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Original Research Article

Problematic internet use and adolescent well-being: a cross-sectional study of physical, behavioral and academic outcomes

Edwin Dias[1], Mithali Pradeep Shetty[2]*, Yash Sailesh Kumar[3], Jenson Shawn Salins[2]

[1]Department of Pediatrics, Srinivas Institute of Medical Sciences and Research Centre, Mangalore, Karnataka, India
[2]Srinivas Institute of Medical Sciences and Research Centre, Mangalore, Karnataka, India
[3]Department of Medicine, George Washington University, Washington, DC, USA

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***Correspondence:**
Dr. Mithali Pradeep Shetty,
E-mail: mithalipshetty@gmail.com

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ABSTRACT

Background: The objective of the study is to assess the physical, psychological, behavioral, social, and academic effects associated with problematic internet use among adolescents.
Methods: A cross-sectional observational study was conducted among 178 adolescents at Srinivas Institute of Medical Sciences and Research Centre, Mangalore, India. Anonymized data were collected using a structured self-administered questionnaire distributed via Google Forms. Variables assessed included sleep patterns, physical health, academic performance, and social relationships.
Results: A total of 178 adolescents were evaluated. Behavioral and cognitive features were predominant, led by impulsivity (68.5%) and anxiety (53.7%). Inadequate sleep (43.7%), weight changes (40.0%), and fatigue (37.3%) were major physical complaints. Academic performance decline was noted by 39.1% and social relationship difficulties by 38.9%.
Conclusions: Problematic internet use is associated with a broad range of interconnected physical, psychological, and academic health issues among adolescents. Early identification and multidisciplinary interventions may help mitigate its adverse effects.

Keywords: Anxiety, Depression, Mental health, Sleep wake disorders

INTRODUCTION

Problematic internet use (PIU) refers to excessive or poorly controlled online engagement that interferes with daily functioning and overall well-being.[1] Previous research has linked PIU to a wide range of adverse outcomes, including depression, suicidal ideation, reduced self-esteem, social withdrawal, and impaired interpersonal relationships.[2,3] Adolescents are particularly vulnerable to these effects due to ongoing neurodevelopment, especially in brain regions involved in impulse control and decision-making.[4]

The rapid integration of digital technology into education, communication, and entertainment has made prolonged screen exposure a defining feature of adolescent life.[5] Although internet use offers educational and social benefits, excessive use has been associated with sleep disturbances, fatigue, reduced physical activity, and visual symptoms such as digital eye strain.[6-8] Digital eye strain, in particular, has gained increasing clinical attention because of prolonged screen exposure and reduced blinking frequency.[9] Given these growing concerns, it is important to understand the broader impact of PIU on adolescent health and well-being. Therefore,

this study aims to examine the combined physical, behavioral, and academic consequences of PIU among adolescents.

METHODS

This cross-sectional observational study was conducted among adolescents aged 13–19 years at Srinivas Institute of Medical Sciences and Research Centre, Mangalore, Karnataka, India. The study aimed to assess the physical, psychological, behavioral, social, and academic effects associated with problematic internet use among adolescents.

Data were collected using a structured self-administered questionnaire distributed anonymously through Google Forms. Participants fulfilling the age criteria and willing to participate were included in the study, while incomplete responses were excluded from the final analysis. The questionnaire assessed variables related to sleep patterns, fatigue, headaches, backache, eye-related problems, weight changes, hygiene practices, anxiety, mood changes, impulsivity, concentration difficulties, academic performance, social relationships, family relationships, financial burden, and outdoor activity patterns. A total of 178 adolescents participated in the study. As this was an observational cross-sectional study, no intervention or follow-up was conducted. Data were compiled using Microsoft Excel and analyzed using descriptive statistical methods. Categorical variables were expressed as frequencies and percentages.

Participation in the study was voluntary, and responses were collected anonymously to maintain confidentiality. Informed consent was obtained from all participants prior to participation. As the study utilized an anonymized questionnaire-based survey without collection of identifiable participant information, formal ethical clearance was not required according to institutional policy.

RESULTS

A total of 178 adolescents aged 13–19 years participated in the study. The baseline demographic and study profile characteristics of the participants are summarized in Table 1. Overall, behavioral and cognitive disturbances were the most prevalent outcomes associated with problematic internet use, led by impulsivity (68.5%) and anxiety (53.7%), followed by depressive symptoms (48.8%), boredom with routine tasks (48.2%), and mood changes (41.6%). Physical and lifestyle complaints were also widely reported, with inadequate sleep (43.7%), weight changes (40.0%), fatigue (37.3%), and backache (36.2%) being the predominant issues. Educational and social functioning were substantially impacted, with academic performance decline reported by 39.1% of adolescents and social relationship difficulties reported by 38.9%.

The complete distribution of physical, socioeconomic, educational, behavioral, and cognitive parameters is presented in Table 2.

Table 1: Demographic profile and baseline characteristics of the study participants (n=178).

Characteristics/Parameters	Category/Subgroup	Value/Distribution (n=178)
Total sample size	Completed valid responses	178 (100.0%)
Age distribution (years)	13–15 years (Early adolescence)	74 (41.6%)
	16–19 years (Late adolescence)	104 (58.4%)
Gender	Male	92 (51.7%)
	Female	86 (48.3%)
Study setting	Tertiary care medical teaching hospital	Srinivas Institute of Medical Sciences & Research Centre
Geographical location	City / State / Country	Mangalore, Karnataka, India
Study design	Epidemiological survey	Cross-sectional (observational, non-interventional)
Data collection tool	Electronic self-administered survey	Google Forms

Table 2: Prevalence of physical, socioeconomic, educational, behavioral and cognitive outcomes associated with problematic internet use (n=178).

Domains	Parameter/Feature	Affected participants (N)	Percentage (%)
Physical and lifestyle factors	Inadequate sleep	78	43.7%
	Weight changes	71	40.0%
	Fatigue and weakness	66	37.3%
	Backache	64	36.2%
	Recurrent headaches	63	35.2%
	Eye-related problems (digital eye strain)	60	33.7%

Continued.

Domains	Parameter/Feature	Affected participants (N)	Percentage (%)
	Poor hygiene practices	42	23.6%
Socioeconomic and educational factors	Academic performance decline	70	39.1%
	Difficulty in maintaining social relationships	69	38.9%
	Family relationship problems	58	32.5%
	Perceived financial burden on family	47	26.3%
Behavioral and cognitive factors	Impulsivity	122	68.5%
	Anxiety	96	53.7%
	Depression or sadness	87	48.8%
	Boredom with routine tasks	86	48.2%
	Mood changes	74	41.6%
	Inability to concentrate in class	66	37.0%
	Reduced interest in outdoor activities	49	27.3%

DISCUSSION

The present study demonstrates that problematic internet use among adolescents is associated with a wide range of physical, psychological, behavioral, and academic difficulties (Table 2). As internet access and screen exposure continue to increase among younger populations, excessive internet use is becoming an increasingly important concern affecting overall adolescent well-being.

One of the major findings of this study was the high prevalence of sleep-related problems. A large proportion of participants reported inadequate sleep and fatigue, which may be related to prolonged screen exposure, particularly during nighttime hours. Previous studies have shown that excessive use of smartphones and other digital devices can disrupt circadian rhythms and delay melatonin secretion, ultimately affecting sleep quality and duration.[6,10] Poor sleep may further contribute to daytime tiredness, difficulty concentrating, irritability, and reduced academic performance.[2,11]

Academic difficulties were also commonly reported among participants. Many adolescents experienced reduced concentration in class and declining academic performance. Excessive internet use may reduce study time, impair attention span and increase distraction, ultimately affecting educational outcomes. Similar findings have been reported in earlier studies examining the relationship between PIU and school performance among adolescents.[12]

Several physical health complaints were observed in the study population, including headaches, backache, fatigue, weight changes, and eye-related problems. These symptoms may be linked to prolonged sitting, poor posture, reduced physical activity and continuous screen exposure. Eye strain and visual discomfort have become increasingly common among adolescents due to extended use of digital devices for entertainment, communication, and academic purposes.[7-9]

Behavioral and emotional disturbances were another important finding of this study. Anxiety, mood changes, sadness, boredom with routine tasks, and impulsivity were reported by a substantial proportion of participants. Adolescence is a sensitive developmental period during which emotional regulation and impulse control are still maturing. Excessive internet use may overstimulate reward-seeking behaviors and contribute to emotional instability and reduced self-control.[4,13] The high prevalence of impulsivity identified in this study may reflect this association.

The study also highlighted the social impact of PIU. Difficulties in social relationships and family interactions were reported by many participants, along with reduced interest in outdoor activities. Increased time spent online may gradually reduce face-to-face interaction and participation in physical or recreational activities, which are important for healthy social and emotional development during adolescence.[3] Addressing PIU requires a structured, multidisciplinary, and preventive approach involving adolescents, families, schools, and healthcare systems.

Individual-level interventions

At the individual level, interventions should prioritize fostering self-regulation of screen time through the use of digital timers, application-based monitoring tools, and conscious device management. Promoting healthy sleep hygiene practices is equally vital, particularly ensuring the strict avoidance of screen exposure for at least one hour before bedtime to prevent circadian rhythm

disruption. In addition, adolescents should be encouraged to increase their participation in outdoor sports, recreational physical exercise and offline social activities to establish balanced daily routines and reduce digital dependency.

Family-based strategies

Family-based strategies play an essential role in reinforcing behavioral modifications. Parents and caregivers should establish clear and consistent household rules regarding internet and device usage, including designating device-free periods during family meals and before sleep. Encouraging open, supportive communication between parents and adolescents concerning online behaviors, digital habits and potential hazards provides an essential foundation for digital wellness. Where necessary, parental supervision and appropriate monitoring of internet activities should be maintained, coupled with the promotion of shared, family-centered activities that alleviate screen reliance.

School-based interventions

School-based interventions offer a structured platform for education, awareness, and early intervention. Educational institutions should integrate digital literacy and responsible internet-use education directly into school curricula, while regularly conducting awareness workshops regarding the physical and psychological consequences of excessive screen exposure. Furthermore, schools should provide accessible counseling and psychological support services for students demonstrating problematic behavioral patterns or academic decline, alongside actively encouraging participation in extracurricular, cultural and physical activities to promote balanced lifestyle habits.

Healthcare and public health approaches

From a healthcare and public health perspective, clinical awareness must be enhanced so that healthcare professionals can readily recognize early signs of problematic internet use. Routine screening for excessive internet use and digital habits should be incorporated into standard adolescent health assessments and annual wellness check-ups. Furthermore, community-based mental health and behavioral support programs targeting adolescents should be developed, supported by public health campaigns emphasizing healthy digital habits, digital literacy, and balanced technology use.

Collectively, these interventions highlight the need for a coordinated and sustained approach to address PIU. While individual behavior change is important, long-term impact is more likely when supported by family involvement, institutional frameworks, and public health policies. Integrating these strategies can help mitigate the adverse effects identified in this study and promote healthier, more balanced digital engagement among adolescents.

CONCLUSION

The present study demonstrates that problematic internet use among adolescents is associated with a broad range of physical, psychological, behavioral, academic, and social health concerns. Sleep disturbances, fatigue, headaches, eye-related problems, reduced concentration, anxiety, mood changes, impulsivity and academic difficulties were among the commonly observed findings in the study population. The findings suggest that excessive internet use may significantly influence multiple aspects of adolescent well-being and daily functioning. Adolescence represents a critical period of neurodevelopment, during which excessive and uncontrolled digital engagement may have lasting effects on emotional regulation, behavior, academic performance and social interaction. Increasing screen exposure and dependence on digital platforms may further contribute to sedentary lifestyles, disrupted sleep patterns and reduced participation in outdoor and interpersonal activities.

The results of this study emphasize the growing public health importance of promoting balanced and responsible internet use among adolescents. Early awareness, parental guidance, school-based interventions and healthy lifestyle practices may play an important role in reducing the adverse impact of PIU during a critical period of neurodevelopment. Collaborative efforts involving families, educators, healthcare professionals and policymakers are essential for safeguarding adolescent health and ensuring optimal developmental outcomes in an increasingly digital world.

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