

Impact of internet use on mental health among students from Medical, Engineering and Paramedical Disciplines

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Abstract:

Background: While earlier studies emphasized the use of the internet for academic purposes and communication, recent research has highlighted a concerning rise in the use of internet addiction, particularly among the younger population. This condition, now recognized as pathological, mirrors substance addictions like alcohol and drugs leading to academic decline, reduced work performance and impaired psychological well-being. Lots of suicides are being noticed in student society. Notably, studies on students in medical and paramedical fields remain scarce, with limited data on correlations across different academic disciplines. With this background, the present study explores the effects of internet use on the mental health of students from various fields through a cross-sectional study.

Materials and Methods: A questionnaire was administered to 1,000 students across various fields of study (Medical, Engineering, Paramedical), with data collected from 960 participants. Of these, 41% were female and 59% were male, mean age averaging to 18.9 years. The sample included 42.5% from rural areas and 57.5% from urban areas. The distribution across academic fields was 44.3% paramedical, 42.3% medical, and 13.4% engineering. The data was analyzed using the ANOVA and Fisher-Freeman Halton Exact test.

Results: 50.3% of students preferred spending time online over socializing in person. 47.9% reported feelings of depression, anxiety, or nervousness when offline with relief upon reconnecting. Female students had significantly higher DSM-IV scores (17.34+/-6.32) compared to males (15.93+/-5.99), with a p value of 0.001. Engineering students showed the highest rates of severe Internet Addiction Test (IAT) scores, with p<0.001.

Conclusion: The findings indicate a notable prevalence of mild to moderate internet addiction among students, with significant impacts on mental health, particularly among engineering students.

Key Word: Internet, addiction, students, psychology, Wi-Fi, mental health

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I. Introduction

In recent years, educational institutions have been technologically well-equipped with computers and the internet. Some of the institutions even have Wi-Fi throughout the campus. There is an existing body of literature that recognizes the internet as mainly used for academic purpose and communication, but growing data from several studies have reported that most of the younger generation is becoming addicted to the internet which is now diagnosed as a pathological condition. The Internet is being used mainly for viewing social media rather than for academic purposes [1].

There may be a larger psychological danger in using the internet excessively. This underscores the vulnerabilities of the students, especially in impulse control, social adaption, and emotional skills [2]. Problematic internet use can be positively correlated to psychological distress [3]. Males have higher prevalence for internet addiction [1]. Internet addiction is linked to internal psychological resources such as depression,

anxiety, loneliness, worst sleep quality, and poor psychological well-being [1, 4, 5, 6, 7, 8, 9]. Internet overuse is also associated with personality facets like low conscientiousness and emotional instability along with other associations. This shows that psychological vulnerabilities and personality dispositions determine the misuse of the internet [10]. There might be associations of internet addiction leading suicidal behaviors [11]. The pre-existing emotional issues and compulsive behavior enhance and exacerbate the pathological internet use [4]. There can be a significant negative correlation between internet addiction and academic performance and thereby increase in stress levels [2, 9].

Internet addiction can be prevented by a few coping mechanisms. Increased self-efficacy and resilience factors can be associated with reducing internet addiction, leading to more well-being [3, 12]. Psychological Capital (PsyCap) mediates the association between internet addiction and mental health, which dampens the negative impacts of internet addiction emphasizing the significance of positive psychological resources. Positive psychological resources such as self-efficacy, optimism, hope, and resilience have a crucial role in promoting mental well-being among students [13]. A research study shows that aerobic and anaerobic exercise for more than 30 minutes at a time can correct the internet addiction [14].

All these combined research findings indicate that although there are cultural and regional differences, the general trend continues to show adverse mental health results, academic difficulties, and lifestyle interruptions associated with internet addiction.

Most of the studies done are on undergraduate engineering, science, arts, and management students. Studies specifically on students in the medical field are few, and comparative studies on students studying in different academic fields are lacking. Much of the existing literature comes from non-Indian or non-South Asian contexts.

There is a need to understand how internet addiction operates within Indian academic institutions, especially given differences in educational systems, internet access and cultural attitudes. The gender disparities where internet addiction is higher among males are underexplored in health-related academic settings. Therefore, the purpose of the study is to investigate how internet usage could possibly be considered addictive and to identify the extent of problems created by such misuse.

II. Material And Methods

Questionnaires were given to 1000 students studying in different colleges and institutions which include Medical, Dental, Engineering, Allied Health Sciences and Physiotherapy. Students of Allied Health Sciences, Physiotherapy, Nursing and Dental were grouped as Paramedical fields.

Questionnaire included student details, Internet Addiction Test (IAT), and Diagnostic and Statistical Manual of Mental Disorders (DSMIV). The questionnaires were filled by students and collected through hard copies. The data collected was statistically analyzed using ANOVA, Fisher Freeman-Halton Exact Test, and Independent sample t-test for scoring.

Study Design: Cross-sectional study

Study Location: The study was done in the Department of Anatomy, at Sathagiri Institute of Medical Sciences and Research Center, Bengaluru.

Sample size: 1000 Students studying in various colleges in and around Bengaluru.

Sample size calculation: The sample size was calculated using the single population proportion formula: $n = z^2 p(1-p) / d^2$ assuming a 95% confidence interval ($Z=1.96$), an expected prevalence of internet addiction of 30% based on previous Indian studies, and an absolute precision of 3%. The minimum required sample size was calculated to be 897 participants. After accounting for an anticipated 10% non-response rate, the required sample size increased to approximately 987, which was rounded off to 1000 participants. A total of 1000 questionnaires were distributed, of which 960 complete responses were available for final analysis.

Subjects & selection method: The investigators took approval from principals of various colleges in and around Bengaluru to conduct the study. The participation by students in the study was voluntary. The consent was taken by each student to participate in the study. Hardcopies of the questionnaires were distributed to students and duly filled in responses were collected from them.

Inclusion criteria:

1. Students studying in one of the following professional colleges- Medical, Paramedical, Engineering
2. Students should be accessing internet with any one of the gadgets excessively- mobile, laptop, tablet, desktop

Exclusion criteria:

1. Students studying in schools, pre-university colleges, and degree colleges

Procedure methodology

After written informed consent was obtained from each student, a well-designed questionnaire was used to collect the duly filled data. Hard copies of 1000 questionnaires were given to students studying in various

colleges and institutions which include Medical, Engineering, Dental, Nursing, Allied Health Sciences, and Physiotherapy. Dental, Nursing, Allied Health Sciences, and Physiotherapy were grouped into Paramedical discipline.

Questionnaire included the student details, Internet Addiction Test (IAT), and Diagnostic and Statistical Manual of Mental Disorders (DSMIV). The duly filled questionnaire was collected, and data was analyzed using ANOVA, Fisher-Freeman-Halton Exact Test, and Independent sample t-test scoring.

III. Result

Out of 1000 students, a total of 960 students consented to fill out the form for the study. The participants were 41% (n=394) females and 59% (n=566) males. The age ranged from 16 to 33 years, having a mean $\pm$ -SD of 18.92 $\pm$ 1.465. Students from rural areas accounted for 42.5% (n=408) and Urban residential areas were 57.5% (n=552). The percentage of students from academic fields were 44.3% (n=425) from paramedical, 42.3% (n=406) from Medical and 13.4% (n=129) from Engineering field. The observations were tabulated and statistically analyzed.

Table no 1 shows students' perception using a 5-point Likert scale. It includes 20 questions and corresponding responses in terms of percentages. No significant percentages emerge from this table.

Table no 1: Students perception with 5-point Likert scale

Sl. No	Questions	Not Applicable	1.Rarely	2.Occasionally	3.Frequently	4.Often	5.Always
1	How often do you find that you stay online longer than you intended	6 (0.7%)	270 (28.1%)	267 (27.8%)	217 (22.6%)	150 (15.6%)	50 (5.2%)
2	How often do you neglect household chores to spend more time online	10 (1%)	391 (40.7%)	260 (27.1%)	157 (16.4%)	99 (10.3%)	43 (4.5%)
3	How often do you prefer the excitement of the Internet to intimacy with your partner	960 (100%)	-	-	-	-	-
4	How often do you form new relationships with fellow online users	45 (4.7%)	569 (59.3%)	166 (17.3%)	104 (10.8%)	46 (4.8%)	30 (3.1%)
5	How often do others in your life complain to you about the amount of time you spend online	20 (2.1%)	379 (39.5%)	221 (23%)	144 (15%)	117 (12.2%)	79 (8.2%)
6	How often do your grades or schoolwork suffer because of the amount of time you spend online	16 (1.7%)	354 (36.9%)	248 (25.8%)	174 (18.1%)	87 (9.1%)	81 (8.4%)
7	How often do you check your email before something else that you need to do	14 (1.5%)	441 (45.9%)	205 (21.4%)	145 (15.1%)	80 (8.3%)	75 (7.8%)
8	How often does your job performance or productivity suffer because of the Internet	38 (4%)	382 (39.8%)	260 (27.1%)	151 (15.7%)	75 (7.8%)	54 (5.6%)
9	How often do you become defensive or secretive when anyone asks you what you do online?	29 (3%)	402 (41.9%)	229 (23.9%)	145 (15.1%)	89 (9.3%)	66 (6.9%)
10	How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet	34 (3.5%)	298 (31%)	216 (22.5%)	189 (19.7%)	123 (12.8%)	100 (10.4%)
11	How often do you find yourself anticipating when you will go online again	40 (4.2%)	282 (29.4%)	277 (28.9%)	185 (19.3%)	116 (12.1%)	60 (6.3%)
12	How often do you fear that life without the Internet would be boring, empty, and joyless	29 (3%)	262 (27.3%)	196 (20.4%)	161 (16.8%)	141 (14.7%)	171 (17.8%)
13	How often do you snap, yell, or act annoyed if someone bothers you while you are online	32 (3.3%)	393 (40.9%)	257 (26.8%)	160 (16.7%)	68 (7.1%)	50 (5.2%)
14	How often do you lose sleep due to being online?	25 (2.6%)	435 (45.3%)	210 (21.9%)	129 (13.4%)	87 (9.1%)	74 (7.7%)

15	How often do you feel preoccupied with the Internet when off-line, or fantasize about being online	42 (4.4%)	406 (42.3%)	281 (29.3%)	126 (13.1%)	67 (7%)	38 (4%)
16	How often do you find yourself saying "just a few more minutes" when online	22 (2.3%)	212 (22.1%)	234 (24.4%)	193 (20.1%)	135 (14.1%)	164 (17.1%)
17	How often do you try to cut down the amount of time you spend online and fail	40 (4.2%)	300 (31.3%)	180 (18.8%)	182 (19%)	133 (13.9%)	125 (13%)
18	How often do you try to hide how long you've been online	33 (3.4%)	418 (43.5%)	177 (18.4%)	138 (14.4%)	89 (9.3%)	105 (10.9%)
19	How often do you choose to spend more time online over going out with others	34 (3.5%)	483 (50.3%)	212 (22.1%)	109 (11.4%)	84 (8.8%)	38 (4%)
20	How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online	38 (4%)	460 (47.9%)	182 (19%)	132 (13.8%)	82 (8.5%)	66 (6.9%)

Table 2 shows the classification of students into four levels of categories based on the severity. According to IAT scores, out of 960 students, 23.3% (n=224) were normal, 49.2% (n=472) showed mild internet addiction, 27.2% (n=261) showed moderate addiction and 0.3% (n=03) had severe internet addiction.

Table no 2: Severity of internet addiction according to IAT score

IAT score level	Frequency (%)
Normal	224 (23.3%)
Mild	472 (49.2%)
Moderate	261 (27.2%)
Severe	3 (0.3%)

Table 3 indicates association of DSMIV scores with internet addiction levels. The p-value <0.001 indicates that the difference in DSMIV scores across the IAT levels is statistically significant, hence, can be considered a meaningful association between DSMIV and IAT scores.

Table no 3: Association of DSMIV to IAT scores (ANOVA)

Variable	IAT Level				Total	p-value
	Normal	Mild	Moderate	Severe		
DSMIV Total	15.09+/-6.24	16.18+/-5.88	18.30+/-6.20	18.67+/-8.73	16.51+/-6.16	<0.001*

Table 4 shows the association of DSMIV to different academic fields. The p-value <0.001 indicates the statistical significance showing the significant difference between DSMIV scores with all three academic fields. The average DSMIV score is highest in the engineering field followed by medical and paramedical fields.

Table no 4: Association of DSMIV to various academic fields (ANOVA)

Variable	Academic field			Total	p-value
	Medical	Paramedical	Engineering		
DSMIV Total	16.69+/-6.19	15.76+/-5.93	18.40+/-6.43	16.51+/-6.16	<0.001*

Table 5 indicates the relationship between DSMIV Total and gender with statistically significant p-value of <0.001. This shows a positive relationship between gender and DSMIV scores. Females have higher DSMIV values than males.

Table no 5: Association between DSMIV and gender (Independent sample t-test)

Gender	N	Mean+/-SD	p-value
Female	394	17.34+/-6.32	0.001*
Male	566	15.93+/-5.99	

Table 6 shows the analysis of DSMIV scores in urban and rural areas. The p-value of 0.026 indicates that the difference in DSMIV Total with urban and rural areas is statistically significant.

Table no 6: Association between DSMIV Total with urban and rural areas (Independent sample t-test)

Area	N	Mean+/-SD	p-value
Rural	408	16.0+/-5.93	0.026*
Urban	552	16.89+/-6.31	

Table 7 shows the association between gender and IAT levels. The p-value <0.001 indicates there is statistically significant relationship between the gender and IAT levels.

Table no 7: Association between Gender and IAT levels (Fisher-Freeman-Halton Exact Test)

Gender	IAT level				p-value
	Normal (n=224)	Mild (n=472)	Moderate (n=261)	Severe (n=03)	
Female	119	170	104	1	<0.001*
Male	105	302	157	2	

Table 8 shows the association between the IAT levels with rural and urban areas. The analysis shows no statistically significant association between the IAT levels with rural and urban areas.

Table no 8: Association between IAT levels with Rural and Urban areas (Fisher-Freeman-Halton Exact Test)

Area	IAT level				p-value
	Normal (n=224)	Mild (n=472)	Moderate (n=261)	Severe (n=03)	
Rural	92	208	107	1	<0.805
Urban	132	264	154	2	

Table 9 shows the association between IAT levels with various academic fields. The observation from this table shows that Engineering field has reached its maximum threshold with 100% having the severe internet addiction according to IAT level with p value of <0.001.

Table no 9: Association between the IAT levels and the students studying in Medical Engineering and Paramedical courses (Fisher-Freeman-Halton Exact Test)

Academic course	IAT level				p-value
	Normal (n=224)	Mild (n=472)	Moderate (n=261)	Severe (n=03)	
Engineering	26	52	48	03	<0.001*
Medical	104	188	114	00	
Paramedical	94	232	99	00	

IV. Discussion

The findings from the study highlight a distinct correlation between patterns of internet use and mental health of students in different academic fields of study. The IAT results classify students into four categories of addiction: normal, mild, moderate, and severe. The conclusions include the most common level being mild addiction, which impacts 49.2% of the students. Severe addiction in this study is, however, rare (0.3%), but occurs only among engineering students, as seen in Table 2. This concurs with previous research studies reporting greater internet addiction in technical and medical students [1, 7]. Combined, these works emphasize how some fields are more likely to have heightened vulnerability, not merely individual predisposition but also educational settings that heighten dependence on internet usage.

Female students recorded much higher DSM-IV scores (17.34 ± 6.32) than males (15.93 ± 5.99) at a p -value of <0.001 (Table 5). This suggests that females are likely to have more intense psychiatric symptoms from internet addiction contrasting with the previous studies showing more prevalence among males [1, 7]. While internet addiction might be more prevalent among males, females are potentially more vulnerable to the psychiatric effects of excessive use. Such observations highlight the nuances in gender differences, which in health-related academic environments are not yet fully investigated.

The findings also indicate that urban students recorded higher DSM-IV scores (16.89 ± 6.31) than rural students (16.00 ± 5.93) (Table 6). Statistically significant ($p = 0.026$), however, the difference is, marginal, and this implies that location is not a key factor influencing addiction severity. This finding is consistent with the studies such as [6, 15].

Academic disciplinary differences revealed, with engineering students demonstrating the highest DSM-IV scores (18.40 ± 6.43) and the only instances of severe dependency. Lower DSM-IV scores were seen in medical and paramedical students, with paramedical students reporting the lowest vulnerability to internet dependency (15.76 ± 5.93) (Table 4). These results indicate the influence of discipline-specific stressors, coping abilities, and learning environments on the manifestation of internet addiction and its psychological effects.

The present research also shows a positive correlation between IAT scores and DSM-IV scores. With increasing severity of internet addiction, DSM-IV scores increase, reflecting a higher degree of psychiatric symptoms like depression and anxiety (Table 3). The meta-analysis of more than 223 studies, which identified strong associations between pathological internet use and depression, anxiety, and loneliness [8] and there is also evidence to show that compulsive internet use predicts and exacerbates emotional instability [4, 10]. Our findings also lend support to Davis's cognitive-behavioural model of pathological internet use, proposing a cyclical relationship in which psychiatric symptoms and addictive use enhance each other.

From the Likert scale analysis (Table 1): 42.5% of the students reported remaining online longer than desired sometimes or often. Almost half of the respondents (47.9%) confessed feeling restless or irritable when offline, which diminishes after getting connected again. Notwithstanding intense online engagement, students did not put internet usage above intimacy, since 100% indicated this situation as "Not Applicable." Although the current research did not identify intimacy or relationships being affected, the psychological and behavioural disturbances cited by the students are strongly consistent with the general global pattern associating internet overuse with psychiatric and emotional impacts.

Overall, the discussion brings out that internet addiction among students is not a one-size-fits-all phenomenon but different by gender, location, and area of study. While mild addiction is the most prevalent, psychiatric symptoms are substantially higher with increased severity, paralleling findings in various cultural settings. These findings emphasize the importance of intervention that takes discipline-specific sources of stress, gendered experiences, and general psychological resources that act as buffers against pathological internet use into account. They also make culturally informed observations regarding how internet addiction works in Indian academia, filling in gaps created by prior research that targeted mostly non-Indian populations or one academic discipline.

Despite the helpful insights provided by this study, it has few limitations. The cross-sectional design limits the potential to create causal links between internet addiction and psychiatric symptoms. The underlying psychological challenges may lead to and arise from unhealthy internet use. Using only student samples may reduce the external validity of results to larger populations since the experiences of students can be different from those of working professionals or other non-academic constituencies. The self-report survey where student participation may underreport bad behaviors or overreport good qualities might be a threat of possible social desirability bias. The examination of neuroticism, intolerance of stress, loneliness, and boredom previously identified as sources of internet misuse might unlock further insight into underlying processes of addiction.

V. Conclusion

This study demonstrates evidence for strong association between internet addiction and psychiatric symptoms in students from different academic disciplines. The engineering and female students appeared to be especially vulnerable. Mild to moderate internet addiction was found to be the most common pattern which may be associated with psychiatric symptoms. These findings underscore the need to be addressed by educational institutions starting from the school. The present study has several significant implications for practice and policy. Interventions like physical exercise, yoga-based lifestyle, and meditation should be integrated into academic institutions. These strategies might significantly reduce the compulsive usage of the internet, thereby lessening the association of severity of psychiatric symptoms. Psychological counseling and awareness programs can empower students with healthy coping skills to overcome excessive use of the internet, thereby reducing the risk of psychiatric manifestations like anxiety and depression. The incorporation of mental health services into schools is essential to tackle the challenges in the present world. Higher education institutions should consider regulating non-academic access to the internet by preserving access only to learning and

research. This promotes a balanced digital ecosystem restraining compulsive usage and emphasizing academic productivity. Future research studies should focus on longitudinal multidisciplinary designs to find out the causal pathways between internet addiction and mental health outcomes. Study populations should be expanded beyond student groups to non-professional student groups, professionals and general populations for the generalized insights and broader understanding of how internet addiction manifests itself in different social settings. The present study emphasizes the importance of internet addiction as not a mere technological concern but as a critical mental health issue which needs to be addressed by coordinated and sustainable action.

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