"A Cross Sectional Study on Prevalence of Internet Addiction and Relation with Psychopathology in Undergraduate Medical Students"

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Abstract
Background: Internet has become an essential part of our daily life. Besides using internet for information, education, and training for diagnosis, as well as patient management among healthcare students ,they are a vulnerable group on account of the time they spend on the internet. The excessive undisciplined use by individuals has led to the emergence of internet addiction.
Objective: To study the prevalence of internet addiction and the usage pattern among undergraduate medical students and also to assess its association with depression, anxiety, and stress.
Material and Methods: A cross-sectional study was conducted among undergraduate medical students in GEMS Medical college , Srikakulam , Andhra pradesh ,India. A total of 172 students were included in the study. They were assessed by semi -structure proforma, Young's Internet Addiction Scale, and Depression Anxiety Stress Scales 21 (DASS21). Descrpitive statistics and Fisher's exact test to assess the association were used.
Results: Majority (59.8%) of the respondents were females .The prevalence of internet addiction was 36.6% mild, 18% moderate, while 45.3% students reported normal internet usage. Severe internet addiction was not reported . The main purpose of using the Internet was social networking (25.5%) followed by entertainment (20.34%).There was a significant association between Internet addiction and stress (odds ratio=9.5), anxiety (odds ratio=8.12) and depression (odds ratio=6.1).
Conclusion :Internet addiction is a serious problem with a profound impact on mental health.
The benefits of internet must not be lagging behind the unhealthy use of internet and its addiction .So vigilance on students and awareness creation among students about demerits of internet addiction are essential.
Key words: Internet Addiction, Young's scale, Depression, Anxiety, Stress

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I.   Introduction

One of the important features of modern society is the increased effect of online communication tools, especially the internet, on people. The Internet is a worldwide system of interconnected computer networks which has gone through various fast technological improvements since its inception in early 1960s, and today it provides a variety of services. The number of internet service provider is also increasing and people can access the internet through computers, mobile, laptop, tablets, smart televisions and other types of emerging gadgets. The number of Internet users in India stood at 481 million in December 2017 and is expected to reach 500 million by June 2018, 730 million by 2020 (Internet and Mobile Association of India, IAMAI)[1] 829 million in year 2021(CISCO)[2].There has been an explosive growth in the use of internet not only in India but also worldwide in the last decade. The internet is used by some to facilitate research, to seek information, for interpersonal communication, and for business transactions. On the other hand, it can be used by some to indulge in pornography, excessive gaming, chatting for long hours, and even gambling. There have been growing concerns worldwide for what has been labeled as "internet addiction."[3]

Internet addiction is one of the important social problems arising out of excessive internet use . The term "internet addiction "was proposed by Dr. Ivan Goldberg in 1995 for pathological compulsive internet use.[4] . Griffith considered it a subset of behavior addiction and any behavior that meets the 6 "core components" of addiction, i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse.[5] . Internet addiction commonly refers to an individual's inability to control his or her use of the internet (including any online related, compulsive behavior), which eventually causes one's marked distress and functional impairment in daily life [6] The prevalence of internet addiction varies from 1.5% to 25% in different populations.[7-10] Research suggests that problematic internet use (PIU) is associated with decline in the size of social circle, depression

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loneliness, lower self-esteem and life satisfaction, sensation seeking, poor mental health, and low family function.[11-16]

PIU is also associated with anxiety and stress.[17] It has been found that paranoid ideation, hostility, anxiety, depression, interpersonal sensitivity, and obsessive compulsive average scores are higher in people with high internet addiction scores than those without internet addiction.[18.19] Internet addiction is associated with significant psychiatric disorders such as alcohol abuse , attention deficit and hyperactivity, depression, and anxiety.[20] In fact, younger internet users were more at risk of becoming internet addicts than older users. Psychological and environmental factors in the lives of college students may leave them disproportionately vulnerable to Internet addiction.[21,22] .Various studies around the globe have emphasized that students studying in medical and dental courses experience higher stress.[23,24,25] .The Stress levels with the curriculum of the professional courses also contribute to students getting prone to depression and hence getting addicted to internet.

In India, use of internet is enormous, especially in the young population. Hence, it was found necessary to study internet addiction among young adults in health care system with an attempt to measure the prevalence of internet addiction among undergraduate medical students and its relationship with mental health ,so that preventive and therapeutic interventions can be recommended.

II. Review of literature:

Cynthia Subhaprada S. et al ,2017 study among medical students showed that, 62.2% were males and 37.8% were females were participated. Males were more addicted to internet than females. The prevalence of internet addiction among the study subjects in the present study was 52.63% mild, 24.21% moderate, while 23.16% students reported normal internet usage.[26]

Santanu Ghosh   et al 2018 study among undergraduate medical students showed two participants were found to have severe internet addiction whereas 54.2% had mild to moderate addiction. Factors such as male gender, average duration of internet use per day and amount of money spent by them for internet use were found to be significantly associated with internet addiction.[27]

Deepak Goel et al 2019 showed (68.9%) were female and 306 (31.1%) were males.

Of the total, about 74.5% were moderate (average) users. Using Young's original criteria, 0.7% were found to be addicts. Those with excessive use internet had high scores on anxiety, depression.[3]

Sachin R Gedam,et al 2019   showed the total prevalence of internet addiction was 19.85%, with moderate and severe addiction being 19.5% and 0.4%, respectively. Internet addiction was associated with gender, computer ownership, preferred time of internet use, login status, and mode of internet access ($P < 0.05$). It was also associated with anxiety, depression, loss of emotional/behavioral control, emotional ties, life satisfaction, psychological distress, and lower psychological well-being ($P < 0.05$)

III. Materials And Methodology

The cross-sectional study was carried out among MBBS undergraduate students in GEMS Medical College, Srikakulam , Andhra Pradesh. Ethical committee clearance was obtained from the institution. The study period was from September 2019 to January, 2020. Only the students of 3rd semester,7th semester batches of the college were selected as the study population ,others were not included due to their upcoming examinations and also restricted use of mobile.

Inclusion criteria
- MBBS Undergraduate Medical students
- History of using internet for the past 6 months or more.
- Willing to give consent

Exclusion criteria
- Not using internet or a history of using internet for less than a 6months
- Not willing to give valid consent.

The tools used in the study were as follows:
1. A semi-structured proforma that included details of age ,gender ,educational qualification, usual login status, time of internet use, and reasons for internet use. Data were collected from those using internet for at least 6 months.
2. The Internet Addiction Test (IAT): It is the first validated and reliable measure of addictive use of the Internet. Developed by Dr. Kimberly Young, the IAT is a 20-item 5-point Likert scale that measures the severity of self-reported compulsive use of the internet. Cronbach's alpha computed for this questionnaire was 0.889 by Frangos. The marking for this questionnaire

ranges from 20–100; the higher the marks are, the greater the dependence on the internet is. It is evaluated as
0-19: no addiction
20-49:mild internet users
50-79: moderate addicts
80-100: severe addicts

3. Depression, anxiety, and stress scale (DASS-21). It is a 21-item scale with 7 items each to screen for depression, anxiety, and stress. The response to each question varies from "Did not apply to me at all" to "Applied to me very much, or most of the time" and the scores derived from each category are multiplied by two to arrive at the final scores. All these mental health variables, namely, depression, anxiety and stress are classified into normal, mild, moderate, severe, and very severe categories based on their score cutoffs.

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+

A total of 178 students were identified after excluding those 26 students who were not participated . Consent was taken from the students. The questionnaire was explained to the participants. Each of the participants was handed over a copy of the self administered questionnaires and given adequate time to fill it up. Each of the questionnaire was meticulously scrutinized .A total of 172 completely filled up questionnaires were analyzed after excluding 6 incompletely filled forms.
 After all the questions have been answered, numbers for each response were added to obtain a final score. Total internet addiction scores and DASS 21 scores were calculated.

STATISTICAL ANALYSIS
Data were entered in MS Excel sheet and analyzed using SPSS software. The results were subjected to descriptive statistical analysis and Fisher's exact test was used to test the significance .

IV. Results
In the present study, out of 172 internet users, 103 (59.8%) were females and 69 (40.1%) were males (Table 1)

Table 1: Gender wise distribution of study participants.

Gender	Number	Percentage
male	69	40.1%
Female	103	59.8%
	172	

Internet addiction score	Male	Female	Total
0-19(no addiction)	29(42.0%)	49(47.5%)	78(45.3%)
20-49(mild)	30(43.47%)	33(32%)	63(36.6%)
50-79(moderate)	10(14.4%)	21(20.3%)	31(18.0%)
80-100(severe)	-	-	-

Table 2: Gender wise comparison of internet addiction scores.

It was found that 94 (54.6%) reported internet addiction and 78 (45.3%) reported normal internet usage. The internet addiction test scores revealed 78 (45.3%) in the score range of 0-19 i.e. no addiction, hence normal users, 63 (36.6%) in the score range of 20-49 i.e. mild internet addiction and 31 (18%) in the score range of 50-79 i.e. moderate internet addiction and none of the study subjects reported severe addiction i.e. with a score range of 80-100 (Table 2). Hence the prevalence of internet addiction among the study subjects in the present study was 36.6% mild, *18*% moderate, while 45.3% students reported normal internet usage. Severe internet addiction

was not reported among the study participants..

Table 3	Pattern of internet usage in participants
Most common gadgets used	
mobile	159(92.4%)
laptop	5(2.9%)
tablet	8(4.6%)
Preferred time for internet use	
morning	2(1.16%)
afternoon	52(30.2%)
evening	15(8.7%)
night	103(59.8%)
Usual login status	
continuous	144(83.7%)
intermittent	28(16.2%)
Reasons for use	
educational	30(17.4%)
social networking	44(25.5%)
entertainment	35(20.34%)
playing games	26(15.11%)
shopping	32(18.60%)
others	5(2.9%)

The main purpose of using the Internet was social networking (25.5%) followed by entertainment (20.34%). The most common gadget used was mobile(92.4%) followed by tablet(4.6%).Preferred time for internet use was high at night(59.8%) followed by afternoon(30.2%) and usual login status was continuous among 83.7%. (Table 3).

Table 4.Association between internet addiction and depression ,stress and anxiety (n=172)

Internet addiction	Depression				Anxiety				Stress			
	present	absent	odds ratio OR	95% CI	present	absent	odds ratio OR	95% CI	present	absent	odds ratio OR	95% CI
present	56	38	6.1	3.08 -12.4	68	26	8.12	4.08 -16.13	76	18	9.5	4.7 -19.2
absent	15	63			19	59			24	54		

Those having internet addiction are found to be more stressed(odds ratio=9.5, 95% CI=4.7-19.2), anxious (odds ratio =8.12, 95% CI=4.08-16.13) and depressed (odds ratio=6.1, (95% CI=3.08-12.4), as compared to those who are not having internet addiction. There was a significant association between Internet addiction and depression, anxiety, and stress ($P < 0.0001$)(Table 4).

V. Discussion

Today Internet has become the integral part of life and a basic necessity. Internet usage, both by broadband and mobile users, has increased in India and abroad. The university campuses are being made wireless with free and unlimited access to the internet. Many online courses are now available for the medical students interested in pursuing such courses, to add to their credentials. Due to the various applications of worldwide web in all walks of daily life, the undergraduate medical students become susceptible to internet addiction. Easy access and social networking are two important promoting factors for addicting behavior.

Among the study population of 172 students, Males constituted 69(40.1%) of study population while females constituted 103(59.8%) of the study population. The reason being females outnumbered males in both semesters of medical education.

Our study showed that the prevalence of Internet addiction in study participants as 54.6%. Among them 36.6% in mild internet addiction 18% in the moderate internet addiction and none of the study subjects reported severe addiction Hence the prevalence of internet addiction among the study subjects in the present study was 36.6% mild, *18*% moderate, while 45.3% students reported normal.

A study by Santanu Ghosh among undergraduate medical students showed

two participants were found to have severe internet addiction whereas 54.2% had mild to moderate addiction.[27]

A study by **Sachin R Gedam** showed the total prevalence of internet addiction was 19.85%, with moderate and severe addiction being 19.5% and 0.4%, respectively [29]

The most common gadget used was mobile(92.4%) followed by tablet(4.6%) and laptop (2.9%).The main purpose of using the Internet was social networking (25.5%) followed by entertainment (20.34%),shopping (18.60%),education (17.4%), playing games (15.11%) and others (2.9%). Preferred time for internet use was high at night (59.8%) followed by afternoon (30.2%),evening (8.7%),morning (1.16%) as most of them become free at night and busy with their academic and daily activities in the remaining time .Usual login status was continuous among 83.7% and intermittent in 16.2%.

Prevalence of Depression in the study population was 41.27% as per DASS scale. Apart from depression, 50.5% and 58.1% of our study population were having anxiety and stress problems respectively . Numerous studies have found that there is a significant association between Internet addiction and such psychological morbidities as depression, stress, suicide intention, aggression, and antisocial behaviors[29,30,31,32]. These studies corroborate our findings of significant association between depression, stress, and anxiety and Internet addiction ($P < 0.0001$). The cause and effect relationship between Internet addiction and depression, stress, and anxiety could not be established considering the cross-sectional design of the study.

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[33].

Study by Vaidya et al found the prevalence of depression as 39.44%. Incidence of anxiety was found to be 66.05% and that of stress was 51.37%[34].

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[35]

Some limitations of the present study should be noted. First, the present study was a cross-sectional design; we cannot determine casual relation between the internet addiction and Psychological well being. Second, our study was limited to college students, not representative of the general population, so data obtained from college students cannot be universalized to the general population. Further studies with cohort design are needed, to determine temporal association between internet addiction and Psychological well being.

VI. Conclusion

Medical sciences are based upon recent developments and it is very much necessary for medical fraternities to update themselves with those developments for the proper application of patient caring and other activities in health sector. But Internet has emerged as two-edged sword. Vigilance to the overall activity of students regarding internet and awareness creation among the generation about the demerits of prolonged internet use both from health and social point of view are essential.

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