Digital Screen Exposure and Its Impact on the Physical and Mental Health of School Adolescents: A Study in Darjeeling District

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Abstract

The rapid expansion of digital technology has transformed the daily lives of adolescents. Smartphones, tablets, computers, and television have become essential tools for education, communication, and entertainment. While digital devices provide numerous benefits, excessive screen exposure has raised concerns regarding the physical and mental health of adolescents. This study examines the impact of digital screen exposure on school-going adolescents in Darjeeling District, West Bengal. The study focuses on physical health outcomes such as eye strain, sleep disturbances, headaches, obesity, and musculoskeletal problems, as well as mental health outcomes including anxiety, depression, stress, social isolation, and reduced academic performance. A descriptive and analytical approach is proposed to understand the relationship between screen time and adolescent well-being. The findings indicate that prolonged screen exposure is associated with adverse physical and psychological outcomes, highlighting the need for digital literacy, parental monitoring, and healthy screen-use practices among adolescents.

Keywords |:Digital Screen Exposure, Adolescents, Mental Health, Physical Health, School Students, Darjeeling District

1. Introduction

The twenty-first century has witnessed an unprecedented increase in digital technology usage among adolescents. The widespread availability of smartphones, laptops, tablets, and internet connectivity has significantly altered educational, social, and recreational activities. Adolescents spend substantial portions of their day engaging with digital screens for academic purposes, social networking, gaming, and entertainment.

India has experienced a remarkable increase in internet penetration and smartphone ownership, particularly after the COVID-19 pandemic, when online learning became essential. Although digital technology offers educational opportunities and access to information, excessive screen exposure may negatively affect physical and psychological well-being. Adolescence is a critical developmental stage characterized by rapid physical, cognitive, and emotional changes. Therefore, understanding the impact of digital screen exposure on adolescent health is of paramount importance.

Darjeeling District, with its unique socio-cultural and geographical characteristics, provides an important setting to investigate digital screen usage patterns among school adolescents and their associated health consequences.

2. Review of Literature

Research indicates that excessive screen time is associated with various mental health problems among adolescents. A systematic review involving 50 studies found significant associations between prolonged screen exposure and reduced mental well-being, depressive symptoms, anxiety, and lower life satisfaction. Smartphone use and social media engagement were particularly linked to adverse mental health outcomes.

Several studies have reported that excessive screen use disrupts sleep patterns, resulting in reduced sleep duration and poor sleep quality. Sleep disturbances subsequently contribute to emotional instability, academic difficulties, and psychological distress.

Evidence also suggests that adolescents spending four or more hours daily on screens are at higher risk of anxiety, depression, behavioral problems, and attention deficits. Reduced physical activity and irregular sleep schedules often mediate these effects.

Physical health consequences of excessive screen exposure include digital eye strain, headaches, neck pain, obesity, poor posture, and reduced cardiovascular fitness. Sedentary behavior associated with prolonged screen use contributes to unhealthy lifestyle patterns among adolescents.

3. Statement of the Problem

The increasing dependence on digital devices among school adolescents has become a significant public health concern. Excessive screen exposure may adversely affect physical health, mental well-being, social relationships, and academic performance. However, limited empirical research exists regarding these issues among adolescents in Darjeeling District. Therefore, this study seeks to investigate the extent and impact of digital screen exposure on adolescent health.

4. Objectives of the Study

To assess the extent of digital screen exposure among school adolescents in Darjeeling District.

To examine the impact of screen exposure on adolescents' physical health.

To analyze the influence of screen exposure on adolescents' mental health.

To identify gender and age differences in screen-use patterns.

To suggest measures for promoting healthy digital habits among adolescents.

5. Research Questions

What is the average daily screen time among school adolescents in Darjeeling District?

How does digital screen exposure affect physical health?

What is the relationship between screen exposure and mental health outcomes?

Are there significant differences in screen usage patterns according to gender and age?

6. Methodology

Research Design

Descriptive and analytical research design.

Study Area

Darjeeling District, West Bengal.

Population

School-going adolescents aged 13–19 years.

Sample Size

Approximately 300–500 students selected through stratified random sampling.

Data Collection Tools

Structured Questionnaire

Screen Time Assessment Scale

Mental Health Assessment Scale

Physical Health Checklist

Data Analysis

Percentage Analysis

Mean and Standard Deviation

Chi-square Test

Correlation Analysis

Multiple Regression Analysis

7. Impact of Digital Screen Exposure on Physical Health

7.1 Eye Strain and Vision Problems

Excessive screen use often causes digital eye strain, characterized by dry eyes, blurred vision, irritation, and headaches. Adolescents spending prolonged hours on smartphones frequently report visual discomfort.

7.2 Sleep Disturbances

Blue light emitted from digital devices suppresses melatonin production, delaying sleep onset and reducing sleep quality. Poor sleep negatively affects concentration, emotional regulation, and academic performance.

7.3 Musculoskeletal Disorders

Poor posture while using smartphones and computers contributes to neck pain, shoulder pain, and back pain among adolescents.

7.4 Obesity and Physical Inactivity
Extended screen time reduces participation in physical activities and sports, increasing sedentary behavior and obesity risk.

8. Impact of Digital Screen Exposure on Mental Health
8.1 Anxiety and Depression
Research demonstrates that excessive screen exposure is associated with increased symptoms of anxiety and depression among adolescents. Social comparison, cyberbullying, and excessive social media use contribute to these outcomes.

8.2 Stress and Emotional Distress
Continuous digital engagement and information overload can increase psychological stress and emotional exhaustion.
8.3 Reduced Self-Esteem
Social media platforms often encourage unrealistic comparisons, leading to body image concerns and reduced self-confidence.
8.4 Attention and Academic Performance
Excessive screen use may impair concentration, memory, and academic achievement due to constant digital distractions.
8.5 Social Isolation
Although digital platforms facilitate communication, excessive online engagement may reduce face-to-face interactions and social connectedness.

9. Discussion
The findings from existing literature suggest that digital screen exposure is a double-edged phenomenon. While technology supports educational advancement and social connectivity, excessive usage poses significant risks to adolescent health. The adverse effects are particularly evident in sleep quality, emotional well-being, physical activity levels, and mental health outcomes. The impact varies according to the type of screen activity, duration of use, and individual characteristics. Therefore, balanced and regulated digital engagement is essential for promoting healthy adolescent development.
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10. Recommendations
Schools should conduct digital wellness awareness programs.
Parents should monitor and regulate screen usage at home.
Adolescents should be encouraged to engage in outdoor activities and sports.
Screen-free periods should be incorporated into daily routines.
Educational institutions should promote responsible digital citizenship.
Health professionals should regularly assess screen-related health issues among adolescents.

11. Conclusion
Digital technology has become an integral part of adolescents' lives. While it offers educational and social benefits, excessive screen exposure can negatively affect physical and mental health. The evidence indicates associations between prolonged screen use and eye strain, sleep disturbances, obesity, anxiety, depression, and reduced well-being. Therefore, collaborative efforts involving parents, schools, healthcare professionals, and policymakers are necessary to ensure healthy and balanced digital engagement among adolescents in Darjeeling District and beyond.

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