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# A Cross Sectional Study Evaluating Internet Addiction and Depression Levels among Medical and Engineering Students of Bengaluru City

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## ABSTRACT

**Introduction:** The study was conducted to determine the prevalence of Internet addiction, to assess the levels of depression, anxiety and stress among medical and engineering students and to correlate the level of internet addiction with depression levels.

**Methods:** A cross sectional study was carried out among 200 first year undergraduate students, 100 each from medical and engineering colleges of Bengaluru city, selected by simple random sampling method. Data was collected by interpersonal interviews using a standardized 'Internet Addiction Test' questionnaire by Dr. Kimberly S. Young and 'Depression, Anxiety and Stress Scale (DASS)-21' questionnaire by Psychology foundation, UNSW, Australia.

**Results:** In total of 200 students, the mean age of participants was 18.85 ± 0.197 years. Males constituted 52% while females constituted 48% of study population. The prevalence of Internet addiction was 67%. Prevalence of Depression, Anxiety and Stress in the study population was 49.5%, 52.5% and 67.5% respectively because of internet addiction. Statistically significant association (p=0.0002) was found between internet addiction and depression levels; between depression and anxiety levels (p=0.00001); depression and stress levels (p=0.0002).

**Conclusion:** The present study highlights the vulnerability of professional college students to internet addiction. Internet addiction also seems to be associated with increasing prevalence of depression, anxiety and stress.

**Keywords:** Internet Addiction, Young's scale, Depression, Anxiety, Stress

## INTRODUCTON

The internet aptly called information superhighway is widely used throughout the world. India is the third largest country globally after China and United States with respect to number of internet users.

The technological development has introduced wide number of online access systems like wi-fi and broadband which have resulted in an epidemic of youth spending hours and hours in front of electronic gadgets anywhere in the world.[1]

Even though good internet connectivity has provided widescale opportunities for collecting information and social interaction easily, excessive undisciplined use by some individuals has led to the emergence of internet addiction.[2-4] The population of India is around 1.2 billion as of 2012, of which Internet users are around 205 million. It is estimated to increase to 243 million by June 2014, and India will be following China which currently has the highest Internet user base of 300 million.[5]

Medical and Engineering students are a particularly vulnerable group, considering that technology is incorporated into their education and they often have easy access to the internet at their respective campus. Some students face internet addiction symptoms related to time and behavior management.[6] Internet addiction is associated with significant psychiatric disorders such as alcohol abuse, attention deficit and hyperactivity, depression, and anxiety.[7] The Stress levels with the curriculum of the professional courses also contribute to students getting prone to depression and hence getting addicted to internet. Hence, assessment of stress levels, leading to anxiety, depression and subsequent addiction or suicidal tendencies is needed.

Various studies around the globe have emphasized that students studying in medical and dental courses experience higher stress.[8,9,10]

There is paucity of evidence-based research in the field of internet addiction and its increasing association with depression particularly among professional college students. This study aimed to explore the level of internet addiction and its association with depression among college students in medical and engineering courses and to increase the understanding of relationships between internet addiction and depression, anxiety and stress.

## METHODS

A cross sectional study was carried out among first year medical (MBBS) and engineering students studying in professional medical and engineering college respectively in Bengaluru. Data collection started after getting ethical clearance from Institutional Ethics committee. A total number of 200 first year medical students were included in the study by simple random sampling method, with 100 selected randomly from each of medical and engineering college. Students who gave informed consent were included in the study. Participants were assured that the information given by them would be anonymous and confidential to avoid reporting bias.

**Sample size:** Taking internet addiction as 50% among students of professional courses using the formula

$N = \frac{Z^2 P (1-P)}{D^2}$ where Z=1.96, P=50%, 1-P=50% and d= relative error of 15% of P=7.5. The calculated sample size comes out to be 177. Considering 10% non-response rate, the sample size was 1 which was rounded to 200 students. 100 medical students and 100 engineering students were selected for the study.

A semi-structured, pretested questionnaire was developed and administered to the medical and engineering students. The questionnaire consisted of sociodemographic details, Young's internet addiction scale was used to assess the degree of internet addiction [11] and level of depression was assessed by DASS 21 scale.[12]

**Young's scale of internet addiction**

Young's Internet Addiction Test (IAT) is a widely used 20- item instrument that has demonstrated good reliability, to screen for Internet addiction. Young Scale consists of 20 questionnaires and it is assessed based on the following grading: 0 = Never 1 = Rarely 2 = Occasionally 3 = Frequently 4 = Often 5 = Always. 1) 20-49 points: Average online user, may surf the web a too bit long at times, but have control over the usage. 2) 50-79 points: Experiencing occasional or frequent problems because of internet impact on life. 3) 80-100 points: The internet usage is causing significant problems in life, should evaluate the impact on the internet on your life and address the problems directly caused by your internet usage.

**DASS (Depression, anxiety and stress scale) 21**

This score consists of 21 questions, involving questions on depression, anxiety and stress factors. The individual scores are given to the questions in the scale and later graded into,

| Grades | Depression | Anxiety | Stress |
|---|---|---|---|
| Normal | 0-4 | 0-3 | 0-7 |
| Mild | 5-6 | 4-5 | 8-9 |
| Moderate | 7-10 | 6-7 | 10-12 |
| Severe | 11-13 | 8-9 | 13-16 |
| Extremely Severe | 14+ | 10+ | 17+ |

The required modifications were made to the questionnaire before the start of the study. Students having access to internet by any source and students giving informed consent fulfilling inclusion criteria were included and students not willing to participate in the study were excluded. The study period was between April to August 2017.

**Statistical analysis:** Data was entered in MS excel, analyzed using SPSS version 24. Descriptive statistics (percentage, mean, standard deviation, range) were used to summarize baseline characteristics of the study subjects. Sociodemographic variables have been denoted by frequency tables. The prevalence of Internet addiction was described in terms of percentage. An association between two categorical variables was analyzed using Pearson's Chi-square test and p value < 0.05 was considered as statistically significant. Correlation between internet addiction and depression, anxiety and stress levels were also assessed using one-way ANOVA and by Regression analysis.

## OBSERVATION

The mean age of participants among the study population of 200 students was found to be 18.85 ± 0.917 (Mean ± Standard deviation) years. Majority (96.5%) of study population belongs to upper class (class-I) according to revised B.G. Prasad classification (2016). Significant association was not found between male gender and presence of internet addiction (p=0.130) using Chi Square test. The socio-demographic and socio-economic details have been described in Table-1.

**Table 1: Socio-demographic data of study population and association between gender and internet addiction**

| Variables (N-200) | Frequency (%) |
|---|---|
| **Sex*** | |
| Male | 116 (58) |
| Female | 84 (42) |
| **Religion** | |
| Hindu | 177 (88.5) |
| Muslim | 20 (10) |
| Christian | 3 (1.5) |
| **Socio-economic Status†** | |
| Upper class | 193 (96.5) |
| Upper Middle class | 02 (1) |
| Middle class | 02 (1) |
| Lower Middle class | 0 (0) |
| Lower class | 03 (1.5) |
| **Mean Age (years) ± SD** | 18.85 ± 0.917 |

* Chi-square test to test association between Gender and Internet Addiction P value 0.130

† According to Revised BG Prasad Socio-economic classification (2016)

In our study,66 students (33%) were normal users with no kind of addiction and remaining 67% of students were found to have internet addiction as per Young's scale as depicted in table 2. 57.5% (115) students were found to be average online user who surfed the web for lengthy hours. (Table 2)

Prevalence of Depression in the study population was found to be 49.5% (99) as per DASS scale. The association between presence of depression and internet addiction was found to be significant statistically ( p value of 0.0002). 52.5% (105) of study population were having anxiety problems because of internet addiction. However, this association between anxiety and internet addiction was statistically not significant. 67.5% (135) of study population were suffering from different grades of stress because of internet addiction. This association was not significant statistically (Table 3).

The sample of students suffering from depression as per DASS 21 scale were regrouped into two groups as 'Depressed' and 'Non-depressed' and the sample having internet addiction as per Young's scale was regrouped into two groups as 'Internet addicts' and 'Internet non-addicts'. Association was then tested between these two variables, i.e., depression and internet addiction by using Pearson's chi-square test by formulating two by two tables. The association was found to be statistically significant with $p < 0.05$, depicted in Table- 4.

A one-way ANOVA was run to compare the different levels of internet addiction separately with Depression, Stress and Anxiety. From the results it was found that among addicted students, moderately addicted group showed higher levels of depression, anxiety and stress compared to mildly addicted group.

**Table 2: Level of internet addiction**

| YOUNGS SCALE | Freq (%) |
|---|---|
| Average Online User | 115 (57.5) |
| Experiencing occasional or frequent problems because of internet impact on life. | 18 (09) |
| Internet usage is causing significant problems in life | 1 (1.5) |
| **Total*** | 100 (100) |

*66 students (33%) were normal users with no kind of addiction, whose values were found missing during analysis as total scoring was less than 20

**Table 3: Association of Depression, Anxiety and Stress with internet addiction**

| Variable & Grades | Frequency (n=200) (%) | Chi-square | P value |
|---|---|---|---|
| **Depression** | | | |
| Normal | 101 (50.5) | 13.131 | 0.0002* |
| Mild | 24 (12) | | |
| Moderate | 27 (13.5) | | |
| Severe | 17 (8.5) | | |
| Extremely severe | 31 (15.5) | | |
| **Anxiety** | | | |
| Normal | 95 (47.5) | 0.651 | 0.420* |
| Mild | 36 (18) | | |
| Moderate | 26 (13) | | |
| Severe | 20 (10) | | |
| Extremely severe | 23 (11.5) | | |
| **Stress** | | | |
| Normal | 65 (32.5) | 0.214 | 0.214* |
| Mild | 27 (13.5) | | |
| Moderate | 18 (9) | | |
| Severe | 23 (11.5) | | |
| Extremely severe | 67 (33.5) | | |

*Chi-square test to test association between the variables (Depression, Anxiety, Stress) and Internet Addiction

**Table 4: Association between internet addiction and depression**

| | Non-Depressed (%) | Depressed (%) |
|---|---|---|
| **Internet non-addicts** | 28 (20.7) | 107 (79.3) |
| **Internet Addicts** | 22 (33.8) | 43 (66.2) |

Pearson's Chi-square value 4.019; p- value 0.045

**Table 5: Correlation of Depression, Anxiety and Stress with internet addiction**

| Level of internet addiction | No Addiction | Mild | Moderate | Severe | p value (ANOVA) |
|---|---|---|---|---|---|
| Depression | 3.13±3.82 | 7±8.18 | 14.14±11.24 | 6 | <0.001 |
| Stress | 16.58±14.4 | 7.96±7.004 | 17.86±10.06 | 32 | <0.001 |
| Anxiety | 4.31±3.79 | 3.88±4.702 | 6.57±8.95 | 18 | <0.001 |

**Table 6: Association of Depression and Anxiety with internet addiction using multiple regressions**

| Variable | B | Standard Error | Regression Coefficient | p value | 95% Confidence Interval |
|---|---|---|---|---|---|
| Depression | 1.333 | 0.211 | 0.443 | <0.001 | (0.917, 1.750) |
| Anxiety | 0.899 | 0.450 | 0.210 | 0.047 | (0.11,1.78) |

ANOVA test also showed statistically significant difference between the levels of internet addiction depression [F (3,196) =17.47 p<0.001))], Stress (F (3,196) =6.53 (p<0.001)) and anxiety (F (3,196) =4.27 (p<0.001)] respectively. (Table-5)

A multiple regression was used to predict the internet addiction from Depression, Stress and Anxiety scores. The multiple regression model with all three predictors produced $R^2 = 0.282$, F (3,196) = 27.017, $p < 0.001$. Among all the three variables, only depression and anxiety added statistically significantly to the prediction, $p<0.05$.

Between Depression and Anxiety, Depression (p value<0.001) was having more predictive value for internet addiction as compared to anxiety (p value=0.047) (Table 6).

## DISCUSSION

Among the study population of 200 students, the mean age of the participants was 18.85 ± 0.197 years. Males constituted 52% of study population while females constituted 48% of the study population.

Our study showed that the prevalence of Internet addiction was 67%. 66 students (33%) were normal users with no kind of addiction. Amongst this 67% students, 57.5% (115) were found to be average online user who surfed the web for lengthy hours. The proportion of students who experienced occasional or frequent problems because of internet impact on life were found to be around 9% (18). Only 1.5% (1) of study population were facing significant problems in life because of internet usage.

Study by Kishore et al among college going students in Nanded city assessed internet addiction by using Young's scale and found that mild internet addiction was seen among 90 (31.36 %) of study subjects and moderate internet addiction was in 99 (34.49%). None of study subject was having severe addiction.[13]

Study in Jabalpur, Madhya Pradesh the internet addiction test scoring revealed 57.3% as normal users, 35.0% as mildly addicted to the Internet, 7.4% as moderately addicted, and 0.3% as severely addicted. Internet addiction is a growing problem among the students of professional courses.[14]

Prevalence of Depression in the study population was 49.5% (99) as per DASS scale. Amongst the depressed population, 15.5% (31) were facing extremely severe depression followed by 13.5% (27) with moderate depression, 12% (24) with mild depression and 8.5% (17) with severe depression. The association between presence of depression and internet addiction was significant statistically with p value of 0.0002. Study by Vaidya et al found the prevalence of depression as 39.44%

Apart from depression, 52.5% and 67.5% of our study population were having anxiety and stress problems respectively because of internet addiction.

A study by Meena et al among medical students in Ajmer calculated YIAS (Young's Internet Addiction Scoring) scores and found that 42.1% participants were average users, 54.8% were over users, and 3% met YAIS criteria for addiction (YAIS scores 80-100). Analysis of the DASS-21 indicated that 26.9% of participants met criteria for mild depression while 21.8% and 8.1% had moderate and severe depression respectively.[15]

Study by Vaidya et al found the prevalence of depression as 39.44%25. Incident of anxiety was found to be 66.05% and that of stress was 51.37%.[16] Study conducted by Iqbal et al at IMS, Odisha among medical students revealed 17.5% students had severe or extremely severe depression. This percentage was 33.4% for anxiety and 13.1% for stress.[17]

Presence of depression is found to be significantly associated with internet addiction (p=0.0002). Students facing depression were also having anxiety and it was statistically significant (p=0.00001). Students with depression were also suffering from different grades of stress and this association was also found to be significant (p=0.0002). Significance was established as per Chi-square test and one -way ANOVA.

## CONCLUSION

The present study highlights the vulnerability of professional college students to internet addiction. Internet addiction seems to be associated with increasing prevalence of depression, anxiety and stress, which could be an underlying predisposing factor for internet addiction. Thus, both problems should be assessed simultaneously, and appropriate screening and comprehensive preventive measures need to be framed.

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