Original Research Article

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Prevalence of internet addiction and its association with quality of sleep among arts and science college students of Puducherry, India

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ABSTRACT

Background: College students are found to be heavy users of internet globally. Hence, present study was aimed to find the prevalence of internet addiction and the association of internet addiction with quality of sleep.

Methods: An institution-based cross-sectional analytical study was conducted among arts and science college students of Puducherry, India. Two arts and science colleges selected and proportionate stratified sampling was used for selecting the students. Young's internet addiction scale and Pittsburgh sleep quality index were used as study tools. **Results:** A total of 497 students participated in the study. The median age was 19 years, and 56.3% were males. The prevalence of mild internet addiction was 42% (95% CI 37.9-46.6), and moderate addiction was 18.7% (95% CI 15.5-22.3). Prevalence of poor sleep quality was 63% (95% CI 58.8-67.3). After adjusting for the covariates, male gender had high internet addictions (2.24 95% CI 1.84-2.72, p<0.001). Students with internet addiction had 1.67 times poor sleep quality compared to their counterparts (p<0.001). Students from 20 to 24 years had poor sleep quality compared to 18-19 years (p=0.040).

Conclusions: There was a high prevalence of poor sleep quality among college students and was associated with internet addiction.

Keywords: Addictions, Internet use, Sleep quality

INTRODUCTION

The world population has been on an upward track of internet usage, especially in India in the last decade.¹ Over 80% of the United States, United Kingdom, France, Germany, and Canada have an internet connection.² Indian has 560 million internet users, and the largest online market ranked behind China.¹ According to the report of IAMAI (Internet And Mobile Association of India), the total internet users in India would reach 371 million by June 2016.³ However, recent reports show that India's internet use will double to 730 million, leaving the USA far behind. A twofold increase in internet

penetration among the rural population at 730 against 350 million at the end of 2015.²

College Students are found to be heavy users of internet globally. Studies showed that 86% of college students go online than the general population (59%).⁴ An online study conducted in the 17-24 years age group in India reported that 93% of students access the internet every day, 73% accessed internet through mobile phones.⁵ Studies conducted on Internet Addiction were reported that Internet addiction is associated with sleep problems, including subjective insomnia and poor sleep quality.⁶ The poor sleep can contribute to acne and other skin

ailments.⁶ Studies conducted among adolescents showed that their cognitive and physical functioning are more negatively affected by poor sleep quality.⁷ Poor quality of sleep can raise our risk of getting some chronic health problems. It can also affect our thinking, work, and relationships with others.⁸ The worst affected population due to sleep-deprivation are college students.⁹

Several studies had been conducted globally on the prevalence of internet addiction. 9-15 In India, most of the studies on internet addiction among college students had been done among medical students and engineering students. However, 83% of the total students enrolled in higher education were from the arts and science group. Studies on Internet addiction among arts and science college students in India are few, and most of them included these students as a sub group.

Aim

The current study aimed to find the prevalence of internet addiction among arts and science college students of Puducherry, India. Also, we aimed to find the association between internet addiction and quality of sleep among those students.

METHODS

Study design, population, and setting

An institution-based cross-sectional analytical study was conducted among arts and science college students of Puducherry, India between June and November 2016. Two arts and science colleges, one government and one private, were selected. All students in the aged 18 years and above were included.

Sample size

The sample size was estimated to be 424, calculated using OpenEpi version 3.0, taking an absolute precision of 7%, assuming a prevalence of internet addiction to be 43%, non-response rate as 10%, and a design effect of 2 for clustering.¹⁶

Sampling technique

Proportionate stratified sampling was used for selecting a sample from each college. The sample size was estimated proportionately based on the student strength in each college. For a sampling of students within each college, simple random sampling was used. Each batch in the arts & science course was considered a cluster, and each course had three batches at any point in time. Only second and third year batches were included in the sampling. The total strength of students in government and private college was 1700 and 500 respectively. A list was prepared considering each batch of students as a cluster. Only second and third year batches were included. The average batch size was taken as cluster

size. Clusters of students included in the sample were selected using a simple random technique based on random sequence generated using a Microsoft Excel sheet. Out of 36 clusters (26 clusters in a government college and 10 in private college), 21 clusters were selected (16 clusters from Government College and five from private college) from 18 different courses conducted in two colleges. Three hundred seventy-eight students from government colleges and 119 students from the private college were selected proportionately from students' total strength in each college.

Study procedure

The study was undertaken after getting permission from the institute ethics committee and college authorities of the selected colleges. The data collection period was assigned to be during August to September 2016. In each class, after taking informed consent and giving instructions, self-administered questionnaires were distributed to all students who were using the internet at a single point in time. The questionnaire was pretested among 15 students from the college who were not involved in the sampling. It took 30-40 minutes for each individual to fill up the questionnaire. All the questionnaires were screened for non-response before collection.

Study tool

Young's internet addiction scale: it covers the degree to which internet use affects daily routine life, social interactions, productivity, sleeping pattern, and feeling. The total score can range from 0 to 100 and be categorized into normal (<20), mild (20-49), moderate (50-79), and severe (\geq 80) internet addiction groups. Pittsburgh sleep quality index: the PSQI differentiates "poor from "good" sleep quality. The total score can range from 0 to 21. The higher the score, the more is the sleep problem. A score greater than 5 is suggestive of a significant sleeping disorder (poor sleep quality). History of smoking and alcohol use: collected using the questions of STEP questionnaire, tea/coffee intake (frequency): collected using food frequency questionnaire. Tea/Coffee intake (timings) collected using a table of 24-hour recall questions. Written informed consent was obtained from the students before enrollin to the study.

Statistical analysis

The data entered using EpiData manager version 2.0.9.25. Data were analyzed using STATA 14. Continuous variables like age, IAT score, PSQI score were summarized as mean (SD) or median (IQR). Categorical variables such as gender, academic year, father's education, socio-economic status and smoking summarized as the proportion. Prevalence of internet addiction and poor sleep quality were summarized as the percentage with a 95% confidence interval (CIs). Associations of internet addiction and PSQ with various

factors were assessed using chi-square test, and strength of association reported using unadjusted prevalence ratio (UPRs). Log binomial regression model was done using variables had a p value less than 0.2 in the unadjusted analysis and adjusted prevalence ratios (APRs) with 95% CI was calculated, p<0.05 was considered as statistically significant.

RESULTS

A total of 497 students participated in the study. The median age was 19 (range 18-23) years, and male students were more (56.3%) than females.

Table 1: Sociodemographic characteristics of the students in arts and science colleges of Puducherry, India (n=497).

Variables	Categories	N	%
A == (======)	18-19	345	69.4
Age (years)	20-23	152	30.6
Gender	Male	280	56.3
	Female	217	43.7
A and amin man	2nd year	294	59.2
Academic year	3rd year	203	40.8
	Early childhood	174	35
	Primary	2	0.4
Fathers education	Lower secondary	195	39.2
	Upper secondary	55	11.1
	Post-secondary non-tertiary	40	8
	Short cycle tertiary	0	
	Bachelors or equivalent	24	4.8
	Masters or equivalent	7	1.4
	Doctoral or equivalent	0	
Residence	Urban	265	53.3
	Rural	232	46.7
Socio-economic class	Class I	47	9.5
	Class II	79	15.9
	Class III	139	28
	Class IV	164	33
	Class V	68	13.7
Access to internet	Mobile phone	282	56.7
	Computer	120	24.1
	Both	95	19.1

Almost 60% of the students are studying in the second year. The students coming from urban areas were higher (53.3%). More than one-third (35%) of student's fathers completed early childhood education, and the majority of the students belong to the lower social class, and 75% had

access to the internet through mobile phones (Table 1). The prevalence of internet addiction and poor sleep quality are depicted in (Table 2). The prevalence of mild internet addiction among students was 42% (95% CI 37.9-46.6), and moderate addiction was 18.7% (95% CI 15.5-22.3). Poor sleep quality was reported by 63% (95% CI 58.8-67.3). The association of sociodemographic factors with internet addiction is shown in (Table 3). Age of the student, gender, and academic year was significantly associated with internet addictions. After adjusting for the covariates, male gender had high internet addictions (2.24 95% CI 1.84-2.72) compared to the comparison group (p<0.001). The factors associated with poor sleep quality are depicted in (Table 4). Students with internet addiction had 1.67 times poor sleep quality compared to their counterparts (p<0.001). Similarly, students aged 20 to 24 years had poor sleep quality compared to 18 to 19 years (p=0.040). Other sociodemographic factors such as gender, academic year, area of residence, social class, coffee or tea intakes were not significantly associated with poor sleep quality.

Table 2: Prevalence of internet addictions and poor sleep quality of the students in arts and science colleges of Puducherry, India (n=497).

Prevalence	N	%	95% CI
Type of user (IAT score)			
Normal user (<20)	194	39	-
Mild addiction (20-49)	210	42.3	37.9-46.6
Moderate addiction (50-79)	93	18.7	15.5-22.3
Severe addiction (80-100)	0	0	-
Poor sleep quality			
Present	314	63.2	58.8-67.3
Absent	183	36.8	-

DISCUSSION

The prevalence of internet addiction in the current study using Young's internet addiction test was 61% (95% CI 56.65-65.15). The study conducted by Endreddy et al in Andhra Pradesh among medical college students of 17 to 25 years age group showed the prevalence of internet addiction as 76%, similar to the current prevalence. ¹⁷ Another study by Goel et al among college students of 16 to 18 years age group showed a low prevalence of 26% due to increased technological advancement and internet reachability during the past 5 years. ¹⁸ The current study shows male gender as a significant predictor of internet addiction. Most of the previous studies showed a statistically significant association between male gender and internet addiction, stating males are more likely to get internet addiction. ^{16,18-20}

Table 3: Sociodemographic factors associated with internet addiction among students in arts and science colleges of Puducherry, India (n=497).

Variables	Category	Total	Internet Addiction N (%)	Unadjusted PR (95% C)	Adjusted PR (95% CI)	P value
Age	18-19	345	190 (55.1)	1	1	-
	20-24	152	113 (74.3)	1.35 (1.18-1.54)	1.05 (0.92-1.20)	0.465
C 1	Male	280	226 (80.7)	2.27 (1.88-2.74)	2.24 (1.84-2.72)	< 0.001
Gender	Female	217	77 (35.5)	1	1	-
Residence	Urban	265	110 (41.5)	1.14 (0.91-1.43)	1.02 (0.91-1.17)	0.624
	Rural	232	84 (36.2)	1	1	-
Socio-economic status	Class I	47	29 (61.7)	1.05 (0.84-1.32)	1.11 (0.86-1.43)	0.417
	Class II	79	52 (65.8)	1.12 (0.90-1.40)	1.11 (0.91-1.35)	0.299
	Class III	139	81 (58.3)	1	1	-
	Class IV	164	98 (59.8)	1.12 (0.90-1.4)	1.01 (0.85-1.19)	0.909
	Class V	68	43 (63.2)	1.02 (0.81-1.29)	1.10 (0.91-1.33)	0.331
Academic year	2nd	294	164 (55.8)	1	1	-
	3rd	203	139 (68.5)	1.23 (1.07-1.41)	1.06 (0.93-1.21)	0.403

Table 4: Sociodemographic factors associated with poor sleep quality among students in arts and science colleges of Puducherry, India (n=497).

Variables	Category	N	Poor sleep quality N (%)	Unadjusted PR (95%CI)	Adjusted PR (95%CI)	P
Internet addiction	Yes	303	232 (76.6)	1.81 (1.52-2.16)	1.67 (1.38-2.02)	< 0.001
	No	194	82 (42.3)	1	1	-
Age in years	18-19	345	203 (58.8)	1	1	-
	20-24	152	111 (73.0)	1.24 (1.09 (1.41)	1.16 (1.01-1.34)	0.040
G 1	Male	280	206 (73.6)	1.47 (1.27-1.71)	1.17 (0.99-1.37)	0.066
Gender	Female	217	108 (49.8)	1	1	
A J	2nd	294	184 (62.6)	1	1	-
Academic year	3rd	203	130 (64)	1.02 (0.89-1.17)	0.90 (0.78-1.04)	0.147
Residence	Urban	265	168 (63.4)	1.00 (0.88-1.15)	1.03 (0.91-1.18)	0.606
	Rural	232	146(62.9)	1	1	-
Socio- economic class	Class I	47	32 (68.1)	1.25 (1.11-1.56)	1.25 (0.93-1.67)	0.132
	Class II	79	52 (65.8)	1.21 (0.96-1.52)	1.18 (0.91-1.52)	0.293
	Class III	139	90 (64.7)	1.18 (0.94-1.49)	1.21 (0.96-1.55)	0.110
	Class IV	164	103 (62.8)	1.15 (0.91-1.45)	1.17 (0.92-1.47)	0.193
	Class V	68	37 (54.4)	1	1	1
Coffee intake	Yes	135	88 (65.2)	1.04 (0.90-1.20)	1.01 (0.88-1.15)	0.904
	No	362	226 (62.4)	1	1	1
Tea intake	Yes	287	185 (64.5)	1.04 (0.91-1.20)	1.01 (0.90-1.16)	0.791
	No	210	129 (61.4)	1	1	1

In India, 61% of internet users are males.¹ This trend might be due to more freedom and cultural acceptance regarding internet access for males than females. The prevalence of poor quality of sleep in the current study was 63.2%. Previous studies that show similar results were those conducted by Isabella Wolniczak et al done in Peru (55%) and Lemma et al done in Ethiopia (53%) among college students. An Indian study done by Madhusudan et al reported a prevalence of 38%.²¹⁻²³ This low prevalence compared with the current study could be due to the smaller sample size (n=67) of the previous one

done among medical college students of 18 to 22 years. The current study showed that internet addicts were more likely to get poor sleep quality than those without internet addiction. Studies by Wolniczak et al and Tan et al also showed similar findings. ^{21,24} A meta-analysis study done by Bartel et al suggests that technology use alters bedtime and sleep, thus contributing to poor sleep quality. ²⁵ The current study tried to include a representative sample of the entire Arts & Science stream students of Puducherry by including students from government and a private college. Also, the study chose a proportionate stratified

sampling method to incorporate participants proportionately from two colleges.

Limitations

Limitations of current study were; firstly, the questionnaires were self-administering so that the actual cause for poor sleep quality among the participants could not be investigated. Qualitative study design could be a better design to explore it deeply. As the data collected from class rooms, the chances of social desirability bias cannot be ruled out. As we have included only one Government and one private college for the study, the generalizability of the findings is limited.

CONCLUSION

The current study showed that internet addiction is a major problem affecting 61% of arts and science college students of Puducherry. Every one out of two students in the arts & science stream were addicted to the internet. Sensitize college students about the importance of proper sleep, quality of sleep, and how it will interact with their mental health need of the hour. It is also essential to develop strategies to minimize internet addiction among these populations.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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