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Research Paper

Internet Addiction Among Higher Secondary and University Students in India: A Post-COVID Assessment

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ABSTRACT

Background: Prior research has highlighted the adverse effects of extensive Internet usage among adolescents and college students. However, these concerns have not been thoroughly examined through cross-sectional studies focusing on Indian higher secondary, undergraduate, and postgraduate students following the COVID-19 pandemic.

Objectives: The present investigation aimed to assess the prevalence of Internet addiction among students at both secondary and university levels in India.

Materials & Methods: In this research, a total of 128 students were involved, comprising 47 from higher secondary, 50 undergraduates and 31 postgraduate students. A self-administered measure consisting of two parts assessed sociodemographic variables and the levels of internet usage. The Internet addiction test (IAT) was administered to assess internet addiction levels. Descriptive analysis, one-way analysis of variance and chi-square test were employed for data analyses.

Results: In our study, the Mean±SD age of the participants was 20.50±1.20 years (min=16, max=23 years). Approximately, 67.2% of the participants surpassed the established normal scores for the IAT. Specifically, 32.80%, 47.7%, 18% and 1.56% of participants fell into categories indicating normal, mild, moderate, and severe levels of Internet addiction according to the IAT. Internet addiction was significantly higher among urban-dwelling students (70%) compared to 30% of normal Internet users. About 69.70% of males were Internet addicts compared to 30.20% of males belonging to regular Internet users.

Conclusion: The study revealed a significant prevalence of internet addiction among Indian higher secondary, undergraduate, and postgraduate students in the wake of the COVID-19 pandemic. Internet addiction was notably higher among students living in cities and men than ordinary Internet users. These findings suggest that there is an urgent need for targeted interventions and preventative measures to combat Internet addiction in educational institutions, particularly among male and urban students.

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Introduction

The stringent restrictions on movement imposed during the lockdown compelled individuals to remain confined to their homes and workplaces [1–5]. The sudden shift to online platforms during this period has had both positive and negative repercussions. Digital technology facilitated remote work, learning, and social interactions with minimal physical exertion and time investment. The surge in internet usage during the lockdown, reaching 4.9 billion users in 2021 compared to 4.1 billion in the previous year [6], underscores this trend. However, studies have pointed to a concerning increase in problematic internet usage among young university students worldwide [7]. Factors such as emotional distress, feelings of loneliness, excessive engagement with social media, and the desire to escape reality contribute to this phenomenon [8].

Pre-pandemic research aimed at measuring the prevalence of internet addiction among under-graduate students revealed that 25.3% fell into the addiction category [9-12]. Studies found excessive internet usage closely linked to decreased psychological well-being [13], lowered social adaptation, and impaired emotional management skills [14], diminished social interactions [15], heightened feelings of loneliness [16] and increased levels of depression and anxiety [17, 18].

This study seeks to evaluate the extent of internet addiction across various student groups, encompassing those in higher secondary, under-graduate and post-graduate programs within Indian educational institutions. Additionally, it aims to discern if notable differences exist in internet usage levels among these student cohorts. Given the limited attention to internet addiction prevalence among Indian students post-COVID-19, this research fills a gap by specifically investigating internet addiction prevalence among higher secondary and university students in India.

Materials and Methods

Design and study participants

The survey, conducted between September 10 and 20, 2022, utilized a cross-sectional questionnaire administered via Google Forms to individuals across various educational levels (secondary, under-graduate and post-graduate). Prior to participation, the researcher secured full engagement from potential respondents, who were presented with a clear choice to opt in or out of the study. Participants were also given the option to discontinue their involvement if they found the process uninteresting or tedious. The estimated time required to complete the questionnaire was prominently displayed on the initial page of the Google Form, reassuring participants that their contribution would only take a few minutes. Notably, it was observed that certain individuals may overlook online research surveys shared through platforms like WhatsApp, Gmail and other social media channels. Additionally, all participants received assurance regarding the confidentiality of their personal information, safeguarding it from public disclosure.

Based on Cohen's (1988) standards, a medium effect size of 0.30 was selected with a significance level of 0.05 and a power of 0.80 [19]. The estimated sample size required to detect this effect size was n=67, calculated using G*Power software, version 3 [20]. We chose a sample size of 128, which is considered sufficient to achieve the objectives of the study.

Inclusion and exclusion criteria

The study includes students who have provided informed consent to participate and who are actively enrolled in higher secondary, under-graduate, and post-graduate programs at Indian universities. Students who are not consistently engaged in their studies at the higher secondary, under-graduate, and post-graduate levels in Indian universities tended to exhibit incomplete questionnaire responses, demonstrating disinterest and failing to provide informed consent.

Young individuals enrolled in Indian colleges and universities were recruited for participation, and tasked with completing the Internet addiction test (IAT) [21]. A cohort of 128 students, comprising 47 from higher secondary, 50 under-graduates and 31 post-graduates, aged between 17 and 23, completed the questionnaires via a Google Form.

Study measures

The study measures consisted of two parts. Both measures were self-administered questionnaires. In the first part, the sociodemographic characteristics of the participants were examined, such as gender, age, levels of education, number of hours of sleep per day and family income.

The second part included Internet addiction diagnostic questionnaire (DQ) that was developed by Young (1998). DQ consisted of eight items rooted in DSM 4

criteria [21]. Subsequently, 12 additional items were incorporated into the original eight, evolving the questionnaire into what is now known as the IAT. Widyanto and McMurran (2004) validated Young's IAT to assess its psychometric properties [22]. Scores on the IAT, ranging from 0 to 100, are determined using a five-point Likert scale. Higher scores suggest greater severity of internet addiction. Scores between 0 and 30 indicate normal internet usage, while scores between 31 and 49 suggest mild addiction. Moderate addiction is indicated by scores between 50 and 79 and scores between 80 and 100 denoted severe susceptibility to internet addiction [21].

Data analysis

The study utilized descriptive statistics such as Mean±SD, one-way ANOVA analysis and chi-square test to analyse the data. Socio-demographic variables such as gender, age, educational level and family income that may affect the prevalence of Internet addiction were added to a multivariate logistic regression analysis. A significance level of $P<0.05$ was considered for the study. The data analysis was carried out using SPSS software, version 26.

Results

Table 1 presents descriptive statistics detailing various sociodemographic factors among study participants. The Mean±SD age of the participants was 20.50±1.20 years, the minimum age was 16 years, and the maximum was 23 years. The comparison of sociodemographic factors across different educational levels of the participants are presented in Table 2. Among females, the majority were enrolled in under-graduation and higher secondary categories, comprising 30(60%) and 41(87.2%) respectively. For males in these categories, the figures stood at 17(40%) for under-graduate and 6(12.8%) for higher secondary. In the post-graduation category, there were 17 boys (54.8%) and 14 girls (45.2%).

Regarding residential areas, a higher proportion of participants hailed from rural backgrounds in the under-graduation and post-graduation categories, constituting 27(54%) and 17(54.8%) respectively. Conversely, in the higher secondary category, urban residency was more prevalent, with 23(48.9%) residing in urban areas, 7(14.9%) in semi-urban areas, and 17(36.2%) in rural areas. Additionally, a larger portion of participants belonged to the middle socioeconomic stratum across all educational levels, comprising 42(84%) in under-graduation, 28(90.3%) in post-graduation and 25(53.2%) in the higher secondary level.

Table 1. Sociodemographic variables (n=128)

Variables		No. (%)
Age (y)	<20	79(61.71)
	>20	49(38.28)
Gender	Male	43(33.59)
	Female	85(66.40)
Educational level	Higher secondary	47(36.71)
	Under graduation	50(39.06)
	Post-graduation	31(24.20)
Socio-economic status	Low	33(25.78)
	Middle	95(72.21)
Place of living	Urban	40(31.25)
	Semi-urban	27(21.09)
	Rural	61(47.65)

Table 2. Distribution of demographic variables among educational categories

Attributes		No. (%)		
		Under-graduation	Post-graduation	Higher Secondary
Gender	Male	20(40)	17(54.80)	6(12.80)
	Female	30(60)	14(45.20)	41(87.20)
Placeofliving	Urban	10(20)	7(22.60)	23(48.90)
	Semi-urban	13(26)	7(22.60)	7(14.90)
	Rural	27(54)	17(54.8)	17(36.2)
Socioeconomic status	Low	8(16)	3(9.7)	22(46.8)
	Middle	42(84)	28(90.3)	25(53.2)

The average IAT score was 39.8±14.9. Among the participants, under-graduate students achieved a Mean±SD IAT score of 39.3±15.94, post-graduate students attained a score of 37.2±12.6 and higher secondary students obtained a score of 42.1±15.1 (P=0.33).

The findings revealed that 67.2% of the participants surpassed the established normal scores for internet addiction according to IAT score. Descriptive statistics further demonstrate that out of the total, 42 individuals (32.8%) scored within the 0 to 30-point range on the IAT, indicative of no significant addiction. Additionally, 61 participants (47.7%) exhibited mild levels of Internet addiction, scoring between 31 to 49 on the IAT. Moreover, 23 participants (18%) displayed a moderate level of internet addiction, falling within the 50-79 range on the IAT. Notably, the study observed a relatively low prevalence of severe internet addiction, with only 2 participants (1.6%) scoring within the severe category, ranging from 80-100 on the IAT.

Table 3 indicated that the prevalence of internet addiction was found to be high among urban-dwelling students (P>0.009). Nearly 70% of internet addicts were urban dwellers compared to about 41% of internet addicts among semi-urban and 41% in rural areas. A statistically significant relationship was found between gender and internet addiction (P>0.003). About 70% of internet addicts were male compared to 42.3% of the females. No statistically significant relationships were found between educational level, age and socio-economic status and the prevalence of internet addiction.

Discussion

Numerous prior investigations have revealed a surge in internet usage during the COVID-19 pandemic; however, severe cases of internet addiction were less prevalent compared to mild and moderate levels of addiction. In contrast to previous research which identified 23.6% severe internet addicts among college students aged 18.81±1.189 in Bhubaneswar City, India [23], the present study found a notably lower proportion, approximately 1.56%, of severe internet addicts. The observed differences in different studies examining the prevalence of internet addiction in the same country could be due to the differences in the social context, such as the advent of COVID-19 and the social changes it brought. At the same time, we found multiple studies that found approximately similar levels of severe internet addiction to our research. Our findings (17.97% moderate IA and 1.56% severe IA) are comparable to the conclusions of a study conducted to examine the prevalence of internet addiction among Indian medical students, which found 19.1% prevalence of internet addiction (17.4% moderate IA and 1.7% severe IA) [24]. Some studies found almost similar levels of moderate internet addiction that we found from our research. A study conducted to find out the prevalence of internet addiction among medical students residing in Gujarat found 17.3% moderate IA and 0.3% severe IA [25]. Another study found a 17.4% moderate level of IA [26].

Although the current study observed a lower prevalence of internet addiction in the moderate and severe categories compared to mild and normal scores, it remains critical not to underestimate its potential to engender severe

Table 3. Relationship between sociodemographic variables and internet addiction among higher secondary and university students

Variables		No. (%)		P
		Level of Internet Addiction		
		Normal (n=42)	Mild/Moderate/Severe (n=86)	
Age (y)	<20	46(58.2)	33(41.7)	0.72
	>20	27(55.1)	22(44.8)	
Gender	Male	13(30.2)	30(69.7)	0.003
	Female	49(57.6)	36(42.3)	
Educational level	Higher secondary	27(57.4)	20(42.5)	0.92
	Under-graduation	27(54)	23(46)	
	Post-graduation	18(58.6)	13(41.9)	
Socio-economic status	Low	19(57.5)	14(42.4)	0.81
	Middle	57(60)	38(40)	
Place of living	Urban	12(30)	28(70)	0.009
	Semi-urban	16(59.2)	11(40.7)	
	Rural	36(59.1)	25(40.9)	

mental health issues and impair cognitive and academic performance. Consistent with a systematic review and meta-analytic study on the prevalence of internet addiction among Indian college-going students, the current study found similar moderate to severe levels of internet addiction. The meta-analytic study examined fifty studies on internet addiction from 19 Indian states and found a 19.9% prevalence of moderate and severe levels of internet addiction, which was surprisingly similar to the 19.5% moderate and severe levels of internet addiction found in our study. A systematic review and meta-analysis of fifty studies that explored the prevalence of internet addiction among Indian college students showed that a moderate level of internet addiction was higher than a severe level of internet addiction in all of those studies, similar to our current study [27].

Consistent with prior research, the current study similarly observed a descending order of prevalence rates for mild, moderate, and severe internet addiction. For instance, Anand et al. (2018) reported that among Indian engineering university students, 27.1% were classified as mild internet addicts, 9.7% as moderate, and 0.4% as severe [28]. Similarly, Anand et al. (2018) found that among medical college students from south India, 27% exhibited mild internet addiction, 10.4% moderate and 0.8% severe addiction. Mild internet addiction predominated in both the aforementioned studies and in the present investigation, followed by moderate and severe cases [29].

Our findings revealed a concerning prevalence of mild, moderate, and severe internet addiction among participants, surpassing the occurrence of normal internet usage. This presents troubling empirical evidence. Several factors may explain why a greater proportion of participants fell into internet addiction scores beyond the normal range. During the COVID-19 pandemic, individuals turned to digital devices as a coping mechanism for negative emotions such as stress, loneliness and reduced social communication. It's plausible to assume that excessive internet usage during this period persisted in participants' daily routines even after the pandemic subsided.

A study investigating the psychological effects of the COVID-19 lockdown revealed significant enhancements in relationships with key individuals such as spouses/partners (47.4%), children (44.2%), neighbours (61.8%), colleagues (59.6%) and parents (47.3%) [30]. These improvements in relationships may be attributed

to the prolonged physical proximity with significant others. Increased physical interaction likely prompted individuals to recognize the importance of intimacy with loved ones and bolster their affection for them [31].

Despite a rise in internet usage during the lockdown compared to pre-COVID times, increased physical engagement with significant others may have acted as a deterrent to internet addiction. Future research could explore the potential relationship between mutual physical interaction with loved ones and internet addiction, particularly within the context of lockdown periods. The gradual easing of lockdown restrictions by governmental authorities may have encouraged people to reconnect with the broader social world instead of relying heavily on the internet, which was often used as a coping mechanism for boredom and loneliness during the lockdown.

However, our current study found a higher prevalence of internet addiction compared to baseline levels. Further investigation should delve into the underlying factors contributing to internet addiction to gain deeper insights. Policymakers should implement interventions aimed at reducing internet addiction by promoting constructive avenues for engaging in meaningful cognitive activities. In the current study, male students were found high in moderate and severe levels of addiction (69.7%) compared to female students (42.3%). This finding is similar to other studies that found the male gender as a risk element for internet addiction [32]. Our study found a statistically insignificant relationship between age and internet addiction in contrast to the studies that indicated that internet addiction is associated with age (lower age) [11]. About 70% of the students with moderate and severe internet addiction were living in urban areas compared to 40 % of the students who lived in semi-urban or rural areas. This higher prevalence of internet usage among urban students is consistent with other studies [33].

Gender differences in internet addiction may stem from distinct socialization patterns and psychological needs. Men often seek games and pornography, driven by competitive and visual stimuli, while women may prefer social networking for relational fulfilment. Biological factors, such as hormonal influences, and differences in their coping mechanisms for stress and loneliness also play a role. Social expectations and norms further shape these behaviours and reinforce certain online activities that are more common among one gender than the other [34]. Internet addiction may differ between urban and rural/semi-urban areas due to several factors. Urban areas tend to have better internet infrastructure, making access easier and more consistent and leading to higher usage. Additionally, urban residents may face greater social isolation despite higher population density, driving them to seek online connections. In contrast, rural and semi-urban areas may have stronger community ties and outdoor activities, reducing reliance on the Internet for social and recreational needs [35].

The study has a number of limitations. The sample size used for the current study was small and future studies may compensate for this by using larger samples. Future research could examine the possible relationship between reciprocal physical interaction with loved ones and Internet addiction, particularly in the context of lockdown periods. The gradual easing of lockdown restrictions by government authorities may have encouraged people to reconnect with the wider social world, rather than relying heavily on the internet, which is often used as a coping strategy for boredom and loneliness during lockdown. Future research could also examine the relationship between epistemic cognition and Internet addiction, as reliable instruments such as the Epistemological Belief Inventory are available to examine epistemic cognition.

Conclusions

Study findings showed that a significant proportion (67.2%) of Indian students spanning secondary and tertiary education levels displayed signs of internet addiction. Diverse levels of addiction were identified: 32.8% demonstrated typical usage, whereas 47.7%, 18%, and 1.56% were classified as having mild, moderate, and severe addiction, respectively. Internet addiction poses potential hazards such as negative impacts on both public health and cognitive function. This underscores the necessity for interventions targeting the promotion of responsible internet usage to decrease these risks. Although severe addiction was less common, it's still concerning because it could harm students' health and how well they do in school. We think it's important to teach students how to use the internet responsibly to prevent these problems.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the Ethics Committee of the Indira Gandhi National Tribal University (Code: 4848787).

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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