Internet addiction and its effect on sleep quality among undergraduate medical students in Central India: A cross sectional study

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Abstract

Introduction: Over the last couple of decades, the internet has become an important element in everyone's daily lives but overuse of the internet causes various adverse effects on a person's physical, mental and social health. Sleep disturbance is one such problem faced which in turn can lead to fatigue, lower concentration, poor academic performance and overall poor health. Hence the study aims to assess the level of internet addiction, the associated factors and effect of internet addiction on sleep quality among undergraduate medical students.

Methods: This was a cross sectional study conducted among 372 undergraduate medical students for a period of 3 months using a self-administered questionnaire. Young's Internet Addiction Test (IAT) and Pittsburgh Sleep Quality Index (PSQI) were used to evaluate level of internet addiction and sleep quality respectively. Statistical data was analysed using Chi square test and Mann Whitney U test. Correlation between variables was assessed using Spearman's correlation.

Results: The mean age of study participants was 20.5 ± 1.71 SD. The prevalence of internet addiction in our study was 59.3%. Among them, 93 (25%), 73 (19.6%) and 25 (6.7%) students had mild, moderate and severe addiction respectively. 147 (39.5%) students were found to have poor sleep quality. The study found significant correlation between sleep quality and level of internet addiction ($r^2 = 0.234$).

Conclusion: More than half of the study participants had internet addiction. Internet addiction and sleep quality showed a significant correlation.

Keywords: Internet addiction, sleep quality, medical students, IAT score

Introduction

Over the last couple of decades, the internet has become an important element in everyone's daily lives as a tool for education, entertainment, business, telecommunication, networking, shopping, banking among its many other advantages. The term "internet addiction" was proposed by Dr. Ivan Goldberg in 1995 for pathological compulsive internet use.[1] Internet addiction is characterized by excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and internet access that lead to impairment or distress.[1] Other names for internet addiction are pathological internet use, internet dependence, problematic internet use and compulsive computer use[3,4]. Some types of internet addiction include net compulsions (online activities like online shopping, online gambling, trading stocks, etc), cyber relationship addiction, cybersex addictions, video streaming, compulsive information seeking and gaming addiction.[3]

Internet user population world-wide has increased from 360 million in December 2000 to 4.8 billion in June 2020.[4] Some causes of increasing internet use can be attributed to speed of internet, accessibility, intensity of information that can be assessed online, surge of digital technologies, convenience of getting information or communication.[5] Overuse of the internet can also cause various adverse effects on a person's physical, mental and social health. Physical effects include eye strain, headache, sleep deprivation, reduced sleep quality, back pain, carpal tunnel syndrome, binge eating and sedentary lifestyle both leading to weight gain, etc. It also impacts mental health by leading to anxiety, depression, poor academic or work performance.[6] There is increased susceptibility of facing cyber bullying, cyber racism, cyber shaming, increased chance of cyber suicide, social withdrawl.[7]

Sleep is an important factor for good health. Excessive internet usage may significantly affect the sleep cycle of the person which leads to insomnia, irregular sleep patterns and excessive daytime sleepiness.[8] Such sleep disturbance further causes fatigue, lower concentration, poor academic performance, reduced coping mechanisms. The relation between sleep and excessive internet usage is a vicious cycle. As per a hypothesis, excessive exposure to the light emitting diodes of screens particularly before bedtime, disrupts the biological clock and the circadian rhythm, thus leading to a phase delay and a slowing of melatonin secretion.[9] The consequences of this phase shift leads to sleep disturbances with later bedtimes, shorter sleep duration, diurnal hypersomnolence, and headaches.[10] The reverse is also true, since individuals who are predisposed to sleep disturbances or have existing sleep disturbances are likely to use internet as a measure to distract. Due to the academic pressure medical students are under, they tend to spend time on the internet for relaxation and hence are one of the most vulnerable populations to get addicted to the internet.[11] Hence the study aims to assess the level of internet addiction, the associated factors and effect of internet addiction on sleep quality among undergraduate medical students.

Material and Methods: A cross sectional study was conducted between January 2023 to March 2023 among 372 undergraduate medical students studying in Indira Gandhi Government Medical College in Nagpur, Maharashtra. Inclusions were all undergraduate medical students from 1st to final year of MBBS, who volunteered for the study and were using the internet for the last 6 months. Students who did not give consent to participate were excluded from the study. A self administered

questionnaire containing questions regarding socio-demographic details, internet usage, Young's 20 Item Internet Addiction Test (IAT) and Pittsburgh Sleep Quality Index (PSQI) were distributed to the students from all years. Students were assured confidentiality to avoid reporting bias. Young's 20 Item Internet Addiction Test is a self rated scale developed by Dr. Kimberly Young and contains 20 questions. Each question is rated on a likert scale ranging from 0 to 5 where 0 = Not Applicable, 1 = Rarely, 2 = Occasionally, 3 = Frequently, 4 = Often 5 = Always. The IAT total score is the sum of the ratings given by the examinee for the 20 item responses. The maximum score is 100 points. Higher score denotes higher severity of the problem. The score range are as follows: 0 to 30 points = Normal level of Internet usage, 31 to 49 points = Mild level of Internet addiction, 50 to 79 points = Moderate level of Internet addiction, 80 to 100 points = Severe Internet addiction.[12,13.] Pittsburgh Sleep Quality Index is a 19 item self reported questionnaire which measures 7 different components of sleep like subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each component is scored on a scale of 0-3. The total PSQI score, which ranges from 0-21 is then calculated by adding the 7 component scores. A score of more than 5 indicates poor sleep quality.[14]

Sample Size: According to a study conducted by Chaudhari B et al[5], prevalence of internet addiction (p) was 58.87%. Using the formula z^2pq/e^2, with 5% absolute error, sample size of 372 was obtained.

Statistical Analysis: Data collected was entered in MS Excel Sheet and analyzed using SPSS software Version 20. The qualitative data was expressed in number and percentage. The quantitative data was expressed in terms of mean and standard deviation. Categorical variables were compared using Chi square test. Scores of IAT and PSQI were compared using Mann Whitney U Test. Correlation between internet addiction and sleep quality was assessed using Spearman's rank correlation.

Results

Table 1 shows distribution of study participants as per level of internet addiction bases on Young's Internet Addiction Test score. It can be seen that 181 (40.7%) students had normal score, 93 (25%) had mild internet addiction, 73 (19.6%) students had moderate internet addiction whereas 25 (6.7%) students had severe internet addiction.

Table 2 shows distribution of study variables and their association with internet addiction. The mean age of study participants was 20.5 ± 1.71 SD. The total males in study were 180 (48.4%) and females were 192 (51.6%). Majority of the students were from 1st year of MBBS that is 148(39.8%), belonged to Class I as per modified BG Prasad scale 127 (34.1 %), currently resided in hostel that is 279 (75%), were singles 284(76.3%). Most of the participants scored between 60-70% in their academics 256(68.8%), 187 (50.3%) students used the internet for more than 5 hours a day and 219 (58.9%) used phone while eating. 270 (72.61%) students slept late due to phone usage. As per Pittsburgh Sleep Quality Index, 225 (60.5%) students had good sleep quality while 147 (39.5%) had poor sleep quality. There was significant association found between Internet addiction with current residence (p value = <0.001), relationship status (p value = <0.001), academic performance (p value 0.002), daily internet usage (p value = <0.001), phone usage while eating (p value = <0.001) and sleep quality (p value <0.001).

Table 3 and 4 shows the association between Internet Addiction Test and Pittsburgh Sleep Quality Index. Since the data was not found to be normally distributed (Shapiro Wilk Test - p value <0.001 and Homogeneity of Variances Test - p value <0.001), Mann Whitney U Test was used for analysis. The PSQI scores among students with internet addiction present and absent were 6.53±3.12 and 4.20±2.05 respectively. There was significant association found between Internet addiction and PSQI scores (p value < 0.001). The scores among students with good and poor sleep quality was 32.4±15.9 and 45.1±20.7 respectively. There was significant association found between sleep quality and IAT scores (p value < 0.001).

Figure 1 shows distribution according to the platform of internet usage. It can be seen that the majority that is 365 (98.1%) students spend time on social networking sites, 320 (86%) students spend time on streaming platforms, 278 (74.7%) students spend their time watching academic videos while 86 (23.1%) spent time on gaming. 59 (15.9%) students spend time on other platforms like trading of stocks, graphic designing, etc.

Figure 2 shows the effects of internet use. It was seen that 227 (61%) students experienced eye strain, 156 (41.93%) students formed a habit of overeating while using the internet, 80 (21.5%) students experienced headache, 76 (20.43%) experienced back pain. 57 (15.3%) students suffered from poor mental health while 35 (9.4%) students faced cyber bullying.

Figure 3 shows correlation between IAT scores and PSQI scores. Spearmann's rank correlation showed positive correlation between the 2 scores denoting that there is correlation between internet addiction and sleep quality. r^2 was found to be 0.234.

Table 1: Distribution of study participants as per level of internet addiction

Level of internet addiction	Number (%)
Normal usage	181 (40.7%)
Mild level	93 (25%)
Moderate level	73 (19.6%)
Severe level	25 (6.7%)
Total	372 (100%)

Table 2: Distribution of study variables and their association with internet addiction

Variables	Internet Addiction		Total	X^2, df, p value
	Present (n=191)	Absent (n=181)		
Gender				
Male	100 (55.6%)	80 (44.4%)	180	2.48, 1, 0.116
Female	91 (47.4%)	101 (52.6%)	192	
Socioeconomic class				
Class I	64 (50.4%)	63 (49.6%)	127	3.03, 3, 0.386
Class II	60 (51.7%)	56 (48.3%)	116	
Class III	49 (48%)	53 (52%)	102	
Class IV	18 (66.7%)	9 (33.3%)	27	
Current residence				
Hostel	170 (60.9%)	109 (39.1%)	279	41.1, 1, <0.001
Home	21 (22.6%)	72 (77.4%)	93	
Year of MBBS				

1st	69 (46.6%)	79 (53.4%)	148	2.29, 3, 0.515
2nd	55 (55.6%)	44 (44.4%)	99	
3rd	33 (53.2%)	29 (46.8%)	62	
4th	34 (54%)	29 (46%)	63	
Relationship Status				
Single	163 (57.4%)	121 (42.6%)	284	17.6, 1, <0.001
Committed	28 (31.8%)	60 (68.2%)	88	
Academic performance				
50%-60%	37 (68.5%)	17 (31.5%)	54	12.6, 2, 0.002
60%-70%	132 (51.6%)	124 (48.4%)	256	
>70%	22 (35.5%)	40 (64.5%)	62	
Daily Internet Usage				
3-5 hours	60 (32.4%)	125 (67.6%)	185	52.6, 1, < 0.001
> 5 hours	131 (70.1%)	56 (29.9%)	187	
Phone usage while eating :				
Yes	133 (60.7%)	86 (39.3%)	219	18.8, 1, <0.001
No	58 (37.9%)	95 (62.1%)	153	
Sleeping late due to phone usage				
Yes	168 (62.2%)	102 (37.8%)	270	46.6, 1, <0.001
No	23 (22.5%)	79 (77.5%)	102	
Sleep Quality (PSQI scale)				
Good	81 (36%)	144 (64%)	225	53.7, 1, <0.001
Poor	110 (74.8%)	37 (25.2%)	147	

Table 3: Association between Internet addiction and PSQI scores

	Internet addiction		P value
	Present (191)	Absent (181)	
PSQI scores	6.53±3.12	4.20±2.05	< 0.001

Table 4: Association between Sleep quality and IAT scores

	Sleep quality		P value
	Good (225)	Bad (147)	
IAT scores	32.4±15.9	45.1±20.7	< 0.001

Figure 1: Distribution of study participants according to the platform of internet usage.
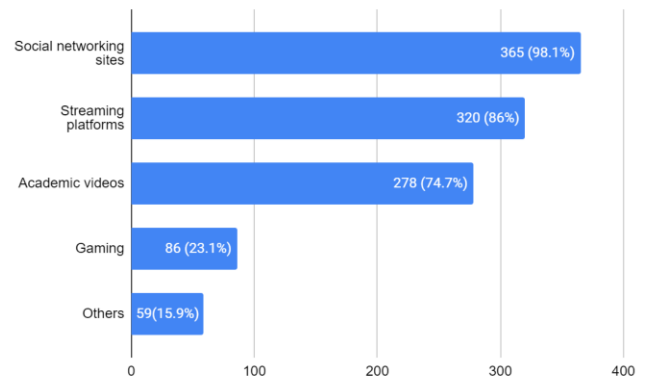

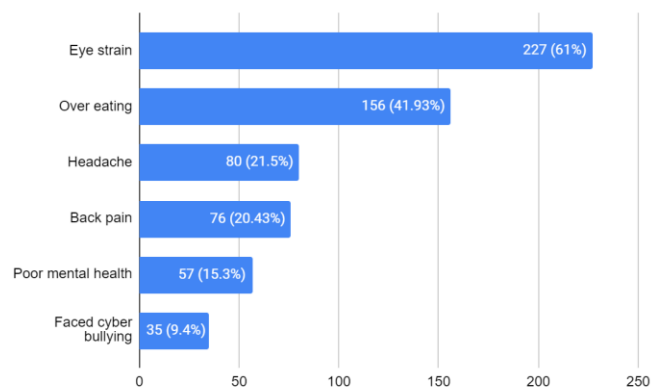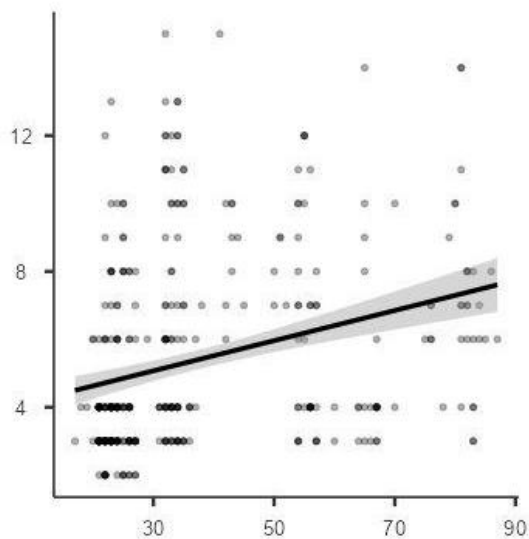Figure 2: Distribution of study participants according to effect of internet use on their health

Figure 3 shows correlation between IAT scores and PSQI scores

Discussion

Mean age of students in our study was 20.5 ± 1.71 SD, similar to findings by Chauhan N et al, Awasti A et al [15-16]. Our study included more female students than males, similar to some other studies by Sagar M et al [17], Nagori N et al [18], Raveendran R et al [19], Bhavaskar Y et al [20]. In our study, the majority of students belonged to Class I as per Modified BG Prasad scale. This finding was in accordance with findings by Dagdiya K et al [21]. Most students who participated in our study were from 1st year whereas in a study by Dagdiya K et al, majority of students participated were from 3rd year [21]. In this study, the prevalence of internet addiction was found to be 59.3% which is consistent with findings by Chaudhary B et al [5], Chauhan N et al [15], Singh HN et al [22]. But prevalence were more than findings by Chandrashekhar et al [11], Raveendran R et al [19], Andhi N et al [23], and less than studies by Aqueel K et al[4], Tahir MJ et al[8], Asokan A at al [24]. Most common reason for internet usage in our study was social networking sites, similar to findings by Shashiraj HK et al [25], Vaidya M

et al [26], Srijampana V et al [27], while it was for educational content in a study by Raveendran R et al[19]. In the above study there was no significant association found between internet addiction and gender, consistent with findings of Chandrashekhar et al [11], Awasthi A et al [15], Sengupta D et al [28], but in contrast to study by Aqeel K et al [4], Asokan A at al [24]. Our study also found a significant association between internet addiction and relationship status, in contrast to findings of Chauhan N et al [15]. In our study, there was significant association found between internet addiction and current residence, similar to findings by Chaudhary b et al [5], Awasthi A et al [15], Jain S et al [29]. There was no significant association found between internet addiction and year of study similar to findings by Singh HN et al [22]. We found a significant association between internet addiction and daily internet usage, consistent with findings of Aqeel K et al [4], Chandrashekhar et al [11], Asokan A at al [24].In our study, we found significant association between internet addiction and academic performance similar to findings of Mahmoud O et al [30] but not with findings of Chauhan N et al [15].Our study also found significant association between phone usage while eating and internet addiction, which were in accordance with findings by Chauhan N et al [15]. In our study, the prevalence of poor quality of sleep was 39.5%. Prevalence of poor sleep quality was lesser in study by Awasthi A et al [16] but was found to be more in studies by Chauhan N et al [15], Andhi N et al [23] and Nayak A et al [31]. In our study, significant association was found between sleep quality and IAT score, findings of which were consistent with the study by Sagar M et al [17] and Nagori N et al [18].There was also significant association found between Internet addiction and PSQI scores , which was in accordance with findings of Nagori N et al [18], Sengupta D et al [28], Nayak A et al [31], Tarrahi

M et al [32], Usmani S et al[33]. In our study, there was significant correlation found between IAT score and PSQI score, which were consistent with findings of Nagori N et al with $r^2 = 0.233$[18].

Conclusion

The prevalence of internet addiction in our study was 59.3%, out of which 93 (25%), 73 (19.6%) and 25 (6.7%) students had mild, moderate and severe addiction respectively. Social networking sites were the most used platform and eye strain was the most common problem experienced due to internet use. The study concluded that there was significant association found between internet addiction and current residence, relationship status, academic performance, daily internet usage, phone usage during eating, sleeping late due to phone usage and sleep quality. The study also found significant correlation between sleep quality and level of internet addiction.

Recommendation

1. Programs to increase awareness regarding internet use and its risk factors.
2. Promoting healthy recreationals activities that could lower internet use.
3. Counselling regarding improving sleep quality among students.
4. Strategies like screen-time alarms.

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