



Original Research Article

Internet Addiction causing Anxiety and Depression

Internet Addiction and Its Association with Anxiety and Depression Among Medical Students of Andhra Pradesh

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Abstract: Internet usage has increased over the past couple of years and is significantly higher among medical students. Estimating the prevalence of Internet addiction and psychological problems among medical students and studying its association with psychological distress can give new evidence in this domain. This study was conducted in various Medical Colleges in Andhra Pradesh. It was a cross-sectional study. All parameters were collected at a single point in time. The study was conducted from September 2023 to November 2023 (3 months). A convenience sampling method was used. 240 medical students from various Medical Colleges in Andhra Pradesh were used. Most of the students were from government medical colleges. Females were more compared to males. Most of the students uses the internet for 2 to 4 hours. 28% of students use the internet for 4 to 6 hours. 20% of students use internet for more than 6 hours. 13% of students use internet for less than 2 hours. Most of the students have been using the internet for the last 4 years. The mean number of years of internet usage was 4.23+ 2.52 among the students. Internet addiction prevalence rate was 56.25%. The prevalence of depression and anxiety was 49.17%. 63.3% had no anxiety, 19.6% had minimal to mild anxiety, 10% had moderate to marked anxiety, and 7.1% had severe anxiety. The current study done among 240 medical students proved that there is a high prevalence of internet addiction among medical students, and there is a significant positive correlation between internet addiction and anxiety and depression. A holistic approach is needed to limit medical students' Internet use. Educating parents, professors, and policymakers about the adverse consequences of Internet addiction helps reduce deleterious consequences on mental health.

Keywords: Internet addiction, Anxiety, Depression, Medical students, Medical education

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1. INTRODUCTION

The internet has become a crucial part of our life. Internet usage has increased over the past couple of years and is significantly higher among medical students. There were 658 million internet users in January 2022 in India. India's internet penetration rate was around 47% of the total population during 2022¹. The prevalence of possible Internet addiction varied from 7.4% to 46.4% among students from southeast asia². The Internet has become a necessary tool for medical graduates for academic and social purposes. The stress of medical education and lack of parental supervision in college life is likely to lead to internet addiction, which in turn can cause psychological problems. Internet Addiction is an individual's inability to control their Internet utilization, causing disturbances and impairment in accomplishing work, social, and personal commitments.³ Internet gaming disorder is classified under Section III of DSM-V, which conceptualizes it as persistent and recurrent use of the internet for gaming with increased preoccupations, withdrawal symptoms, tolerance, unsuccessful attempts to control the use, continued use despite knowledge of harm in a 12-month period which is in line with criteria for substance use disorder.⁴ Internet addiction during undergraduate college days can impede the academic learning of the student. The presence of low self-esteem, low motivation, fear of negative evaluation, and social avoidance observed in depressed individuals are hypothesized to lead to addictive usage of the Internet in such individuals. Social isolation caused by internet addiction might lead to depression. Researchers have proposed that the availability of online learning, modern gadgets, unstructured timetables, and lack of parental control contribute to internet addiction and its negative outcomes among medical students.⁵ Internet addiction (IA) leads to mental health problems like anxiety.⁶ Internet addiction can also lead to pathological gambling and game playing, especially in young individuals.⁷ Depression and Internet addiction are associated with each other. Depressed individuals have low self-esteem, feel lonely, and have a high need for affiliation, all of which can lead to excessive use of the Internet. Individuals with excess internet use are usually socially isolated, which can lead to depression.⁹ Internet Addiction can lead to anxiety and stress.¹⁰ Young (1998) reported that most Internet addicts have a history of depression and anxiety.¹¹ Studies have disclosed that personality traits, self-esteem, and psychiatric disorders are associated with Internet addiction.¹² Depression, anxiety, and stress were collectively assessed using a single instrument DASS scale.¹³ In the present study, depression was assessed using zung SDS¹⁴, and anxiety was assessed using zung SAS scales.¹⁵ Estimating the prevalence of Internet addiction and psychological problems among medical students and studying its association with psychological distress can give new evidence in this domain. It help to start preventive strategies and mitigation measures to keep control of this silent public health problem. With this perspective, a present study was proposed among medical undergraduate students. We aim to know the prevalence of internet addiction among medical students of andhra pradesh. Our objective is to know the association between internet addiction and anxiety and to know the association between internet addiction and depression.

2. MATERIALS AND METHODS

2.1 Study site

This study was conducted in various Medical Colleges in Andhra Pradesh.

2.2 Study design

It is a cross-sectional study. All parameters were collected at a single point of time.

2.3 Study duration

The study was conducted from September 2023 to November 2023(3 months)

Sampling method: The convenience sampling method was used.

2.4 Sample size

240 medical students from various medical colleges in Andhra pradesh were used.

2.5 Inclusion criteria

1. All regular medical undergraduate students whose ages are 17years and above
2. Students willing to consent to the study were recruited.

2.6 Exclusion criteria

1. Medical students who were unwilling or were suffering from any diagnosed psychiatric illnesses were excluded from the study.

2.7 Study procedure

A sample of 240 medical students was recruited using a convenience sampling method after ethical committee clearance. The Google Form link was sent to the interested participants through email, WhatsApp, and other online platforms. The form contains detailed instructions along with the Zung self-rating anxiety scale, Zung self-rating depression scale, and IAT scale. An option for inviting a friend was also kept. Confidentiality and anonymity among the study participants were assured.

2.8 Ethical considerations

Informed consent was taken from every student participating in the study. Ethical committee approval was taken before conducting the study. (Reg no: ECR/1351/Inst/AP/2020).

2.9 Instruments

A self-reported questionnaire was used, which consisted of five sections: Sociodemographic data, Zung self-rating depression Sociodemographic data, Zung self-rating depression scale I4 (Zung SDS), Zung Self-Rating Anxiety Scale I5 (Zung SAS), Internet Addiction Test scale.¹⁶

3. Data analysis

Data analysis was done using Microsoft Excel and Epi info software 7.2.5 version. Pearson correlation was used to know the correlation between parameters. The chi-square test was

used to know the association between categorical parameters. A p-value of < 0.05 was considered statistically significant.

4. RESULTS

A total of 240 medical students have participated in the study.

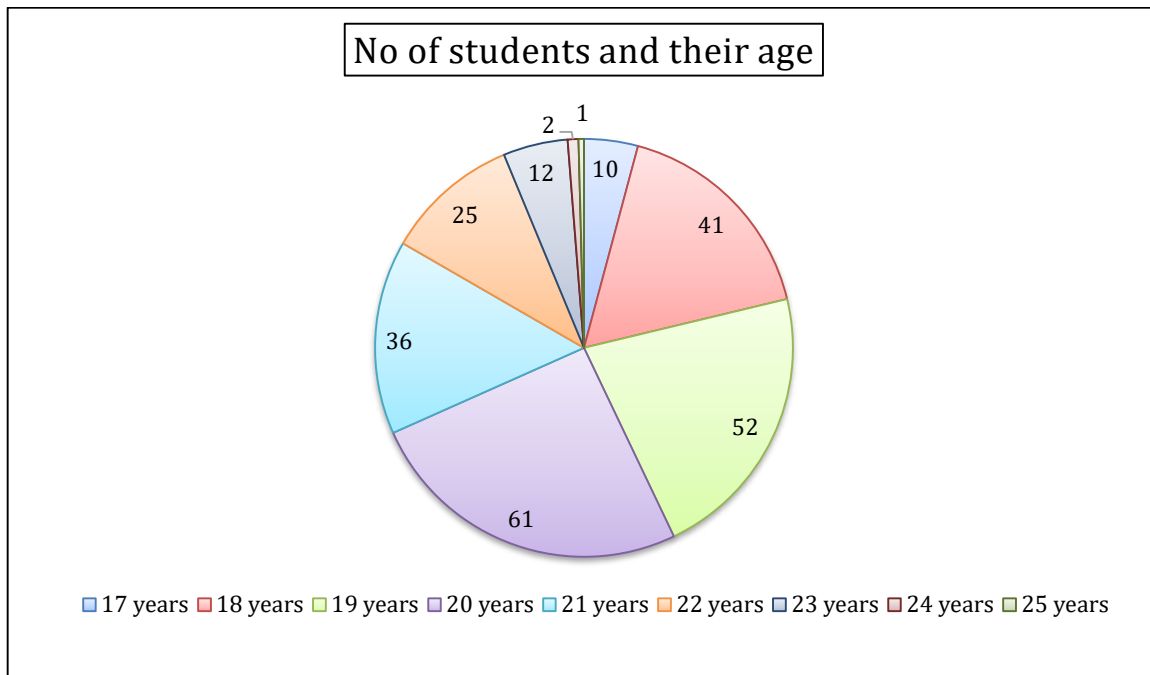


Fig 1: Shows the participants' age distribution in the study.

Participant ages ranged between 17 and 25 years, with a mean of 19.88 ± 1.01 years. Most of the patients were aged 20 years, as shown in Figure 1

Variable	Frequency	Percentage (%)
Gender		
Female	167	69.6%
Male	73	30.4%
Type of college		
Private Medical College	49	20.4%
Government Medical College	191	79.6%
Residence area		
Rural	59	24.6%
Urban	181	75.4%
Socioeconomic status		
Upper class	184	76.6%
Upper middle class	29	12.1%
Middle class	12	5%
Lower middle class	11	4.6%
Lower class	4	1.7%

Out of 240 students, 181 (75.4%) were residing in Urban and 59 (24.6%) in Rural. Most students were in the upper class, 184 (76.6%), followed by the upper middle class, 29 (12.1%). Most students were from government medical colleges, 191 (79.6%), compared to private colleges. Most of the patients were females.

Variable	Frequency	Percentage (%)
Use the Internet for work		
Yes	208	86.7%
No	32	13.3%
History of any psychiatric illness		
Yes	15	6.3%
No	225	93.8%

History of any psychiatric illnesses in the family			
Yes	22	9.2%	
No	218	90.8%	

Internet was used for work by the majority of students - 208(86.7%). 15(6.3%) students had past history of psychiatric illness and 22(9.2%) had history of psychiatric illnesses in the family.

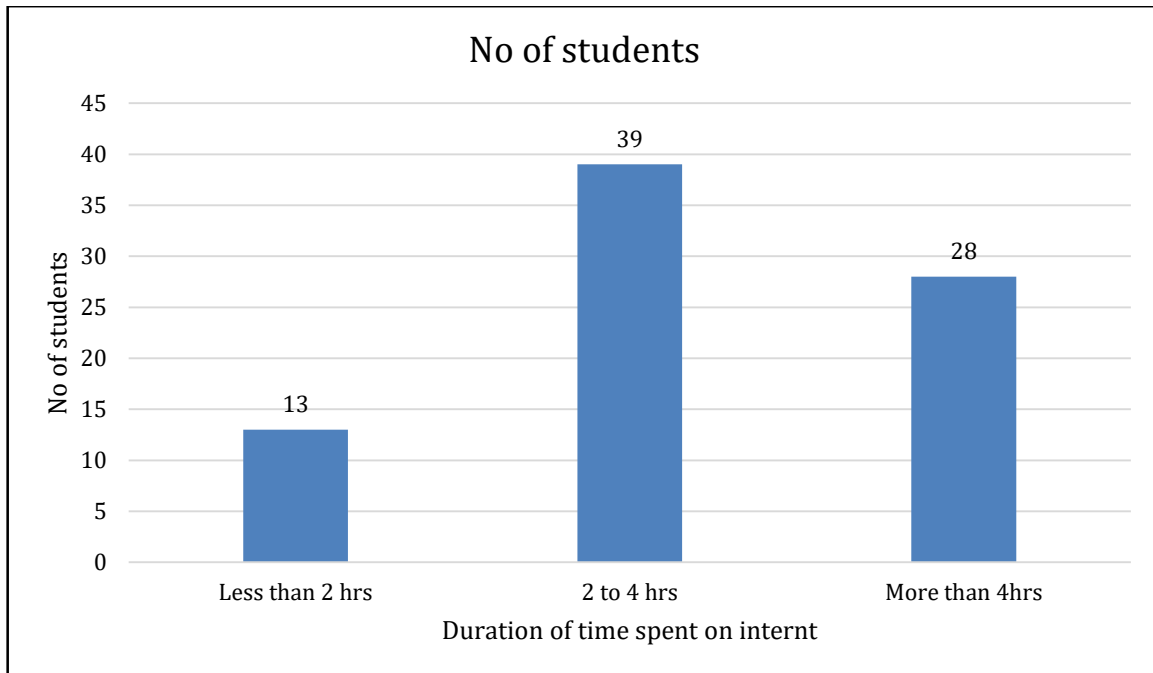


Fig 2: Duration of Internet Usage

Most of the students use the internet for 2 to 4 hours. 28% of students use the internet for 4 to 6 hours. 20% of students use the internet for more than 6 hours. 13% of students use internet for less than 2 hours.

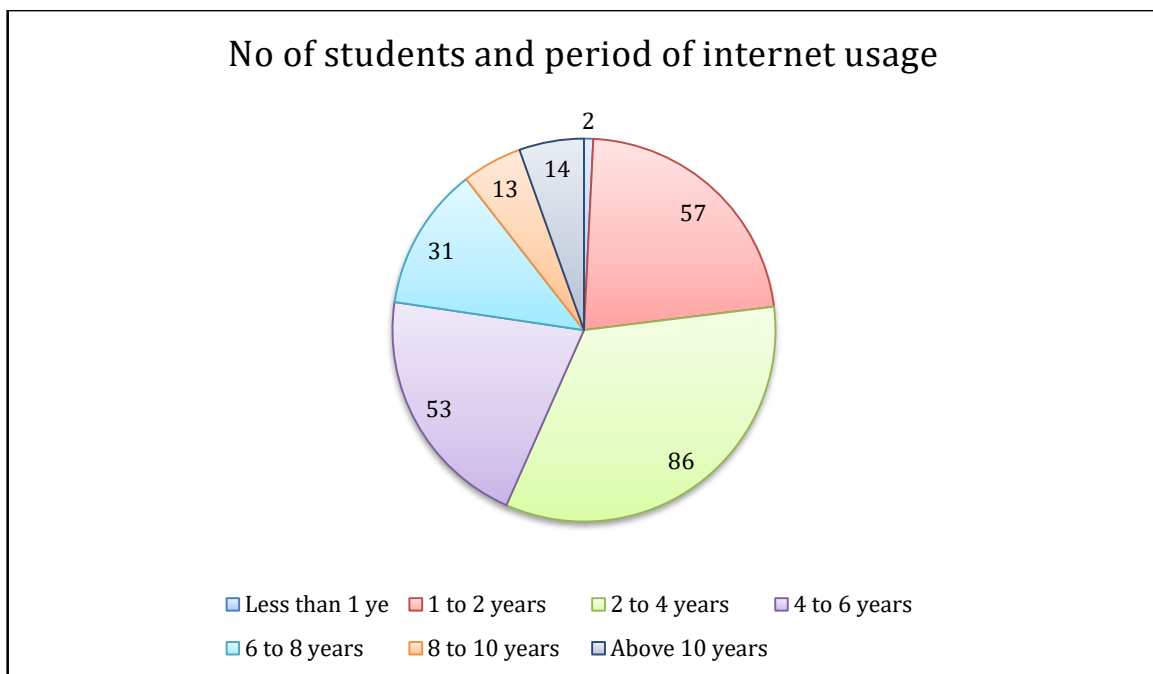


Fig 3: Duration of Internet usage

Most students have been using the Internet for the last 4 years, as shown in Figure 3. The mean number of years of internet usage was 4.23+ 2.52 among the students.

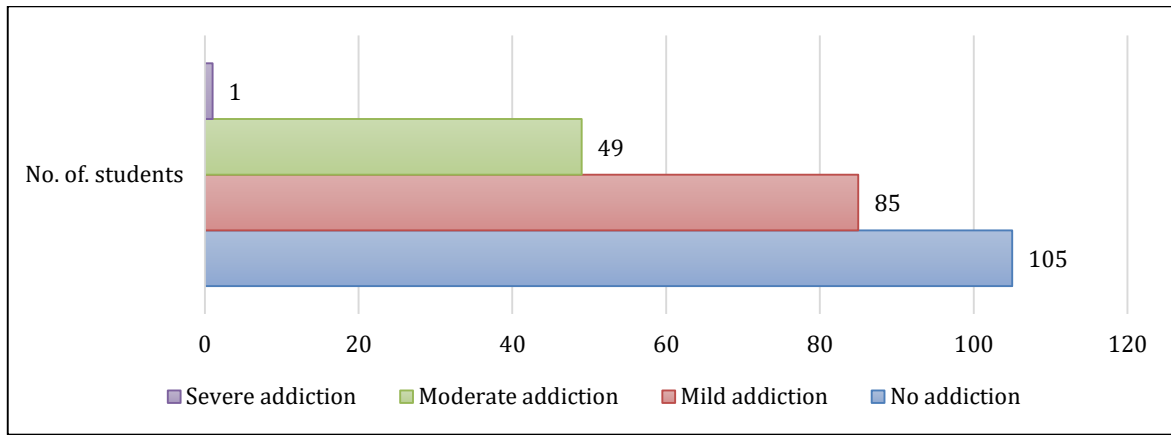


Fig 4: Prevalence of internet addiction

Figure 4 shows Internet addiction prevalence (YIAT). The average YIAT score was 34.67 ± 17.5 ; the internet addiction prevalence rate was 56.25%. The mean length of internet use was 4.45 ± 0.39 h/day. Of 240 students, 105 (43.75%) students did not have any internet addiction, while 135 (56.25%) students had internet addiction, out of which 85 (35.41%) were mild addicts while 21 (20.41%) were moderate addicts. There was only one (0.42%) severely addicted student.

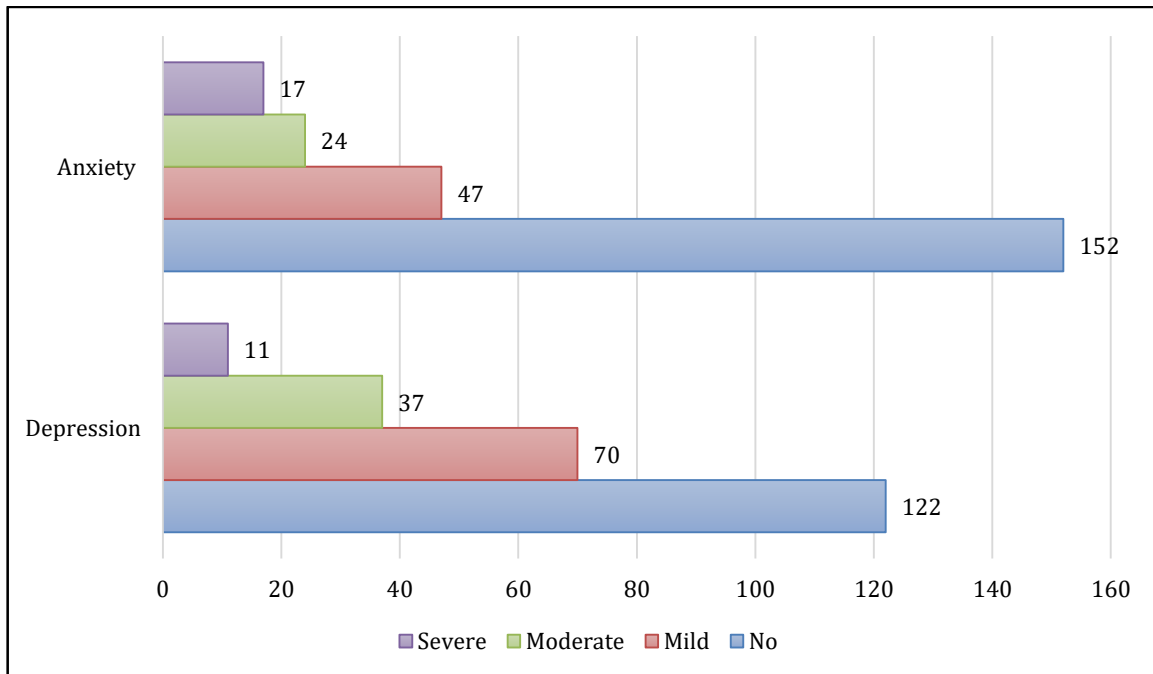


Fig 5: Prevalence of Depression and Anxiety

Figure 5 shows Depression and Anxiety prevalence (Zung Scale)-Prevalence of depression and anxiety symptoms as 49.17% (SDS index score ≥ 50) and 36.67% (SAS index score ≥ 50). Average scores of the SDS and SAS indexes were 48.9 ± 12.23 points and 47.47 ± 12.37 points, respectively. The prevalence of each category was 50.8% (no depression), 29.1% (minimal to mild depression), 15.4% (moderate to marked depression) and 4.6% (severe depression). 63.3% had no anxiety, 19.6% had minimal to mild anxiety, 10% had moderate to marked anxiety, and 7.1% had severe anxiety.

Variable	Total	No addiction (N=105) (%)	Mild addiction (N=85) (%)	Moderate&Severe addiction (N=50) (%)	Chi-value	Sig. (p-value)
Age (Mean+SD)		19.77+1.62	19.96+1.58	19.96+1.54		0.4146
Gender						
Female	167	76(45.51%)	60(35.93%)	31(18.56%)	1.7874	0.4091
Male	73	29(39.73%)	25(34.25%)	19(26.03%)		
Type of college: Private Medical College	49	20(40.82%)	18(36.73%)	11(22.45%)	0.2285	0.8921
Government	191	85(44.50%)	67(35.08%)	39(20.42%)		

Medical College							
Residence area							
Rural	59	32(54.24%)	19(32.20%)	8(13.56%)	4.1816	0.1236	
Urban	181	73(40.33%)	66(36.46%)	32(17.68%)			
Socioeconomic status							
Upper class	184	70(38.04%)	72(39.13%)	42(22.83%)			
Upper middle class	29	15(51.72%)	9(31.03%)	5(17.24%)	14.0903	0.02864*	
Middle class	12	10(83.33%)	1(8.33%)	1(8.33%)			
Lower middle & Lower class	15	10(66.67%)	3(20%)	2(13.33%)			
Any psychiatric illness in the family							
Yes	23	8(34.78%)	8(34.78%)	6(26.09%)	0.7902	0.6736	
No	217	97(44.7%)	77(35.48%)	43(19.82%)			
Duration of Internet usage							
<4hrs	125	79(63.2%)	36(28.8%)	10(8%)	59.6517	0.00001*	
4-6hrs	68	18(26.5%)	34(50%)	16(23.5%)			
>6hrs	47	8(17%)	15(31.9%)	24(51.1%)			
Years Online		3.82+2.91	4.39+ 2.21	5.24+ 2.28			0.001*

*Significance at level $p < 0.05$; Chi: Chi-square test; SD: Standard deviation

Table 5 shows an association between sociodemographic variables and internet addiction. It shows that variables such as the socioeconomic status of students have a significant association with internet addiction. Upper-class students are more addicted to the internet than other socioeconomic-class students ($P = 0.0286$). About 61.96% of upper-class students were addicted to the Internet, compared to 48.27% of the upper middle class, 16.66% of the middle class, and 33.33% of the lower middle class. Students using the internet for >6 hours (82.97%) were more addicted to the internet as compared to students using the internet for 4-6 hours (73.53%) and < 2 hours (33.33%) ($P=0.00001$). Students with moderate & severe internet addiction were online for years with a mean value of 5.24+ 2.28, which is high compared to no addiction (3.82+ 2.91) and mild addiction (4.39+ 2.21). It means more addicted students were online for more years($P=0.001$).

Group	IA/IIA	Depression	Anxiety
IA	I		
Depression	$r = 0.4465^*$ $p=0.00001^*$	I	
Anxiety	$r = 0.4727^*$ $p=0.00001^*$	$r = 0.7423^*$ $p=0.00001^*$	I

*Significant at level 0.05; IA: Internet Addiction

Table 6 shows the result from the Pearson test between internet addiction and depression ($r = 0.45$, $p = 0.00001$) and anxiety ($r = 0.47$, $p = 0.00001$). These results show there is a significant relationship between internet addiction and depression and anxiety. On the other hand, the table also showed that depression has a positive correlation with anxiety having a high correlation value (anxiety $r = 0.74$, $p = 0.00001$). A positive relationship with a moderate correlation value was also found in internet addiction with anxiety ($r = 0.47$, $p < 0.05$), which means a higher internet addiction score followed by a high anxiety score on the subject. Meanwhile, the internet addiction variable has a relation with enough value with depression ($r = 0.44$, $p < 0.05$), which means that with a higher internet addiction score, the depression experienced by the subject will be high. The correlation of internet addiction with anxiety is more than the correlation of depression ($r = 0.47$, $p < 0.05$).

5. DISCUSSION

The current study was done on 240 medical students. The mean age was 19.88+1.01 yrs. The study population consisted of government and private medical college students. Among the participants, almost 70% were female students, and 30% were male students. Similar gender distribution is seen in studies conducted by Stankovic., and other studies¹⁷⁻²³ In the

present study, most of the students were from government medical colleges. Deb et al. also reported that most were from government medical colleges.¹⁹ In a few studies, female students were 54-56% and male students were 46-44%.²⁴⁻²⁶ Most of the students were from the higher class in our study, whereas most of them were from the middle class in other studies.²⁷ Time spent per day on the internet was 2-4hrs in 39.2%, 4-6hrs in 28.3%, > 6hrs in 19.6% of the students in the present study. 41.6% spent < 5 hours per day, and 58.4% spent > 5 hours per day in a study conducted by Acharya et al.²⁷ The prevalence of IA in the present study was 56.25% overall. In this study, 35.41% had mild IA, 20.41% had moderate IA, and 0.42% had severe IA. In another study conducted among medical students, the prevalence of mild, moderate, and severe IA was reported to be 34.8%, 19.4% & 1.3%, respectively.⁵ In a study done by Alok M et al., 17.3% had moderate IA, and 1.8% had severe IA.²⁸ In a study done by Dawadi et al., 39.3% had mild IA, and 13.5% had moderate IA.²⁹ These studies support the prevalence rates of IA in the present study. A study done by Yekefallah et al. showed the prevalence of mild, moderate, and severe IA was reported to be 56.3%, 12%, and 0.3%, respectively.¹⁴ In a study by Chaudari et al., mild and moderate IA was 51.42% and 7.45%, respectively.¹⁶ The study by Saikia et al. found an 80.7% prevalence of IA among the study participants.²² The prevalence of anxiety was 17.3% in the present study; a similar prevalence rate (19%) was

observed in the study done by Mounika *et al.*²⁶ The prevalence of anxiety was 27.2% in the study conducted by Alok M *et al.*, which is higher compared to the present study.²⁸ The present study showed a positive correlation between IA with depression and anxiety, which was statistically significant ($p < 0.05$). Higher scores for IA correlated with higher scores for depression and anxiety. Depression showed a positive correlation with anxiety, which means higher scores for depression corresponded to higher scores for anxiety. A study conducted by M Stankovic *et al.*, observed a positive correlation between IA with depression, anxiety, and stress.¹⁸ A study conducted by M Santoso *et al.*, also observed a positive correlation for IA with depression, anxiety, and stress,²⁰ another study also observed a similar correlation for IA with depression, anxiety, and stress.³⁰ In these studies, the Depression Anxiety Stress Scale (DASS) was used to assess anxiety, depression, and stress. A study conducted by Swathi *et al.* used GHQ28 to assess mental health. Study results showed the highest relationship between depression and somatic symptoms with IA. However, these results are not statistically significant.²⁵ The Association between internet addiction and depression, anxiety, and stress was not statistically significant in the study conducted by Pragma Lodha *et al.*³¹

6. MERITS OF THE STUDY

The study sample consists of subjects from different medical colleges, which makes it a multicentric study. Standardized scales were used in the study. Appropriate statistical analysis was used. Cross-sectional study design. Quantitative scales

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were used to assess IA, depression, and anxiety. Using google forms to conduct a study saves time and money.

7. LIMITATIONS OF THE STUDY

There is no control group. Small sample size. Single center study. Cause and effect cannot be determined for IA with depression and anxiety since it is a cross-sectional study.

8. CONCLUSION

The current study done among 240 medical students proved that there is a high prevalence of internet addiction among medical students, and there is a significant positive correlation between internet addiction and anxiety and depression. A holistic approach is needed to limit medical student's use of the internet. Educating parents, professors, and policymakers about the adverse consequences of Internet addiction helps reduce deleterious consequences on mental health.

The study is self-sponsored. There were no conflicts of interest.

9. AUTHORS CONTRIBUTION STATEMENT

Dr Sagar R. planned the entire study. Loukya got the ethics approval and gathered Google forms. Dr Niranjan did data analysis. Dr Raghava Rao monitored the entire process. Dr. Ramya R. drafted the study.

10. CONFLICT OF INTEREST

Conflict of interest declared none.

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