Original Research Article

An Empirical Study on Behavioural Changes in Young Children Associate to Screen Time

**ABSTRACT**

Globally, there is an alarming increase in sedentary behavior among children in both developed and developing countries. Screen time refers to the amount of time a person spends using electronic devices such as televisions, video games, computers, tablets, and smart phones. Excessive screen time can negatively impact on children's physical health and changes of their behavioral pattern. This study examines the relationship between students' screen time exposure and various demographic, socio-economic, and behavioral factors. Chi-square analysis revealed no significant association between excessive screen time which defined as two or more hours per day and factors such as grade level, gender, parental employment status, parental education level, or type of digital device and internet connectivity. However, significant associations were observed with device ownership and gaming addiction, as students who owned digital devices or were addicted to games were more likely to spend excessive time on screens. The study highlights the detrimental effects of excessive screen time on students' interpersonal relationships, physical health, and educational performance. Students exposed to excessive screen time were 4.5 times more likely to have poor relationships with parents, 3.5 times more likely to have strained sibling relationships, and 16 times more likely to exhibit poor social connectivity. Additionally, these students were four times less likely to participate in sports, 5.7 times more likely to face weight-related health issues, and 2.7 times more likely to demonstrate poor academic performance. The findings underscore the significant negative impact of prolonged screen time on students' overall well-being, emphasizing the need for interventions to reduce screen exposure and foster healthier, more balanced lifestyles.

**Key Words**: Excessive Screen Time, Young Children, Behavioural Factors, Risk, Socio- economic

**1. INTRODUCTION**

The modern society is rapidly integrating with technology day by day, while concurrently, the education system is increasingly leaning towards digitalization. The COVID-19 pandemic has intensely impacted people's lifestyles, leading to experiences of lockdowns, curfews, challenges in accessing medical care, a lack of social interaction, and the closure of schools. This situation has fostered the development of habits like increased engagement with digital devices. Many educational institutions have turned to technology for the virtual delivery of lessons. Moreover, with the restrictions on outdoor activities, numerous individuals have sought entertainment and social connection through digital media. As a result, most devices equipped with digital screens such as smart phones, tablets, laptops, desktops, television, gaming consoles, etc. have become increasingly popular among students. The amount of time a person spends watching or interacting with the screen of any digital device as simply known as screen time. In today's digital age, screen time has become a mandatory aspect of students' daily lives. With the widespread adoption of smartphones, tablets, computers, and other digital devices, students are constantly exposed to screens for various purposes such as education, entertainment, and communication in post COVID -19 too.

Excessive screen time has become a growing concern due to its adverse effects on the physical, mental, and social well-being of children and adolescents. Prolonged use of electronic devices, can lead to a sedentary lifestyle, increasing the risk of obesity, cardiovascular diseases, and metabolic disorders like diabetes and hypertension. Furthermore, excessive screen time is associated with poor posture and reduced physical activity, which can result in musculoskeletal problems. Mentally, prolonged screen exposure, especially to violent or distressing content, can negatively impact emotional regulation and contribute to increased anxiety, depression, and sleep disturbances. The blue light emitted from screens also disrupts the natural sleep cycle, making it harder for individuals to fall asleep or achieve restful sleep, further affecting cognitive function and mood. Socially, excessive screen time can hinder the development of face-to-face communication skills and lead to social isolation. Children and adolescents may become overly reliant on virtual interactions, reducing their ability to form meaningful relationships in the real world. The overuse of screens can also limit time spent on creative, educational, or outdoor activities, all of which are essential for healthy development. Overall, while technology offers numerous benefits, its excessive use can significantly harm physical, mental, and social health, underscoring the importance of balanced screen time and encouraging active, real-world engagement. This study focusses on the relationship between students' screen time exposure and various demographic, socio-economic, and behavioral factors.

**2.LITERATURE REVIEW**

 Lannotti et al., (2009) conducted a study using school aged children in grade 6 to 10 in USA and Canda to examine the adolescent physical activity and screen-based media use related to physical and social health indicators. This study provided evidences of negative concomitants of screen-based media usage to physical and social health indicators. Furthermore, they suggested that potential positive consequences of increasing physical activities and decreasing screen-based media uses in adolescents. Another study conducted by de Lucena et al., (2015) using 2874 high school adolescents aged between 14 – 15 years old revealed that the prevalence of excessive screen time was higher in mails compared to females and the students who belongs to highest economic class had higher chance of exposure to excessive screen time while level of physical activities and nutritional status of adolescents were independent of the excessive screen time. Domingues – Montanani (2017) claimed that screen time has become a complicated concept with an ever-expanding variety of electronic devices available throughout the world. Moreover, he claimed that the computers, video games and ownership of the device are occurring from an increasingly young age and screen time has been negatively associated with the development of physical and cognitive abilities while it made positive association with obesity, sleeping problems, depression and anxiety. A study carried out by Vanderloo et al., (2020) to examine the association between screen time and a comprehensive total cardiometabolic risk in school aged children (7-12 years). A total of 567 children with repeated measures used and it was found that there was no association between parent – reported child screen time and total cardiometabolic risk. However, increased screen time was associated with slightly lower high- density lipoprotein.

Farias et al., (2021) carried out a cross-sectional school-based study using 1471 students aged between 7 years to 18 years in Porto Velho, Rondonia state, Brazil to examine children and adolescents' behaviour related to screen time. Based on the finding of the crude and adjusted prevalence ratio and their 95% CI derived from the Poisson regression concluded that the risk of screen time exposure was high in males than female. Those who expose to two hours or more than two hours screen time per day has risk of having excessive body fat. Excessive screen time has been associated to negative impacts on students’ physical health. Time spend on screen over 2 hours per day leads to more myopic refraction and high body mass index in school children aged 6-7 years and over 50% of children with myopia exceed the World Health Organization's recommended maximum screen time of two hours per day (Harrngtopn and O’ Dwyer; 2022) To identify the association of physical activity and use of screen time and the interaction between physical activity and screen time uses towards to body mass index in adolescent a study was conducted by Nagata et al., (2023). A mong the 5797 adolescents in this sample reported, the screen time use 6.5 per day. I is revealed that the category with moderate screen time uses (Relative Risk =1.24 with 95% CI (1.06-1.35) and high screen time uses category (RR 1.29, with 95% CI 1.11-1.51) were associated with high overweight or obesity risk compared with other groups of students.

**3.METHODOLOGY**

The study was carried out in schools located in Matale district, Central Province, Sri Lanka. This population characterization was based on school data collected in 2023. There were 310 schools belongs to Matale districts including national and provincial schools and 9,578 students of both genders were studying at aged between 14 to 16 years old. Multi stage cluster sampling was utilized to select 370 students who studying at grade 9,10, and 11 from six schools located in Matale district. The necessary primary data were collected via well structed questionnaire while secondary data too were needed to collect for the better understanding of the relationship between screen time and adolescence behaviors. Screen time was calculated by measuring mean daily time (in hours/minutes) spent by students for spending times with their mobile smart phone, tablet, desktop or laptops computers and also counting to spend time on watching television, playing video games on working days as well as weekends during a typical week. The nature of the main response variable of scree time is dichotomous defined as the students who exposed to scree time 2 hours or more and student who expose to scree time less than two hours per day.

The study employs descriptive statistics to explore the fundamental data, serving as the basis for quantitative analysis. Binary logistic regression was utilized to identify the factors that affect excess screen time. Also, Chi-square analysis was performed to test the association between excess screen time and demographic and socio-economic factors of students. This was used in the initial exploratory phase of understand relationships between variables. In order to find the risk of exposing to the excess scree time of students and its consequence, the study followed Relative Risk statistical approach. This was further fashioned to identifying if there were any difference between students who expose to scree time two or more than 2 hours per day as opposed to students who expose to scree time less than 2 hours towards.

**4.RESULT AND DISCUSSION**

The data collected were formatted using various statistical tools which brought out the results of the study. Descriptive analysis showed a fair breakdown with the number of students in each grade and the highest number of students (39%) were from grade 10 whereas the lowest (30%) from the grade 11. The ages of the students ranged between 14 and 16 years of age at the time of conducting the research from March to May in 2023. Gender differences were clearly seen with only 49% of the sample being males whereas the remaining 51% of the sample were females. Out of the total, 67% of the students' mothers are not attending to any works while 92% of fathers working as a full-time employee. It is found that the 10% of the mothers and 12% of the fathers had education up to grade five only, while 37% of the mothers and 35% of fathers had studied up to G.C.E. (O/L), moreover, 46% of the mothers and 48% of the fathers of students in the sample had studied up to G.C.E. (A/L) rest of the parents are graduates and the corresponding percentages were 7% and 6% respectively. Out of the total 84% of the students use mobile smart phone while 16% of the students have different devices as tablets, laptops, desk tops. In addition to this, almost all students were watching television too. Only the 25% of the students had ownerships of the device that they use for the scree time whereas most of the student's digital device belong to their parents (58%) while rest of the student use the digital devices which belong to their friends. It is revealed that the 71% of the students used data packages or the Wi-Fi to connect with the internet while only 29% used pre-paid data card for internet connection. Out of the total 36% of the students were addicted to the video games while rest were not much interesting in doing video games. It is revealed that the 56% of the students were exposed to excess scree time 2 hours or more than two hours per day.

According to the result of Chi -square analysis, it is indicated that there is no significant association between excess scree time expose and the many demography and socio-economic factors as grade of students, gender of the students, whether the mother and the father employee or not, parental education level, and the type of the digital device and the way how them were getting internet connection. However, in contrast, according to the result of the Table 1, it is implied that the there is a significant association between ownership of the digital device and the excess scree time exposure. Moreover, the students who addicted to play the video game also showed the significant association with the excess screen time expose.

**Table 1.** **The results of the chi-square analysis of demography and socio-economic factors**

|  |  |
| --- | --- |
| **Variable** | **Pearson Chi-square** |
| **Value** | **P-Value** |
| Grade of student | 3.749 | 0.153 |
| Gender | 2.039 | 0.153 |
| Lev\_Edu\_Mother | 2.053 | 0.561 |
| Lev\_Edu\_Father | 0.362 | 0.948 |
| Employability status of Mother | 0.001 | 0.996 |
| Employability sauts of Father | 0.014 | 0.906 |
| Type of Digital Device | 2.417 | 0.120 |
| Ownership of the Device | 29.430 | 0.000 |
| Type of Connection to the Internet | 0.247 | 0.619 |
| Addicting in Video Games | 40.147 | 0.000 |

According to the analysis of the binary logistic regression also implied the similar result. Ownership of the device () and the addiction to the video games () are the only two factors that affect the excess scree time expose. Based on the above result, the students who addicted to the video games were exposed to more scree time than other students while the ownership of the digital device belong to the parents significantly spent much more time on digital devises either one of them (smart phone, tablet, lap top or the desk tops).

Findings from past studies indicate that excessive screen time has adverse effects on students' future careers. A Relative Risk approach was used to determine whether there are significant risks associated with students' relationships with parents, siblings, friends, social connections, educational performance, engage in sports activities and body mass index. Prior to this analysis, a Chi-square test was performed to assess the association between excessive screen time and the factors mentioned above. The results of the Chi-square analysis are presented in Table 2.

**Table 2.** **The results of the chi-square analysis of behavior in young children**

|  |  |
| --- | --- |
| **Behavioural Characteristics in Young Children**  | **Pearson Chi-square** |
| **Value** | **P-Value** |
| Relationship with Parents | 86.894 | 0.000 |
| Relationship with Siblings | 64.748 | 0.000 |
| Relationship with Friends | 56.462 | 0.000 |
| Social Connectivity  | 126.635 | 0.000 |
| Engage in Sports | 62.161 | 0.000 |
| BMI Index | 94.746 | 0.000 |
| Level of Education performance | 53.903 | 0.000 |

Table 2 highlights the significant relationships between students exposed to excessive screen time and various factors, including their relationships with parents, siblings, and friends, the nature of their social connectivity, participation in sports, and their level of educational performance. Additionally, the table illustrates the behavioural changes observed in students as a result of excessive screen time exposure. Table 3 provides the Relative Risk values along with their corresponding 95% confidence intervals.

**Table 3.** **Relative Risk and the 95% Confidence Intervals**

|  |  |  |
| --- | --- | --- |
| **Behavioural Characteristics in Young Children** | **RR** | **95% CI** |
| **Lower** | **Upper** |
| Relationship with Parents | 4.531 | 3.028 | 6.781 |
| Relationship with Siblings | 3.565 | 2.459 | 5.167 |
| Relationship with Friends | 25.702 | 6.391 | 103.362 |
| Social Connectivity  | 16.226 | 7.342 | 35.858 |
| Engage in Sports | 4.043 | 2.657 | 6.150 |
| BMI Index | 5.727 | 3.604 | 9.100 |
| Level of Education performance | 2.673 | 1.974 | 3.620 |

According to the results shown in Table 3, students exposed to screen time for more than two hours per day are 4.5 times more likely to have poor relationships with their parents compared to those exposed to screen time for less than two hours per day. Additionally, these students tend to have strained relationships with their siblings, being 3.5 times more likely to maintain poor sibling relationships than their peers with lower screen time exposure. Furthermore, their connection with society appears to be significantly compromised. Students who spend more than two hours per day on screens are 16 times more likely to exhibit poor social connectivity compared to the other group of young children. Students who are exposed to screen time for more than two hours per day tend to be less engaged in sports activities compared to their peers. In fact, they are four times more likely not to participate in sports than those with lower screen time exposure. Additionally, students exposed to two or more hours of screen time per day face a 5.7 times higher risk of having either underweight or overweight conditions, deviating from normal health standards. Furthermore, these students are 2.7 times more likely to exhibit poor educational performance compared to their peers.

**5.CONCLUSION**

The study provides an insightful analysis of the relationship between students' screen time exposure and various demographic, socio-economic, and behavioural factors. Chi-square analysis indicated no significant association between excessive screen time which defined as two hours or more per day and factors such as students’ grade, gender, parental employment status, parental education level, or the type of digital device and internet connectivity. However, significant associations were observed between device ownership and excessive screen time exposure. Students who owned their digital devices or were addicted to video games were more likely to spend excessive time on screens. These findings emphasize the influence of device ownership and gaming addiction on excessive screen time, suggesting potential areas for intervention to mitigate its impact on students. The analysis also, highlights significant relationships between excessive screen time exposure and various aspects of students' lives, including their relationships with parents, siblings, and friends, social connectivity, participation in sports, their health conditions, and educational performance. The behavioural changes associated with prolonged screen time, suggesting its adverse impact on students' interpersonal relationships and overall well-being. The findings indicate that excessive screen time has profound negative effects on various aspects of students' lives. Students with high screen time exposure are 4.5 times more likely to have poor relationships with their parents and 3.5 times more likely to experience strained sibling relationships compared to their peers with lower screen time exposure. Social connectivity is significantly affected, with these students being 16 times more likely to exhibit poor social connections.

Excessive screen time also adversely impacts physical and educational outcomes. These students are four times less likely to engage in sports activities, 5.7 times more likely to face weight-related health issues (underweight or overweight), and 2.7 times more likely to show poor academic performance. These results highlight the urgent need for interventions to reduce screen time and promote healthier, more balanced lifestyles for students.

**REFERENCES**

Bailey, J., Oliveri, A., & Levin, E. (2013). Patterns of Adolescent Physical Activity, Screen-Based Media Use and Positive and Negative Health Indicators in the U.S. and Canada. *Bone*, *23*(1), 1–7.

De Lucena, J. M. S., Cheng, L. A., Cavalcante, T. L. M., Da Silva, V. A., & De Farias, J. C. (2015). Prevalence of excessive screen time and associated factors in adolescents. *Revista Paulista de Pediatria*, *33*(4), 407–414.

Domingues-Montanari, S. (2017). Clinical and psychological effects of excessive screen time on children. *Journal of Paediatrics and Child Health*, *53*(4), 333–338.

dos Santos Farias, E., de Carvalho, W. R. G., Leitão, F. N. C., dos Santos, J. P., de Castro, R. F., & de Souza, O. F. (2021). Children’s and adolescents’ behavior regarding screen time in Porto Velho, Brazilian Western Amazon. *Journal of Human Growth and Development*, *31*(1), 1–10.

Harrington, S., & O’Dwyer, V. (2023). The association between time spent on screens and reading with myopia, premyopia and ocular biometric and anthropometric measures in 6- to 7-year-old schoolchildren in Ireland. *Ophthalmic and Physiological Optics*, *43*(3), 505–516.

Nagata, J. M., Smith, N., Alsamman, S., Lee, C. M., Dooley, E. E., Kiss, O., Ganson, K. T., Wing, D., Baker, F. C., & Gabriel, K. P. (2023). Association of Physical Activity and Screen Time With Body Mass Index Among US Adolescents. *JAMA Network Open*, *6*(2), E2255466.

Vanderloo, L. M., Keown-Stoneman, C. D. G., Sivanesan, H., Parkin, P. C., Maguire, J. L., Anderson, L. N., Tremblay, M. S., & Birken, C. S. (2020). Association of screen time and cardiometabolic risk in school-aged children. *Preventive Medicine Reports*, *20*(January), 101183.