problems Among Children 2-10 Years

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OPEN ACCESS

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Received: 14-10-2025

Accepted: 16-11-2025

Available online: 24-11-2025

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Medical and Pharmaceutical Research

ABSTRACT

Background: With the increasing prevalence of digital technology, children are exposed to screens from an early age. Excessive screen time has been linked to aggression, attention difficulties, and emotional challenges. This study examines the relationship between screen time and behavioral outcomes in children aged 2 to 10 years, especially considering increased exposure during the COVID-19 pandemic.

Methods: A cross-sectional study was conducted with 100 children aged 2-10 years. Parent-reported questionnaires were used to collect data on screen time and behavioral issues. Spearman's rank correlation coefficient was used to assess relationships between daily screen time and behavioral indicators, accounting for non-parametric data. Demographic factors such as age, gender, and socioeconomic status were also considered.

Results: A significant positive correlation was found between screen time and behavioral problems. The strongest correlation was with frequent physical complaints ($\rho = 0.812, p < 0.001$), followed by restlessness ($\rho = 0.683, p < 0.001$) and temper tantrums ($\rho = 0.683, p < 0.001$). Screen time was negatively correlated with prosocial behaviors such as sharing ($\rho = -0.429, p < 0.001$) and helping others ($\rho = -0.429, p < 0.001$). The correlation between screen time and age was not significant ($\rho = 0.153, p = 0.129$).

Conclusions: Increased screen time is associated with higher restlessness, physical complaints, and reduced prosocial behaviours in children. These findings underscore the need for parental monitoring and balanced media use to support healthy social-emotional development. Further research on the type and context of screen use is recommended to inform interventions and public health policies.

Keywords: Screen time, Aggression, Attention difficulties, Behavioural issues.

INTRODUCTION

In recent years, the increasing prevalence of screen time among children has sparked widespread concern regarding its potential effects on mental health and behavior. The rise of digital technology—including smartphones, tablets, and television—has transformed the way children engage with the world around them. While these tools offer educational benefits and entertainment, there is growing evidence that excessive screen time may contribute to various behavioral problems in children aged 2 to 10 years.

Research has shown that children who engage in high levels of screen time may exhibit symptoms such as increased aggression, attention difficulties, and social withdrawal (Domingues-Montanari, 2017; Hinkley et al., 2019). A study by Przybylski and Weinstein (2019) found a correlation between high screen time usage and increased emotional difficulties

among young children, suggesting that the balance between screen exposure and in-person social interaction is crucial for healthy development. Additionally, a meta-analysis conducted by Hinkley et al. (2022) indicated that every additional hour of recreational screen time was associated with a 10% increase in the risk of developing behavioral disturbances.

The World Health Organization (WHO) has issued guidelines recommending that children aged 2 to 4 years should engage with screens for no more than one hour per day, and children under two years should not be exposed to screen time at all (World Health Organization, 2019). Despite these recommendations, many children exceed these limits, raising pressing questions about the implications for their behavioral outcomes

METHODS

A cross-sectional study was conducted with 100 children aged 2-10 years. Parent-reported questionnaires were used to collect data on screen time and behavioral issues. Spearman's rank correlation coefficient was used to assess relationships between daily screen time and behavioral indicators, accounting for non-parametric data. Demographic factors such as age, gender, and socioeconomic status were also considered.

Spearman's rank correlation coefficient (often denoted as ρ or r_{srs}) is a non-parametric measure of correlation that assesses how well the relationship between two variables can be described using a monotonic function. Unlike Pearson's correlation, which requires the data to be normally distributed and continuous, Spearman's rank correlation is appropriate for ordinal data or non-normally distributed interval data.

In the study "Investigating the Relationship Between Screen Time and Behavioral Problems Among Children Aged 2-10 Years," employing Spearman's rank correlation offers significant advantages: it is a non-parametric method suitable for skewed or ordinal data, enabling accurate analysis when normality and linearity assumptions are not met. This approach effectively assesses ordinal behavioral measures (e.g., mild, moderate, severe) and can detect monotonic relationships, revealing trends even in non-linear patterns. Additionally, the results are easily interpretable for stakeholders, such as parents and educators, while IBM SPSS Statistics provides straightforward implementation, efficiently delivering the Spearman coefficient and significance levels for enhanced clarity in understanding the implications of screen time on child behavior.

RESULTS

Gender Distribution of Sample

Gender	Frequency	Percentage
Female	40	40.00
Male	60	60.00
Total	100	100.00

The table below presents the gender distribution of the sample population for this study. Out of a total of 100 participants, 40% identified as female, while 60% identified as male. This gender breakdown is important for understanding the demographics of the sample as it can influence the interpretation of behaviors and findings related to the research focus.

Discussion on Gender Distribution

Previous research indicates that gender may influence media consumption patterns and behavioural responses. For instance, studies have demonstrated that boys tend to spend more time on screens for gaming purposes, while girls might engage more in social media and communication (García et al., 2019). Consequently, the skewed gender distribution could affect the results, warranting careful interpretation of behavioral indicators and correlational findings based on gender.

Future research should consider stratifying analyses by gender to identify possible differences in behavioral tendencies and how these may relate to screen time use, thereby enabling a more nuanced understanding of the impacts of screen exposure on children.

Descriptive statistics	Minimum	Maximum	Mean	Std deviation
Age in Years	2	10	5.91	2.462
Screen time in hours	0	10	2.955	1.6296

Descriptive Statistics Overview

The table below summarizes the descriptive statistics for the age and screen time of the participants in this study. This information provides insight into the central tendencies and variability within the sample population.

Commentary on Descriptive Statistics

- Age in Years:**
 - Minimum:** The youngest participant in the sample is 2 years old.

- **Maximum:** The oldest participant is 10 years old, suggesting that the sample covers a diverse range of early childhood development stages.
 - **Mean:** The average age of participants is 5.91 years, indicating a concentration around the preschool to early elementary ages.
 - **Standard Deviation:** The standard deviation of 2.462 suggests a moderate spread around the mean, reflecting that participants' ages vary significantly within the sample.
2. **Screen Time in Hours:**
- **Minimum:** Some participants reported no screen time, indicating that there are children who engage in very limited to no screen exposure.
 - **Maximum:** The maximum recorded screen time is 10 hours, which aligns with concerns about excessive screen exposure among children.
 - **Mean:** The average screen time of 2.955 hours per day suggests that, on average, children are spending a significant portion of their day engaged with screens.
 - **Standard Deviation:** The standard deviation of 1.6296 indicates that there is also variability in screen time usage, with children spending anywhere from minimal to substantial hours in front of screens.

DISCUSSION

Given the average screen time of nearly 3 hours a day, further examination of its potential impact on cognitive and social-emotional behaviors in children is warranted. Moreover, the significant variability in both age and screen time underscores the importance of tailored interventions and guidance for different age groups to mitigate any adverse effects of excessive screen exposure.

Age Group Distribution of Participants

Age groups	Frequency	Percentage
2-4 years	35	35
5-7	33	33
Above 7 years	32	32
Total	100	100

The table below outlines the distribution of participants across different age groups. This distribution is essential for understanding the demographic breakdown of the sample population, which may influence study outcomes.

Commentary on Age Group Distribution

- 2-4 Years:**
 - The largest group in the sample consists of children aged 2 to 4 years, accounting for 35% of the participants. This age group typically includes toddlers and preschoolers, likely still developing key cognitive and social skills.
- 5-7 Years:**
 - The second-largest group consists of children aged 5 to 7 years, representing 33% of the sample. This age range typically includes children in early elementary school, who may have different patterns of screen time usage and social interactions compared to younger children.
- Above 7 Years:**
 - The third age group, consisting of children older than 7 years, makes up 32% of the sample. This group may experience more peer influences and independence regarding media consumption, often engaging with more interactive and diverse forms of screen-based content.

Implications for Research

Understanding the distribution of participants across these age groups is crucial for interpreting the data and analyzing how age-related factors may influence screen time use and related behaviors. Given that developmental milestones vary significantly among these age categories, this demographic insight can help tailor interventions and recommendations regarding screen time in accordance with age-specific needs and considerations.

Socio Economic status of parents:

Socio economic status	Frequency	Percent
Higher class	12	12.0
Middle class	40	40.0
Lower class	48	48.0
Total	100	100.0

The table outlines the socio-economic status of the parents of children in the study. Here's a concise breakdown:
The majority of participants belong to the **lower class (48%)**, indicating that nearly half of the respondents are from lower socio-economic backgrounds.

- A significant portion of participants is classified as **Middle class (40%)**, suggesting a substantial representation of individuals who are not wealthy but also not in poverty.
- Only **12%** of participants are categorized as **Higher class**, indicating that this socio-economic group is underrepresented in the study.

Distribution of Screen Time Among Participants

The table below summarizes the distribution of participants based on their reported daily screen time. This data is essential for understanding the screen exposure habits of the sample population.

Screen Time in Hours	Frequency	Percent
Less than 2 hours	22	22.00%
2-5 hours	72	72.00%
More than 5 hours	6	6.00%
Total	100	100.00%

Commentary on Screen Time Distribution

- 1. Less than 2 Hours:**
 - **Frequency:** 22 participants (22%) reported screen time of less than 2 hours per day. This group represents a smaller segment of the population, indicating that some children are adhering to recommended guidelines for limited screen use.
- 2. 2-5 Hours:**
 - **Frequency:** The majority of participants (72 or 72%) fall into the 2-5 hours category. This suggests that a significant portion of children engages in moderate to high screen time daily, raising concerns about potential impacts on their development and well-being, especially considering that the American Academy of Paediatrics recommends limiting screen time to encourage healthy media use habits.
- 3. More than 5 Hours:**
 - **Frequency:** Only 6 participants (6%) reported exceeding 5 hours of screen time daily. While this group is small, it reflects a concerning trend among a minority of participants who may be at risk for the adverse effects associated with excessive screen exposure.

Implications for Research and Interventions

The data indicates that a majority of children in this sample have screen time usage that may exceed recommended limits. This calls for targeted interventions and educational efforts that promote balanced media usage and encourage alternative activities, such as physical play and social interaction outside of screens.

Correlation between Screen time and Q1-Q5:

The analysis of the relationship between screen time and behavioral problems in children aged 2-10 years yields significant associations, represented by Spearman's rank correlation coefficients. The results indicate that increased screen time correlates positively with various behavioral issues, while certain positive behaviors, such as sharing, show an inverse relationship.

Specifically, the strongest correlation was observed for "often complains of headaches, stomach-aches, or sickness" ($r = 0.812$, $p < 0.001$), suggesting that higher screen time is closely tied to physical complaints in children. Additionally, both restlessness ($r = 0.683$, $p < 0.001$) and frequent temper tantrums ($r = 0.683$, $p < 0.001$) also exhibited strong positive correlations with screen time. Conversely, the tendency to share readily with peers was inversely correlated with screen time ($r = -0.429$, $p < 0.001$), highlighting a potential decline in social and empathetic behaviors as screen exposure increases.

These findings align with previous research, which indicates that excessive screen time is associated with both physical and emotional problems (Hale & Guan, 2015; Domingues-Montanari, 2017). They also support the growing body of literature emphasizing the importance of monitoring children's screen exposure due to its potential negative implications on their behavioral and social development.

Behavioral Item	Correlation Coefficient (Spearman's rho)	Significance (p-value)	N
Considerate of other people's feelings	0.558**	0.000	100
Restless, overactive, cannot stay still for long	0.683**	0.000	100
Often complains of headaches, stomach-aches, or sickness	0.812**	0.000	100
Shares readily with other children (treats, toys, pencils, etc.)	-0.429**	0.000	100
Often has temper tantrums or hot tempers	0.683**	0.000	100

Note: ** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION POINTS

Nature of Screen Time: It may be beneficial to further explore the types of screen content children are engaging with during their screen time. Research has shown dramatic differences between passive media consumption and interactive gaming, suggesting varied impacts on behaviour (Gentile et al., 2012).

Longitudinal Effects: Future research should consider longitudinal studies to assess how prolonged exposure to screen time affects the trajectory of behavioural development over time.

Social Development Impact: The inverse relationship observed between screen time and sharing behaviors suggests that high screen use may inhibit social engagement and the development of empathetic skills in children. This aligns with studies asserting that interactive play and real-world social interactions are crucial for emotional and social development in early childhood (Vygotsky, 1978; Hurwitz et al., 2013).

Physical Health Considerations: The significant correlation between screen time and complaints of headaches, stomach aches, or sickness raises concerns about the physical health impacts of screen exposure. It may suggest that excessive screen time could contribute to a sedentary lifestyle, which is linked to various health issues, including obesity, poor posture, and vision problems (American Academy of Pediatrics, 2016). Research suggests that physical activity should be encouraged concurrent with limited screen time (Donnelly et al., 2016).

Parental Influence and Societal Context: Understanding the role of parents in moderating screen time is crucial. The presence of parental supervision and co-viewing practices can potentially mitigate negative outcomes associated with screen exposure. Parental attitudes towards technology also play a pivotal role in shaping children's media habits (Hinkley et al., 2019). Studies indicate that parents who model balanced media consumption may foster healthier behaviors in their children.

Cultural and Socioeconomic Factors: Different cultural norms related to technology use may influence the amount of screen time children receive. Socioeconomic status can also shape children's access to technology and the quality of their media consumption. Understanding how these factors contribute to screen time and behavioral outcomes is essential for developing effective interventions (Rideout & Hamel, 2006).

Intervention and Policy Development: Given the identified correlations, public health interventions and policy recommendations aimed at reducing screen time among children are necessary. Educational campaigns targeting parents and caregivers, promoting alternative activities like outdoor play and group interactions, could be beneficial. Policies that encourage the integration of media literacy in schools could also empower children to make healthier choices regarding their media use (Gordon et al., 2019).

DISCUSSION

Emotional Impact: The strong association between screen time and increased worries suggests the need for further research into how digital content influences children's emotional landscapes. Anxiety may stem from exposure to inappropriate content or the addictive nature of certain games and platforms¹. **Social Development:** The correlation between screen time and social behaviors such as solitary play and decreased helpfulness indicates potential adverse effects on children's social skills. Future studies should investigate how screen interactions compare to physical play in fostering social competencies². Excessive screen time in children is linked to several developmental concerns. Research indicates that higher screen exposure may impair cognitive development, specifically in attention span and executive functioning (Hinkley et al., 2019). Additionally, increased screen time can reduce the quality of parent-child interactions, which are essential for fostering

communication skills and emotional resilience (Madigan et al., 2020). Sedentary behavior associated with prolonged screen use contributes to health issues such as obesity, underscoring the need for guidelines on screen time (World Health Organization, 2019)³. Moreover, the content consumed plays a critical role in shaping behavior. Educational programming can support positive developmental outcomes, while exposure to violent media may lead to increased aggression (Anderson et al., 2010). Cultural factors also influence how children respond to screen time, highlighting the necessity for culturally aware interventions (Valkenburg & Peter, 2011). As such, monitoring both the quantity and quality of screen time is vital for promoting healthy development in children⁴.

CONCLUSION

The findings of this study indicate a clear association between increased screen time and various behavioral issues among children aged 2 to 10 years. High screen usage corresponded with increased restlessness, physical complaints, and decreased prosocial behaviors. These results reinforce the necessity for parents and caregivers to actively monitor children's screen time and promote balanced media use to support healthy social-emotional development. Further investigation into the types and contexts of screen interactions is recommended to inform targeted interventions and public health initiatives.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to all those who supported me throughout the course of this study.

DECLARATIONS

Funding: Self funding

Conflict of interest: The authors declare that there are no conflicts of interest regarding the publication of this paper

Ethical approval: The study was approved by the Institutional Ethics Committee, Reg No: ECR/1410/Inst/KA/2020 - Institutional ethics committee (IEC), GIMS, Kalaburagi.

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