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Case Study

Association between Screentime and it's Behavioral, Psychological and Physical health impacts in Children, Adolescents, Adults: A multi- age cross-sectional study

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ABSTRACT

Background: Across all age groups, excessive screen usage has been linked to poor sleep and mental health outcomes. Goal: To assess how screen usage affects kids, teens, and grown-up's behavioural, emotional, sleep, anxiety, and depressive outcomes.

Methodology: A standardized questionnaire was used in a cross-sectional observational study to measure electronic media engagement patterns in 300 study participations. Adults were evaluated using PSQI, GAD-7, and PHQ-9, while children and adolescents' behavioural and emotional outcomes were analysed using PMUM/PMUM-SF and SDQ. Statistical analysis was used to examine relationships between device usage time and outcome measures.

Results: Increased time spent on display (≥ 4 hours) was linked to worse sleep (66%), as well as more feelings of severe anxiety (7%) and severe depression (8%) in adults. Increased media use was linked to more emotional, behavioural, and peer issues in children and teenagers. Worsening mental health outcomes were strongly correlated with poor sleep quality, indicating a mediation function.

Conclusion: Across all age groups, increased screen usage is strongly linked to poor sleep and mental health outcomes. Psychological and sleep-related morbidity may be avoided with early detection and public health initiatives that encourage responsible technology use.

Keywords: Screen time, emotional, behavioural, mental health, psychology, sleep, anxiety, depression.

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INTRODUCTION

Screen Time" refers to an individual spending time on electronic devices for the purpose of various activities such as online works and studies, watching television and mobile phones, entertainment purposes, etc. Excessive media exposure had shown to have detrimental effects on different age groups, including decreased outdoor activity, decreased sleep time, sleep disorders, behavioral abnormalities, poor academic performance, and delinquent behavior. Our culture is changing dramatically these days as a result of our growing reliance on media and technology gadgets, which has made it much easier for us to obtain fresh ideas and information.

minors and teenagers are most likely the ones who are suffering the most from our increasing reliance on electronic media. In fact, excessive multimedia exposure at young age is emerging as a new health risk. Growing minds are negatively impacted by unsupervised exposure to age-inappropriate media content. [1,11,12,13]

Adolescents are more inclined to watch media that is directed by adults, and if they are given unsupervised media time, they may be exposed to violent and inappropriate content, which could have effects their behavior and mental development. Teenager's sleep is disturbed by excessive screen watch which is linked to both delayed sleep start and shorter sleep duration.[1,11]

Students from both urban and rural areas were shown to be more dependent on screen. It was discovered that urban children possess other phrases related to mobile access.[10]. Teenagers watch television for about 60% of the time, with other gadgets accounting for the remaining 40%. Additionally, as was already mentioned, time spent on cellphones is replacing time spent watching television. [9,20,21,22,23,24]

Media use is linked to obesity; potential explanations include an increase in energy intake, a shift in time spent exercising, or, more directly, a decrease in metabolic rate.[2]

Device exposure is with multiple depressive and mental symptoms in teenagers, and the same finding was made in an adult population. Studies additionally indicated that longer visual display was correlated with ADHD problems and elevated psychotic-like experiences (PLEs) in adolescent samples. [3]

Poor sleep which is caused due to prolonged digital exposures is a predictor for the development and recurrences of depression. Research reveals that sleep issues (inadequate sleep, signs of insomnia, inconsistent sleep patterns), are positively connected with child depressed mood.[4]

Time spent on "screen use" must be diverted from other potentially beneficial tasks. For example, for stimulating cognitive growth in young children 'reading' is a key habit for parents to encourage.[5,18,17]

The brain undergoes tremendous development throughout the first three years, and the young youngster is learning rapidly. Brain is consequently vulnerable at this time to positive as well as harmful effects. Not surprisingly the newborns and young ones exposed to technology use time exhibit changes in structure and function of their brains.[5,14,15,16]

Media consumption has a negative effect on young children's overall development. Higher monitor use in adults may negatively impact learning, memory, and mental health, along with possibly raising the chances of early neurodegeneration. The findings suggest that individuals aged 18 to 25 who engage in excessive screen use experience a reduction in the thickness of the cerebral cortex, which is the brain's outer layer that manages memory and cognitive tasks like decision-making and problem-solving. [5,6]

Exposure to display light instructs your brain to remain alert, and the ongoing stimulation throughout the day can hinder your ability to relax at night. If you experience ongoing sleep problems, a sleep study at a specialized center may be beneficial. Excessive screens can result in eye fatigue, along with lowered vision clarity. Reflections on screens and high display brightness can further exacerbate the strain on your eyes leading to headaches. Prolonged periods spent sitting at a desk while typing or gazing down at a phone can create tension in the neck, shoulders, and back. Maintaining these positions for long durations may result in discomfort and potentially lead to more serious musculoskeletal problems. The time an individual now spends on panel replaces with dedication for being active-such as going for walks, gardening, engaging in sports, or working on various projects. Increasing risk of obesity and various other health issues.[7]

Electronic use causing depression can differ greatly. Influencing or the advantages of media exposure can change depending on duration and individual traits (such as age, gender, geographical location). In younger and female demographics, engaging for more than 1 hour a day was connected to an elevated risk of experiencing depression.[8]

MATERIALS AND METHODS

Study Design: Cross-sectional descriptive study.

Study Site: CAIMS hospital, schools and work places involving digital exposure.

Sample Size: 100 samples from each age group making a total of 300 samples

Inclusion criteria:

- Individuals who regularly use digital screens, such as computers, TVs, tablets and cell phones.
- A willingness to take part and give informed consent (or, in the case of children, parenteral consent)
- The capacity to understand and react to the interview or questionnaire.

Exclusion criteria:

- People who have been diagnosed with neurological or psychological conditions unrelated to screentime such as schizophrenia or epilepsy.
- Individuals receiving therapy for visual problems that restrict screen time.
- People who spend less than 30 minutes a day in front of screens.
- Unable or unwilling to give consent or fulfil the study's requirements.
- Older adults over 60, since their physical and cognitive abilities will naturally decline with age.

Data Collection Tools:

CHILDREN (6-11 years old)

- Screen Time Questionnaire: To measure duration, type and impact of screen time.
- Problematic Media Use Measure (PMUM) scale: To assess problematic media use and behavioural addiction domains)

ADOLESCENTS (12-19 years old)

- Screen Time Questionnaire: To measure duration, type and impact of screen time
- Strengths and difficulties questionnaire (SDQ) scale: for behavioural screening
- Problematic Media Use Measure – Self Reporting (PMUM-SF): To assess problematic media use and behavioural addiction domains)

ADULTS (20-55 years old)

- Screen Time Questionnaire: To measure duration, type and impact of screen time
- Pittsburgh Sleep Quality Index (PSQI) scale: To assess sleep quality and disturbances over a month interval
- Patient Health Questionnaire-9 (PHQ-9) scale: To assess depressive symptoms

- Generalised Anxiety Disorder -7 (GAD-7): To assess anxiety symptoms

Statistics:

- Correlation analysis: To evaluate association between various study variables
- Chi Square Tests: To know further sub-group analysis of numerous variables.

RESULTS

Screen-use-related disorders differ significantly by age group. Children have significant levels of addiction (31%) and are at risk of addiction (40%), although they do not exhibit SDQ problems, somatic symptoms, sleep troubles, melancholy, or anxiety. Adolescents are the most affected behaviourally, with increased addiction (46%), risk of addiction (40%), SDQ abnormal (35%), SDQ borderline (22%), and physical symptoms (49%), but no serious mental health problems are observed. Adults have few addiction-related concerns, but they have many physical symptoms (98%), poor sleep quality (66%), and some severe depressed (8%) and anxiety symptoms (7%). Overall, addiction and behavioural issues are more prevalent in children and

adolescents, whereas physical and mental health issues are more severe in adults

In children ($r = 0.619$, $p < 0.001$) and teenagers ($r = 0.686$, $p < 0.001$), the research shows a strong positive correlation between screen time and PMUM scores, suggesting that higher screen exposure is associated with more problematic media use. There was no significant link found between screen time and gender or purpose of use in youngsters, but there was a little but significant correlation with weight ($r = 0.232$, $p = 0.020$). While age was not significantly correlated, screen time in teenagers was highly correlated with SDQ scores ($r = 0.381$, $p < 0.001$), indicating a connection with behavioural issues. Higher GAD-7 and PHQ-9 scores were substantially correlated with poorer sleep quality in adults, and screen time was also significantly correlated with anxiety levels.

Furthermore, a strong correlation between screen time and both global PSQI scores and sleep quality was found by chi-square analysis ($p < 0.001$). Overall, these results show that negative behavioural and psychological effects are consistently associated with increasing screen use across age groups.

Table 1: Distribution of physical symptoms, poor sleep quality, severe anxiety and depressive symptoms, addiction, at risk of addiction, SDQ abnormal, SDQ borderline in

Age Group	Physical Symptoms	Poor Sleep Quality	Severe Depressive Symptoms	Severe Anxiety Symptoms
Children	Nil	Nil	Nil	Nil
Adolescents	49%	Nil	Nil	Nil
Adults	98%	66%	8%	7%

Age Group	Addicted	At Risk of Addiction	Sdq Abnormal	Sdq Borderline
Children	31%	40%	Nil	Nil
Adolescents	46%	40%	35%	22%
Adults	Nil	Nil	Nil	Nil

Table 2: Chi-Square variables and significance between screentime, sleep quality and global PSQI score:

Variables	X^2 value	df	P value	Significance
Screentime and Sleep quality	57.538	1	< 0.001	Significant
Screentime and Global PSQI score	68.742	19	< 0.001	Significant

Table 3: Evaluating the association between screentime and variables for different age group

Correlating variables	r value	p value	Outcome
CHILDREN			
Screentime and PMUM score	0.619	< 0.001	Significant
Screentime and weight	0.232	0.020	Significant
PMUM score and purpose of child's screen use	0.100	0.324	Not significant
Screentime and gender	0.058	0.563	Not significant
ADOLESCENTS			
Screentime and SDQ score	0.381	< 0.001	Significant
Screentime and PMUM-SF score	0.686	< 0.001	Significant
Age and SDQ score	-0.106	0.293	Not significant
ADULTS			
Sleep Quality and GAD-7	0.370	< 0.001	Significant
Sleep Quality and PHQ-9	0.352	< 0.001	Significant
Screentime and GAD-7	0.363	0.014	Significant

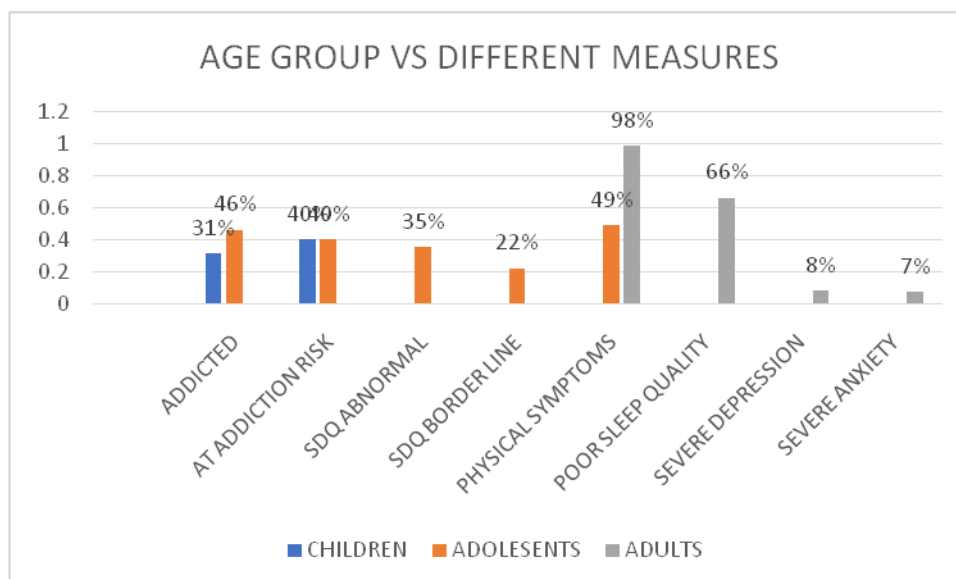


Figure 1: Age groups VS D

DISCUSSION

CHILDREN

A study conducted by Rubina Sulaiman et al. in children age from 5-12 years showed that 42.3% of kids between the ages of 5 and 12 were addicted to their phones. Mobile phone addiction was found to be statistically significantly correlated with a number of factors, including the family's higher socioeconomic level, the father's education, children's normal weight for their age, the prevalence of vision issues, headaches, poor concentration, and sleep disturbances. Similar in our investigation conducted in 100 children (6-12 years) shows that, 31% children are addicted to screen use and show serious negative effects from excessive screen time. 40% users, are at addiction risk and just 29% users are classified as low-risk. Our study also found a statistically significant ($p \leq 0.001$) positive association between screen time and PMUM score. The strength of the correlation implies that screen time is a significant behavioural factor that contributes to problematic media use practices and contribute to the emergence of harmful media behaviours. Research conducted by Terri Lipman et al. overuse of screen media is linked to poorer sleep quality, shorter sleep duration, a higher risk of being overweight or obese, reduced executive functioning, worse academic achievement, and more internalizing and externalizing issues. There might be reciprocal relationships. And in our analysis the association between screen time and body weight among the study participants ($N = 100$) was evaluated using Pearson's correlation analysis. Screen time and weight were found to positively correlate ($r = 0.232$) and to be statistically significant ($p = 0.020$, two-tailed). This suggests that within the study population, increased screen time is linked to increased body weight. It is also important to note that it alone doesn't cause weight changes but may contribute to weight related health risks. According to the graphical findings of our inquiry, children use screens mostly for watching cartoon (36%) and mixed use (46%), with very little for education. Particularly in upper screen- time categories, boys spend more time on screens than girls. Many participants (54%) reported using screens for more than four

hours a day, despite awareness and concern about excessive screen exposure.

ADOLESCENTS

A study conducted by Prashant V Kariya et al showed that adolescents who spent more than four hours a day on screens had considerably higher ratings for behaviour issues and hyperactivity. It highlighted a strong link between excessive screen time and behavioural issues among adolescents in school. Greater hyperactivity was associated with greater screen time. According to our study, we found that more social and behavioural issues were indicated by higher abnormal scores for conduct problems (39%) and peer problems (45%). While normal scores were often lower in most categories, borderline values were common in prosocial behaviour (40%) and hyperactivity (39%). In general, a sizable portion reported emotional and behavioural issues, especially with regard to peer interactions and behaviour. Screen time and SDQ scores showed a positive association ($r = 0.381$) among the participants ($N = 100$). The correlation analysis between two variables was statistically significant ($p \leq 0.001$), suggesting that SDQ scores tend to rise in tandem with screen use which signifies increased screen time is linked to worse psychosocial outcomes because higher SDQ scores indicate more emotional and behavioural problems. A study conducted by Dinesh J Bhandari et al revealed that 37% of students within age of 16- 19 years were addicted to smartphone use. Our evaluation similarly note that 46% of adolescents were addicted to use screen and media in a problematic way and 40% were at risk with moderate use. Screen time and the Problematic Media Use Measure (PMUM) score had a substantial positive association ($r = 0.686$) according to Pearson's correlation analysis, which was highly statistically significant ($p \leq 0.001$). This suggests that children's problematic media usage behaviours are substantially correlated with increased screen time. Our research study confirms the crucial role that screen time plays in the emergence of maladaptive, addiction and media-related behaviours by showing a strong correlation between screen exposure and problematic media use. It has also been found that female adolescents were more likely than male

adolescents to have high screen time (≥ 4 hours/day) and with roughly 42% users, social media is the most popular activity this highlights the importance of early supervision and healthy digital habits, especially for girls.

ADULTS

In research done by Gunaseelan Deivendran et al; revealed that smartphones use was linked to worse sleep quality. Bad sleep quality (61.7%) and 48.1% showed getting sleep during daytime. Similarly, our study had strong association ($P \leq 0.001$) in which subjects with more than 4 hours of digital use had poor sleep quality (66%) and good sleep quality (34%). According to assessment conducted by Saleem, Sheikh Mohd; Jan, Shah Simaya Depression symptoms were prevalent at 37.9%, anxiety symptoms at 33.3%, high stress at 43.7%, and low self-esteem at 25.3%. Screen time, social media use, and symptoms of depression ($r = 0.32$, $r = 0.25$), anxiety ($r = 0.28$, $r = 0.22$), and stress ($r = 0.36$, $r = 0.29$) showed significant positive connections, whereas self-esteem ($r = -0.25$, $r = -0.18$) showed negative relationships. While social support and physical activity demonstrated protective effects, poor sleep and cyberbullying made mental health problems worse. In this observation, we found a statistically positive association of the sleep patterns, anxiety (7%) and depression (8%) with both ($P = 0.001$). When combined with study's screentime trend, the results imply that more display time is linked to worse sleep, which in turn is strongly associated to more severe anxiety and depression. Overall, our research work revealed participants of smaller and teenagers age had addiction and behavioural problems, whereas adults showed prominent physical and mental health problems.

CONCLUSION

This study concludes that across all age groups, greater screen time was linked to negative psychological consequences, with consistent effects on behavioural performance, emotional well-being, and sleep quality. Increased screen time was associated with worse sleep, which was linked to more anxiety and depressive symptoms in adults. This suggests that sleep disturbance is a crucial therapeutic pathway. Excessive screen time was linked to more emotional and behavioural problems in children and adolescents, especially hyperactivity issues and conduct problems, which may have detrimental consequences on social and developmental functioning. Overall, the results show that visual time was a significant, modifiable risk factor with considerable implications for public health and clinical practice. Improved mental health outcomes across populations may result from regular screen time assessments and interventions that support balanced technology use and sound sleep habits across all age groups.

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