Is Internet Becoming the New Opioid Crisis? An Inter-Institutional Exploration of Internet Addiction & It's Effect on Paramedical & Medical Undergraduate Students.

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ABSTRACT
BACKGROUND: The internet has become an integral part of our lives, especially for adolescents who use it extensively for various purposes such as socializing, entertainment, and education. However, excessive and unmonitored internet use can negatively affect adolescents' health. Sleep is a vital component of health, but nowadays, adolescents and youth often neglect sleep due to social media and binge-watching. Excessive exposure to expansive internet content can contribute to negative impacts and may lead to poor mental health. OBJECTIVES: To study the level of internet usage among young adults.To assess their mental health status and sleep quality. To find the relationship between internet usage, general mental health, and sleep quality.MATERIALS AND METHODS:This multicentric study was conducted on medical and paramedical students from three universities in three states. After obtaining scientific and ethical committee clearance, self-administered pre-tested and pre-validated questionnaires (Internet Addiction Test, General Mental Health-5, and Pittsburgh Sleep Quality questionnaire) were used. RESULTS:2.55% of males and 1.19% of females have severe internet addiction, while 24.45% of males have normal internet usage and 35.41% females have normal internet usage. Only 6.88% of students reported having good-quality sleep, 66.55% reported poor-quality sleep, and 26.55% reported moderate-quality sleep. There was significant correlation between internet addiction, mental health, and sleep quality. CONCLUSION: This inter-institutional study provides valuable insights into the prevalence of internet addiction among students and its impact on mental health and sleep quality. Promoting a healthy balance between online and offline activities is imperative, thereby safeguarding future healthcare professionals' well-being.

ground: The internet is undeniably important for adolescents, but its excessive use can significantly and negatively impact their health, particularly their sleep and mental well-being. Objectives: The study is designed to thoroughly assess internet usage among young adults, their mental health status, and sleep quality. Method: The study employs Google Forms to conduct a comprehensive assessment of medical and paramedical students from three universities. Results: The study reveals distinct levels of internet addiction and consistently poor sleep quality among participants, with a substantial percentage exhibiting sign of poor mental health. Conclusion: The study unequivocally emphasizes the prevalence of internet addiction and its detrimental effects on the mental health and sleep quality of medical students. It stresses the urgent need for heightened awareness and targeted interventions to establish a healthier balance between online and offline activities.

INTRODUCTION:

When a habit changes into an obligation, it becomes an addiction. Out of all forms of addiction, non-substance addiction can be very difficult to detect or even cure. "In today's digital age, the internet has become a crucial part of our daily lives. Surviving in this new and fast-paced age without the internet is next to impossible. It offers numerous benefits, such as instant access to information, social connectivity, and entertainment. It not only facilitates communication, but also disseminates information, and aids in academic pursuits. However, its widespread presence also presents significant challenges, particularly about the potential for fostering addictive behaviours."[1] With over 900 million internet users, India was the second largest online market globally, behind China. Despite the large number and a consistent increase in accessibility, Internet penetration in the country was less than 50% compared to European countries such as the Netherlands, Norway, and Saudi Arabia, which have almost a 99% penetration rate [2]. While judicious use of the internet can be beneficial for studies, opportunities, and connectivity, excessive and injudicious use of the same can lead to addiction, particularly among vulnerable populations such as the adolescent population and students undergoing professional training like medical students [3]. There have been growing concerns worldwide for what has been labelled as "internet addiction". The term 'internet addiction' was proposed by Dr. Ivan Goldberg in 1995 for pathological compulsive internet use [4]. Internet addiction (IA) is increasingly recognized as a public health concern, characterized by excessive or poorly controlled preoccupations, urges, or behaviours regarding internet use that lead to impairment or distress. Among various population groups, medical and paramedical students are particularly susceptible to internet addiction due to the unique pressures and demands of their educational and professional environments. These students often rely heavily on digital resources for academic purposes, which may inadvertently contribute to increased screen time and potential internet overuse. Furthermore, the intense academic workload, coupled with the need for social support and stress relief, may drive students towards online activities as a coping mechanism. Medical education heavily relies on technology for learning and research, making students susceptible to problematic internet use. Internet addiction can have detrimental effects on mental health and sleep quality, which are critical components of overall well-being. Understanding the prevalence and consequences of internet addiction among medical students is essential for developing interventions to mitigate its negative impact.

Despite the growing recognition of internet addiction (IA) and its consequences, there is a dearth of comprehensive, inter-institutional studies that explore this phenomenon among medical and paramedical students. This study aims to fill this gap by examining the prevalence of IA and its impact on mental health and sleep quality across multiple institutions. This research seeks to provide a nuanced understanding of IA in this demographic and study its effect on mental health and quality of sleep.

The results of this study will add to the current body of literature on internet addiction (IA), mental health, and sleep quality. These findings will help in creating specific strategies to reduce the adverse impacts of excessive internet use among medical and paramedical students. Ultimately, this research aims to encourage healthier internet usage habits and improve the overall well-being of future healthcare professionals.

We began with the objective of understanding Internet usage among young medical and paramedical students aged 18 to 25 years. Our goal was to assess the status of Internet addiction, if present. Additionally, we aimed to study the mental health status and sleep quality of these students, seeking to identify any correlations or relationships among these three parameters.

MATERIAL & METHODS:

This cross-sectional study involved medical students from multiple institutions across three different states in India. A questionnaire-based approach was utilized to collect data on internet addiction, mental health, and sleep quality. This study was conducted by sharing the consent form and questionnaires on Google Forms.

After obtaining approval from the Institutional Scientific Committee and Ethical Committee, the questionnaires were sent to the students through Google Forms, after obtaining consent and

explaining the purpose of the study on the opening page of the Google form. Their age, gender, college, and state name were collected. Personal information like name, email, roll number, etc., were not collected to maintain anonymity.

This study was conducted by using Google Forms. It was a multicentric study conducted on Medical and paramedical students of MTMC, Jamshedpur, Jharkhand, India, AMC, NRIIMS, Visakhapatnam, Andhra Pradesh, India, and PRMC, Baripada, Odisha, India. After obtaining Scientific and ethical committee clearance, self-administering pre-tested and pre-validated questionnaires were used. The Google Form link was shared among medical students, and they were asked to fill it out after obtaining consent and submitting their general data. Their personal information like email, name, etc., was not collected to maintain anonymity and avoid bias.

Study Population – Young adults between the age group 18-25 years. It will be conducted on Medical and paramedical students at different institutes in three different states.

Inclusion criteria – All healthy medical and paramedical students within the age group of 18-25 years who consented for the study were included.

Exclusion criteria – Non-consenting students and those who are on medication for mental health issues and/or sleep disorder were excluded from the study. Students who have any form of chronic or acute illness were also excluded.

Study design – Cross-sectional study.

Statistical analysis – The data is tabulated using Excel and analysed using a t-test and correlation test using Jamovi software.[5]

Sample size – As per the study done by Gupta R et al; taking the overall prevalence of internet addiction as 18% the sample size was found to be 631 with a 3% error. [6]

Google form link was shared among approximately 1000 students (250 students in each college). Only 610 students consented and submitted the duly filled forms. The Internet Addiction Test (IAT) [7] was employed to assess internet addiction levels among participants. The Mental Health Inventory-5 (MHI-5) was used to evaluate mental well-being [8], while the Pittsburgh Sleep Quality Index (PSQI) measured sleep quality [9].

MHI-5 has a score of 0 to 100, where a score of 100 represents optimal mental health. The mean scores as well as the prevalence of mental problems were reported. Because no formal cut-off point is determined, we used the cut-off score for the MHI-5 (<60).[10]

RESULTS

We had distributed google forms in three different medical colleges under three different universities in three different states of India. Preliminary analysis revealed a high prevalence of internet addiction among medical students, with a significant proportion exhibiting symptoms indicative of problematic internet use.

Table 1

	NUMBER	Mean current age (in yrs) ± SD	Age at which started internet usage (in yrs) ± SD
MALE	274(44.9%)	19.976 ± 1.030	13.472 ± 3.469
FEMALE	336(55.1%)	19.582 ± 1.646	13.686 ± 3.414
TOTAL	610(100%)	19.76 ± 1.836	13.866 ± 3.449

Males and females included in the study have average age of 19.976 and 19.582 for males and females respectively. The mean age at which they had started using the internet is also 13.472 years and 13.686 years respectively. The average age of males and females are almost close so age and gender related biases are avoided.

Figure 1

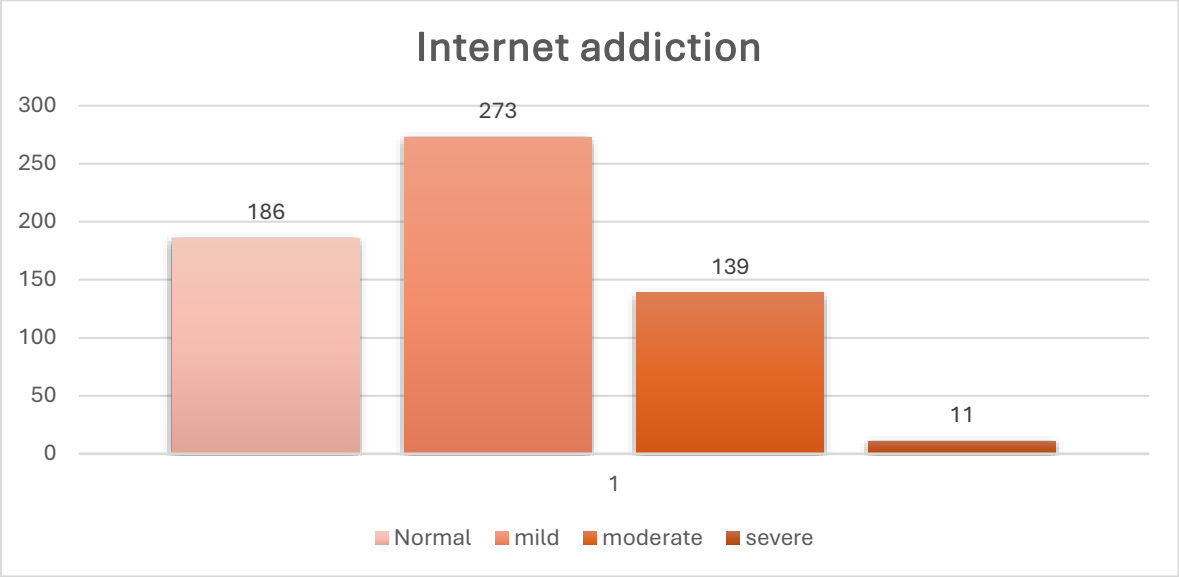

Figure 1 shows Normal (IAT score from 1-30) , Mild (IAT score 31-49), Moderate (IAT score 50-79) and severe (IAT score 80 -100) . Out of 610 participants only 186 (30.49%) were found to be normal, whereas 414 (69.5%) were found to be suffering from different grades of Internet addiction.

Table 2 (Internet Addiction Questionnaire)

Sl No	Question	Not applicable	Rarely	Occasionally	Frequently	Often	Always
1	Stay online longer than you intended	5 (0.8%)	59(9.7 %)	174(28. 5%)	179(29. 3%)	135(22. 1%)	58(9. 5%)
2	Neglect household chores to spend more time online	54(8.9 %)	187(13. 7%)	189(31 %)	108(17. 7%)	47(7.7 %)	25(4. 1%)
3	You prefer the excitement of the Internet to spending time with your friends?	68(11.1 %)	173(28. 4%)	181(29. 7%)	112(18. 4%)	45(7.4 %)	31(5. 1%)
4	How often do you form new relationships with fellow online users?	231(37. 9%)	248(40. 7%)	77(12.6 %)	30(4.9 %)	18(3%)	6(1%)
5	How often do others in your life complain to you about the amount of time you spend online?	75(12.3 %)	200(32. 8%)	172(28. 2%)	103(16. 9%)	32(5.2 %)	28(4. 6%)
6	How often do your grades or schoolwork suffer because of the amount of time that is spent online?	88(14.4 %)	150(24. 6%)	178(29. 2%)	104(17 %)	50(8.2 %)	40(6. 6%)
7	How often do you check your email before something else that you need to do?	122(20 %)	240(39. 3%)	130(21. 3%)	62(10.3 %)	39(6.4 %)	16(2. 6%)
8	How often does your job performance or productivity suffer because of the Internet?	83(13.6 %)	146(23. 9%)	189(31 %)	111(18. 2%)	56(9.2 %)	25(4. 1%)
9	How often do you become defensive or secretive when	121(19. 8%)	218(35. 7%)	137(22. 5%)	68(11.1 %)	43(7%)	23(3. 8%)

	anyone asks you what you do online?						
10	How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?	80(13.1%)	162(26.6%)	155(25.4%)	110(18%)	62(10.2%)	41(6.7%)
11	How often do you find yourself anticipating when you will go online again?	73(12%)	188(30.8%)	192(31.5%)	100(16.4%)	33(5.4%)	24(3.9%)
12	How often do you fear that life without the Internet would be boring, empty, and joyless?	73(12%)	139(22.8%)	152(24.9%)	98(16.1%)	89(14.6%)	59(9.7%)
13	How often do you snap, yell, or act annoyed if someone bothers you while you are online?	127(20.8%)	231(37.9%)	148(24.3%)	62(10.2%)	31(5.1%)	11(1.8%)
14	How often do you lose sleep due to being online?	81(13.3%)	157(25.7%)	169(27.7%)	109(17.9%)	68(11.1%)	26(4.3%)
15	How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?	131(21.5%)	231(37.9%)	142(23.3%)	61(10%)	35(5.7%)	10(1.6%)
16	You find yourself saying "just a few more minutes" when online	36(5.9%)	118(19.3%)	158(25.9%)	137(22.5%)	89(14.6%)	72(11.8%)
17	How often do you try to cut down the amount of time you spend online and fail?	41(6.7%)	122(20%)	177(22%)	126(20.7%)	87(14.3%)	57(9.3%)
18	How often do you try to hide how long you've been online?	134(22%)	168(27.5%)	147(24.1%)	80(13.1%)	39(6.4%)	42(6.9%)
19	How often do you choose to spend more time online over going out with others?	124(20.3%)	228(37.4%)	131(21.5%)	71(11.6%)	31(5.1%)	25(4.1%)
20	How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?	153(25.1%)	200(32.8%)	143(23.4%)	58(9.5%)	56(5.9%)	20(3.3%)
	TOTAL						
t test		8.56	16.44	25.7	12.54	8.72	7.9
df		19.0	19.0	19.0	19.0	19.0	19.0
p		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

(Note. * p < .05, ** p < .01, *** p < .001)

Table 2 shows a highly significant t-test for all the parameters of Internet Addiction Test. 9.5% of the participants agreed that they **always** stayed longer on the internet than intended. 25 (4.1%) participants agreed that they **always** neglect household chores to spend more time online. 31(5.1%) participants **always** prefer the excitement of the Internet to spending time with their friends, which can be very concerning for a healthy society. Only 6 (1%) of participants **always** make new friends

online, which shows that contacts are not well made or easily formed online. 28 (4.6%) participants agreed others in their lives **always** complain about the amount of time they spend online. 104(17%) participants' grades **frequently**, and 40 (6.6%) participants' grades **always** suffer due to staying preoccupied with the internet which can lead to poor academic performance. 72 (11.5%) 4.1% of the participants agreed that their productivity is always affected by staying on the internet. 59(9.7%) participants **always** feel that life without the internet will be dull and joyless. 148(24.3%) participants **occasionally** snap or yell if someone disturbs them, while they are online and 11(1.8%) **alway**s did so.

Table 3 (Internet Addiction Test)

Sl No	Gender	N	Normal (IAT score 0-30)	Mild (IAT score 31-49)	Moderate (IAT score 50-79)	Severe (IAT score 80-100)
1	Male	274	67 (24.45%)	132 (48.17%)	68 (24.81%)	7 (2.55%)
2	Female	336	119 (35.41%)	141 (41.96 %)	71 (21.13%)	4 (1.19%)
3	Total	610	186 (30.49%)	273 (44.75%)	139 (22.78%)	11 (1.803%)
P value (Chi-square test)			<0.001	<0.001	<0.001	<0.001

(Note. * p < .05, ** p < .01, *** p < .001)

As per the Internet Addiction questionnaire, 2.55% of males have a severe internet addiction, while 24.45% of males have a normal level of internet usage. For females, 1.19% have a severe internet addiction, and 35.41% have a normal level of internet usage. Additionally, 41.96% of females have a mild addiction, and 21.13% have a moderate addiction. Overall, only 30.49% of all participants have normal internet usage, and 1.803% have a severe internet addiction. Furthermore, 44.75% have a mild addiction, and 22.78% have a moderate addiction.

Table 4 (MHI and PSQI)

PSQI	>5 (POOR SLEEP)	3-5 (MODERATE)	< 3 (GOOD SLEEP)
M	190	64	20
L	216	98	22
T	406 (66.55%)	162(26.55%)	42(6.88%)
Goodness of fit (p value)	<0.001	<0.001	<0.001
MHI -5	<60 (MENTALLY UNHEALTHY)	≥ 60 (MENTALLY HEALTHY)	
M	134	140	
F	163	173	
T	297 (48.68 %)	313(51.31 %)	
Goodness of fit (p value)	<0.001	<0.001	

(Note. * p < .05, ** p < .01, *** p < .001)

As per the PSQI questionnaire, only 6.88% of students were found to have good quality sleep whereas 66.55% have poor quality sleep. 26.55% of students had moderate-quality sleep. As per MHI -5 score 51.13% had a≥ 60 cutoff score which means they are mentally healthy. 48.68% of the total participants were found to be mentally unhealthy.

Table 5 (Correlation Matrix)

		MHI	PSQI
MHI-5 score	Pearson's r	-	
	P - value	-	
PSQI score	Pearson's r	- 0.092*	-
	P - value	0.023	-
IAT score	Pearson's r	-0.362***	0.234***
	P - value	<0.001	<0.001

(Note. * p < .05, ** p < .01, *** p < .001)

Table 5 shows the correlation between the IAT Score, MHI-5 Score, and PSQI score. The IAT score is negatively correlated with the MHI-5 score but positively correlated with the PSQI score. A higher PSQI score indicates poor quality sleep, so it indicates IAT is Positively correlated with poor quality sleep. PSQI score is also negatively correlated with the MHI-5 score which indicates that if the PSQI score increases i.e.; sleep quality decreases then MHI-5 score will decrease i,e; mental health will decrease.

DISCUSSION

The association between internet addiction, mental health, and sleep quality highlights the interconnectedness of these domains and emphasizes the importance of adopting a holistic approach to student well-being. Collaborative efforts between educational institutions, healthcare providers, and policymakers are essential to address this multifaceted issue effectively. Table 1shows the demographic distribution of males and females in our study. Their average age and average age at which they have started using internet is almost similar for both males and females.

As in Table 2,3 we found that males are more addicted to the internet (2.55%) than females (1.19%). Overall, 1.98% of medical students have a severe addiction to the internet and only 30.49% have normal internet usage. 44.75% have mild internet addiction whereas 22.78% have moderate internet addiction. We have also found that only 4.3% of the population does not use internet on regular basis. Similarly, Sharma A et al; found that 57.3% were normal internet users but only 0.3% were addicted to internet usage. They also found that males were more addicted than females [9]. Gupta R et al found that 18% medical students were above the validated score for internet addiction [5]. 28 (4.6%) participants agreed that, others in their lives always complain about the amount of time they spend online, which may be a deterrent factor for healthy friendships or society.

Table 4, Pittsburg Sleep Quality Index (PSQI) shows poor sleep if the PSQI index is higher. >5 indicates poor sleep which was seen in 406 (66.55%) of students. < 3 PSQI index indicates good quality sleep which was seen in only 41 (6.72%) of students. 162(26.55%) students had moderate-quality sleep [11]. Mental Health Index- 5(MHI-5) scale scoring shows greater the score better is the mental health. 0 is the poorest and 100 is the best mental state and their cut-off value is at 60. 297 (48.68%) students were found to be mentally unhealthy as their MHI-5 score was <60. Students having ≥ 60 MHI-5 scores were 313 (51.31%).

As seen in Table 5, The relationship between internet usage, sleep quality, and mental health among medical and paramedical students has garnered significant research interest in recent years. The studies generally converge on the finding that excessive internet use, often characterized as internet addiction (IA), correlates negatively with sleep quality and mental health.

We found strong negative correlation of Internet addiction with mental health and sleep quality. Multiple studies have established a strong link between IA and poor sleep quality among medical students. For instance, Tahir MJ et al; in his study found that 67.6% of medical students scored above

30 on the Internet Addiction Test (IAT), indicating potential Internet addiction, while 73.5% of participants reported poor sleep quality according to the Pittsburgh Sleep Quality Index (PSQI)[12]. Another study conducted by Mahmoud OAA et al at Sohag University had similar findings to ours, indicating that students with internet addiction (IA) were more likely to experience poor sleep quality compared to those without IA [13]. The underlying mechanisms according to the researchers were: disrupted circadian rhythms, and the suppressive effect of blue lights on melatonin production which is emitted by screens.

Our study found that mental health is also significantly affected by excessive internet use which is similar to the findings of researchers like Dam VAT et al. As per their study students with higher levels of IA are more prone to experiencing depressive symptoms, anxiety, and general psychological distress [14]. Fabris MA et al, found that social media addiction harms the emotional well-being of adolescents [15]. A meta-analysis on Indian college students found that around 20-40% young population is at risk of internet addiction which is alarming [16]. Rao R et al found that one out of every three medical students are suffering from internet addiction and nomophobia which may result in a deterrent factor in their learning process [17].

The recent literature underscores the detrimental effects of excessive internet usage on both sleep quality and mental health among medical and paramedical students. These findings highlight the need for targeted interventions to promote healthy internet usage habits and improve sleep hygiene among this vulnerable population. Educational institutions should consider incorporating awareness programs and support systems to help students manage their internet use and mitigate its adverse effects on their well-being. There are WHO guidelines for healthy internet use which are either not well known, or not followed, and children and young adults are permitted to use screens and the internet sometimes it may start at a very young age—even during infancy. It is believed to be trendy to let kids use the internet at a very young age since parents are unaware of the harmful effects of overly early screen and internet use. A national policy for the use of the internet by young children, teenagers, and adults must be developed, especially in light of the rising trend of internet addiction in recent years and the high incidence of internet addiction in these age groups as shown by this study. Should this not be given top priority, it is not far that internet addiction may become a serious medical disorder which requires active and careful intervention.

The internet which is believed to increase our work efficiency and academic performance due to its addictive nature has led to decreased work output and academic failure as various studies have shown detrimental effects of internet addiction on brain, behaviour and performance which is similar to various other addiction [18]. It may be alarming as few other studies believe that internet addiction can lead to substance abuse which is alarming [19] as it will open up a plethora of problems for a country with highest number of youth population.

SUMMARY

The findings of this study underscore the need for targeted interventions to address internet addiction among medical students. Early education on healthy internet use, cognitive-behavioural therapy, sleep hygiene practices and mindfulness-based interventions may prove effective in promoting healthy internet usage habits and mitigating the adverse effects on mental health and sleep quality. While psychological distress, depression and anxiety are becoming more common among medical students it is important to control their internet usage which maybe one significant contributor.

Medical education curricula should incorporate modules on digital health literacy and self-regulation skills to equip students with the necessary tools to navigate the digital landscape responsibly.

In conclusion, this inter-institutional study provides valuable insights into the prevalence of internet addiction among medical students and its impact on mental health and sleep quality. By raising awareness and implementing targeted interventions, we can work towards promoting a healthy balance between online and offline activities, thereby safeguarding the well-being of future healthcare professionals.

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