

## Original Research Article

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# A cross sectional study of prevalence of internet addiction and its association with mental health among college going students in Nagpur city

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## ABSTRACT

**Background:** The Internet has become an integral part of life. India is the third largest country in the world next to China and United States in respect of the number of internet users. Adolescents usually have poorer self-control, worse self-regulation, and poorer cognition as compared to adults and are considered the most vulnerable group to the temptations of the internet. Objective of the study was to understand the patterns, preferred use of internet, prevalence Internet addiction and its effect on their mental health status among college students in Nagpur.

**Methods:** This cross-sectional study was carried out in different colleges across in the Nagpur corporation during the period Dec 2016 to May 2017. Pre-validated, pre-tested, structured questionnaire was developed. Young's 20-item scale for Internet addiction (YIAT) was applied to qualify for the prevalence of Internet addiction. The 12-item General Health Questionnaire has excellent psychometric properties as a screening instrument for psychiatric disorders in nonclinical settings.

**Results:** This study of college students aged 17-25 years with marginally high male representation (51.92%), identified 30.69%, 26.60% and 0.26% students with mild, moderate and severe Internet addiction respectively. Those who are having internet addiction are two times at a risk of having poor mental health (OR = 2.28, p = 0.01).

**Conclusions:** Disproportionate Internet use is an evolving issue among college going students as our study have highlighted that excessive use of the Internet undesirably affects one's physical and mental health and social well-being.

**Keywords:** Internet addiction, Young IAT-20, GHQ-12, Mental health, Adolescents

## INTRODUCTION

The Internet has become an integral part of life.<sup>1</sup> Moreover, Internet has the touch in each and every aspect of human life. There is an emerging public health concern over the increase in Internet usage, particularly among college going students.<sup>2</sup> Today, 1.2 billion adolescents

stand at the crossroads between childhood and the adult world. Around 243 million of them live in India.<sup>3</sup> India is the third largest country in the world next to China and United States in respect of the number of internet users.<sup>4</sup> GSMA 2017 report tells that from 2016 to 2020, subscriber penetration will be increased from 51 % to 65

% and smartphone adoption will increased from 28% to 49%.<sup>5</sup>

The technological development has brought in high speed mobile broadband internet connectivity, wi-fi, and smart phone applications that has transformed the pattern of internet access of youth, from just “logging in” for a particular duration of time in front of a desktop computer to an era of being online anytime. Indeed, such development has made people life easier in terms of communication, business, banking, education, research, health seeking, shopping and entertainment. Now it is hard for most of us to imagine a world without instant and continuous access to internet.<sup>6</sup>

In 1995, a clinical psychology student Ms Kimberly Young, then in Rochester, USA, got interested in the psychological factors behind computer use and independently conceived of “addictive use of the Internet” as a pathological condition.<sup>7</sup> In tandem with the splurge in access to the Internet globally, with the rise of new-generation gadgets, the risk of “internet addiction” is emerging as a significant behavioural addiction pandemic to be tackled worldwide.<sup>8</sup>

As Internet use has proliferated, so too have reports of internet addiction / problematic internet use. In the rapidly burgeoning literature in this area, different terms are used to refer to seriously dysfunctional patterns of excessive Internet use.<sup>9</sup> It has been recommended to include internet addiction (IA) in Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM 5).<sup>10</sup>

Adolescents usually have poorer self-control, worse self-regulation, and poorer cognition as compared to adults and are considered the most vulnerable group to the temptations of the internet.<sup>11</sup>

Internet use can become overuse and addiction when it starts to take away from the time one normally spend on socializing with friends or family, relaxing, or doing a hobby. Of course, it's not that extreme for everyone.<sup>12</sup> Researchers have also shown that younger population and especially college students are more vulnerable because of their psychosocial and environmental characteristics.<sup>13</sup>

Though there are innumerable studies globally depicting a worldwide scenario of the behavioural addiction phenomena, a lot of these studies have utilized inconsistent criteria to rate the levels of addiction, applied recruiting methods that may have caused serious sampling bias, and examined data using primarily exploratory rather than confirmatory data analysis techniques to investigate the degree of association rather than a causal relationship among variables.<sup>14</sup> The absence of large-scale epidemiological studies and huge disparities in the use of diagnostic criteria have resulted in difficulties in establishing the prevalence of Internet addiction. This paper attempts to understand the patterns,

preferred use of internet, prevalence Internet addiction and its effect on their mental health status among college students in Nagpur. Unfortunately, there is no similar published study from the central city of India. With this background, we undertook the present study to take a close look on this issue.

## METHODS

Methodology is discussed under following headings

### **Study design**

A cross sectional study design is used in present study to identify prevalence of internet addiction among college going students in colleges of across different streams (arts, science, and computer science) in the city of Nagpur during the period Dec 2016 to May 2017.

### **Study population**

College going students in Nagpur city, who are of adolescent age group and young adults age group were included in our study.

### **Study setting**

Various colleges in Nagpur city were contacted prior start of the study. Out of them one junior college, two senior college is selected randomly for selecting study subjects.

### **Sampling procedure/technique**

A multistage cluster random sampling design was applied to target recruitment procedure. Nagpur has eight zones under Nagpur Mahanagar Palika. Senior secondary, undergraduate, masters, and postgraduate colleges in the selected zones were randomly selected and then contacted for permission to conduct the survey. The survey was made with students of all the colleges where permission was granted. Out of the 08 colleges that were contacted, 03 colleges gave immediate permission to conduct the survey.

### **Sample size**

The required sample size for our study is calculated from study conducted by Krishnamurthy et al, on College Students in Bengaluru in 2015, and found total prevalence of 43 % of total internet addiction, allowing a relative error of 10% and for a confidence interval of 95%, using the Epi Info ver 7.1.2 software, the estimated minimum sample size was 376. Total 400 students were surveyed in campus.<sup>8</sup>

Our study covered about 400 college students aged 16-24 years. Study participants were from senior secondary, graduate and postgraduate colleges. Of the total 400 students surveyed, 395 returned filled questionnaires, around 2 could not be included in the study as they were

not Internet users, and 9 submitted forms that were incomplete. Hence total, 384 students were included in final analysis.

### **Measurement tools**

The questionnaires were anonymous and self-administered.

The questionnaire contained four parts:

1. Sociodemographic information,
2. Details regarding patterns of internet use,
3. Young's Internet Addiction Test (YIAT), and
4. General Health Questionnaire 12 items.

Young's 20-item scale for Internet addiction was utilised for qualification of the prevalence of Internet addiction. It is a 20-item questionnaire gauged on the five-point Likert Scale (score 1 to 5). After all the questions have been responded, numbers for each response are added to obtain a final score. The higher the score range, the greater the level of addiction; normal range: 0-30 points, mild: 31-49 points, moderate: 50-79 points, and severe: 80-100 points.<sup>15</sup> The outstanding psychometric properties of the questionnaire are well-documented in the previous studies.<sup>16</sup> Young's IAT, developed for screening and measuring levels of Internet addiction, and has been the most widely used and well-tested for its psychometric properties.<sup>17</sup> The items of the YIAT, each rated from 1 (rarely) to 5 (always), include compulsive behaviour related to use of the Internet, the occupational or academic difficulties, lack of competence at home, problems in interpersonal relations, and emotional problems. The underlying principles for choosing Young's diagnostic questionnaire for the study was that it is the first global psychometric measure and hence has been extensively and frequently used across many studies globally, is self-completed, has been validated on adult and adolescent populations, and has good internal consistency reliability as well as concurrent validity. In a recent meta-analysis study drawing from a large sample of studies conducted to determine the overall value for the reliability YIAT20, the mean differences showed that it is more reliable in college students and probably in Asia. The overall Cronbach's computed from the studies was 0.889 [95% confidence interval (CI) 0.884-0.895]. The standard deviation of the alpha was low, at 0.049.<sup>18</sup>

GHQ is a screening tool used to assess the overall psychological well-being of students which is defined as a state of being in which a student is balanced both emotionally and intellectually. GHQ was developed by Goldberg and has been widely used in various studies as a screening tool to determine whether an individual is at risk of developing a psychiatric disorder. It is extensively used by researchers and found to be reliable and well validated.<sup>19</sup> GHQ 12 stress scale was used in this study.

GHQ – 12 scale score >18 is considered stressful mental state.

### **Hypothesis**

Our hypothesis is that those who are having internet addiction are at a risk of having poor mental health.

### **Data collection**

All questionnaires were distributed to the participants in campus settings at a predetermined time and were collected onsite after 30 min.

### **Ethical consideration**

College approval and written informed consent were obtained for all students who participated. The study was approved by Institutional Ethics Committee, Govt. Medical College, Nagpur. A pilot study was done on 40 students; subsequent suggestions were incorporated before the start of the study.

### **Data analysis**

The Stata Ver 13.1 was used for statistical analysis of the data collected. Sociodemographic variables and patterns of Internet use have been represented by frequency tables. The prevalence of Internet addiction was described in terms of percentage. Descriptive statistics has been used to examine the association of factors of the questionnaire with Internet addiction. The frequency and odds ratio with CI has been reported for all variables where the p values (<0.05) was significant.

## **RESULTS**

Socio demographic characteristic of the students and pattern of Internet use are depicted in Tables 1 and 2. Majority were adolescents (68.79%). The patterns of Internet use are extremely varied, with the majority of students having been using computers for more than 4 years 274 (70.08%), using computers for less than 2 hours per day 252 (64.96%), using Internet for less than 4 years 249 (63.68%), using Internet for less than 2 h a day 237 (60.61%), using smartphone since last 4 years 313 (80.05%), daily use of smartphone upto 4 hrs 248 (63.43%), spending less than Rs. 200 per month for Internet usage 292 (74.68%), the mobile phone being the most preferred gadget for Internet use 281 (71.87%), logging off at end of work 171 (43.73%), mobile internet most common mode of internet access 260 (66.50%), accessing internet at residence 287 (73.40%) and being under parental supervision 253 (64.71%).

Table 3 represents preferred use of internet. Time spent per day using the Internet and amount spent per month on the Internet that could be the consequence of excessive Internet use were proportionately high among those with moderate and mild addiction, and these significant outcomes of Internet addiction are depicted in Table 4.

**Table 1: Socio-demographic characteristics of study participants (n=391).**

Sr. No	Characteristics	Frequency	Percentage (%)
1	Age#		
	≤17 yrs.	145	37.08
	18 – 19	124	31.71
	20 – 21 yrs.	90	23.02
2	≥22 yrs.	32	8.18
	Gender		
	Male	203	51.92
	Female	188	48.08
3	Year of study		
	11 <sup>th</sup>	69	17.65
	12 <sup>th</sup>	74	18.93
	First year	115	29.41
	Second year	62	15.86
4	Third year	71	18.16
	Father's education status*		
	Professional Degree / PhD	3	0.79
	Graduate or Postgraduate	218	57.37
	Intermediate or Post High School Diploma	99	26.05
	High School Completion	50	13.16
	Middle School Completion	7	1.84
	Primary School Completion	0	0.00
5	Illiterate	3	0.79
	Mother's educational status**		
	Professional Degree / PhD	2	0.51
	Graduate or Postgraduate	172	44.10
	Intermediate or Post High School Diploma	134	34.36
	High School Completion	60	15.38
	Middle School Completion	12	3.08
	Primary School Completion	6	1.54
6	Illiterate	4	1.03
	Father's occupation status*		
	Profession	28	7.37
	Semi Profession	12	3.16
	Clerk, Shop Owner, Farm Owner	57	15.00
	Skilled Worker	244	64.21
	Semi Skilled Worker	13	3.42
	Unskilled Worker	15	3.95
7	Unemployed / Retired	11	2.89
	Mother's occupational status**		
	Profession	32	8.21
	Semi Profession	7	1.79
	Clerk, Shop Owner, Farm Owner	4	1.03
	Skilled Worker	23	5.90
	Semi Skilled Worker	1	0.26
	Unskilled Worker	1	0.26
8	Homemaker	322	82.56
	Place of Stay		
	Home	304	77.75
	Hostel	29	7.42
	Rent	58	14.84

# mean±SD=18.49±2.04, Range (15-24) \*n=380, \*\*n=390.

**Table 2: Pattern of internet use.**

Characteristics	No. of study subjects n=391	Percentage (%)
<b>Years of computer use (in years)</b>		
1-4	117	29.92
5-8	167	42.71
>8	107	27.37
<b>Daily computer use (in hours)</b>		
0-2	252	64.96
2-4	113	28.90
4-6	19	4.86
>6	5	1.28
<b>Years of internet use (in years)</b>		
1-4	249	63.68
5-8	119	30.43
>8	23	5.88
<b>Daily internet use (in hours)</b>		
0-2	237	60.61
2-4	94	24.04
4-6	43	11.00
>6	17	4.35
<b>Years of smartphone use (in years)</b>		
1-4	313	80.05
5-8	75	19.18
>8	3	0.77
<b>Smartphone use per day (in hours)</b>		
0-2	115	29.41
2-4	133	34.02
4-6	85	21.74
>6	58	14.83
<b>Expenditure on Internet per month (in Rs.)</b>		
<200	292	74.68
200-400	52	13.30
400-600	24	6.14
>600	23	5.88
<b>Most commonly used gadget for accessing Internet</b>		
Mobile phone	281	71.87
Desktop	47	12.02
Laptop	55	14.07
Tablet	8	2.05
<b>Login status</b>		
Log in and off occasionally	166	42.46
At end of work log off	171	43.73
permanently online	54	13.81
<b>Most common mode of internet access</b>		
Mobile Internet	260	66.50
Wi-Fi	60	15.35
Broadband	30	7.67
Data card	41	10.49
<b>Most common location of internet access</b>		
Residence	287	73.40
Classroom	15	3.84
Cybercafé	29	7.42
Hostel	9	2.30
Computer lab	14	3.58
Library	3	0.77
Other public places	34	8.70

Continued.

Characteristics	No. of study subjects n=391	Percentage (%)
<b>Parents know about my internet activities</b>		
Never	20	5.12
Rarely	27	6.91
Sometime	91	23.27
Most of the times	99	25.32
Always	154	39.39

**Table 3: Preferred use of internet.**

Use of internet for	n=391	Percentage (%)
<b>Chatting</b>	297	75.96
<b>Using internet for coursework</b>	254	64.96
<b>General websites</b>	233	59.59
<b>Shopping</b>	217	55.50
<b>E – mail</b>	196	50.12
<b>Games</b>	160	40.92
<b>Online friendships</b>	153	39.13
<b>Pornography</b>	138	35.29
<b>Online relationships</b>	31	7.92

**Table 4: Outcome of internet addiction.**

Variable	n	Normal	Mild	Moderate	Chi	p	OR	CI
<b>Time spent</b>	$\leq 4$ hrs.	126	71	40	29.08	0.000	3.24	2.08-5.03
	>4 hrs.	40	49	105				
<b>Amount spent</b>	$\leq 200$ Rs	128	91	73	4.95	0.02	1.68	1.10-2.65
	>200 Rs	38	29	32				

**Table 5: Prevalence of internet addiction.**

Prevalence	YIAT criteria	Frequency (n)	Prevalence
<b>Normal users</b>	Score 0 – 30	166	42.46
<b>Mild</b>	Score 31-49	120	30.69
<b>Moderate</b>	Score 50-79	104	26.60
<b>Severe</b>	$\geq 80$	1	0.26
<b>Total</b>		391	100.00

**Table 6: Association between internet addiction and GHQ12 score.**

Internet addiction	GHQ score		Chi Square	OR (95% CI)	P value
	Normal (%)	High (%)			
<b>Normal</b>	133 (38.01%)	33 (21.21%)			
<b>Addicted</b>	150 (61.99%)	75 (78.79%)	8.64	2.03 (1.26-3.26)	0.001
<b>Total</b>	283	108			

With 1 (0.26%) prevalence of severe internet addiction, moderate levels of addiction 104 (26.60%) seem to be at par with what has been reported elsewhere in the literature in the same population. Mild Internet addiction 120 (30.69%) though is marginally on the higher end. The findings have been reported in Table 5. Table 6 shows association between internet addiction and GHQ-12 score. OR of 2.03 (1.26-3.26) suggests internet addiction causes higher level of stress.

## DISCUSSION

Present study was undertaken among college going students to recognize whether there is a morbid use of the Internet. We have found, mild internet addiction among 30.69 % of study subjects, moderate addiction among 26.60% and severe among 0.26%.

Internet Addiction terminology includes variety of symptoms such as preoccupation with the internet,

withdrawal symptoms, tolerance, unsuccessful attempts to control internet use, and continued excessive internet use despite the negative consequences. There is also evidences of loss of interest in previous hobbies, entertainment as a result of, and with the exception of, internet use.<sup>10</sup> In the current study, a Cronbach's alpha of 0.90, suggested good internal consistency of the overall questionnaire.

The age distribution of college students in our study is similar to the study conducted by Bagdye et al <16 yrs = 34.41%, 17-18 yrs=41.74%, >19 yrs= 28.90%.<sup>20</sup> Also Surwase et al conducted study on college going students had age distribution 17 – 18 yrs. = 19.86%, 19 – 20 yrs. = 60.63, > 20 yrs. = 19.51%.<sup>21</sup> The gender distribution in our study is nearly equal, males were 51.92% and females were 48.08%. Krishnamurthy et al conducted study on college going students and found slightly higher proportion of males (56%) as compared to females (44%).<sup>8</sup> Also study conducted by Prabhakaran et al, males = 56.8%, females = 43.2%.<sup>10</sup>

The pattern of internet use in our study was diverse and Krishnamurthy et al, Surwase et al, Bagdye et al had similar pattern of internet use.<sup>8,20,22</sup> Chatting 297 (75.96%) was most preferred use of internet in our study. The preferred use of internet was similar to the study conducted by Bagdye et al (66.51%) while Krishnamurthy et al found chatting use in 60.39%.<sup>8,20</sup>

Students with Internet addiction had thrice the odds of spending more than 28 h per week on the Internet (OR=3.24) and spending more than Rs. 200 per month (OR=1.68) as compared to their non-addict counterparts. Even though time is not a direct function in detecting internet addiction, Krishnamurthy et al suggested that those classified as dependent online users were generally disproportionate online usage, spending anywhere from 40 to 80 hours per week, with sessions that could last up to 20 hours.<sup>8</sup>

The prevalence of internet addiction in our study is mild internet addiction among 30.69 % of study subjects, moderate addiction among 26.60% and severe among 0.26%. Surwase et al studied in Nanded, Maharashtra reported mild prevalence 31.36% which is similar to our study while moderate 34.49% which was higher than our results.<sup>21</sup> While Chaudhari et al found mild prevalence of 51.42%, and moderate prevalence 7.45%.<sup>13</sup> Our hypothesis is significant that those who are having internet addiction are two times at a risk of having poor mental health (OR=2.28, p=0.01). There are very few studies conducted on assessing ill effects of internet addiction on mental health. Alpaslan et al conducted study on Turkish medical students and found internet addiction was significantly associated with loneliness, alexithymia and probability of suicide (p<0.001).<sup>22</sup> Similarly Soumya also found significant relation (Chi square=4.649 and p=0.031).<sup>1</sup>

## CONCLUSION

Disproportionate Internet use is an evolving issue among college going students as our study have highlighted that excessive use of the Internet undesirably affects one's physical and mental health and social well-being. Our observations suggest that internet addiction is a prevalent public health issue, which is having multiple risk factors and varied patterns of Internet use. Also the Internet is becoming an inclusive component of an individual's personal and social life.

### Weakness

There are several limitations involved in this study which must be addressed to provide direction for future research. First, the analysis reported here should be regarded as exploratory. Secondly, the sample size of our study is relatively small compared to the estimated 616 million current mobile services users.<sup>23</sup>

Our data collection was based on self-reporting of symptoms by the students, and we did not conduct any interview with students to confirm the clinical diagnosis of internet addiction. In addition, the well-matched control group was not taken which weakens the comparative results. Therefore, generalizability of results must be interpreted with caution and continued research should include larger sample sizes to draw more accurate conclusions.

Along with the non-consideration of design effect in the calculation of sample size, the other two relatively key drawbacks were recall bias and social desirability bias. As, subjects being inquired about details of past exposure to/use of internet. As the study participants may have answered in such a way as to portray themselves in a good light hence social desirability bias could be present.

### Strengths

The study has been designed scientifically at various levels to significantly avoid bias. Major strength of the present study was targeted age group, these participants can be considered as representative of similar college going students studying in majority of big cities. Sampling bias has always been a major drawback of previously conducted studies. This study has tried to significantly fill this gap, as the study did not recruit participants through email, group networks, and postings on websites designed for Internet or other addicts. Therefore limiting itself to a sample of participants who have some interest or psychological investment in the topic and would have been more likely to participate. Questionnaires were answered anonymously, and teachers were kept away from the classrooms where information was being collected. Anonymous answering of the questionnaires and data analysis after pooling ensured that the participants could provide more factual and credible answers without the fear of later consequences.

### Recommendations

India is a developing country that is embracing technological growth at a pace faster than ever. The role of young generation is crucial in building the nation. The need of the hour is to create awareness among them, plan public health policies with regard to this behavioural addiction, and conduct further research to support the same. Future studies may be directed toward the effect of the Internet on human behaviour, its association with psychological distress and ultimately quality of life.

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