Original Article

Prevalence Of Internet Addiction And Its Association With Depression, Anxiety And Stress In Medical Students During The Covid-19 Pandemic

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Abstract

Introduction: The use of the internet has become an integral part of everyday life in these modern times of digitalization, especially the lives of adolescents. At the same time, excessive use of the internet has emerged as a significant affliction. However, the impact of Internet addiction has not been well studied in India on these crucial years of life. The objective of this study was to evaluate the prevalence of internet addiction and its association with depression, anxiety and stress among medical students during the COVID -19 pandemic.
Methodology: A cross-sectional study was conducted among medical students of Saveetha Medical College, Chennai during the covid-19 pandemic. A pretested, predesigned questionnaire, Young's Internet Addiction Scale, and Depression Anxiety Stress Scale (DASS21) are used in the study. Chi-square test, Fisher's exact test were used to assess the association between internet addiction and depression, anxiety and stress.
Results: A very high prevalence (72.04%) of internet addiction was observed among the respondents. The primary purposes of using the internet were entertainment (21.30%) and social media (20.80%) followed by academics (18.07%), and a majority (40.13%) reported spending 3-5 hours a day followed by more than 5 hours a day (38.49%). There was a significant association between Internet addiction and depression (odds ratio =8), anxiety (odds ratio=8) and stress (odds ratio=7).
Conclusion: Internet addiction is a serious issue with huge impacts on mental health. Early intervention therefore is crucial.

Keywords: Anxiety, depression, Depression Anxiety Stress Scales 21, Internet addiction, stress, Young's Internet scale, covid-19.

INTRODUCTION

The internet has become an essential and irreplaceable part of our everyday life. The internet has not only become an omnipresent force, it has also practically become an indispensable modern resource for shopping, learning, researching, connecting and keeping in contact with family members and friends through various applications ranging from Wikipedia to Facebook. With the rapid advances made in wireless Internet technology such as Wi-Fi, 3 G and 4 G, and the introduction of low-cost 3 G and 4G-enabled smartphones, the internet has become readily available to individuals across all socioeconomic groups. This has led to the rise of a relatively recent and alarming phenomenon called "Internet Addiction," which is negatively affecting teenagers and young adults more

and more. Excessive internet use is defined as when internet use has become excessive, uncontrolled, and time-consuming to the point of timelessness and severely disrupting people's lives [1]. The terms "problematic internet use" [2], pathological internet use [3-5] and "internet addiction" [6-8] are usually considered synonyms of internet dependence [9]. Due to the sudden onset of COVID-19, the mental health of the people was primarily affected.
Internet Addiction prevalence may vary according to age, sex and ethnicity, and it prevails more commonly among college students [10].
A high rate of personality disorders is found in individuals with Internet Addiction [11-14].
Our hypothesis was that Internet Addiction could be a major concern among university medical students especially during this lockdown period and that it is vital to examine its association with depression, anxiety and stress so that appropriate steps can be taken to address this issue.
The effects of this addiction will impede their studies and affect their long-term career goals for medical students who want to grow as health professionals and can have wide-ranging and negative consequences for society as a whole.
The objective of this study was to evaluate the prevalence of internet addiction, and its association with depression, anxiety and stress among medical students during the covid -19 pandemic.

MATERIALS AND METHODS

Study design, setting and sampling

A cross-sectional (online questionnaire-based) study was conducted among the undergraduate medical students belonging to the age groups from 18 to 25 years studying in a Tertiary care Medical College and Hospital in Chennai from April to August 2020.

Data collection and study procedure

The questionnaire contained 4 parts, the demographic details, details regarding internet use, the internet addiction questionnaire and DASS-21 questionnaire. The 1st part assessed demographic information including age, gender, year of study, place of residence, residential background, marital status and family status. The 2nd part collected details regarding internet usage like time spent on the internet daily, the usual purpose of using the internet, and money spent on internet recharge.
The Young's internet addiction questionnaire includes twenty Likert scale questions ("does not apply" to "always"), which produced an overall score between 0 and 100 each of which measures internet addiction at 0 to 6 points scale. Total scores that range from 0 to 30 points are considered to reflect an average level of Internet usage; scores of 31 to 49 indicate the presence of a mild level of Internet addiction; 50 to 79 reflect the presence of a moderate level, and scores of 80 to 100 indicate a severe dependence upon the internet.
The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) contains a set of three scales designed to measure the emotional states of depression, anxiety and stress. Each of the three DASS-21 scales contains seven items, divided into subscales with similar content.
The rating scale consisted of 4 options 0,1,2 and 3, with 0 being "did not apply to me at all "and 3 being "applied to me very much or most of the time ".The participants had to choose one of the options based on which applied to them over the past 1 week.
Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items. Scores on the DASS-21 need to be multiplied by 2 to calculate the final score. For depression, a score of 0-9 was normal,10-13 mild,14-20 moderate, 21-27 severe, and 28+ was extremely severe. For anxiety, a score of 0-7 was normal,8-9 mild,10-14 moderate,15-19 severe, and 20+ was extremely severe. For stress, a score of 0-14 was normal,15-18 mild,19-25 moderate,26-33 severe and 34+ extremely severe.

Selection and Description of Participants

The inclusion criteria for the study were students having internet facilities and willingness to participate. Exclusion criteria was not having internet facilities or lack of consent. The students and interns who were willing to participate and who gave consent were included in the study, and those who were not willing to participate were excluded. Batches were selected randomly by lottery method from each year, and interns were selected by convenient sampling. A total of 304 responses were collected for this study.

Statistical Analysis

Frequencies and percentages were calculated and, chi-square test and Likelihood ratio were used to find association ($p < 0.05$ considered significant).

Ethical considerations

Ethical clearance was taken from the Institutional Ethical Committee of Saveetha medical college and hospital before starting the study.

RESULTS

A total of 304 students were approached to participate in the study with consent. Our study population comprised of 174 (57.24%) male and 130 (42.76%) female students. Age ranged between 17 and 25 years with a mean of 20.52 ± 1.25 years. The overall prevalence of Internet addiction was 72.04%. An analysis of the various grades of mild, moderate, and severe addiction showed that 32.24% of the respondents had mild, 34.21% had moderate, and 5.59% had severe addiction. [Table 1]

Table 1: Shows Baseline Characteristics of the respondents, and prevalence of Internet addiction by these characteristics (n=304)

Characteristic		Level of Internet addiction			
		No addiction	Mild addiction	Moderate addiction	Severe addiction
		N (%)	N (%)	N (%)	N (%)
Gender	Male	46(54.12)	58(59.18)	60(57.69)	10(58.82)
	Female	39(45.88)	40(40.82)	44(42.31)	7(41.18)
Year of Study	First Year	7(8.24)	13(13.27)	16(15.38)	0(0)
	Second Year	17(20)	19(19.39)	15(14.42)	2(11.76)
	Third Year	48(56.47)	51(52.04)	37(35.58)	2(11.76)
	Fourth Year	10(11.76)	13(13.27)	27(25.96)	3(17.65)
	CRRI	3(3.53)	2(2.04)	9(8.65)	10(58.82)

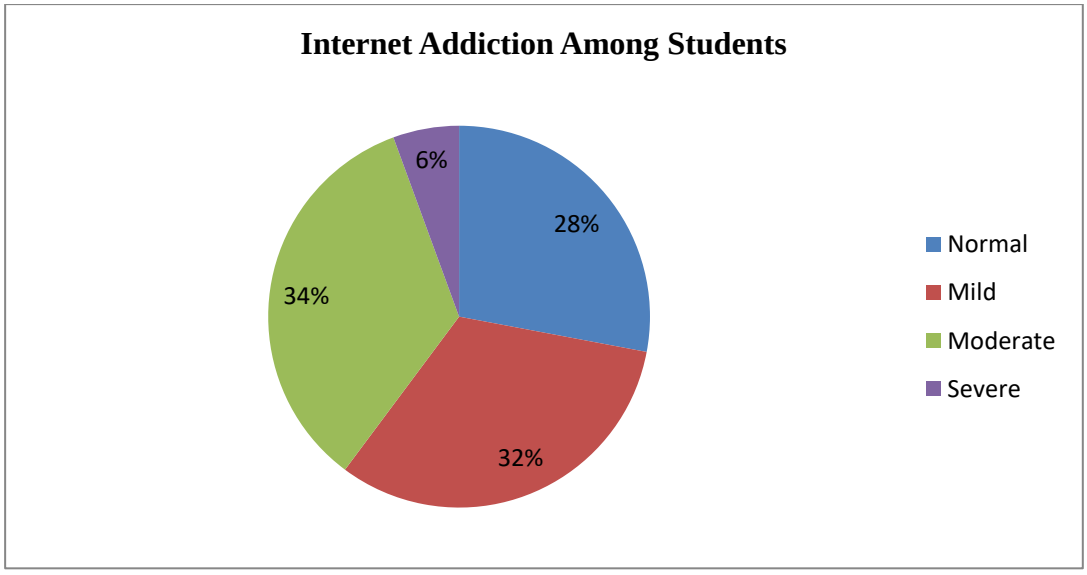

Figure 1: Shows internet addiction among students

The main purposes of using the internet were entertainment (21.30%) and social media (20.80%) followed by academics (18.07%), and a majority (40.13%) reported spending 3-5 hours a day followed by more than 5 hours a day (38.49%).[Table 2]

Table 2: Purpose of internet use and time spent on internet

PURPOSE OF INERNET USE	**%**
Academics	18.07%
Entertainment	21.30%
Shopping	14.46%
Social media	20.80%
Online games	15.48%
Porn	9.80%
Hours spent on internet	**%**
<1 HOUR	1.97%
1 TO 3 HOURS	19.41%
3 TO 5 HOURS	40.13%
>5 HOURS	38.49%

According to DASS21 score calculation, extremely severe depression, anxiety, and stress were observed among 26 (8.55%), 51 (16.78%) and 9 (2.96%) medical students respectively and also a majority of the respondents i.e. 140(46.05%), 155(50.99%),160(52.63%) were observed to be normal over the depression, anxiety and stress respectively.[Table 3]

Table 3: Depression, anxiety and stress levels of the respondents according to DASS21 scores.

Categories	**Depression N**	**Depression N %**	**Anxiety**	**Anxiety N%**	**Stress**	**Stress N%**
Normal	140	46.05	155	50.99	160	52.63
Mild	23	7.57	18	5.92	76	25.00
Moderate	82	26.97	58	19.08	30	9.87
Severe	33	10.86	22	7.24	29	9.54
Extremely Severe	26	8.55	51	16.78	9	2.96

Those having internet addiction are found to be more depressed (odds ratio=8), stressed (odds ratio=8) and anxious (odds ratio=7), as compared to those who are not having internet addiction. There was a significant association between Internet addiction and depression, anxiety, and stress ($P < 0.0001$). There was a high prevalence of depression (89.6%), anxiety (90.6%) and stress (90.2%) in the participants those who were addicted to the internet.[Table 4]

Table 4: Association between Internet addiction and depression, anxiety and stress (*n*=304)

Internet Addiction	**Depression**			**Anxiety**			**Stress**		
	Present N	Absent N	Odds Ratio	Present N	Absent N	Odds Ratio	Present N	Absent N	Odds Ratio
Present	147	17	8	135	14	8	130	14	7
Absent	72	68		84	71		89	71	

There was a statistically significant uphill correlation between depression (correlation coefficient .601 and p <.001) and internet addiction and a milder uphill correlation between stress and internet addiction (correlation

coefficient .563, p < .001) and an even milder uphill correlation between anxiety and internet addiction (correlation coefficient .463, p < .001). [Table 5]

Table 5: Correlation between internet addiction and depression, anxiety, and stress.

Internet Addiction	Depression	Anxiety	Stress
Correlation Coefficients	0.601	0.463	0.563
p value	<0.001	<0.001	<0.001

DISCUSSION

In this study, we tried to evaluate the prevalence of internet addiction and its various correlations among the undergraduate medical students studying in a Tertiary care Medical College and Hospital in Chennai and to find the association between this addiction to the internet and depression, anxiety, and stress. The high prevalence of Internet addiction (72.04%) in the present study requires in-depth qualitative research. However, there is no clear-cut definition of Internet addiction. In a study conducted in Lucknow (Piyush Upadhyay *et al*., 2017), 74.5% were found to be potential addicts [15]. A result which is consistent with the results of our study.

Our study revealed that the prevalence of internet addiction was not significantly related to gender i.e: males (73.56%), females (70%) which was in contrast with other studies conducted by Mazalin and Moore 2004[16], Chen and Fu 2009,[17] and Hasanzadeh *et al*. 2012[18] on a teenage population on the association between gender and Internet addiction, where male Internet addiction was found to be significantly higher.

In our study, most students used the Internet 3–5 h/day (40.1%). A relatively slightly lesser number of students used the internet for >5 h/day (38.5%). This is in contrast to a study conducted by Mutalik *et al*. 2018[19] and by Sharma *et al*. 2014[20] in which the average hours of Internet use per day was found to be less than 3 h. The reason for this difference could be that our study was conducted during covid 19 lockdown period that allowed the students relatively high spare time for Internet use.

The predominant use of the internet by the respondents was for social networking and entertainment followed by study(academics). This is similar to the findings reported by Scimeca *et al*.[21]

The significant difference in the prevalence of Internet Addiction and its relationship with depression, anxiety, and stress were observed in the study. That may be due to Internet Addiction not being consistent in all time. The internet is getting cheaper, more accessible and more resources provided as time goes by. A study done on college students in India revealed a positive correlation between Internet Addiction and depression, anxiety, and stress[22] which is in accord with our study findings.

Numerous studies have found a significant association between internet addiction and such psychological morbidities as depression, stress, intention to commit suicide, aggression and antisocial behaviours.[23-26] These studies support our findings of a significant association between depression, stress, anxiety and Internet addiction (P < 0.0001). Given the study's cross-sectional nature, the cause and effect relationship between internet addiction and depression, stress, and anxiety could not be determined.

CONCLUSION

With the exponential growth of Internet users worldwide, especially during the lockdown period, Internet addiction, in particular among teenagers and young adults, has seen a substantial rise. The scene in India in general and Tamil Nadu, in particular, is no different. With the internet's rapid penetration into all corners of the country, dependency on it has increased for various purposes ranging from social media, data gathering to news. People also enter the narrow paths of the virtual world to either avoid depression or to obtain recognition from friends and peers. Our study has shown a significant association between Internet addiction and depression, anxiety, and stress. And also there is a significant association between internet addiction and COVID-19. COVID 19 is the reason for lockdown, social distancing and social isolation so that it can be presumed to increase internet use. Thus COVID-19 tends to affect the mental health, causing depression, anxiety and stress. Frequently there is a revolving loop of depression that leads to internet addiction that causes more depression. The significant association between Internet addiction and depression, anxiety, stress that supports the idea that Internet addiction should be included in the next version of DSM is found in our study as well as in most of the earlier ones. To explore the gravity of the situation, we need more studies with greater sample size. The need now is to identify

and resolve Internet addiction as a real problem, before it escalates to alarming proportions. A holistic or comprehensive approach is needed to restrict the use of the internet by adolescents by engaging and informing parents, teachers, and policymakers about the adverse effects of Internet addiction.

Ethical clearance- Ethical clearance was taken from the Institutional Ethical Committee of Saveetha medical college and hospital before starting the study.

Source of funding- Individual

Conflict of interest- Nil

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