Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 13, (2024)
https://www.jneonatalsurg.com

OPEN ACCESS

Exploring the Relationship between Screen Time and Developmental Delays in Early Childhood

Muhammad Ayaz[1], Manesha Juriasinghani[2], Monica Punshi[3], Fatimah Karim Kundi[4], Muhammad Nasir[5], Hameed Mumtaz Durrani[6], Taiwo A Gbamgbola[7], Benash Sarwar[8]

[1]Assistant Professor, Department of Pediatrics, College of Medicine, King Faisal University, Hofuf (AL-Ahsa), Saudi Arabia

[2]MBBS, MSPH, Former Lecturer at SZABIST University, Karachi, Pakistan

[3]Consultant Gynaecologist/Obstetrician and Public Health Expert Dr Ruth KM Pfau Civil Hospital Karachi, Pakistan

[4]Department of Psychiatry, Fazaia Medical College, Islamabad, Pakistan

[5]Bahria Medical College, Karachi, Pakistan

[6]Assistant Professor, Department of Community Medicine, Shifa College of Medicine, Islamabad

[7]International University of Health Sciences, St Kitts

[8]Lecturer/Consultant Dietitian and Community Nutritionist/PKNC, University of Agriculture Faisalabad, Pakistan

Corresponding Author:

Benash Sarwar,

Lecturer/Consultant Dietitian and Community Nutritionist/PKNC, University of Agriculture Faisalabad, Pakistan

Email ID : binish.sarwar@uaf.edu.pk

Cite this paper as: Muhammad Ayaz, Manesha Juriasinghani, Monica Punshi, Fatimah Karim Kundi, Muhammad Nasir, Hameed Mumtaz Durrani, Taiwo A Gbamgbola, Benash Sarwar, (20xx) Exploring the Relationship between Screen Time and Developmental Delays in Early Childhood. *Journal of Neonatal Surgery*, 13, 1296-1301.

ABSTRACT

Background: There is evidence that children's healthy development suffers when they spend more time in front of screens. Less is known regarding this connection in early infancy, in contrast to the majority of research that has concentrated on school-aged children. We set out to address this knowledge gap by investigating the link between preschoolers' screen usage and their developmental health.

Objective: Determine the direction of the relationship between the amount of time spent in front of a screen and the outcomes of development among a set of mothers and their children.

Methods: In this longitudinal cohort study 312 children and mothers were presented. The mothers' reports were used to assess the children's screen-time behavior (total hours per week) & their developmental results (Ages & Stages Questionnaire, Third Edition) at one, two, and three years age. In order to evaluate all of the data, SPSS 25.0 was utilized.

Results: There were majority 178 (57.1%) males and 134 (42.9%) were female children.The results of a random-intercepts, cross-lagged panel model showed that there was a statistically significant correlation between higher levels of screen time at 2 and 3 years and worse performance on developmental screening tests at 3 years (β, −0.05; 95% CI, −0.8 to −0.02). Both of these within-person associations were time-varying, and they controlled for between-person differences.

Conclusion: This study lends credence to the idea that screen usage has a direct impact on children's growth and development. In order to mitigate the negative effects of excessive use, it is recommended that family media planning be encouraged and that screen time be managed.

Keywords: *Screen Time, Children, Mothers, Development Delay*

1. INTRODUCTION

Mobile and interactive screen media are quickly becoming integral parts of even the most basic aspects of children's daily life. They are the so-called "digital natives," having spent their whole lives immersed in the ubiquitous and ever-changing digital media landscape. Children now spend an average of four months each year interacting with media, down from four years in 1970 [1]. A big concern in public health is the potential long-term harmful effects of children's screen media use on their health, despite the fact that technology has undeniably enhanced communication, education, and the flow of information [2]. Obesity, behavioral problems, sleep disorders, poor academic performance, and other associated problems have become

more common among children as a result [1-3].

Screen time and other forms of digital media are becoming ubiquitous in children's lives. Nearly every American child has access to the internet at home, and the average American child spends over two hours each day in front of devices.[4] Pediatric recommendations recommend no more than one hour of high-quality television per day for children, so this is much too much. While moderate screen time might have some beneficial advantages, excessive screen time is associated with several detrimental physiological, behavioral, and mental health consequences.[6] While it's true that screen time might stunt children's growth and development, it's also possible that children with delays turn to screens more often as a means of managing challenging behaviors. As an example, studies have shown that toddlers who struggle with self-regulation tend to spend more time in front of screens compared to their typically developing peers.We can't say much about the directionality of associations because most studies have used cross-sectional approaches [7].

The purpose of this research was to determine if children who met or exceeded the recommended daily screen time for preschoolers (i.e., more than one hour per day) were at risk for difficulties in physical, social, emotional, and cognitive development. Important health habits like sleep and physical exercise were also included, along with demographic factors including sex, disposable income, ethnicity, and whether the children lived in rural or urban areas.

Many gaps in the literature have been filled up by this study. Research on screen usage has mostly concentrated on older children [8,9], and its effects on early childhood development have received comparatively little attention. Research on screen time also neglects to consider other important health behaviors, such as exercise and sleep, and contextual factors, such as family income, ethnicity, and location (rural vs. urban), when studying children. Physical, social, emotional, cognitive, and communication abilities are just a few of the many early childhood developmental health inicators that have not been adequately studied. Research on the negative health impacts of screen usage has mostly concentrated on obesity in children [10-12].When advising parents on the appropriate amount of screen time for their children's developmental stage and the potential negative effects of screen addiction, pediatricians and other health care providers might benefit from additional information on the directionality of associations.

2. MATERIALS AND METHODS

The study was conducted in Karachi. Participants included mothers and children from the all Families study, a large, prospective pregnancy cohort of 312 mothers and children. Primary care physicians' offices, neighborhood ads, or the local blood lab all had a role in recruiting pregnant women for this group. For this study, we needed participants who met four conditions: (1) being at least 18 years old, (2) fluent in English, (3) having a gestational age of fewer then 24 weeks, and (4) getting prenatal care in their local area. In this study, screen time data were gathered from mothers during 34 and 36 weeks of gestation and again at1, 2, and 3 years of age.

Mothers filled out the Stages and Ages Survey, Third Edition (ASQ-3), when their children were 1, 2, and 3 years old. Parents often utilize the ASQ-3 as a screening tool. The ASQ-3 measures growth in five areas: interpersonal, problem-solving, gross-motor skills, communication, and fine-motor skills. The child's capacity to do a task is assessed on 30 items in the questionnaire, which can be answered with yes, at times, or not yet.

Screen Time

Mothers detailed their children's regular workday and weekend usage of different electronic gadgets. Some of the media and equipment brought up by moms include computers, gaming consoles, television, and audio and video recordings on VCRs and DVD players. A weighted average of screen time across all media on weekdays and weekends was used to establish the total number of hours spent in front of screens each week.

A number between one and zero was used to indicate the child's sex, years were used to record the mother's age, and months were used to record the infant's age. At twelve months of age, mothers were asked how frequently they felt comfortable "looking at or read children's books to my child," with responses ranging from "not very often" to "sometimes" and "often" (3). At the 24-month mark, mothers rated their children's average amount of physical activity on a weekday using the National Center for Epidemiologic Depression Scale; answers ranged from one (1) to seven (7) hours. At 36 months, we took the mother's income, which was reported in increments, the number of hours of sleep the child gets in a typical 24-hour period, and her educational level using the National Longitudinal Survey of Children and Youth Parenting Scales.

The Statistical Package for the Social Sciences [SPSS] version 25.0 was used for all data analysis. Along with the demographic data, descriptive statistics (mean, interquartile range, standard deviation, and range) were computed for the CPS, CSTUR, and CPTP subscales individually. To determine if the variables were statistically related to one another, we employed Spearman's rho correlation analysis with bootstrapping. The purpose of this study was to examine the relationship between children's screen time and their play involvement and perceptions using regression analysis with bootstrapping. They were finished when there was a substantial correlation ($p < 0.05$) between the independent and dependent variables. When the sample size is too small to generalize the research results to the target population, bootstrapping can be utilized as a statistical process to enhance the sample's representativeness and to determine the parameters.

3. RESULTS

There were majority 178 (57.1%) males and 134 (42.9%) were female children. Mean age of the mothers was 30.21±13.75 years at the time of delivery. Mean gestational age was 34.28±10.37 weeksat the time of delivery.Most of the mothers 188 (60.3%) were illiterate. 165 (52.9%) cases had poor socio-economic status. Mean screen of children per day was 3.16±5.43 hours.(table 1)

Table-1: Children and mother baseline information

Variables	Frequency/%age
Children's Sex	
Male	178 (57.1%)
Female	134 (42.9%)
Mean age of mother (years)	30.21±13.75
Mean gestational age (weeks)	34.28±10.37
Education status of Mothers	
Literate	124 (39.7%)
Illiterate	188 (60.3%)
Socio-economic status	
Poor	165 (52.9%)
Middle/high	147 (47.1%)
Mean screen time of children per day (hours)	3.16±5.43

In a multivariate regression, covariates were used as predictors, and the between-person variables were regressed onto all variables at the same time. With the exception of the TLI, the model that was allowed to incorporate all of these covariates produced a moderately well-fitting model on fit indexes ($\chi 253 = 514.05$; $P < .002$; RMSEA = 0.05; 95% CI, 0.04-0.05; TLI = 0.67; SRMR = 0.052). Since mothers' reports of reduced maternal depression and greater household income, maternal positivity, levels of child exercise, child exposure to reading, and hours of sleep per day were associated with higher female person-level averages on the ASQ-3. These factors explained fifteen percent of the variation. In addition to mothers reporting lower rates of maternal depression, higher levels of wealth, education, child exposure to reading, or hours of sleep per night were associated with lower person-level means of screen time for girls. Twelve percent of the variation was explained by these factors. The inter-person stability factors had a standardized covariance (correlation) of $\sigma = -0.12$ (95% CI, −0.20 to −0.10) when these variables were taken into consideration, indicating that these predictors do not explain the presence of a consistent link between screen time and the ASQ-3. To determine if the CSUTR subscale scores reported by children and the CSTUR subscale scores reported by parents were predictive of the CPTP and CPS subscale scores, respectively, we ran linear regression analyses using bootstrapping. The regression models only contained independent variables that had a strong correlation with the dependent variables. (table 2)

Table-2: Factors that Influence the Relationship Between Individuals' Screen Time and Major Life Events

	Standardized Estimate (β), 95% (CI)	
Predictor	**Screen Time**	**Developmental Outcomes**
Child age	−0.03 (−0.06 to 0.04)	0.05 (−0.02 to 0.05)
Mothers age	0.02 (−0.02 to 0.08)	0.00 (−0.03 to 0.09)
Mothers positivity	−0.04 (−0.09 to 0.03)	0.11 (0.05 to 0.14)[a]
Mothers depression	0.09 (0.02 to 0.14)[a]	−0.05 (−0.10 to −0.03)[a]

Female child	−0.05 (−0.10 to −0.03)[a]	0.20 (0.15 to 0.25)a
Socioeconomic	−0.9 (−0.11 to −0.02)[a]	0.13 (0.05 to 0.10)[a]
Physical activity	−0.02 (−0.06 to 0.03)	0.06 (0.02 to 0.11)[a]
Sleep (h/night)	−0.15 (−0.20 to −0.12)[a]	0.7 (0.08 to 0.14)[a]
Average daily screen use and ASQ-3 score at 2 years of age, β	-0.04 (-0.08, -0.05)	0.15 (0.03 to 0.15)
1-year-old ASQ-3 score and 2-year-old screen time, γ	-0.02 (-0.04, 0.02)	0.23 (0.03 to 0.17)
The relationship between screen time at age 2 and the ASQ-3 score at age 3, β	-0.07 (-0.06, -0.08)	0.14 (0.04 to 0.16)
ASQ-3 score at 2 years old and screen time at 3 years old, γ	-0.03 (-0.03, -0.02)	0.16 (0.02 to 0.18)[a]

4. DISCUSSION

This novel longitudinal three-wave study employs repeated assessments to find out how much screen time matters at various ages. According to the results, screen time is probably the first effect; children whose screen time is high at 1 year old perform worse on developmental screening tests at 2 years old and even worse at 6 years old. As technology permeates every aspect of modern life, screen time is becoming more frequent in today's households. Research, health, and public discourse have all focused heavily on the effects of screen addiction in the last 10 years.two separate sources But which comes first: inadequate development time or too much screen time?[13,14]

A correlation between the social play subscale of the CPTP and the social screen time subscale of the CSTUR, which measured how much time kids spent in front of screens each day, was found statistically. In order to determine how much time kids spend on screens during the week that is dedicated to socializing and engaging with others, researchers use the child-reported CSTUR (Ye et al., 2023).[15]

According to Ye et al. (2023)[15], a subscale of the child-reported CSTUR measuring interactive screen time may be obtained by adding up the amount of time children spent on weekdays altering screen content. The CSTUR subscale that measures screen time spent each day and the CPTP subscale that measures active play were significantly correlated with one another. Consistent findings were obtained from a cross-sectional study that looked at the recreational activities of two student groups in 2001 and 2011. (Bertuol et al., 2019[16]). The survey found that students would rather spend their time playing video games than engaging in extracurricular activities or cultural events. Another relevant research was that of Pedersen et al. (2022)[17], which also used cluster randomized clinical trials and included 89 households with children aged six to ten. The findings demonstrated that reducing screen time for entertainment causes children to engage in more physically demanding activities. These two research support the current study's findings.

Our study found that youngsters averaging 1, 2, and 3 years old spent around 2.6, 3.7, and 1.9 hours each day in front of the screen, respectively, due to their high television viewing habits. Children in the US are reportedly spending an average of 2 hours and 19 minutes per day in front of screens, which is in line with the amount of time spent on screens in this sample.[18] Even while cross-lag analyses including rank-order stability vs mean change would not be affected by the decrease in screen time after 3 years, it is nonetheless notable. The kids in our group start elementary school at five years old, and they start attending before- and after-school programs at the same age, so they spend less time at home and naturally use less screens.

Significant maturation and maturation take place throughout a child's first five years of life. During a critical period of growth and maturation, children's screen usage might impair their potential for optimal development, according to researchers. Young children who are glued to their devices for long periods of time may be losing out on opportunities to hone their social, motor, & communication skills. For instance, kids may not develop their gross motor abilities like walking and running as quickly when they sit in front of computers all day without any kind of interactive or physical element. Another way screens hinder caregiver-child connections is by cutting off chances for the kinds of verbal and nonverbal social interactions that are crucial to healthy development and growth [19-21].

Several suggestions for future research and practice are derived from this study. To start, it's important for professionals to stress that screen time isn't a panacea and that high-quality caregiver-child interactions free of screens are among the best ways to boost children's development.[22] is a Secondly, in order to make sure that screen time isn't getting in the way of face-to-face contacts or family time, it is recommended that pediatricians and other health care providers work with families to create tailored media plans or point them in the direction of resources that may help them do so [23]. Each family's demands may be met by tailoring their media plan. In order to prioritize physical activity and family interactions, the plans offer guidance on how to set and enforce age-appropriate limits and restrictions on media use, create screen-free zones and device curfews in the house, and find a balance between online and offline activities.

5. CONCLUSION

This study lends credence to the idea that screen usage has a direct impact on children's growth and development. In order to mitigate the negative effects of excessive use, it is recommended that family media planning be encouraged and that screen time be managed.

REFERENCES

[1] Increased screen time: implications for early childhood development and behavior. Radesky JS, Christakis DA. https://doi.org/10.1016/j.pcl.2016.06.006. PediatrClin North Am. 2016;63:827–839.

[2] . Screen media overuse and associated physical, cognitive, and emotional/behavioral outcomes in children and adolescents: an integrative review. Liu J, Riesch S, Tien J, Lipman T, Pinto-Martin J, O'Sullivan A. https://doi.org/10.1016/j.pedhc.2021.06.003. J Pediatr Health Care. 2022;36:99–109.

[3] . Screen time and sleep among school-aged children and adolescents: a systematic literature review. Hale L, Guan S. https://doi.org/10.1016/j.smrv.2014.07.007. Sleep Med Rev. 2015;21:50–58.

[4] Radesky JS, Christakis DA. Increased screen time: implications for early childhood development and behavior. PediatrClin North Am. 2016;63(5):827-839.

[5] . Sweetser P, Johnson DM, Ozdowska A, Wyeth P. Active versus passive screen time for young children. Aust J Early Child. 2012;37(4):94-98

[6] Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. ActaPaediatr. 2008;97(7):977-982.

[7] Radesky JS, Silverstein M, Zuckerman B, Christakis DA. Infant self-regulation and early childhood media exposure. Pediatrics. 2014;133(5):e1172-e1178.

[8] . Stiglic N, Viner RM. Effects of screentime on the health and well-being of children and adolescents: A systematic review of reviews. BMJ Open. 2019;9:23191.

[9] Hancox RJ, Milne BJ, Poulton R. Association between child and adolescent television viewing and adult health: a longitudinal birth cohort study. Lancet. 2004;364:257–62.

[10] Twenge JM, Campbell WK. Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. Preventive Medicine Reports. 2018;12:271–83.

[11] . The Human Early Learning Partnership. The Childhood Experiences Questionnaire. University of British Columbia. 2021. http://earlylearning.ubc.ca/cheq/. Accessed 27 Jan 2021.

[12] . Fang K, Mu M, Liu K, He Y. Screen time and childhood overweight/obesity: A systematic review and meta-analysis. Child 2019;45:744–53.

[13] . Bolhuis K, Verhoeff ME, Hillegers M, Tiemeier H. Psychotic-like symptoms in preadolescence: what precedes the precursory symptoms of severe mental illness? J Am Acad Child Adolesc Psychiatry. 2017;56(10):S243.

[14] . American College of Pediatricians The impact of media use and screen time on children, adolescents, and families. http://www.acpeds.org/the-college-speaks/position-statements/parenting-issues/the-impact-of-media-use-and-screen-time-on-children-adolescents-and-families. Published November 2016. Accessed September 4, 2018.

[15] Ye, W., Brown, T., & Yu, M.-L. (2023). The impact of different types of screen time on school-aged children's quality of life and participation. British Journal of Occupational Therapy, 86(1), 62–75.

[16] . Bertuol, C., da Silva, K. S., Barbosa Filho, V. C., da Silva Bandeira, A., Veber Lopes, M. V., da Silva Lopes, A., &ViniciusNahas, M. (2019). Preference for leisure activities among adolescents in southern Brazil: What changed after a decade. Revista De Psicología Del Deporte, 28(1), 71–80.

[17] . Pedersen, J., Rasmussen, M. G. B., Sørensen, S. O., Mortensen, S. R., Olesen, L. G., Brønd, J. C., Brage, S.,

Kristensen, P. L., &Grøntved, A. (2022). Effects of limiting recreational screen media use on physical activity and sleep in families with children: A cluster randomized clinical trial. JAMA Pediatrics, 176(8), 741–749.

[18] . Common Sense Media The Common Sense census: media use by kids age zero to eight 2017. Common Sense Media website. https://www.commonsensemedia.org/research/the-common-sense-census-media-use-by-kids-age-zero-to-eight-2017. Accessed August 30, 2018.

[19] Pempek TA, Kirkorian HL, Anderson DR. The effects of background television on the quantity and quality of child-directed speech by parents. J Child Media. 2014;8(3):211-222.

[20] Radesky J, Miller AL, Rosenblum KL, Appugliese D, Kaciroti N, Lumeng JC. Maternal mobile device use during a structured parent-child interaction task. AcadPediatr. 2015;15(2):238-244.

[21] Hoff E. The specificity of environmental influence: socioeconomic status affects early vocabulary development via maternal speech. Child Dev. 2003;74(5):1368-1378.

[22] Kerai, S., Almas, A., Guhn, M. et al. Screen time and developmental health: results from an early childhood study in Canada. BMC Public Health 22, 310 (2022).

[23] . Madigan S, Browne D, Racine N, Mori C, Tough S. Association Between Screen Time and Children's Performance on a Developmental Screening Test. JAMA Pediatr. 2019 Mar 1;173(3):244-250. doi: 10.1001/jamapediatrics.2018.5056. Erratum in: JAMA Pediatr. 2019 May 1;173(5):501-502.