ORIGINAL ARTICLE

Association of Internet Addiction with Insomnia, Depression, Anxiety and Stress among University Students - A Cross-Sectional Study.

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Abstract

Background & Objectives: Internet is undoubtedly leading to the fourth industrial revolution. Use of internet comes with its misuse, namely Internet Addiction (IA). Mood disorders have been reported to be associated with heavy internet use, especially among young adults. We assessed the prevalence of IA and its association with insomnia, anxiety, depression and stress among University students. **Material & Methods**: In a cross-sectional survey using an anonymous, self-administered questionnaire, information on socio-demographic characteristics was collected from all willing students. Previously validated and standardized scales like Insomnia Severity Index (ISI), Depression Anxiety Stress Scale (DASS 42) and Young Internet Addiction Test (YIAT) were used. **Results:** Among 430 average YIAT score was 29.69 ± 16.66. Potential IA prevalence rate was 13% with a 95% CI of 10 - 16%. Prevalence of depression was 44.1%, Anxiety was 59.1% and stress was 37.2%. Significant correlations were found between potential IA and insomnia, stress, anxiety and depression (p-value < 0.0001). ISI, DASS stress scores were significantly associated with internet addiction. **Conclusion**: Potential internet addiction often exists with other psychological problems which warrant its detection in order to provide appropriate counselling and supervision.

Keywords

Introduction

Internet, undoubtedly leading to the fourth industrial revolution evolving at an exponential pace forming a communicative, social and economic transformation (1). The use of internet comes with its misuse, the Internet Addiction (IA), with harmful behavioral-psychological impact (2). IA is generally accepted as a subset of technology addiction associated with the compulsion to use Internet akin to other media addictions like television, without the use of an intoxicating drug (3). The Internet allows to meet, socialize and exchange ideas with online friends and some may develop an emotional attachment similar to the behavior of casino gamblers (4). Disrupting the real-life relationships,

individuals addicted to Internet spend more time in solitary seclusion and may create online profiles pretending to be other than themselves; many a times leading to clinical problems of depression and anxiety (5). Poor sleep quality, mood disorders, impulsivity and other health problems have been reported to be associated with heavy internet use (6-8). IA can also affect the orbito-frontal cortex due to which activities like planning, prioritizing, paying attention, remembering details and controlling emotions are affected (9). Across age, gender and ethnicity, IA prevalence have been reported to vary; but more commonly seen among the youth (10). In a first-ever study by the authors in the same study setting (11) revealed more than half of the medical undergraduates being affected by stress (53%), anxiety (66.9%) and depression (51.3%), that prompted to explore its association with internet use in a wider setting like among university students.

Aims & Objectives

To assess the Internet Addiction prevalence and its association with depression, anxiety, stress and insomnia.

Material & Methods

Study type: Cross-sectional, Study Population: Undergraduate students of Medicine, Dentistry, Nursing, Pharmacy, Law, Hospital Administration, Business Administration and Agriculture, Study Area: Siksha 'O' Anusandhan University, Odisha. Study duration: July – August 2017. Sample size calculation: Using the formula $n=Z^2pq/d^2$ (where Z=1.96 at 95% confidence; p= prevalence of internet addiction; q=1-p; and d= absolute allowable error). Since the prevalence of IA varied (42% to 76.6%) at various locations within India among similar age groups, with p=0.5; q=0.5; d=10% of p, a sample of 450 was considered with a non-response rate of 15%.

Inclusion criteria: Age more than 18 years. Willingness to participate. Exclusion criteria: Those having any chronic disease.

Strategy for data collection: Random numbers were generated from the line list of the students' registration numbers using randomizing software (https://www.randomizer.org/) and were contacted with the help of a designated faculty appointed by the head of the respective institution. Those who were absent on the day of the survey were replaced by the immediate next registration number. Using a self-administered anonymous questionnaire, information on socio-demographic characteristics

(name of the institute, age and gender) and personal history (h/o medication or chronic disease) was collected.
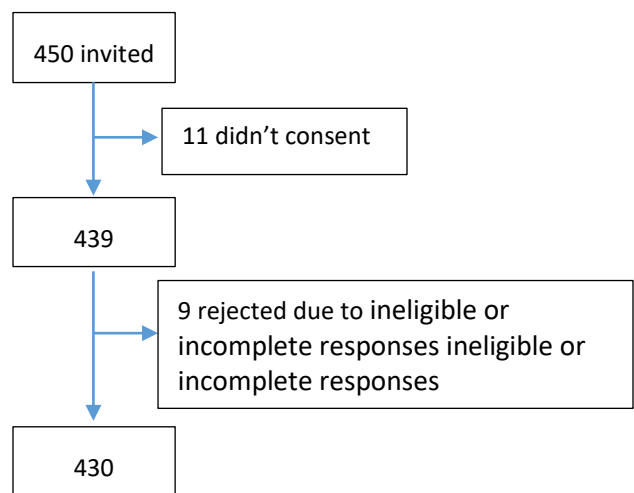
Previously validated and standardized scales were used like Insomnia Severity Index (ISI) (12), with 7 questions for capturing sleep problems, Depression Anxiety Stress Scale (DASS) (13), with 42 questions for mental state assessment and Young Internet Addiction Test (YIAT) (14) with 20 questions to determine the degree of addiction of internet.

Ethical approval: Approval taken from the institutional ethics committee.

Consent: Informed written consent was obtained.

Data analysis: The data was analyzed using SPSS software v20.0 (IBM Corp., Armonk, NY) licensed to the institute. Continuous data were expressed in terms of mean and standard deviation (SD) of mean and proportions in terms of percentages and confidence interval (CI). Data normality was checked by Shapiro-Wilk's test. Associations between continuous variables were carried out using Spearman's rank correlation and between categorical values using Man-Whitney U test. Multivariable logistic regression analysis was carried out to find the role of each significant variable in determining the relevant sub-scale scores. A p value of < 0.05 was considered significant.

Results

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│ 450 invited  │
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       │        ┌──────────────────┐
       ├───────▶│ 11 didn't consent│
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│     439      │
└──────┬───────┘
       │        ┌──────────────────────────────┐
       ├───────▶│ 9 rejected due to ineligible  │
       │        │ or incomplete responses        │
       │        │ ineligible or incomplete       │
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│     430      │
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450 students were invited to participate in the study, of whom 11 students did not consent (response rate 97.5%) and scripts of 9 students were rejected due to ineligible or incomplete responses. The mean age was 20.52 ± 2.26 (range 18-37yrs) with 42.3% males. The participants included 14.2% from the faculty of Dentistry, 11.9% from the faculty of Agricultural

Sciences, 11.2% from the faculty of pharmacy, 6% from the faculty of Law, 9.1% from the faculty of Management in Hospital Administration, 7% from the faculty of Nursing Sciences, 23.7% from the faculty of Medicine and 17.0% from the faculty of Bachelor in Business Administration.

Internet addiction prevalence (YIAT)

Prevalence of potential internet addiction (those who experience problems) was 13% (95% CI 10% - 16%). The average YIAT score was 29.69 ± 16.66 (Table 1).

Insomnia prevalence and severity (ISI): Prevalence of moderate to severe insomnia was 9.10% (95% CI 6.5% – 12.2%). The mean ISI score of the sample was 6.84 ± 4.84 (Table 1).

Depression Anxiety Stress Score (DASS-42): Normal DASS Anxiety score was reported by 40.9% of participants and the average DASS A score was 10.34 ± 6.75. Normal DASS Depression score reported by a majority (55.1%) of the participant, the average DASS D score was 10.26 ± 8.21. Similarly, normal DASS Stress score was reported 62.8% of participants and the average DASS S score was 12.90 ± 7.92 (Table 1). We evaluated the gender wise and institution wise differences of scores of Internet addiction, depression, anxiety, stress and insomnia severity (table not described). Except for the stress score, which was significantly higher among females there was no significant association between other scores across gender and the type of institution.

Associations between scores of internet addiction, insomnia, depression anxiety and stress showed that among potential internet users the ISI and DASS scores were significantly higher (Table 2). Moreover, a significant association existed between YIAT scores and other scores (table 3). The multivariate logistic regression analysis showed that ISI, DASS stress scores were significantly associated with internet addiction (table 4).

Discussion

In the present study, we assessed the prevalence of IA among the university students and its possible association with insomnia, anxiety, depression and stress. To the best of our knowledge, no similar study has been published from eastern India.

Though the age of the participants varied from 18-37 years, the majority (97.4%) of them were between the ages of 18-25 years. The prevalence of potential IA of 13% and mean YIAT score being 30 is akin to other studies published from within India and outside (7,15,16,17). Similar to other studies, there were no gender wise differences in IA (8,15) and there was no significant association with the stream of education (18) in our study setting.

While examining insomnia, we found that close to 38% of the participants had some degree of insomnia. Moderate to severe insomnia was noted in about 9% of the participants, which is comparable to other studies reported among university students (19). Further, insomnia was associated with the degree of internet addiction at statistically significant level after controlling for other scores; in accordance with the findings of other studies (7,15). Sleep problems could either be negative outcomes or manifestation of complications of internet addiction (20), but the reverse possibility cannot be ruled out as among young university students, sleep problems predict longer time spent on social networking (21).

Furthermore, our study reported a higher proportion of students suffering from depression and anxiety among potential internet addicts in univariate analysis. Contrary to the previously published literature that showed a correlation between pathological internet use and anxiety (22) and depression (23,24), it was not statistically significant in our study in the final regression model. However; stress scores were significantly associated with IA as reported by Sharma P et al (25) among school children.

Conclusion

Our study has revealed the problem of IA is very prevalent (13%) in this study setting and was associated with insomnia severity index and stress scores at significant level.

Recommendation

It could be hypothesized that growing burden of IA may have deleterious consequences leading to wide societal ramifications, which need to be addressed. Supervision and counselling of the students may help to lessen the degree of addiction that is prevalent among the adolescent subjects. Further, spreading awareness about these potential problems is of utmost importance.

Limitation of the study

Due to inherent study design, our findings should be interpreted with caution regarding causality. We did not evaluate the association with other addictions or

with the consequences of internet addiction like academic failures. Nonetheless, being the first ever study conducted in this study settings the findings of this study warrants further studies with robust designs.

Relevance of the study

Prevalence of IA among university students in this geographic location is quite high and is associated with insomnia and stress.

Authors Contribution

All the authors contributed substantially to the design, acquisition of data, analysis, interpretation, drafting of the article and final approval.

Acknowledgement

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Tables

TABLE 1 STUDENTS IN EACH CATEGORY OF THE THREE QUESTIONNAIRES: (N = 430)

Scale	Severity	N (%)
ISI	No Insomnia	265 (61.6%)
	Mild Insomnia	126 (29.3%)
	Moderate Insomnia	36 (8.4%)
	Severe Insomnia	3 (0.7%)
	Mean ± SD	6.84 ± 4.84
DASS D	Normal	237 (55.1%)
	Mild	69 (16.0%)
	Moderate	69 (16.0%)
	Severe	34 (7.9%)
	Extremely severe	21 (4.9%)
	Mean ± SD	10.26 ± 8.21
DASS A	Normal	176 (40.9%)
	Mild	43 (10%)
	Moderate	102 (23.7%)
	Severe	60 (14.0%)
	Extremely severe	49 (11.4%)
	Mean ± SD	10.34 ± 6.75
DASS S	Normal	270 (62.8%)
	Mild	60 (14.0%)
	Moderate	65 (15.1%)
	Severe	31 (7.2%)
	Extremely severe	4 (0.9%)
	Mean ± SD	12.90 ± 7.92
YIAT	No addiction	140 (32.6%)
	Average online user	234 (54.4%)
	Experience problems	56 (13.0%)
	Severe addiction	0 (0.0%)
	Mean ± SD	29.69 ± 16.66

TABLE 2 UNIVARIATE ANALYSIS OF THE RELATIONSHIPS BETWEEN ISI, DASS A, DASS S AND DASS D SCORES AND POTENTIAL INTERNET ADDICTION.

	Internet usage	N	Mean ± SD	P value
Insomnia severity index	Normal internet use	374	6.27 ± 4.53	.0001
	Potential internet addiction	56	10.66 ± 5.15	
Depression score	Normal internet use	374	9.32 ± 7.44	.0001
	Potential internet addiction	56	16.57 ± 10.17	
Anxiety score	Normal internet use	374	9.65 ± 6.38	.0001
	Potential internet addiction	56	15.00 ± 7.40	
Stress score	Normal internet use	374	11.92 ± 7.45	.0001
	Potential internet addiction	56	19.46 ± 7.94	

TABLE 3 UNIVARIATE ANALYSIS OF THE RELATIONSHIPS BETWEEN THE SCORES

Spearman's rho Correlations		Insomnia severity index	Depression score	Anxiety score	Stress score	YIAT score
Insomnia severity index	Correlation Coefficient	1.000	.367**	.354**	.416**	.375**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	430	430	430	430	430
Depression score	Correlation Coefficient	.367**	1.000	.765**	.783**	.490**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	430	430	430	430	430
Anxiety score	Correlation Coefficient	.354**	.765**	1.000	.819**	.484**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	430	430	430	430	430
Stress score	Correlation Coefficient	.416**	.783**	.819**	1.000	.514**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	430	430	430	430	430
YIAT SCORE	Correlation Coefficient	.375**	.490**	.484**	.514**	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	430	430	430	430	430
** Correlation is significant at the 0.01 level (2-tailed).						

TABLE 4 MULTIVARIATE REGRESSION ANALYSIS OF THE RELATIONSHIPS BETWEEN INTERNET ADDICTION AND ISI, DASS SCORES

Independent variables	B	S.E.	Wald	df	Sig.	OR	95% C.I. for OR	
							Lower	Upper
ISI	.109	.032	11.403	1	.001	1.116	1.047	1.189
Depress	.015	.030	.257	1	.612	1.015	.958	1.076
Anxiety	.012	.036	.102	1	.750	1.012	.942	1.086
Stress	.065	.033	3.788	1	.052	1.067	1.000	1.139
Constant	-4.141	.423	95.872	1	.000	.016		
a. Variable(s) entered on step 1: ISI, Depress, Anxiety, Stress.								