

Internet Addiction and the Pattern of Internet Use among Under Graduate Medical Students: A Cross- Sectional Study from North India

Priyanka ^{*1} , R K Pal ²

1. Assistant Professor, Community Medicine Lady Hardinge Medical College, New Delhi, India
2. Professor, Community Medicine, ESIC Medical College, Faridabad, India

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Corresponding Author:

Priyanka

priyankavirdi@yahoo.com

ABSTRACT

Introduction: Excessive use of the Internet affects the academic achievements of students. This study aimed to investigate the prevalence of Internet addiction and the pattern of Internet use among undergraduate medical students.

Method: This analytical cross-sectional study conducted on 177 undergraduate medical students in batch 2016, 2017 and 2018, who were included in this study by convenience sampling method. The study tool was Young's Internet Addiction Test containing questions regarding the pattern of Internet use. Data entry and analysis was done by using Microsoft excel and SPSS version 21. Qualitative data were described in terms of frequency and percentage while quantitative data were expressed as mean and standard deviation. Chi square test and multiple linear regression were used to find out the relationship between various factors and Internet Addiction (IA). The significance level was considered 0.05.

Results: The mean age of the participants was 20.3 years (± 1.19), and 62 % of the subjects were males. The prevalence rate of Internet Addiction (IA) was found to be 56.5% and 42.9% of them were in mild and 13.6% were in moderate addiction category. Being male ($\beta = -0.143$, $p = 0.038$), staying at a hostel ($\beta = 0.167$, $p = 0.018$), not having a time preference for using the Internet ($\beta = -0.174$, $p = 0.012$), spending more time on the Internet everyday ($\beta = 0.201$, $p = 0.000$), being always online ($\beta = 0.276$, $p = 0.000$) and more years of using the Internet ($\beta = 0.175$, $p = 0.015$) were significantly related with IA in students.

Conclusion: A large proportion of medical students were found to be addicted to the Internet. Therefore, this issue should be addressed immediately.

Key words: Internet Addiction, Medical Students, Prevalence, Pattern

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Introduction

Internet access has increased dramatically in the past few years. Over the last decade, Access to the Internet has increased a thousand times over globally (1). It is a very powerful medium for easy exchange of information and social communication. It is also used to facilitate research and business transaction. In short, Internet has become a way of life for us.

Over the years, the use of Internet for work and leisure activities is increasing and it has blurred the boundaries between effective and ineffective use of the Internet. The various uses of the Internet such as establishing risk free social connections with strangers, free expression of thoughts, possibility to access prohibited content, playing unique games, and use of numerous other functions in privacy have led to an exponential rise in the use of Internet (2).

Internet use may be beneficial when kept at a normal level, however ; excessive Internet use interfering with daily life, has brought about a range of problems, including decreased psychosocial well-being, relationship breakdown, and neglect of domestic, academic and work responsibilities (3).

(IA) can be described as an individual's inability to control his or her own use of the Internet causing disturbances regarding work, social, and personal commitments (4).

IA leads to different social, psychological, and physical disorders. The worst impacts of IA are anxiety, stress, and depression. In a study done by Mohamed H Taha et al. in Saudi Arabia, 59.7% of medical students felt depressed or nervous when they were offline (5).

Research has shown that a considerable proportion of students have Internet addiction. A meta-analysis identified the pooled prevalence of IA among 3651 medical students as 30.1% (6). Another research showed up to 67% prevalence of IA among medical students (7). Hardie E et al. in their study, found 52% over-users with frequent problems caused by their Internet use, and 8% were pathologically addicted to the Internet (3).

Excessive use of the Internet also affects the academic achievements of the students. Students

addicted to the Internet spend more time on the Internet than their studies, and hence; they have poor academic performance (8). A study on medical students in Pakistan revealed that the students addicted to the Internet had significantly lower academic performance ($p=0.01$) compared to the non-addicts (9). Other authors have found that 63% of medical students had poor academic performance because of excessive Internet use (5).

Several factors have been found to be associated with IA and problematic Internet use. A study by Anand N et al. showed that gender, duration of use, time spent per day, frequency of the Internet use, and psychological distress (depressive symptoms) indicated IA (10). Researchers reported that over-users of the Internet were younger and less experienced with respect to computer use than the average or addicted users (3). In another study by Krishnamurthy S, binary logistic regression found IA to be related with being male and always online, spending less time on the Internet for homework, making new friendships online (11).

Because of excessive and late night use of the Internet, students often have sleep deprivation and disorders. It was reported that Internet users at risk of ID complained of irregular sleep patterns (13.6% reported to often experience an irregular pattern and 11.4% reported to always experience an irregular pattern). Those with both high- and potential-risk of ID suffered from sleep disorders (81.1% and 76.7%, respectively) (12).

In India, internet use is high, especially among the young population and students. Although there is a lot of research on the Internet use among students, there couldn't be found any studies on medical students from Northern region of India exploring the severity of IA. This study aimed to investigate the prevalence of IA and pattern of the Internet use among the undergraduate medical students in North India, in 2019.

Method

This was a cross-sectional study conducted on undergraduate medical students from a state medical college located in Faridabad, India. A

census sampling method was used and all the admitted students of MBBS from 2016, 2017 and 2018, willing to participate in the study were enrolled. A total of 177 students, 110 males and 67 females consented to participate. Data collection was done during the months of August and September, in 2019. The students were given a pre-designed questionnaire containing questions regarding their baseline characteristics like age, gender, place of living, the extent and pattern of Internet use. We used Young's Internet Addiction Test (IAT), which is freely available in public domain and has been widely used in various national and international studies. All the data were kept totally anonymous.

Young's Internet Addiction Test (IAT)

The Internet Addiction Test (IAT; Young, 1998) is a 20-item scale used to measure the presence and severity of Internet dependency among adults. This was developed by Dr. Kimberly Young, a professor at St. Bonaventure University and director of the center for Internet addiction recovery to assess symptoms of IA in a variety of test settings (2).

This test is used to measure the severity of self-reported compulsive Internet use for adults and adolescents. IA is an impulse-control disorder, and the term Internet refers to all types of online activities. It is the most widely used IA scale which has been translated and validated in several languages including English, Chinese, French, Italian, Turkish, and Korean. It had good validity and reliability for the Indian population (11, 14). The tool was Cronbach's alpha with coefficient of 0.86 (13).

The 20-item questionnaire measures characteristics and behaviours which are associated with compulsive use of the Internet which includes compulsion, escapism, and dependency. Questions also evaluate problems related to addictive use of the Internet regarding personal, social and occupational matters. Questions are randomized and each statement was measured along a Likert-scale ranging from 0 = least extreme behaviour to 5 = most extreme

behaviour for each item. Total scores that range from 0 to 30 are considered to reflect a normal level of Internet use, 31 to 49, a mild level, 50 to 79, a moderate level, and 80 to 100 indicate a severe dependence upon the Internet. (2).

Ethical Issues

Data collection was done anonymously with no personal identifiers. Confidentiality of data was maintained. Permission to conduct the study and ethical code was obtained from Institutional Ethics Committee of ESIC Medical College via reference number 134/A/11/16/Academics/MC/2016/122.

Data Analysis

Descriptive statistics were used to describe the distribution of all variables. Qualitative data were described in terms of proportion, while quantitative data were expressed as mean and standard deviation. To compare, students were classified into two groups of normal and addicted. Chi square test was used to find out the relationship between various factors and Internet addiction. Multiple linear regression analysis was also carried out to find the predictors of the IA. The IAT score of each student, which is a quantitative variable, was used as a dependent variable. Gender, place of living, duration of Internet use, preferred time for Internet use, connection time preference and ownership of personal computer were the factors entered into the equation to carry out regression. Data entry and analysis was done using Microsoft Excel and statistical software SPSS version 21. A p value of <0.05 was considered to be significant.

Results

Our study comprised of 177 undergraduate medical students who gave consent to participate. The mean age of the participants was 20.3 (\pm 1.19). Table 1 shows the socio-demographic characteristics of students. Almost 62% (110) of the participants were males. A large proportion of students were staying at a hostel (84.2%). More than one third (38.4%) of the students had their own computers. As far as duration of Internet use is concerned, about 60% were using the Internet for the last 5 to 10 years, one third (33.9%) were

using it for less than 5 years, and only a small proportion (6.8%) were using the Internet for more than 10 years. 39% of the participants used the Internet for less than 2 hours per day, while 14% used it for more than 5 hours daily. About 31% of the participants cited evening as their most preferred time for using the Internet and 27.7%

mentioned night as their desired time, while 40% of the participants had no time preference regarding the Internet use. One third of the students (33.9%) were always connected to the Internet and various sites, while two third (66.1%) sometimes used it.

Table 1. Background Characteristics and Pattern of Internet Use by study subjects

Variable	N	%
Gender		
Male	110	62.2
Female	67	37.8
Place of living		
Home	28	15.8
Hostel	149	84.7
Computer ownership		
Yes	68	38.4
No	109	61.6
Total duration of Internet use		
<5 years	60	33.9
5 to 10 years	105	59.3
>10 years	12	6.8
Average time spent on the Internet daily		
≤ 2 hours	69	39.0
2 to 5 hours	83	46.9
>5 hours	25	14.1
Most preferred time for Internet use		
Evening	55	31.1
Night	49	27.7
No specific time	73	41.2
Connection status		
Always	60	33.9
Sometimes	117	66.1

The prevalence of IA among the students was determined by applying Young's IAT. Those with scores less than 30 were labelled as not addicted to internet. More than half (56.5%) of the study subjects were found to be addicted to the Internet, out of whom 76 individuals (42.9%) had mild IA, and 24 (13.6%) showed moderate level of IA. None of the participants suffered from severe addiction.

63.6% of the male participants showed IA while it was 44.7% for females. Thus, a higher proportion of males were addicted to the Internet, and this relationship was found to be statistically significant ($p < 0.05$). 28.5% of the students residing at their homes were found to be addicted to the Internet compared to 61.7% of the students

who were hostel dwellers, which was also statistically significant ($p < 0.05$). No significant relationship was found between the overall time spent on the Internet as well as owning a computer, and the Internet addiction among the students ($p > 0.05$). 92% of the subjects spending more than 5 hours daily on the Internet were found to be addicted compared to 15.9% of those spending less than 2 hours, and this difference was found to be statistically highly significant ($p = 0.001$). A significantly higher proportion of students who were connected to the Internet continuously (70%) exhibited Internet addiction compared to 49.5% of the students who were sometimes connected ($p < 0.05$). A majority of students (77.6%) whose preferred time of the

Internet use was night, were found to be addicted to the Internet as compared to those who preferred

evening. This difference was also found to be statistically significant ($p < 0.05$).

Table 2. Distribution of Study Subjects according to Various Factors Affecting IA

Variable	Not addicted to the Internet (IAT Scores 0 to 30)	Addicted to the Internet (IAT Scores >30)	P value*
Gender			
Male	40 (36.4)	70 (63.6)	0.014
Female	37 (55.2)	30 (44.8)	
Place of residence			
Home	20 (71.4)	08 (28.6)	0.001
Hostel	57 (38.3)	92 (61.7)	
Computer ownership			
Yes	26 (38.2)	42 (61.8)	0.265
No	51 (46.8)	58 (53.2)	
Total duration of Internet use			
<5 years	31 (51.7)	29 (48.3)	0.072
5 to 10 years	44 (41.9)	61 (58.1)	
>10 years	02 (16.7)	10 (83.3)	
Average time spent on the Internet daily			
≤ 2 hours	11 (15.9)	58 (84.1)	<0.001
2 to 5 hours	66 (79.5)	17 (20.5)	
>5 hours	23 (92.0)	02 (8.0)	
Most preferred time for the Internet use			
Evening	44 (80.0)	11 (20.0)	<0.001
Night	11 (22.4)	38 (77.6)	
No preferred time	22 (30.1)	51 (69.9)	
Connection status			
Always	18 (30.0%)	42 (70.0)	0.009
Sometimes	59 (50.4)	58 (49.6)	

*Chi square test applied. P value <0.05 regarded as significant

It was decided to further analyze the various predictors of IA by using multiple linear regression. The total score of Young's IAT for each participant was regarded as a dependent variable, without categorizing it into addicted and non-addicted group. It was found that being male, staying at hostel, more years of using the

Internet, spending more than 5 hours on the Internet daily, not having a time preference for the Internet use, and being always online were significantly related with IA among the subjects under the study. However age and owning a computer did not have any significant effect on it (Table 3).

Table 3. Predictors of IA in Medical Students by Using Multiple Linear Regression Analysis

	Unstandardized Coefficient B	Standard error	Standardised coefficient β	t	pvalue
Always	33.383	17.724		1.884	0.061
Age	-0.598	0.757	-0.054	-0.791	0.430
Gender	-3.934	1.878	-0.143	-2.095	0.038
Residence	6.081	2.553	0.167	2.382	0.018
Computer ownership	-2.244	1.893	-0.082	-1.185	0.238
Total duration of the Internet use	0.798	0.324	0.175	2.467	0.015
Average time spent on the Internet daily	3.978	1.071	0.201	3.169	0.001
Most preferred time	-4.899	1.932	-0.174	-2.535	0.012
Connection Status	4.358	1.120	0.276	3.892	<0.001
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.507 ^a	.257	.226	11.749	

More than half of the students (53.1%) felt that the Internet is adversely affecting their study time, and a still larger proportion (64.4%) felt the same for their sleep time. Moreover, 17% said they felt more comfortable interacting with their friends

online rather than face to face. 36.7% admitted they had formed new relationships online, and 57% neglected their household chores to spend more time online. (Table 4)

Table 4. Distribution of Students According to Their Perception of the Effect of Internet Use on Their Daily Life

Variable	N	%
Strongly feel that Internet is affecting your study time		
Yes	94	53.1
No	83	46.9
Strongly feel that Internet is affecting your sleep time		
Yes	114	64.4
No	63	35.6
Feel more comfortable interacting with your friends online rather than face to face		
Yes	48	17.1
No	129	72.9
Form new relationships with your fellow Internet users		
Yes	65	36.7
No	112	63.3
Neglect household chores to spend more time online		
Yes	101	57.1
No	76	42.9

Discussion

The results showed that the mean age of the participants was at least 20 years, and the prevalence rate of the IA was found to be 56.5% in the subjects under the study, according to Young's Internet addiction test. 76 students (42.9%) were found to have a mild IA and 24 (13.6%), showed a moderate level of IA. None of the participants suffered from severe addiction. More than half of the students were found to be addicted to the Internet which is a cause for concern. Other researchers have reported the prevalence rate of the IA to range from 8% to 55% (3, 9-23).

The prevalence rate is significantly higher in males compared to females, which is consistent with the findings of several other studies (10-11,14-15,17-19,21-25). The reason for this difference may be because of the fact that males have less societal restrictions in a majority of cultural contexts, and they are apparently more efficient in using Internet (10). However, in one study from Australia, authors reported higher prevalence of Internet addiction in females (19). Another research from a European country showed equal prevalence rate of IA in both genders (28). A

significantly higher proportion of students who stayed at hostels were found to be addicted to the Internet compared to those staying at home. This may be because of more privacy and less parental supervision regarding the hostellers, leading to excessive amount of Internet use which increases their vulnerability to addiction. These findings were consistent with those from other researchers (10-12,23).

Some of the authors reported that the participants having a computer were more prone to IA as they have easy access to the Internet (16-26). But no such relationship was found in our study. The reason may be the widespread accessibility of the Internet via mobile phones which have become quite common these days. Among the students with IA, almost three fourth preferred to use the Internet at night and a large proportion sometimes used it during the day. Another research on engineering students also found similar results (10). The students who spent more time daily on the Internet were more prone to get addicted, and the same has been reported by other authors (7). It was also discovered that IA was significantly

related to continuous connection which was consistent with other studies as well (11, 16).

On further analyzing the various predictors of IA by using multiple linear regression model, it was revealed that males staying at hostels have no specific time preference for using the Internet, and spend more than 5 hours on the Internet every day, and being continuously online was still significantly related with IA among the subjects. In addition, the overall time spent on the Internet had a role in IA and those using it for more number of years were found to be more prone to addiction. These results are consistent with those reported by Krishnamurthy S from Bangalore (11). However age and having a computer did not have any significant effect on it.

The students' perception of the effect of the Internet use on their daily lives has been explored. More than half (53.1%), strongly felt that Internet is affecting their study time, which is quite a significant proportion. A large proportion (64.4%) strongly felt that Internet use was impacting their sleep pattern. Thus, it can be said that students themselves realized that both their studies and sleep were adversely affected by the Internet use. Several other national and international researchers have reported similar results (12, 20, 22, 25).

17% of the respondents admitted that they felt more comfortable interacting with friends online than face to face, which was a very disturbing finding. Lack of real world interaction and living in a virtual world can lead to behavioural problems later on in life. Sharma A et al. discovered that students felt communicating through the Internet was much better than going out with friends (25). More than three fourth of the respondents also admitted they easily formed new relationships with fellow Internet users. Kim Y et al. in their study on Korean adolescents, found that they felt more comfortable with virtual interpersonal relationships (12). Authors from the United States have also reported that college students spent too much time on the virtual world and failed to engage in face to face interaction (22). It was also found that more than half (57%) of the participants neglected

household chores to spend more time online. All these showed that their priority was being online, even at the cost of other important aspects of their life.

The main strength of this study is the use of multivariate analysis for determining association between various factors affecting internet addiction among medical students. This study had few limitations. First, because it was a cross-sectional study, the causal relationship between the various factors studied and the IA cannot be determined. Second, only a few of demographic variables associated with the level of Internet addiction were studied. Further research should be conducted on a larger population by including more explorative variables like perceived reasons for spending excessive amount of time on the Internet, academic performance of the students who are addicted, those who are not addicted to the Internet and socio-economic and psychological status of the students using the Internet.

Conclusion

The prevalence rate of the Internet addiction was found to be 56.5% among the subjects under the study, according to Young's Internet addiction test (IAT), which is a quite large proportion. Further research and activities are recommended to improve the existing situation, before it starts to get out of control and adversely affect the studies and life style of students. Assigning faculty members as mentors of the selected students was already done at many medical institutions including the ones where this study was conducted, to provide personal support and guidance to students. These mentors should also motivate the students to have more face to face interactions among themselves rather than online, and emphasize the importance of studies, enough sleep and other life responsibilities over spending time in the virtual world of the Internet. Special focus should be given to those staying in hostels as the addiction is worse in these students.

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conduct the study and ethical code was obtained from Institutional Ethics Committee of ESIC Medical College via reference number 134/A/11/16/ Academics/MC/2016/122.

Conflict of interest

We declare that we do not have any conflict of interest.

Authors' contribution

Both the authors contributed to conceptualizing and designing the study as well as data collection. P was responsible for data analysis and initial preparation of manuscript. RKP, further evaluated and modified the article.

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