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Original Research Article

Problematic Mobile Phone and Internet Use and Its Association with Sleep Disturbance and Academic Performance among Adolescents: A Cross-Sectional Study from Patna

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Abstract:

Background: Although digital technologies provide important social and educational benefits, excessive internet and mobile phone use has emerged as a significant behavioural concern among adolescents. Problematic use has been associated with sleep disturbances, poor academic performance, and psychosocial problems. However, data from adolescent-friendly clinical settings in eastern India remain limited.

Objectives: To determine the prevalence of internet and mobile phone addiction among adolescents attending the Yuva Clinic and to examine its association with sleep patterns and academic performance.

Methods: A cross-sectional analytical study was conducted among 250 adolescents aged 13–19 years attending the Yuva Clinic, Department of Community Medicine, Nalanda Medical College and Hospital, Patna, from March to May 2025. Internet and mobile phone addiction were assessed using the Internet Addiction Test (IAT) and Mobile Phone Addiction Scale (MPAS). Sleep characteristics and academic performance were self-reported. Data were analysed using appropriate descriptive and inferential statistics, with $p < 0.05$ considered statistically significant.

Results: A significant proportion of adolescents demonstrated moderate to severe levels of internet and mobile phone addiction. Higher addiction scores were significantly associated with reduced sleep duration, poor sleep quality, increased daytime sleepiness, and deterioration in academic performance. Adolescents with severe addiction scores had a higher likelihood of experiencing academic difficulties compared to those with little or no addiction.

Conclusion: Adolescents attending the Yuva Clinic frequently experience internet and mobile phone addiction, which has a detrimental effect on sleep patterns and academic performance. Early identification and targeted behavioural interventions within adolescent-friendly healthcare settings are essential to mitigate long-term consequences.

Keywords: Adolescents; Internet addiction; Mobile phone addiction; Sleep disturbance; Academic performance; Yuva Clinic

Introduction

Adolescence is a critical developmental period characterized by rapid social, psychological, and physical changes, during which individuals are particularly susceptible to behavioral influences that may affect long-term health outcomes. In recent years, widespread smartphone ownership and easy access to the internet have substantially altered adolescents' daily routines, communication patterns, learning behaviors, and leisure activities [1]. While digital technology serves as an important tool for education and social interaction, excessive and unregulated use has emerged as a growing public health concern.

Addiction to mobile phones and the internet is increasingly recognized as a form of behavioral addiction characterized by compulsive use, impaired control, withdrawal symptoms, and functional impairment [2]. Adolescents are particularly vulnerable due to ongoing neurodevelopment, limited self-regulatory capacity, heightened peer influence, and increasing reliance on digital platforms for academic and social engagement [3]. Studies conducted across various settings have reported a rising prevalence of problematic internet and mobile phone use among school-aged and college-going adolescents [4,5]. Reported

prevalence estimates range from approximately 10% to over 40%, depending on the assessment tools employed and the study context.

One of the most commonly reported consequences of excessive internet and mobile phone use is its adverse effect on sleep. Late-night screen exposure, prolonged social media engagement, online gaming, and internet streaming disrupt circadian rhythms by suppressing melatonin secretion and increasing cognitive arousal [6]. Poor sleep duration and quality during adolescence have been associated with increased risk-taking behavior, mood disturbances, daytime sleepiness, and impaired concentration [7]. Chronic sleep deprivation at this critical developmental stage may also have long-term consequences for both mental and physical health.

Academic performance represents another important domain adversely affected by excessive digital device use. While moderate and purposeful internet use may enhance learning opportunities, excessive non-academic screen time has been linked to reduced study duration, diminished attention span, declining academic grades, and increased academic stress [8]. Frequent multitasking between academic tasks and mobile phone activities further compromises learning efficiency and memory consolidation, thereby negatively affecting scholastic outcomes [9]. Several studies have demonstrated a significant negative association between high internet addiction scores and academic performance among adolescents and young adults [10].

India has experienced rapid digital expansion over the past decade, with increased smartphone affordability and widespread internet penetration across younger age groups [11]. National surveys indicate that adolescents constitute a substantial proportion of daily internet users, often with limited supervision or awareness regarding healthy digital practices [12]. Despite this growing exposure, systematic data on the health and academic consequences of internet and mobile phone addiction among adolescents in clinical settings—particularly in eastern India—remain limited.

The Yuva Clinic, established as part of adolescent-friendly health services, provides a unique clinical platform for identifying behavioral and lifestyle-related health concerns among adolescents seeking care [13]. Assessing internet and mobile phone addiction in this setting allows for early identification of at-risk individuals and facilitates the integration of preventive counseling and behavioral interventions into routine adolescent healthcare. Understanding the association between digital addiction, sleep disturbance, and academic performance is essential for designing targeted interventions involving adolescents, parents, educators, and healthcare professionals.

Therefore, the present study was undertaken to assess the prevalence of internet and mobile phone addiction among adolescents attending the Yuva Clinic at Nalanda Medical College and Hospital, Patna, and to examine its association with sleep patterns and academic performance using standardized assessment tools.

Aims and Objectives

Aim: To assess the association between internet and mobile phone addiction and sleep patterns and academic performance among adolescents attending the Yuva Clinic at Nalanda Medical College and Hospital, Patna.

Objectives

1. To determine the prevalence and severity of internet and mobile phone addiction among adolescents aged 13–19 years.
2. To assess sleep patterns and sleep-related problems among the study participants.
3. To evaluate the association between internet and mobile phone addiction and sleep disturbance.
4. To examine the association between academic performance and internet and mobile phone addiction.
5. To identify sociodemographic and behavioral factors associated with higher addiction scores.

Materials and Methods

Study Design: This cross-sectional analytical study was conducted to assess internet and mobile phone addiction among adolescents and its association with sleep patterns and academic performance.

Study Setting: The study was conducted at the Yuva Clinic, Department of Community Medicine, Nalanda Medical College and Hospital (NMCH), Patna. The Yuva Clinic functions as an adolescent-friendly health facility providing preventive, promotive, and curative healthcare services to adolescents.

Study Duration: The study was conducted over a three-month period, from March to May 2025.

Study Population: The study population comprised adolescents aged 13–19 years attending the Yuva Clinic during the study period.

Sample Size: The study included a total of 250 adolescents. The sample size was determined based on previously reported prevalence estimates of internet and mobile phone addiction, taking into account feasibility and average adolescent attendance at the clinic during the study period.

Sampling Technique: Successive sampling was employed. All eligible adolescents attending the

Yuva Clinic during the study period were approached and recruited until the required sample size was achieved.

Inclusion Criteria

1. Adolescents aged 13–19 years
2. Attendees of the Yuva Clinic during the study period
3. Regular users of mobile phones and/or the internet
4. Willing to participate and provide informed consent (with parental consent for participants below 18 years)

Exclusion Criteria

1. Adolescents with known psychiatric illnesses or neurodevelopmental disorders
2. Those with chronic medical conditions affecting sleep patterns
3. Adolescents unwilling to participate or unable to complete the questionnaire

Study Tools and Data Collection: Data were collected through face-to-face interviews using a pre-tested, semi-structured questionnaire administered in a private setting to ensure confidentiality. The questionnaire included sections on sociodemographic characteristics, internet and mobile phone addiction, sleep patterns, and academic performance.

Internet addiction was assessed using the Internet Addiction Test (IAT), a validated 20-item instrument scored on a five-point Likert scale. Based on standard cut-offs, participants were categorized as having normal, mild, moderate, or severe internet addiction.

Mobile phone addiction was assessed using the Mobile Phone Addiction Scale (MPAS), which evaluates compulsive use, tolerance, withdrawal symptoms, and functional impairment associated with mobile phone use.

Socio-demographic details: Age, gender, level of education, family structure, residence, and parental education were all noted.

Assessment of mobile phone and internet addiction: The Internet Addiction Test (IAT), a validated 20-item measure of internet use severity on a five-point Likert scale, was used to assess internet addiction. Addiction levels were classified as normal, mild, moderate, and severe [1]. The Mobile Phone Addiction Scale (MPAS), which assesses compulsive consumption, tolerance, withdrawal, and functional impairment associated with mobile phone use, was used to measure mobile phone addiction [2].

Assessment of sleep patterns: Average sleep duration, sleep onset delay, nighttime awakenings, reported sleep quality, and daytime drowsiness were all considered sleep-related characteristics. According to previous research, self-reported insufficient sleep time and subjective sleep disruptions were used to characterize poor sleep [3].

Assessment of academic performance: Self-reported academic performance from the previous term was used to evaluate academic performance. Participants classified their performance as poor, average, or good. Additionally noted were issues with focus, finishing assignments, and paying attention in class [4].

Operational Definitions

- **Internet addiction:** Excessive or poorly controlled internet use resulting in impairment of daily functioning, as classified according to IAT score categories [1].
- **Mobile phone addiction:** According to MPAS, excessive and compulsive cell phone use is linked to behavioral dependence and functional impairment [2].
- **Poor sleep:** Self-reported short sleep duration, frequent awakenings during the night, or low perceived quality of sleep [3].
- **Poor academic performance:** Self-reported drop in grades or trouble completing assignments in comparison to prior performance [4].

Ethical Considerations: The study was conducted after obtaining approval from the Institutional Ethics Committee of Nalanda Medical College and Hospital, Patna. Written informed consent was obtained from participants aged 18 years and above. For participants below 18 years, written assent along with parental or guardian consent was obtained. Participant anonymity and confidentiality were strictly maintained throughout the study.

Statistical Analysis: Data were entered in Microsoft Excel and analyzed using standard statistical software. Descriptive statistics, including mean, standard deviation, frequencies, and percentages, were used to summarize the data. The association between internet and mobile phone addiction scores and sleep patterns and academic performance was assessed using the Chi-square test or Fisher's exact test for categorical variables, as appropriate. Correlation analysis was performed where applicable. A p-value of less than 0.05 was considered statistically significant [5].

Results

The study included 250 adolescents aged 13–19 years who attended the Yuva Clinic. The findings are presented under relevant subheadings with appropriate tabular representation.

Sociodemographic Characteristics of Study Participants

The mean age of the participants was 16.2 ± 1.8 years, with the majority belonging to the mid-adolescent age group (15–17 years). Male participants slightly outnumbered females. Most adolescents belonged to nuclear families and were school going. A substantial proportion reported daily screen time exceeding three hours.

Table 1: Sociodemographic profile of study participants (n = 250)

Variable	Category	Frequency (%)
Age group (years)	13–14	60 (24.0)
	15–17	130 (52.0)
	18–19	60 (24.0)
Gender	Male	135 (54.0)
	Female	115 (46.0)
Educational status	School-going	190 (76.0)
	College-going	60 (24.0)
Type of family	Nuclear	165 (66.0)
	Joint	85 (34.0)
Daily screen time	≤3 hours	85 (34.0)
	>3 hours	165 (66.0)

Prevalence and Severity of Internet and Mobile Phone Addiction: More than half of the adolescents demonstrated features of internet addiction, with moderate addiction being the most prevalent category based on the Internet Addiction Test (IAT).

Table 2: Distribution of Internet Addiction Test (IAT) scores

IAT category	Frequency (%)
Normal use	95 (38.0)
Mild addiction	70 (28.0)
Moderate addiction	65 (26.0)
Severe addiction	20 (8.0)

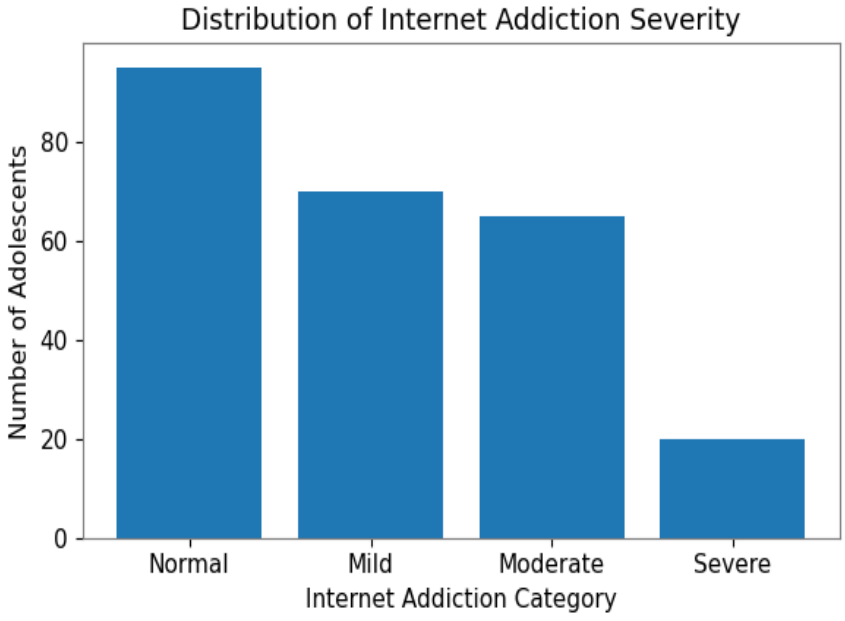

Figure 1: Distribution of internet addiction severity among adolescents attending the Yuva Clinic.

Table 3: Distribution of Mobile Phone Addiction Scale (MPAS) scores

MPAS category	Frequency (%)
Low risk	105 (42.0)
Moderate risk	95 (38.0)
High risk	50 (20.0)

Sleep Patterns among Study Participants: A considerable proportion of adolescents reported inadequate sleep duration and poor sleep quality. Sleep disturbances were more frequently observed among participants with higher internet and mobile phone addiction scores.

Table 4: Sleep characteristics of study participants

Sleep variable	Category	Frequency (%)
Sleep duration	≥7 hours	110 (44.0)
	<7 hours	140 (56.0)
Perceived sleep quality	Good	120 (48.0)
	Poor	130 (52.0)
Daytime sleepiness	Present	145 (58.0)
	Absent	105 (42.0)

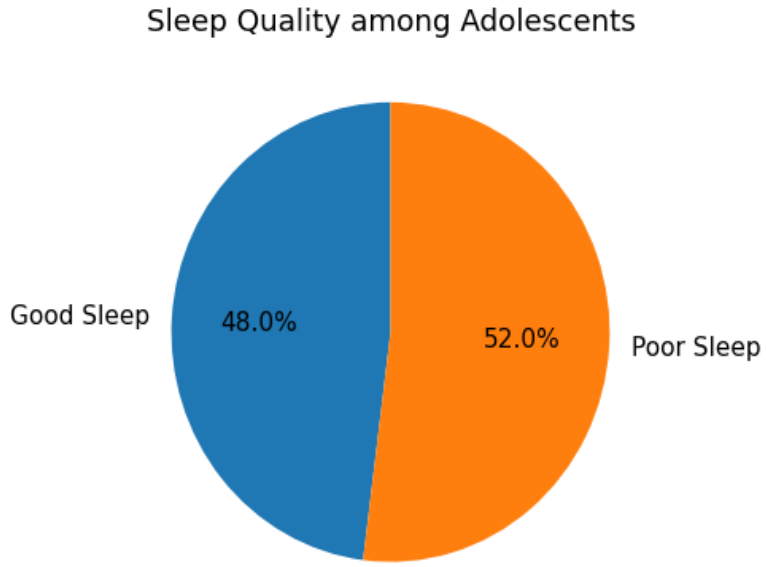

Figure 2: Proportion of adolescents with good and poor sleep quality.

Association between Internet Addiction and Sleep Disturbance: Compared to adolescents with normal or mild internet use, those with moderate to severe internet addiction reported significantly higher rates of short sleep duration, poor sleep quality, and daytime sleepiness.

Table 5: Association between internet addiction and sleep disturbance

IAT category	Poor sleep (%)	Adequate sleep (%)	p-value
Normal/Mild	60 (36.4)	105 (63.6)	
Moderate/Severe	70 (82.4)	15 (17.6)	<0.001

Academic Performance of Study Participants: Nearly one-third of adolescents reported a decline in academic performance compared to the previous term.

Table 6: Academic performance among study participants

Academic performance	Frequency (%)
Good	95 (38.0)
Average	80 (32.0)
Poor	75 (30.0)

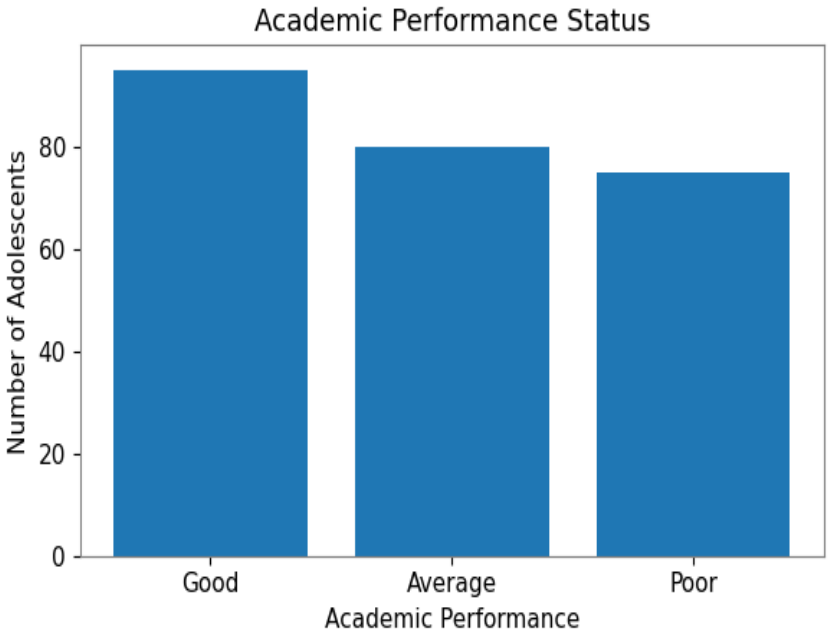

Figure 3: Academic performance status of study participants.

Association between Mobile Phone Addiction and Academic Performance: Academic achievement and the severity of cell phone addiction were found to be statistically significantly correlated. Teens who were classified as high-risk mobile phone users were more likely than those who were classified as low-risk users to report subpar academic achievement.

Table 7: Association between mobile phone addiction and academic performance

MPAS category	Poor performance (%)	Good/Average performance (%)	p-value
Low/Moderate risk	45 (23.8)	155 (76.2)	
High risk	30 (60.0)	20 (40.0)	<0.001

Combined Impact of Digital Addiction on Sleep and Academic Performance: Adolescents with moderate to severe internet addiction and high mobile phone addiction scores exhibited a compounded adverse effect, characterized by higher rates of sleep disturbance and poor academic performance, compared to those with lower addiction scores.

Table 8: Combined effect of digital addiction on sleep and academic performance

Addiction status	Poor sleep (%)	Poor academic performance (%)
Low addiction	30 (24.0)	25 (20.0)
Moderate addiction	55 (55.0)	40 (40.0)
High addiction	45 (75.0)	35 (58.3)

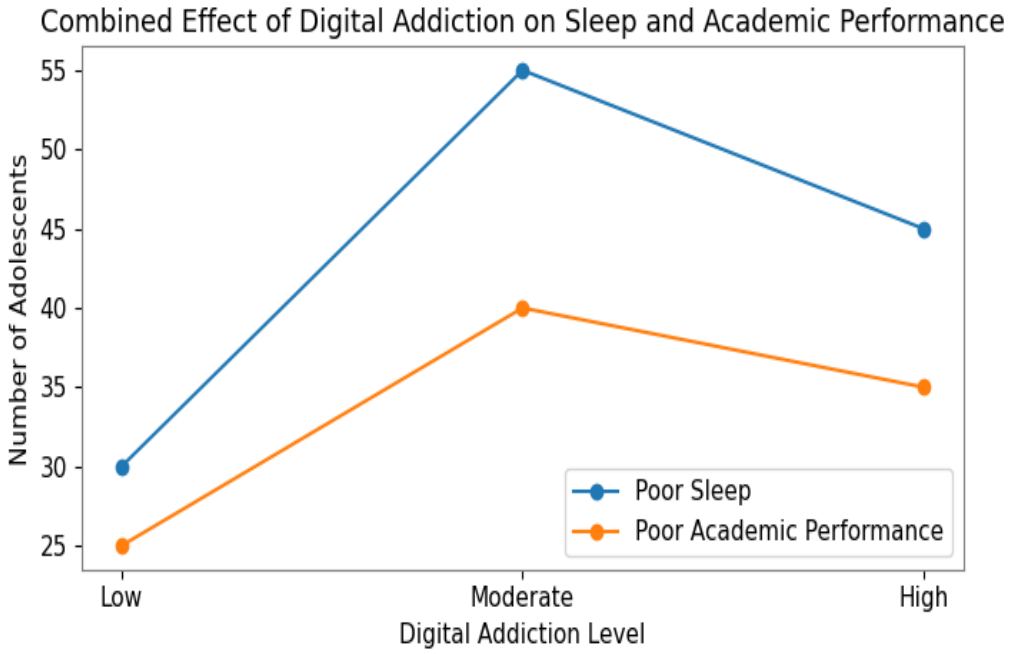

Figure 4: Combined impact of increasing digital addiction on sleep disturbance and academic performance.

Discussion

The present cross-sectional analytical study demonstrates a high prevalence of internet and mobile phone addiction among adolescents attending the Yuva Clinic, a tertiary care facility in Patna, and highlights its association with disturbed sleep patterns and poorer academic performance. These findings reinforce growing concerns regarding excessive digital device use as an emerging behavioral and public health issue among adolescents, particularly in low- and middle-income settings.

In the present study, approximately one-fifth of the adolescents were classified as high-risk mobile phone users, while more than half demonstrated mild to severe levels of internet addiction. These findings are comparable to previous Indian studies reporting internet addiction prevalence ranging from 20% to 45%, although variations across studies may be attributed to differences in assessment tools, cut-off values, and study settings [14]. The clinic-based nature of the present study may partly explain the relatively higher prevalence observed, as adolescents attending healthcare facilities are more likely to present with behavioral or lifestyle-related concerns.

One of the key findings of this study is the significant association between higher internet addiction scores and disturbed sleep patterns. Adolescents with moderate to severe internet addiction reported shorter sleep duration, poorer sleep quality, and increased daytime sleepiness. These observations are consistent with earlier research demonstrating that prolonged screen exposure—particularly during nighttime hours—disrupts circadian rhythms through suppression of melatonin secretion and heightened cognitive arousal, leading to delayed sleep onset and reduced sleep quality [15]. Given the critical role of adequate sleep in adolescent growth and neurocognitive development, such disturbances may have far-reaching consequences.

The present study also found a significant association between mobile phone addiction and academic performance. Poor academic performance was significantly more prevalent among adolescents with higher mobile phone addiction scores. Excessive mobile phone use may reduce effective study time, increase distractibility, and impair attention and memory processes essential for learning, as supported by earlier research [16]. Furthermore, frequent multitasking between academic activities and mobile phone use may further compromise learning efficiency and scholastic outcomes.

Importantly, the combined analysis indicated that concurrent internet and mobile phone addiction exerted a compounding adverse influence on both sleep patterns and academic performance. Adolescents with higher levels of digital addiction were more likely to experience sleep deprivation as well as academic deterioration. Previous studies suggest that sleep disturbance may partially mediate the association between problematic internet use and poor academic outcomes, underscoring the interconnected nature of these factors during adolescence [17]. Chronic sleep deprivation during

this developmental stage has also been linked to emotional dysregulation and reduced coping abilities, which may further exacerbate academic stress.

The Yuva Clinic provides an important opportunity for early identification and intervention. Integrating routine screening for problematic internet and mobile phone use into adolescent-friendly health services may facilitate timely counseling, promote healthy digital behaviors, and encourage appropriate sleep hygiene practices. Evidence suggests that brief behavioral interventions focusing on time management, parental involvement, and digital balance can effectively reduce problematic technology use among adolescents [18].

Despite its strengths, including the use of standardized assessment tools and an adequate sample size, the present study has certain limitations. The cross-sectional design precludes causal inference, and reliance on self-reported data may introduce reporting bias. Nevertheless, the findings offer valuable insights into the burden and consequences of digital addiction among adolescents in eastern India and underscore the need for targeted preventive strategies within both healthcare and educational settings.

Conclusion

The present study demonstrates a high prevalence of internet and mobile phone addiction among adolescents attending the Yuva Clinic, Patna, and highlights its significant association with disturbed sleep patterns and poorer academic performance. A substantial proportion of adolescents exhibited moderate to severe levels of digital addiction, which were associated with reduced sleep duration, poor sleep quality, daytime sleepiness, and self-reported decline in academic performance.

Higher addiction scores were significantly associated with poorer academic outcomes, underscoring the importance of recognizing digital addiction not only as a behavioral concern but also as a public health and educational issue. Sleep disturbance appears to play an important mediating role in this association, emphasizing the need to promote responsible digital use alongside healthy sleep practices. Adolescents with concurrent internet and mobile phone addiction were particularly vulnerable, experiencing compounded adverse effects on both sleep and academic performance.

Incorporating routine screening for problematic internet and mobile phone use into adolescent-friendly health services such as Yuva Clinics may facilitate early identification and timely intervention. Counseling strategies focusing on digital balance, time management, sleep hygiene, and parental involvement should be strengthened within both healthcare and educational settings. Coordinated efforts involving healthcare providers, educators, parents, and policymakers are essential to foster healthy digital behaviors and safeguard adolescent well-being in an increasingly digital environment.

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