

**Internet Addiction And Its Association With Stress Among Medical Students**

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**Abstract**

**Introduction:** Internet is a global system of interconnected computer networks which has facilitated rapid social change. As of 2017, 81 % of the people in the developed world used internet. Social media is a sphere that has drawn maximum attention in recent years. Medical education entails enormous pressure and associated stress may lead to unhealthy use of technology. Internet addiction, defined as “an impulse control disorder which does not involve an intoxicant”, may be one such avenue.

**Materials and Methods:** A cross sectional study was done after obtaining written informed consent from 377 Medical students comprising of undergraduates, interns and postgraduates. Each student was administered a sociodemographic proforma, a semi-structured questionnaire regarding internet use followed by Young’s Internet addiction scale to assess internet addiction and General Health Questionnaire 12 that assessed psychiatric morbidity.

**Results:** Prevalence of internet addiction among medical students was found to be 54.1 % (36.3% mild +16.9% moderate + 0.8 % severe). Males and Phase III students showed the highest prevalence of internet addiction

(78.9%). Internet addiction was associated with significant stress in 39.5 % of students.

**Conclusion:** The study reiterates that internet addiction is a growing problem worldwide, particularly among students. The prevalence of internet addiction among medical students was higher compared to the general population.

**Keywords:** Internet addiction, Stress and Internet, Medical Students and internet

**Introduction**

The internet is a global system of interconnected computer networks that link billions of devices worldwide. The discovery of the modern internet in the mid-90s has resulted in enormous social change. [1] A world without constant access to the internet is difficult to conceptualize as it has entrenched itself into every aspect of the humans’ life. Developing countries such as India observed the eruptive growth of internet usage at the beginning of the 21st century. [2] As of January 2018, the total number of internet users in India was found to be close to 48.1 crores which accounts for approximately 35.4 % of the total population. Addiction is defined as “A primary, chronic disease of reward, motivation, memory and related circuitry in the brain. Dysfunction in these circuits leads to characteristic biological, psychological and social

manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviours”.<sup>[3]</sup>

The term “Internet addiction” was proposed by Dr. Ivan Goldberg in 1995 for pathological internet use.<sup>[4]</sup> Kimberly Young [1996] defined internet addiction as “an impulse control disorder which does not involve an intoxicant” and linked excessive internet use most closely to pathological gambling, a disorder of impulse control in Diagnostic and Statistical Manual of Mental Disorders [DSM-IV]. Young successively adapted the DSM-IV criteria to relate to internet use in the internet addiction test [IAT] developed by her.<sup>[5]</sup>

Internet addiction is a growing problem worldwide. Various research studies in the west and in Asia have suggested that the risk of internet addiction among youth is increasing. Internet being a highly promoted technological tool makes detection and diagnosis of addiction difficult. Despite internet addiction not being codified within a psychopathological framework, it is obvious that a potential for the problem exists.<sup>[6]</sup> Griffiths (2000) argued that internet addiction is a subset of a behavioural addiction and as such contains the core components of an addiction which include: a) Excessive use, often associated with a loss of sense of time or neglect of basic drives, b) Withdrawal, including feelings of anger, tension, and or depression when computer is inaccessible, c) Tolerance, including the need for better computer equipment, more software, or more hours of use, and d) Conflict and negative repercussions, including arguments, lying, poor achievement, social isolation, and fatigue.<sup>[7]</sup>

Numerous social problems, neurological complications, and psychological disturbances have been attributed to internet addiction disorder [IAD].<sup>[8]</sup> Researchers also believe that internet addiction often masks other problems such as depression, low self-esteem, emotional instability, social anxiety, and may even stand in a surrogate for other addictions.<sup>[9]</sup>

Stress may be defined as “Circumstance in a person’s life that causes tension or dysphoria”, which arises as a result of failure of a person to cope with a situation .It may refer to a subject and a predicate, an event and the consequence of the event. Stress has been attributed to be a cause of major psychopathology, a predictor or trigger of

psychiatric illness, and a contributor to considerable mental anguish. Medical education entails enormous pressure. Associated stress may lead to the unhealthy use of technology. Also, psychological and environmental factors in the lives of college students may leave them disproportionately vulnerable to Internet addiction.<sup>[10]</sup> Medical students may experience impairment in their quality of life and can succumb to stress associated anxiety, depression, and substance abuse, even contemplating suicide.<sup>[11]</sup> Yusoff et al reported that the prevalence and level of unfavorable stress and depression increased significantly during medical training in apparently healthy students.<sup>[12]</sup>

Social media is a sphere of the internet that has garnered maximum attention in recent years and drawn users to spend increased amounts of time. Social Networking sites [SNSs] are virtual communities where users can create individual public profiles, interact with real friends, and meet other people based on their shared interests.<sup>[13]</sup> The online disinhibition effect describes the loosening of social restrictions, inhibitions and tendency of many individuals to behave more offensively online than they would do in face to face interactions. It was first described by John Suler, a professor of psychology at Rider University in 2004. He described two main categories of behaviour under online disinhibition effect: a) Benign disinhibition which may be in the form of over disclosure of personal information online, in comparison to real life situations and b) Toxic disinhibition describing behaviour that includes rude language, threats, crime, pornography and violence. It includes places the person might not go to in real life.<sup>[14]</sup>

The DSM-5 Task Force and Workgroups in May 2012, proposed that internet use disorder, which refers primarily to maladaptive internet gaming behaviour, should be included Section III of the DSM-5 as the subject of further empirical inquiry to provide greater clarity to the clinical formulation of internet-related disorders.<sup>[15]</sup>

In a rapidly developing country like India, where youth account for the majority of the population, internet addiction threatens to develop into a major public health problem. Also, the paucity of large-scale studies and inconsistency in the use of diagnostic criteria has resulted in difficulties in establishing the prevalence of internet addiction. As a result, a study on prevalence of internet

addiction in young adults in an Indian setting and its relationship with their mental health was envisioned.

**Aim:** To study the prevalence of internet addiction and any associated stress among medical students

#### **Objectives**

1. To estimate the prevalence of Internet addiction among medical students
2. To identify any stress associated with internet addiction

**Materials and Methods :** The study was conducted at a private medical college in Tumakuru, from November 2016 to April 2018. A total of 377 students of both sexes, including undergraduate students, interns and postgraduate students fulfilling the inclusion criteria, participated in the study. Written Informed consent was taken for the study from the participants after explaining the nature of the study.

#### **Inclusion Criteria**

1. All medical students
2. History of internet use from past 6 months or more
3. Willing to give valid consent

#### **Exclusion Criteria**

1. Students suffering from any Primary (Major) psychiatric disorder

#### **Study Tools Used**

**Socio Demographic Proforma:** The questionnaire consisted of 15 items that included a number of demographic variables.

**Semi Structured Proforma:** The self-administered questionnaire compiled by the staff of Dept. of Psychiatry. It consisted of 15 questions pertaining to the internet usage with closed and open ended responses.

**Young's Internet Addiction Test (IAT):** It is a self-rated scale originally developed by Dr. Kimberly Young in 1998, for screening and measuring internet addiction. It has been extensively used worldwide. It contains 20 questions related to internet use, to be scored on a Likert scale from 1 (rarely) to 5 (always). A total score of < 30 represents average online users, 31-49 indicates mild internet addiction, 50-79 represents moderate addiction and 80-100 represents severe addiction. The Psychometric properties of young's internet addiction scale have been tested by Widyanto and McMurrin.<sup>[16]</sup> Its reliability in Indian population and college students has also been

established. The overall Cronbach's alpha computed from the studies was 0.889 [95% confidence interval].

**General Health Questionnaire 12 (GHQ-12):** The General Health Questionnaire (GHQ) was originally developed by Goldberg in 1972. The GHQ-12 is the shortest version and commonly used as a screening tool in various settings to determine whether an individual is at risk of developing a psychiatric disorder. It is used to identify the severity of psychological distress experienced by an individual within the past few weeks. It comprises of six items that are positive descriptions of mood states and six that are negative descriptions of mood states. GHQ scoring method was on a simple Likert scale ranging from 1 (Often) to 4 (Never).<sup>[17]</sup> It measures psychiatric morbidity in terms of stress. A score less than 13 signifies no stress, 13 to 20 represents mild stress, 21 to 30 represents moderate stress and a score greater than 30 represents severe stress.

**Sample Size:** The sample size for the study was estimated to be a minimum of 182. Data was collected from 377 medical students, representing different phases of medical course that fulfilled inclusion criteria.

**Recruitment Procedure:** This was a cross-sectional study. Medical students were enrolled for this study. A two stage sampling technique was adopted. All Medical students were stratified based on year of education into 1<sup>st</sup> Phase, 2<sup>nd</sup> Phase, 3<sup>rd</sup> Phase, Interns and Postgraduates. They were further stratified based on gender into Males and Females. The students from each stratified group were recruited into the study to make up a sample of 377.

The data was collected from small groups of students mainly at college and hospital to reduce non-response rate. This collection of data was done in a phased manner which was carried out over a period of many months. In each session, the participants were given liberal verbal explanations and description about the topic of research, the importance and aim of the study. Informed consent was obtained. They were guaranteed confidentiality. After collection of consent forms, the socio-demographic pro forma, the semi structured pro forma and the two scales were administered.

**Analysis:** Various variables obtained from the demographic and semi structured pro forma were analyzed and recorded. Using Young's Internet Addiction Test, the respondents were grouped into 4

categories of average users, mild addicts, moderate addicts, and severe addicts. Using General Health Questionnaire 12, the respondents were divided into four categories representing no stress, mild stress, moderate stress, and severe stress.

The data was analyzed using SPSS 20 software (IBM). Microsoft Excel and Microsoft word were used to generate graphs and tables. Continuous data was expressed in terms of Mean and Standard deviation. Proportions were compared using Chi Square test and mean values were compared using ANOVA and Student t-Test. Correlations between various variables and internet addiction scores were calculated using Spearman's Correlation Coefficient test. Logistic regression analysis was carried out to find the role of each significant risk factor in determining its role in internet addiction.

**Results:** Majority of the students in the distribution were in the age group of 17-20 years which accounted for 252 students. Males accounted for 198 students that were slightly more than 179 female students. Majority (76.9 %) belonged to Hindu religion. Mean age of the population was 20.36 (SD ± 3.23) years.

127 Students from Phase I MBBS represented the largest group in the population whereas 28 Postgraduate students accounted for the smallest group. Individual groups were comparable in their characteristics as no significant difference existed between groups.

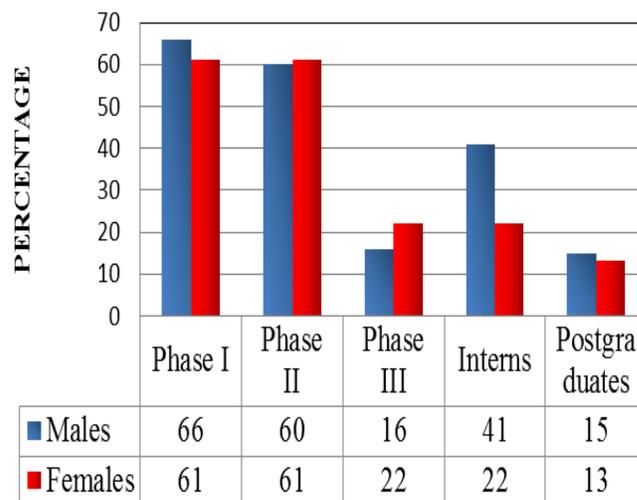
Majority of the students were residing in hostel (77.5%). Out of this 58.4 % were staying with a roommate and 19.1 % were staying alone. 9.5 % were staying with parents. 44.8 % fathers and 43 % mothers were educated up to graduate level and formed the major chunk, whereas 36.9 % of Fathers and 26.8% of the Mothers had received education up to postgraduate level.

Majority of the students (43.5%) fell into the category whose Father's income was between 5-10 Lakhs per annum. In 65.25 % of the students, a single parent was working. Majority belonged to nuclear families [74.2%].

Table 1: Distribution of Age Group by Gender

Age Group		SEX		Total	Chi-Square	P-Value
		Male	Female			
17-20	Count	129	123	252	3.452	0.327
21-23	Count	32	33	65		
24-27	Count	26	21	47		
>27	Count	11	2	13		
Total	Count	198	179	377		

\* The groups were comparable in their characteristics as there was no significant difference between the groups



The Graph describes the distribution of students based on the phase of medical course. Individual groups were comparable in their characteristics as no significant difference existed between groups

6.89 % of students had history of failures in previous terms. 3.44 % had a history of psychiatric disorder in the family and only one student reported history of prior psychiatric consultation for a stress related ailment.

The total prevalence of IA among students was 54.1 %. Males had higher prevalence [61%] compared to females [39%]. Also, majority of the students [67.15%] had mild internet addiction, 31.37 % had moderate addiction and only 1.47 % of the addicts fell in the severe addiction category. The findings were significant with a p value of 0.000. Among different phases, maximum prevalence was seen in Phase III medical students (78.9%) followed by Postgraduates (60.7%). The findings were significant with a p value of 0.006.

A total of 59.15 % students had some form of stress – 39.52 % had mild stress, 9.63 % had moderate stress and none had severe stress. Phase III students were found to have maximum amount of stress (78.9%) followed by Phase I students (66.9%). The findings were significant with a p value of 0.001. A total of 149 students had stress associated with internet addiction. 100 % of the students with severe addiction had moderate stress, 92.2 % of the students with moderate addiction had stress and 63.5 % of the students with mild Internet Addiction had mild or moderate stress. The findings were significant with a p value of < 0.0001.

Table 2: Prevalence of Internet Addiction

PHASE OF COURSE		Internet Addiction		
		Mild	Moderate	Severe
Phase I	Count	48	22	0
	%	37.8%	17.3%	0%
Phase II	Count	38	15	1
	%	31.4%	12.4%	0.82%
Phase III	Count	16	14	0
	%	42.1%	36.8%	0%
Interns	Count	25	8	0
	%	39.7%	12.7%	0%
Postgraduates	Count	10	5	2
	%	35.7%	17.9%	7.1%
Total	Count	137	64	3
	%	67.15%	31.37%	1.47%

Chi Square – 14.441, p-Value – 0.006

Table 3: Internet Addiction and Stress among Medical Students

Internet Addiction (IA)	Stress Level given by GHQ 12	Frequency	Cumulative Frequency	Significance (p Value)
Severe IA	Moderate Stress	3 (100 %)	3	< 0.0001
Moderate IA	Moderate Stress	25 (39 %)	28	
	Mild Stress	34 (53.1 %)	62	
Mild IA	Moderate Stress	26 (19 %)	88	
	Mild Stress	61 (44.5 %)	149	

Correlation between Young’s Internet addiction test scores with scores obtained by General Health Questionnaire (GHQ-12) was done using Spearman’s correlation coefficient. It was found that internet addiction showed significant correlation with stress levels given by GHQ 12 scores among medical students.

Logistic regression analysis predicting internet addiction showed that males are 2 times more likely to develop internet addiction compared to females. Also students whose father’s income is more than 10 lakhs are 1.9 times more likely to be addicted.

Table 4: Correlation between Young’s IAT And GHQ-12 Scores

		YOUNG'S IAT	GHQ -12
YOUNG'S IAT	Pearson Correlation	1	.428**
	Sig. (2-tailed)		.000
	Number	377	377
GHQ -12	Pearson Correlation	.428**	1
	Sig. (2-tailed)	.000	
	Number	377	377

\*\* Correlation is significant at the 0.01 level (2-tailed)

Table 5: Logistic Regression Analysis Predicting Internet Addiction

Characteristics	OR (95% CI)	P - Value
<b>Sex</b>		
Male	2.020 (1.296-3.150)**	0.002
Female	1.00	
<b>Father’s Income</b>		
5 - 10 Lakhs	1.214 (0.680-2.165)	0.512
> 10 Lakhs	1.872 (1.001-3.501)*	0.050
< 5 Lakhs	1.00	
Total Number	377	

**Discussion**

In this study an attempt was made to study and determine the prevalence of internet addiction among medical students belonging to different phases of medical course at a medical college in south India. The relationship of internet addiction with psychiatric morbidity in the form of stress was also studied.

The prevalence of internet addiction in the current study was 54.1% among medical students. The prevalence was comparable to that established by Bhushan Chaudhari et

al., (2015) in India where they found it to be 58.87 % (51.42 mild +7.45 % Moderate) <sup>[71]</sup> and in a study by Mashaei Naffise et al., in 2012 at Rafsanjan University in Iran where they found the prevalence to be 57.6 %. It was further divided in to 51.3 % mild addicts, 5.4% moderate, and 0.9% severe addicts. <sup>[18]</sup>

With regard to gender, both sexes were well represented in this study. Males constituted 52 % of the study population whereas females accounted for 48 % of the sample. The individual age groups also showed equal representation between males and females with a ratio close 1:1 with the exception of those aged more than 27 years, which had more males. Various studies by Chaudhari et al., <sup>[19]</sup>, Ghamari F et al., <sup>[20]</sup>, Malviya et al., <sup>[7]</sup>, Zalavadiya et al., <sup>[21]</sup> and Krishnamurthy et al., <sup>[22]</sup> suggested that males were more prone to be addicted to internet than females with some studies reporting a 3.5 fold risk. In the current study, 61 % of the males and 39 % of the females had internet addiction which was found to be significant with a p value of 0.002. Logistic regression analysis showed that males were 2 times more likely to get addicted to the internet as compared to females. The findings were in agreement with other studies reporting the same.

The prevalence of internet addiction was maximum among Phase III students (78.9 %) followed by postgraduates (60.7 %). Two of the three severe addicts were postgraduates. A possible reason for the same may be the fact that this phase represents the halfway mark of medical course where students have been exposed to clinical field and also have to cope with a sudden surge in the number of subjects studied.

The mean age of starting computer use was 11.52 (SD  $\pm$  3.574) years among students and mean age of starting internet was 13.97 (SD  $\pm$  3.382) years. Age of starting internet was significantly more in interns and postgraduates, which was significant with a p value of 0.000. It may be an indication of the greater penetrance of internet in youth over the years. Parental income was thought to be an important factor determining the prevalence of internet addiction among adolescents. The study by Ghamari F et al. in Iran reported significant association between internet addiction and father's occupation which in turn was representative of family income. <sup>[20]</sup> In the present study, majority of the students

fell into the category where father's income was between 5-10 lakhs per annum (43.5%). Students whose father's income was more than 10 lakhs showed higher prevalence of internet addiction (64.6%). Logistic regression analysis showed that these students were 1.9 times more likely to be addicted to the internet when compared to other groups. The findings showed significance with a p value of 0.040.

A total of 59.15 % of the students had stress on assessment of which 39.52 % had mild stress and 19.63 % had moderate stress. There were no students with severe stress reported in this study. The severity of internet addiction was correlated with the scores obtained on GHQ-12 signifying stress. It was found that a total of 149 Students (39.5 %) had comorbid internet addiction and psychiatric stress. All students with severe internet addiction had moderate stress (100%). 39 % of those with moderate IA had moderate stress and 53.1 % had mild stress. Among mild internet addicts, 19 % had associated moderate stress and 44.5 % had mild stress. The correlation was significant using Spearman's Correlation coefficient with p value of less than 0.0001 which demonstrated that Internet addiction among medical students was significantly associated with psychiatric comorbidity in the form of stress. It showed a linear correlation when plotted against each other on a scatter plot which signified that as the severity of internet addiction increased among students, so did the level of stress.

### Conclusion

Internet addiction is a rising problem around the world that is running parallel with the advancement of technology. The Twentieth century has created a form of digital divide with regard to internet wherein there is a void between parental knowledge and adolescent internet behaviours. Its exponential increase among medical students is also a growing concern. The prevalence of internet addiction among medical students was significantly higher than that in general population. Internet addiction was significantly associated with stress among medical students which displayed a bidirectional relationship.

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