

SCREEN EXPOSURE, SLEEP DURATION, AND BEHAVIORAL PROBLEMS IN SCHOOL-AGED CHILDREN: EMPIRICAL EVIDENCE FROM PAKISTAN

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ABSTRACT

The increasing prevalence of digital screen exposure among young children has raised concerns regarding its adverse impacts on developmental health, behavior, and sleep patterns. This study aimed to investigate the impact of daily screen time on behavioral problems and sleep duration among children aged 5 to 12 years in Pakistan. A quantitative, cross-sectional design was utilized with a sample of N = 74 parents recruited via simple random sampling. Data were collected using a demographic questionnaire assessing daily screen hours and sleep duration, the ScreenQ tool, and the Behavior Problem Inventory-Short Form (BPI-S). Analyses were performed using SPSS, including descriptive statistics, Cronbach's alpha reliability tests, independent samples t-tests, and one-way ANOVA. The overall 46-item scale demonstrated high internal consistency ($\alpha = .887$). Over 35% of children engaged in 5 or more hours of daily screen time, and 55.4% slept only 6 to 8 hours per night. Male children reported significantly higher daily screen exposure ($M = 12.25$, $SD = 2.56$) than female children ($M = 9.97$, $SD = 2.95$; $t(71) = 3.521$, $p < .001$). Males also showed higher mean behavioral problem scores ($M = 18.34$, $SD = 15.88$) than females ($M = 12.26$, $SD = 11.40$), though this difference was not statistically significant ($p = .074$). Screen time did not differ significantly across age sub-groups ($p = .682$). Excessive screen exposure is highly prevalent among children aged 5–12, with distinct gender differences in usage. High screen time displaces necessary sleep duration and is associated with behavioral challenges, highlighting the urgent need for parental guidance and adherence to healthy screen duration limits.

I. INTRODUCTION

Technology and media become an important part in our life, from infant till old age people. Today every house has digital gadgets like computers, television, mobile phones, laptop, tablets, and digital toys etc. Early age children are also introduced with digital gadgets and other smart devices due to their parents, who communicates with their far away living relatives, family or friends. Nowadays it's very common that parents or caregiver use digital media and gadgets for their children especially when a child starts irritating their parent, these gadgets are use as tool for children which help them to calm down or divert their mind. Whereas today's generation is introduced with digital screen (mobile and other smart devices) in residential and educational setting as well. Children who use excessive screen which is associated with developmental problem in social, emotional, cognitive and physical domains, considering other important health behaviors (like physical activity and sleep). Whereas there are a lot of

behavioral issues which also arise when a child uses excessive screen, (i.e. anger, tantrums etc). A lot of parents also get suffer from the side effect of the using excessive screen in different way as children and adolescents will be more aggressive and show tantrums towards when that specific gadget is not being use by them for some time. Some researchers have already done in on this topic about the screen time and developmental and behavioral issues in children and adolescent. But this research is more focus on how the excessive use of screen time (ST) in children (5-12 age) have behavioral problems and issue in sleep timing. These children are not only exposed to technology but they are also addicted to use screen which is affecting their life in different ways.

In the past few years, ST (e.g., watching television, playing virtual games) has almost doubled among young children and adolescents. Screens have a universal presence in day-to-day lives of people, as it is easy to access, and serve as a common platform for activity and entertainment. While screen use can be beneficial for children to some extent (e.g., participation in educational programs), but long-time screen use has been linked to negative development health outcomes including obesity, behavior problems, emotion regulation problems, speech delays, lower executive functioning and academic problems. Some research suggested that time spent in screen-based activities displaces free and active play in childhood to some extent, interferes with social interactions (e.g., with family and peers) as well as impacts sleep duration and quality. ST has been more persistent now a days in young children. From the evidence it is suggested that ST effect children's development in both ways negative and positive ways. Whereas parents play an important role in influencing their children's ST (Chong et al, 2023). A study was conducted (Jean & Campbell, 2018) in which they compare the connection between screen time and well-being. High use of screen is associated with lower psychological well-being, including curiosity, lower self-control, more distractibility, difficulty in making friends, less emotional stability, being difficult to care for and inability to finish tasks. Technology has become an important part for both children and adults who spend most of their time in browsing different kind of things or play games or watching cartoons or movies.

There are no proven benefits of screen exposure or screen time as for any age especially children who are in growing age, screen will never replace with face-to-face exposure which is required for communication with people around. Another study was conducted which (Stiglic & Viner) suggest that there is a significant relationship between screen-time and greater obesity & higher depressive symptoms in children and adolescents. According to this research children and adolescent who use screen excessively effect their health and well-being. But unfortunately, children of this age spend half of their time in using screen which impact their interaction with peers. Now a days many parents use gadgets for their children to keep them busy so that they can do their own work without any interruption from their child. Due to use of screen children don't have any interest in outdoor activities but still parents use it regularly irrespective their impact on their child. As it impacts child's language, speech development, cognition, physical and mental health. Usage of screen among infant and toddlers are also growing significantly. Nowadays children average daily screen time is highly increasing with the age which is warning for their parents as it impacts their child's behavior, sleep and other important areas of life. Research was done on screen-time and sleep among children & adolescents which found that screen time is highly associated with sleep outcomes (especially shortened duration & delayed timing). There are also other factors which impact sleep is type of screen a child & adolescent is expose to. It is advised to youth to limit their exposure of screen, especially before or during bedtime hours to basically reduce harmful effects on sleep and well-being (Hale & Guan, 2015). According to the world Health Organization (WHO) screen time guidelines recommended for children maximum 1 hour per day whereas for adolescents 2 hours per day except for homework (World Health Organization, 2019).

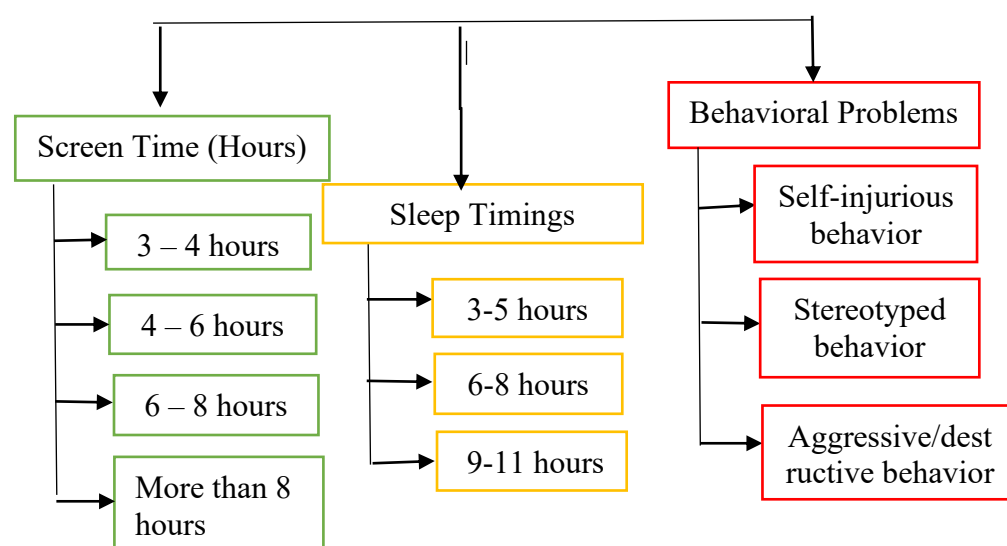
Displacement theory of screen time tell that all kinds of screen negatively affect mental well-being because it displaces time participating in healthier activities, such as physical exercise. According to a research (Mojtaba) children and adolescents who spend most of their time on screen are at higher risk for violent behaviors which includes physical fights, bully and victim. Screen time increase a lot during and after COVID-19 pandemic when policies were made in the world related to closure of schools as well as closure of everything and take it to online even school classes were started online. Due to all these situation children were automatically more exposed to screen as they don't have anything to do at their home and their parents are also facing some crisis which due to which they didn't stop their children for using screen as child is involve in screen and they can do their things properly. These patterns effect children and adolescent's life due to which a lot of issues come in children

adolescent's life. Whereas another research was done by Suleman et al, 2023 state that early years of childhood form the basis of intelligence, personality, social behavior, and capacity to learn and nurture oneself as an adult. From this research it showed that increased screen time is statistically significant with child's age, education level and employment status of mothers. It was that preschool children with screen time of > 60 minutes tend to suffer more from withdrawal syndrome, sleep problems and Autism spectrum problems as compared to preschool children with screen time ≤ 60 minutes.

Furthermore, it has been confirmed that if a young child spends more time on electronics than on other physical activities, they are likely to have behavioral and developmental problems. Families have been using screen media at a much higher rate over the last ten years, and babies are being exposed to screens at earlier ages than ever before. It is contended that the contextual elements of screen watching are more likely to influence the impacts of screen viewing rather than on the quality of viewing. The contextual factors, as opposed to viewing frequency, are the primary determinants of the impacts of screen time. This context includes the actions of adult caregivers while the child is watching, the age-appropriate content that is being viewed, the screen's interaction, and whether or not the screen is in the background. Screen time can affect a child's cognitive development in a favorable, neutral, or negative way, depending on the situation. (Guellai, Somogyi, et.al 2022). Whatever media is depicting children usually imitate that action which she/he watches on the media, significant concern needs to be addressed as it may impact child's life currently or for long time. There are lots of researches done on screen time with different variables but on the basis of this research people get a clearer idea about how screen time straightly influence children and adolescent's life, as they get behavioral problems and issue in sleep schedule. As displacement theory suggest that if a child spend time on screen which means he/she cannot do other activities in his/her life such as outdoor activities, interaction with other peers, concentrating, attention etc. So according to this we would figure out how screen time will be impacting other things in child and adolescent's life as either their parent facing behavioral issues and sleep schedule issue. We are more focus on things which is stressful for parent regarding their child's problematic behaviors due to using of screen in their daily life between 2 to 10 hours of duration (daily).

II. THEORETICAL FRAMEWORK

Figure II: Screen Exposure 5-12 Years Children



As screen become very important in every aspect of our life, at very young age children have expose to phone, tablet, laptops, TV, or any educational gadget. Without screen we didn't do any work either it's related to education, work or daily living activity. So here we will see how much screen timings are affecting children life, how they are facing issue within their life either its sleep timings or behavioral problems. We want to investigate the relationship between the screen time in children with their sleep timings and behavioral problems. According

to the displacement theory explain that time spend online as on screen means not doing other things, and children loss their attention towards other activities in their life which include outdoor activities, playing, reading etc, which may result in problems with paying attentions to other things and gaining too much weight. It means children who spend more time on screen, they will face difficulties with attention as well as with their health as they become lazy by sitting only one place and using screen so there are chances of gaining weight. Due to which they avoid other activities in their life. For children with age 5-12 years old have time to explore things in their surrounding but they are mostly involved with screen due to which their interpersonal relationship gets effected. Whereas there is a chance to get health issue in their adolescents. The more screen hours will be results in less other activities related to their age which will not be part of their life. As Behavioral learning theory also focuses on how people learn through their interactions with the environment. This theory suggests that child who spend more time on screen are most likely to be less interactive with others and don't know how to talk with others, what's the manners, how to maintain eye contact and in what way we should communicate with others face to face.

Nowadays screen is mostly used in every age group person but children are getting its effect in negative ways. As the more screen time will be less in sleep or their time for sleep will be disturbed. For this there is a theory of repair and restoration sleep (2006) when brain activity during sleep helps restore your body and mind for healthy and properly functioning, which is essentially resetting you for another day of activity. So, if the child spends more time on screen which means that their brain didn't help their body and mind to reset for another day, which may result in their physical as well as behavioral problems. There is another theory on content which suggest that the content child is watching and then doing it with their actions are more problematic. According to that whatever a child will expose to the content during screen time he/she will be imitate that behavior unconsciously or consciously, either its related to violence, fight, gaming or abusive language etc. If the child exposed to the negative content which means he/she will copy that behavior in his/her life. The more child will expose to the screen the more there is chances of getting tantrums, destructive behavior and stereotyped behavior. As whatever a child watch on screen there is 90% chances to imitate that behavior. Whereas if child has behavioral problems or any issue in his/her life which is stressful to their parents as well. According to Abidin (1995), parenting stress is the discrepancy between the resource required for parental role and the perception of being able to cope with them. As individual become parent, they are more anxious for their child development, but if their child didn't respond to them or didn't understand whatever they are saying to children can cause them to be in a stressful situation. Parents usually get stress when they loss control over their child and they don't listen to them. Now a days it's very common among children who become reason for their parental stress. Through this research we will get an idea about how behavioral problems of children and adolescent due to screen time will make parent stressful about their child's life.

Hypotheses

1. There is a significant relationship between exposures of screen with behavioral problems in children.
2. Higher daily screen time is significantly associated with reduced overall daily sleep duration in children.

III. METHOD

Participants

This study utilized a quantitative, cross-sectional survey design to analyze the impact of screen time on behavioral problems and sleep disturbances in children. A correlational and predictive approach was employed to examine the relationships between the independent variable (screen time) and the dependent variables (child behavior problems and sleep timings). A sample of N = 74 parents of children aged 5 to 12 years was selected from various regions across Pakistan using a simple random sampling technique. Parents who had at least one child within the age range of 5–12 years, and whose child regularly engaged with screen-based media (e.g., smartphones, tablets, television, laptops). To ensure broad representation, participants were recruited from diverse geographical locations within Pakistan and from various socio-economic classes (low, middle, and high income). Both male and female children were included in the dataset to control for potential gender-based variations. Data collection was carried out using a structured, three-part questionnaires comprised of a demographic profile and two standardized scales.

Measures

[I] Demographic Sheet: Developed by the researcher to gather essential background information, including the child's age, gender, regional location, family socio-economic status. Questions regarding the child's typical sleep timings (total sleep duration) and screen time was measured by first asking parents to report how many hours per day their child spent watching screen. **[II]** ScreenQ: A standardized screening tool utilized to quantify the nature, context, and extent of the child's screen time exposure. It evaluates four key domains: access to screens, frequency of use, content type, and co-viewing. Scores range from 0 to 27, where higher scores reflect greater effect on non-adherence and increased developmental risks. **[III]** Behavioral Problem Inventory - Short Form (BPI-S): A reliable, abbreviated version of the Behavioral Problem Inventory used to measure the frequency and severity of childhood behavioral difficulties, including aggressive behavior, self-injurious behavior, and stereotyped behaviors. In this research we included frequency only as it was conducted on normal population children with using screen. As frequency scales include 5 points Likert scale including (0= Never (not observed in the past two months), 1 = Monthly, 2 = Weekly, 3 = Daily, 4 = Hourly). Formal permission to use this instrument was explicitly obtained from the original author prior to data collection.

Procedure

Data collection was conducted using a structured, three-part questionnaire administered to a sample of N = 74 eligible parents of children aged 5–12 years in Pakistan. A simple random sampling technique was employed to recruit participants via Google Forms across diverse geographical regions and socio-economic classes (low, middle, and high income). Formal permission was obtained from the original author prior to utilizing the standardized research instruments. The questionnaire comprised a demographic profile capturing background variables, daily screen duration, and total sleep duration.

IV.RESULTS

The gathered data was exported from Google Forms, cleaned for inconsistencies, and analysed using the Statistical Package for the Social Sciences (SPSS). The following statistical plan was applied:

Table I: Demographic Profile of Study Sample

Variables	Categories	n	%
Child's Age	5 - 7 year	26	35.1
	7 - 9 year	21	28.4
	9 - 12 year	27	36.6
Child's Gender	Female	37	50
	Male	36	48.6
Child's daily duration of screen time	3 - 4 hours	48	64.9
	5 - 6 hours	17	23.0
	7 - 8 hours	5	6.8
	More than 8 hours	4	5.4
Child's daily duration of sleep	6 - 8 hours	41	55.4
	9 - 11 hours	33	44.6

The study sample comprised children between the ages of 5 and 12 years, with the largest age group being 9 to 12 years (n = 27, 36.5%). The sample was balanced in gender distribution, consisting of 50.0% females (n = 37) and 48.6% males (n = 36). Regarding screen exposure, 64.9% (n = 48) reported 3–4 hours of daily usage, while over a third of the sample (35.2%) engaged in 5 or more hours of daily screen time. For sleep duration, over half of the children (n = 41, 55.4%) received between 6 and 8 hours of sleep per night, whereas 44.6% (n = 33) obtained 9 to 11 hours.

Table II: Reliability Statistics

Cronbach's Alpha	N of Items
.887	46

To assess the reliability of the measurement instrument, Cronbach's alpha coefficient was calculated across the 46 items. The result yielded an alpha coefficient of .887, indicating excellent internal consistency and high measurement reliability.

Table III: One-Sample t-Test Results for Child's Daily Duration of Sleep

Variable	N	M	SD	t(73)	P
Child's daily duration of sleep	74	2.45	.500	-147.033	.001

A one-sample t-test was conducted to evaluate daily sleep duration in children (N = 74). The sample mean (M = 2.45, SD = 0.50) was significantly lower than the comparison target, $t(73) = -147.03$, $p = .001$.

Table IV: Simple Linear Regression Analysis Predicting Children's Behavioral Problems from Screen Time

Variable	R ²	B	Alpha	df	F	P
Screen time	.052	1.051	675.706	1	3.618	.062

A simple linear regression was conducted to determine whether screen time significantly predicts children's behavioral problems. The overall regression model was not statistically significant, $f(1, N - 2) = 3.62$, $p = .062$, $R^2 = .052$.

Table V: Independent Sample t-test to find the impact of Screen Time on Male and Female Behavior Issues

Variable	Males		Females		t	P
	M	SD	M	SD		
Behavior Problem	18.34	15.88	12.25	11.39	1.81	.07

An independent samples t-test was conducted to evaluate whether children's behavioral problems differed significantly by gender. Assuming equal variances, male children (M = 18.34, SD = 15.88) reported higher average behavioral problem scores than female children (M = 12.26, SD = 11.40). However, this difference was not statistically significant at the standard alpha = .05 level, $t(65) = 1.81$, $p = .074$. If equal variances are not assumed (Welch's t-test), the difference similarly remains statistically non-significant, $t(55.79) = 1.79$, $p = .079$. Therefore, the data fails to demonstrate a statistically significant impact of gender on children's behavioral problem scores.

VI: One-way ANOVA test determines whether there is a Statistically Significant Difference in Mean Daily Screen Time across Different Children's Age Groups

Variables	Sum of Squares	df	F	Mean Squares	p
Between groups	7.10	2	.385	3.55	.682
Within groups	654.84			9.22	
Total	661.94				

A one-way analysis of variance (ANOVA) was conducted to evaluate whether screen time varied significantly across children's age groups. The analysis revealed no statistically significant difference in screen time between the age groups, $f(2, 71) = 0.39$, $p = .682$. These findings indicate that a child's age did not significantly impact their daily screen time, and the hypothesis was not supported.

V. DISCUSSION

The primary objective of this study was to evaluate the impact of daily screen time on behavioral problems and sleep duration among children aged 5–12 in Pakistan. Evaluating the empirical results alongside the theoretical

framework reveals critical insights into how digital media influences child development. Displacement Theory posits that excessive screen exposure directly harms development by replacing essential real-world activities, such as physical play and face-to-face social interactions. However, the regression model predicting behavioral problems from screen time was not statistically significant ($F = 3.618$, $p = .062$, $R^2 = .052$), leading to the rejection of the primary behavioral hypothesis. While Displacement Theory assumes a linear relationship between total screen hours and behavioral issues, the data demonstrates that raw screen duration alone (35.2\% of the sample using 5 hours daily) does not directly trigger severe behavioral problems. Social Learning Theory suggests that children internalize and imitate behaviors observed on screens. The non-significant statistical trend ($p = .062$) highlights a core theoretical limitation of measuring screen time purely as a quantitative variable rather than a qualitative one. As recent literature emphasizes, contextual factors—such as content appropriateness, screen interactivity, and parental co-viewing—dictate behavioral outcomes far more than total hours spent watching.

The theoretical framework applies Restoration Theory to argue that nighttime screen exposure disrupts the brain activity required to reset physical and cognitive functions. Descriptively, 55.4\% of children received only 6–8 hours of sleep per night, falling below recommended pediatric baselines. However, demographic comparisons showed no significant differences in screen hours across age groups ($p = .682$) or behavioral scores across gender ($p = .074$), indicating that elevated screen exposure and reduced sleep schedules are widespread across modern household demographics.

Limitations

Several methodological limitations should be considered when interpreting these findings:

- The primary constraint was utilizing the Behavioral Problem Inventory-Short Form (BPI-S). Because the BPI-S is validated for individuals with intellectual disabilities, applying it to a neurotypical population likely caused floor effects on items measuring self-injury and stereotyped behaviors, masking milder, everyday behavioral issues like irritability or emotional dysregulation.
- The sample size ($N = 74$) gathered may limit generalizability across broader socio-economic contexts in Pakistan, it can be increase to large population.
- Subsequent studies should adopt measurement tools specifically tailored to neurotypical pediatric populations (such as the Strengths and Difficulties Questionnaire). Additionally, researchers should incorporate qualitative measures assessing screen content, co-viewing, and pre-bedtime device usage to capture a complete picture of digital media exposure.

VI.CONCLUSION

This study highlights the widespread presence of elevated screen exposure and reduced sleep durations among school-aged children. Although the core hypothesis predicting a direct relationship between screen time and behavioral problems was rejected, the observed patterns emphasize the need for a more nuanced understanding of digital media use. Future research should utilize standardized tools tailored to neurotypical childhood populations and examine qualitative aspects of screen exposure such as content and context to better understand the subtle socio-emotional dynamics of media use.

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