

Prevalence of Internet Addiction and Impact of Internet Socialization on Professional, Academic, Social Lives and Sleep Pattern Among Students and Professionals from Various Fields Across India

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Background: Internet addiction was found to be associated with a variety of psychosocial problems, including academic failure, low self-esteem, poor diet, mental disorders like depression and anxiety, sleep deprivation, and social withdrawal.

Objective: To determine the prevalence and risk factors of internet addiction and evaluate the impact of internet socialization on professional, academic, social lives and sleep pattern among students and professionals from various fields across India.

Methodology: This cross-sectional, descriptive study was conducted from January 2022 to July 2023 among 772 participants who were aged ≥ 18 years. The study tool consisted of a questionnaire with four parts comprising questions related to demographic characteristics, pattern of use and impact of internet over academic, professional, social life, sleep pattern, and Kimberley Young's Internet Addiction Test (IAT) questionnaire.

Results: The prevalence of Internet addiction was 53.6% among the participants. Participants aged above 30 years demonstrated a decreased risk of internet addiction compared to those aged below 30 years (AOR = 0.35). Participants who reported becoming restless without internet access (AOR = 4.88) and going to bed late because of the use of internet or social media (AOR = 3.01) had a significantly higher risk of internet addiction.

Conclusion: Internet addiction is very common among professionals, and students and there is a high risk of internet addiction in persons who get restless when they cannot log in, spend too much time online, stay up late using the internet, and share personal information soon after meeting others on social media sites.

Keywords: prevalence, cross-sectional study, mental health, internet addiction, students, professionals

Introduction

Over the past two decades, there has been a noteworthy surge in internet usage. According to recent estimates of the world's internet users, there are over 803 million users globally. Numerous studies have been conducted on the advantages of using the internet for a variety of purposes including education, research-related work, communication, providing health services, financial transactions, trading, purchasing items, entertainment, etc.^{1,2}

Internet addiction disorder (IAD) was originally briefly explained by Kimberly Young in 1996, and she advocated for its inclusion in the "Diagnostic and Statistical Manual of Mental Disorders" (DSM), 4th edition.^{2,3} The existence of internet addiction (IA) as a mental condition is still not sufficiently acknowledged, though The Diagnostic and Statistical

Manual of Mental Disorders (DSM-5) said that additional research is necessary before IAD can be classified as a full disorder. IAD has detrimental effects on daily living, family relationships, and social interactions.³

Research has stated that several factors, including socio-demographic, personal, and internet-related factors, such as male gender, the first four years of a study course, peer influence, online friendship and chat interactions, watching obscene sites, online dating, online shopping, usual daily internet use, and internet access modes are all related to internet addiction.⁴ Although many experts have studied what makes people more susceptible to becoming addicted to the internet, these investigations have not produced an extensive list of the characteristics that can lead to Internet addiction. Internet Addiction is a broad term covering Internet chatting, purchasing, and information searching, Internet-game addiction.⁵ In spite of the advantages of the internet, there is mounting evidence that its abuse has become a serious issue in today's world. More people are becoming addicted to it as they become dependent on its use, just like other addictive substances such as cocaine, alcohol, and sex. As a result, Internet addiction has become a brand-new, important topic of addiction research.^{2,6}

According to studies, IA is a type of compulsive-impulsive spectrum disorder that has four characteristics: excessive use; tolerance (the need for more hours of use, etc.); emotional withdrawal (such as tension, depression, and anger); and adverse effects like exhaustion, arguments, lying, and social isolation.^{7,8} Numerous studies have suggested that excessive internet use may be linked to stress, anxiety, poor sleep, suicidal thoughts, and decreased physical activity. These harmful impacts can have a significant and negative impact on society as a whole and can affect family relationships, academic achievement, and long-term career ambitions.⁸

There is currently a lot of attention being paid to this issue globally, and studies are being conducted to identify the possible socio-demographic characteristics, risk factors, and effects of Internet addiction.⁶ However, there are very few studies available in India regarding this issue. Moreover, research has shown that internet addiction has been rising among the medical professionals across the globe and India. Because of the demanding nature of their coursework and the widespread use of online resources for communication, studying and research, medical students in particular may be at risk for developing an internet addiction.⁹⁻¹¹ Hence, this study was conducted to determine the prevalence and risk factors of internet addiction and evaluate the impact of internet socialization on professional, academic, social lives and sleep pattern among students and professionals from various fields across India.

Methods

This cross-sectional, descriptive study was conducted after getting ethical clearance from the institutional ethics committee (IEC No: AIIMS/IEC/2022/3779). The participants were recruited after obtaining informed consent from January 2022 to July 2023. The study participants were included if they were 18 years and above. Participants were excluded from the study if they had a history of medical illness like chronic insomnia or exposure to antidepressants for at least 2 months.

Using a prevalence of 41.3% for internet addiction,¹² a margin of absolute error taken as 4%, a confidence interval of 95%, and a 20% non-response rate, the minimum sample size calculated was 699, which was rounded off to 700. This study was conducted through an online survey among students and professionals from various streams like medicine, nursing, engineering, law, arts, and commerce across India. Each of the participants were requested to recommend the survey to their friends or contact list. Subjects included in the study were asked to respond to a pretested, semi-structured questionnaire created in a Google form. The questionnaire consisted of four parts: (i) Demographic information, including age, gender, and current professional status, (ii) Pattern of use of internet or social media, (iii) Questions to evaluate the impact of internet or social media on academic, professional, social life and sleep pattern, and (iv) Young's Internet Addiction Test (IAT) questionnaire. The Kimberly Young's IAT is a 20-item questionnaire that measures the severity of self-reported compulsive use of the internet.¹³ Each item is rated on a 6-point Likert scale ranging from 0 to 5; 0 = Not Applicable, 1 = Rarely, 2 = Occasionally, 3 = Frequently, 4 = Often and 5 = Always. The marking for this questionnaire ranges from 0 to 100; the higher the score range, the greater the level of addiction. Subjects with scores <50 were categorized as "average internet users", and those with scores ≥ 50 were categorized as "problematic internet users" or "internet addiction".¹⁴ Independent variables were socio-demographic characteristics, including age, gender, education, current professional status, the pattern of use of internet or social media such as duration, frequency, and

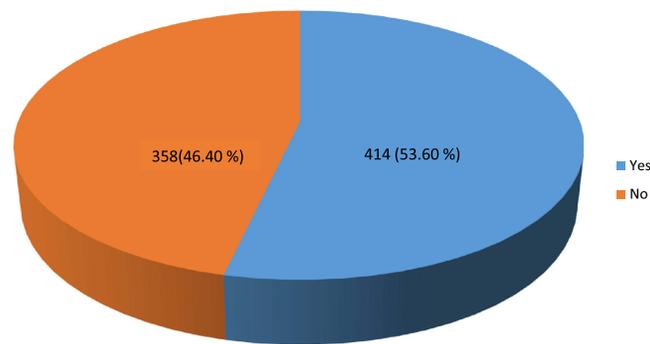


Figure 1 Participants having internet addiction (N = 772).

purposes and also the impact of internet or social media on academic, professional, social life, sleep pattern, and the dependent or outcome variable was internet addiction. All the independent variables were self-reported by the participants themselves. Respondents were asked to press the submit button at the end of the survey, which immediately entered their responses into the Google form spreadsheet.

Data were transferred to Microsoft Excel and analysed in IBM SPSS Statistics (version 23.0. Armonk, NY: IBM Corp software for windows). Care was taken to protect the confidentiality and anonymity of participants. The chi-square test was applied to compare categorical variables such as demographic variables like age, gender, occupation, etc; pattern and impact of use of internet or social media with presence of internet addiction. Binary logistic regression analyses were carried out to produce crude and adjusted odds ratios (ORs) with 95% confidence intervals to examine the relationships between outcome variable (ie, internet addiction) and explanatory variables (ie, demographic variables, pattern, and impact of use of internet or social media). A p-value of <0.05 was considered statistically significant for all the statistical procedures.

Result

The questionnaire was sent to 797 participants, out of which 772 consented to participate and fill the questionnaire. The results of the study indicate that almost half (53.6%, n = 414) of the participants were classified as internet addicts as illustrated in Figure 1. As shown in Table 1, among participants aged below or equal to 30 years, majority (57.7%, n = 388) had IA. For

Table 1 Association of the Participant's Demographic Characteristics with Internet Addiction (N = 772)

Demographic Characteristics		Internet Addiction, n (%)			P-value
		Yes	No	Total	
1. Age	≤30 years	388 (57.7)	285 (42.3)	673 (100)	0.000*
	>30 years	26 (26.3)	73 (73.7)	99 (100)	
2. Gender	Female	190 (52.8)	170 (47.2)	360 (100)	0.658
	Male	224 (54.4)	188 (45.6)	412 (100)	
3. Occupation	Health care worker	47 (35.1)	87 (64.9)	134 (100)	0.000*
	Non-Health care worker	7 (25.9)	20 (74.1)	27 (100)	
	Student	360 (58.9)	251 (41.1)	611 (100)	
4. Medical background	No [#]	31 (47.7)	34 (52.3)	65 (100)	0.316
	Yes	383 (54.2)	324 (45.8)	707 (100)	

Notes: [#]Includes participants from law, finance, engineering, etc. *Statistically significant.

Abbreviations: N, number of total participants; n, absolute number of participants.

those above 30 years, only 26.3% (n = 26) showed signs of internet addiction, with 73.7% (n = 73) not affected. Occupation displayed significant variations, with students having the highest internet addiction rate (58.9%), followed by health-care workers (35.1%) and non-health care workers (25.9%). As shown in Table 2, several patterns of use of internet or social media such as becoming restless without internet access (87.9%), checking notifications during sleep (63.8%), and using the internet during work/study hours (58.9%) were strongly associated with higher rates of internet addiction. Moreover, spending more than one hour online before sleep (70.5%) and going to bed late due to internet use (74.3% for “often”), using the internet for non-academic purposes (57.8%), and being absent from academic activities due to internet or social media use (75%) also were associated with increased internet addiction.

Table 3 shows that participants who felt that internet and social media use has made face-to-face interactions challenging (63.8%), affected their mood and behaviour (57.9%), has led to less emotional bonding in their relationships (60.3%) had a significantly higher prevalence of internet addiction. Social media use had significantly affected sleep quality, with 66% of participants experiencing addiction in this group. Moreover, internet use had a significant impact on study duration (78%) and concentration during duty (78.9%), both of which were also associated with higher addiction rates.

Table 2 Association of the Pattern of Use of Internet or Social Media with Internet Addiction

Characteristics		Internet Addiction			p-value
		Yes (%)	No (%)	Total (%)	
1. Become restless when there are no means to login	No	298 (46.6)	342 (53.4)	640 (100)	0.000*
	Yes	116 (87.9)	16 (12.1)	132 (100)	
2. Checks phone for any social media notifications during sleep	No	264 (49.2)	273 (50.8)	537 (100)	0.000*
	Yes	150 (63.8)	85 (36.2)	235 (100)	
3. Open internet or social media during work or class	No	104 (42.3)	142 (57.7)	246 (100)	0.000*
	Yes	310 (58.9)	216 (41.1)	526 (100)	
4. Frequency of use of internet for non-essential uses [#]	1–10 times per day	50 (42.4)	68 (57.6)	118 (100)	0.001*
	10–25 times per day	180 (51)	173 (49)	353 (100)	
	>25 times per day	184 (61.1)	117 (38.9)	301 (100)	
5. Use of the internet or social media before going to sleep	≤1 hour	266 (47.3)	296 (52.7)	562 (100)	0.000*
	>1 hour	148 (70.5)	62 (29.5)	210 (100)	
6. Hours currently spent online per day for non-essential use	≤5 hour	334 (48.9)	349 (51.1)	683 (100)	<0.001
	> 5 hours	24 (27)	65 (73)	89 (100)	
7. Goes to bed late because due to internet or social media	Never	19 (24.7)	58 (75.3)	77 (100)	0.000*
	Sometimes	177 (44.5)	221 (55.5)	398 (100)	
	Often	162 (74.3)	56 (25.7)	218 (100)	
	Always	56 (70.9)	23 (29.1)	79 (100)	
8. Sharing personal details quickly after meeting people on social media	Immediately	44 (57.9)	32 (42.1)	76 (100)	0.000*
	After few days	99 (70.2)	42 (29.8)	141 (100)	
	After a month	58 (70.7)	24 (29.3)	82 (100)	
	Not at all	213 (45)	260 (55)	473 (100)	

(Continued)

Table 2 (Continued).

Characteristics		Internet Addiction			p-value
		Yes (%)	No (%)	Total (%)	
9. Purpose of the internet use	Work related or academics	144 (47.2)	161 (52.8)	305 (100)	0.004*
	Not related to work or academics	270 (57.8)	197 (42.2)	467 (100)	
10. Absent during some point of time from work because of using internet	Never	195 (43.9)	249 (56.1)	444 (100)	0.000*
	Sometime	161 (66)	83 (34)	244 (100)	
	Often	36 (75)	12 (25)	48 (100)	
	Always	22 (61.1)	14 (38.9)	36 (100)	
11. Duration of internet usage	<1 year	13 (54.2)	11 (45.8)	24 (100)	0.837
	>2 years	358 (54)	305 (46)	663 (100)	
	1–2 years	43 (50.6)	42 (49.4)	85 (100)	

Notes: #Non-essential uses like playing games, watching obscene sites, online chatting, etc. *Statistically significant.

Table 3 Association of Impact of Internet or Social Media on Academic, Professional, Social Life and Sleep Pattern with Internet Addiction

Impact of Internet		Internet Addiction			P-value
		Yes (%)	No (%)	Total (%)	
1. Internet or social media use has made your face-to-face interaction challenging	No	162 (43)	215 (57)	377 (100)	0.000*
	Yes	252 (63.8)	143 (36.2)	395 (100)	
2. Internet or social media use increases online interaction with family/friends	No	112 (55.2)	91 (45.5)	203 (100)	0.607
	Yes	302 (53.1)	267 (46.9)	569 (100)	
3. Internet or social media activities affect mood and behaviour	No	68 (39.1)	106 (60.9)	174 (100)	0.000*
	Yes	346 (57.9)	252 (42.1)	598 (100)	
4. Internet or social media use has led to less emotional bonding in your relationships	Strongly disagree	20 (40)	30 (60)	50 (100)	0.004*
	Disagree	132 (48.9)	138 (51.1)	270 (100)	
	Agree	213 (60.3)	140 (39.7)	353 (100)	
	Strongly agree	49 (49.5)	50 (50.5)	99 (100)	
5. Internet or social media use has affected your sleep quality	No	99 (33.6)	196 (66.4)	295 (100)	0.000*
	Yes	315 (66)	162 (34)	477 (100)	
6. Internet or social media impairs study duration	No	251 (44.6)	312 (55.4)	563 (100)	0.000*
	Yes	163 (78)	46 (22)	209 (100)	
7. Internet or social media decrease concentration during my duty	No	238 (43.4)	311 (56.6)	549 (100)	0.000*
	Yes	176 (78.9)	47 (21.1)	223 (100)	

Note: *Statistically significant.

The logistic regression analysis yielded several significant associations between internet addiction and various variables. Participants aged above 30 years demonstrated a decreased risk of internet addiction compared to those aged below 30 years (AOR = 0.35, $p < 0.001$). Participants who reported becoming restless without internet access (AOR = 4.88, $p < 0.001$), going to bed late because of the use of internet or social media (AOR = 3.01, $p = 0.010$), had a significant higher risk of internet addiction (Table 4).

Table 4 Binary Logistic Regression of Various Factors of Internet Addiction Among Study Participants

Variables	COR (95% CI)*	P-value	AOR (95% CI)*	P-value
1. Age				
a. ≤30 years				
b. >30 years	0.26 (0.16–0.42)	<0.001	0.35 (0.20–0.59)	<0.001
2. Gender				
a. Female				
b. Male	1.07 (0.80–1.42)	0.658	0.81 (0.57–1.13)	0.210
3. Occupation				
a. Non- health care worker				
b. Health care worker	1.54 (0.61–3.92)	0.361	0.62 (0.23–1.71)	0.359
c. Student	4.10 (1.71–9.84)	0.002	1.54 (0.86–2.75)	0.147
4. Medical background				
a. No			(-)	(-)
b. Yes	1.30 (0.78–2.16)	0.317	(-)	(-)
5. Become restless when there are no means to login				
a. No				
b. Yes	8.32 (4.82–14.35)	<0.001	4.88 (2.72–8.75)	<0.001
6. Checks phone for any social media notifications during sleep				
a. No				
b. Yes	1.83 (1.33–2.50)	<0.001	1.19 (0.80–1.77)	0.381
7. Open internet or social media during lectures/lab/clinical rounds/office hours/workplace				
a. No				
b. Yes	1.96 (1.44–2.66)	<0.001	1.50 (1.04–2.15)	0.337
8. Frequency of use of internet for non-essential uses				
a. 1–10 times per day				
b. 11–25 times per day	1.42 (0.93–2.15)	0.106	0.87 (0.54–1.40)	0.570
c. >25 times per day	2.14 (1.39–3.30)	<0.001	0.96 (0.57–1.61)	0.863

(Continued)

Table 4 (Continued).

Variables	COR (95% CI)*	P-value	AOR (95% CI)*	P-value
9. Use of the internet or social media before going to sleep				
a. ≤1 hour				
b. >1 hour	2.66 (1.89–3.73)	<0.001	1.48 (0.99–2.21)	0.059
10. Hours currently spent online per day for non-essential uses				
a. ≤5 hour				
b. >5 hour	2.59 (1.59–4.24)	<0.001	1.15 (0.63–2.09)	0.656
11. Goes to bed late because of the use of internet or social media				
a. Never				
b. Sometimes	2.45 (1.40–4.26)	0.002	1.78 (0.99–3.23)	0.056
c. Often	8.83 (4.84–16.10)	<0.001	4.33 (2.25–8.33)	<0.001
d. Always	7.43 (3.65–15.12)	<0.001	3.01 (1.31–6.93)	0.010
12. Sharing personal details quickly after meeting people on social media sites				
a. Not at all				
b. After few days	2.88 (1.92–4.31)	<0.001	2.09 (1.32–3.31)	0.002
c. After a month	2.95 (1.77–4.91)	<0.001	1.94 (1.10–3.42)	0.022
d. Immediately	1.68 (1.03–2.74)	0.038	0.91 (0.47–1.77)	0.790
13. Purpose of the internet use				
a. Not related to work or academics				
b. Work related/ Academics	0.65 (0.49–0.87)	0.004	0.92 (0.66–1.29)	0.630
14. Absent during some point of time from work because of using internet or social media				
a. Never				
b. Sometime	2.48 (1.79–3.43)	<0.001	1.52 (1.04–2.22)	0.029
c. Often	3.83 (1.94–7.56)	<0.001	1.24 (0.57–2.73)	0.587
d. Always	2.01 (1.00–4.02)	0.050	1.11 (0.46–2.69)	0.817
15. Duration of internet usage				
a. <1 year			(-)	(-)
b. 1–2 years	0.87 (0.35–2.15)	0.757	(-)	(-)
c. >2 years	0.99 (0.44–2.25)	0.987	(-)	(-)

Abbreviations: *COR, Crude odds ratio; AOR, Adjusted odds ratio; CI, Confidence interval.

Discussion

Almost more than half of the participants were found to have IA in contrast to study findings conducted by Chia et al, Cheng et al, Zhang et al, Joseph et al, and Gedam et al.^{5,15–18} Due to demographic variation, a variety of instruments used, varying cut-off scores, and a variety of sample characteristics, the prevalence of Internet Addiction (IA) varies from 7.3% to 51% internationally.^{17,19–22} According to previous research, younger people may be more susceptible than adults

to the adverse effects of Internet addiction while using the Internet at comparable levels.²³ Similar significant association was observed in this study with age and IA. According to studies, most IA users are young men with introverted personalities. Various studies have shown that internet addiction varies with gender, and males have increased odds of IA than females. However, it has also been demonstrated that the prevalence of internet addiction in women is increasing.^{24,25} This study showed an insignificant association with gender.

Researchers have examined the global consequences of IA and found that IA was associated with a variety of psychosocial problems, including academic failure, low self-esteem, poor diet, mental disorders like depression and anxiety, sleep deprivation, and social withdrawal.^{21,26,27} Likewise, Internet surfing could also offer individuals a social platform for compensating loneliness, academic stress, and social support which has been stated by Adler's Theory of Individual Psychology where he has provided an insight for Internet addiction which can be used as means by individuals to achieve superiority or dominance in matters of lifestyle, complexity and social interest.²⁸

The findings in the current study showed that individuals who often go to bed late due to internet or social media use and use internet or social media before going to sleep were associated with IA. Similarly, the study by Tereshchenko et al stated that adolescents addicted to the Internet slept and woke up later, but they had much less total overnight sleep than those who used the Internet in an adapted way.²⁹ Furthermore, time management issues are a common problem among internet addicts. When this circumstance is coupled with people's tendencies to use the internet until late at night, it can lead to significant exhaustion, insomnia the following day, and negative outcomes in both academic and professional fields.^{30,31} Similar observations were made in our study where individuals with IA reported that internet or social media has impaired their study duration and decreased concentration during their duty or class and were absent from duty at some point of time because of internet or social media.

This study finding has shown that participants who reported having challenging face-to-face interaction, having less emotional bonding with family and friends were associated with IA. Moreover, individuals with IA were having mood disturbances due to internet or social media. It was also observed that participants who shared their personal details after meeting people on social media sites, had higher odds of developing internet addiction compared to those who did not share any personal information with people on social media. Emotional regulation refers to the range of abilities needed for keeping track of, controlling, and expressing one's feelings and emotional responses. Various studies have shown that Internet addicts have less self-control than ordinary Internet users in terms of their actions, urges, or emotions.³²⁻³⁴ In this context, raising a person's level of self-control ought to be seen as one crucial intervention approach.

We found evidence that the duration or frequency of time spent online increases the risk of IA, consistent with a previous study where they found that Internet dependency among students was positively correlated with the amount of time spent on the internet.⁶ Various studies have shown that the duration of hours spent online and length of Internet use has a direct association with Internet Addiction Disorder.^{24,25} As a result, some online activities may have a larger additive component, and time spent online may be one of the indicators of IA.³⁵ Similar observations were made in this study where higher frequency of use of internet for non-essential uses and long hours spent online per day for non-essential use were significantly associated with IA.

Strengths

The present study is one of the comprehensive cross-sectional studies which has explored on a less explored topic, ie, Internet Addiction among students and professionals all over India.

Limitations

One limitation of our study is the cross-sectional study design; hence, temporal association cannot be ascertained.

Conclusion

According to our research, internet addiction is very common among professionals and students and is having multiple effects on their academic or professional lives, mental health, sleep, and personal relationships. Further, there is a high risk of internet addiction in persons who get restless when they cannot log in, spend too much time online, stay up late using the internet, and share personal information soon after meeting others on social media sites. Due to their significant

pathophysiological overlap, stopping even one of these can stop the entire cascade from developing. It shows that there is an immediate need for developing and implementing new interventions to prevent Internet addiction in these at-risk populations. As the internet happens to be a part and parcel of daily life in this modern era, the purpose for which it is being used should be self-evaluated by the users.

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Author Contributions

All authors participated in the drafting, revising, or critical review of the article; they gave final approval of the version to be published; they agreed on the journal to which the article has been submitted; and they all made a significant contribution to the work reported, whether that be in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas.

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