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Magnitude of Internet Addiction and Its Associating Risk Factors in Young Medical Students of Western Rajasthan, India

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Abstract
Background: Smartphone and internet has become the necessity of the society and students are more prone to addict in digital world. Internet dependency is compulsive behaviour that influences student health, studies and social relations. The prevalence of Internet addiction is rising worldwide especially among adolescents. The aim of the present study was to explores the prevalence of internet addiction and pattern of internet uses among young medical student and its association with various socio-demographical and behavioural factors. **Material and Methods:** Students were interviewed to predesigned proforma for socio-demographic profile and questionnaire for Internet Addiction Test (IAT). The total score of IAT $\geq$ 50 considered as internet addicted (IA), was main dependent variable, while age, gender, residence, medium of school education, type of family, socioeconomic status and social or behavioural problems were independent variables. Multinomial logistic regression was used to assess significance of internet addiction, *P*-value < .05 considered as significant. **Results:** The prevalence of internet addiction was 24% among young medical students. Students residing with parents or local guardians were more internet addicted (34%) than those residing in hostel (20%), and also the students showing self-injurious behaviour statistically significantly internet addicted (62.5%) than those not having such behaviour (23%). Other studied variables were not found associated with internet addiction. **Conclusion:** The internet addiction prevalence was 24% among medical students. The students staying at home were having 2.526 time more chances of internet addiction that those staying at hostel. Likewise, the students having internet addiction had 5.122 times more chances of self-injurious behaviour than their counterparts.
Keywords: Internet Addiction, Prevalence, Medical Students

Introduction

The technology has become an inevitable part of our lives across all age groups in both urban and rural areas. The youth is using more and more internet ending at the level of addiction. Internet addiction was first reported in the mid-1990s and the conceptual framework was first developed by Kimberly S. Young[1]. Internet addiction is an internet dependency and compulsive behaviour which interfere with several domains of our life (health, interpersonal relationship, work environment)[2]. The prevalence of internet addiction is 6% in the world population with a range of 2.6 % in Northern and Western Europe to a high of 10.9% in the Middle East[3]. The prevalence of internet addiction is 0.7% in India[4], but it is high among students (28.6% in Jaipur city)[5], mainly in medical students (34.8% Nagpur[6], 47% Bengaluru[7].

The impact of internet use in education mainly medical students of Western Rajasthan yet not been explored, though they are frequently using the internet for exploring new advances in medical research, relevant literature and for their studies. The information regarding the effect of various social and demographical domains on internet addiction is still scarce and inconsistent.

Medical students who being in the age of youth are more inclined towards the internet. At the same time, they are exposed to the new

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environment of medical studies, which demands a high level of concentration in studies. So, the present study is hypothesized to explore the prevalence of internet addiction among young medical students with the distribution pattern of internet users.

Materials and Methods

A cross-sectional type of observational study was conducted among students of MBBS (Phase-1) after taking approval from the institutional research review board and ethical committee. Out of total 250 students, only 215 MBBS students were keen to participate on the date of data collection and after their consent, were included for study purpose. Accordingly, 35 students were excluded from the study that falls under the following factors - absent on the day of the survey, seriously ill, not willing to participate or filled incomplete questionnaires for the study.

Procedure

To collect data, keen students were introduced to a predesigned proforma, which had information regarding socio-demographic profile like age, gender, parental residence, place of stay, medium of school education and socio-behavioural problems like any personal and family problem were recorded. Socioeconomic status was classified according to the revised B.G. Prasad Scale[8]. The participants were also subjected to a questionnaire related to Young's Internet Addiction Test (IAT) for assessing internet addiction[1].

Internet Addiction Test (IAT)

It consisted of 20 questions and the respondent was expected to answer each question based on a five-point Likert scale (1 = rarely, 2 = occasionally, 3 = sometimes, 4 = often, and 5 = always). A total

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score was the sum of all items giving a range of 20 to 100 where a higher score indicates a greater level of Internet Addiction (IA).

The score ranges were defined as follows:

Mild (20-49 score): Complete control of internet use (Normal)

Moderate (50-79 score): Overuse with frequent problems and full impact on life (Mild IA)

Severe (80-100 score): Internet addiction with significant problems (Severe IA)

The total score ≥ 50 considered as internet addicted (IA), was the main dependent variable used in the study. The other independent variables were age, gender, parental residence, place of study, medium of school education, and any social or behavioural problems.

Statistical analysis

All data were analysed using excel and primer version (6.0). The quantitative data regarding socio-demographic variables, presented in percentage & proportions. Chi-square test and odds ratio was used to assess the significance of internet addiction among various socio-demographical and behavioural variables. Multinominal logistic regression was also applied to reveal the most affected factor of Internet addition by using IBM SPSS Statistics 20. Internet addiction was taken as dependent variable with first reference category. *P*-valve < .05 considered as significant.

Results

Out of 250 students, 215 (86%) were eligible for the present study. Eligible students were with male predominance (M: F=1.69) and the majority (47%) were 18 years old, followed by 19 years, 20 years, 21 years, 17 years, and 22 years, respectively. There was a slight predominance of urban students and English medium students from their respective counterparts. The majority (59%) of students were living in the hostel and remaining at home with parents (24%) and only a few (9%) reside outside the campus. The majority of students (more than half) belongs to a nuclear family and class-I socioeconomic status. The social and behavioural pattern of medical students depicts presence of social problem only in 13 % of students and self-injurious behaviour was present in 4% of participants. Remaining students did not report any social and behavioural problems (Table-1).

Table 1: Socio-demographic and behavioural profile of young medical students (N=215)

Variables		Frequency	Percentage
Gender	Male	135	**63%**
	Female	80	37%
Age (years)	17	10	5%
	18	83	**47%**
	19	63	32%
	20	41	22%
	21	14	7%
	22	3	1%
	23	1	0.03%
Parental Residence	Urban	113	**53%**
	Rural	102	47%
Medium of Study	English	125	**58%**
	Hindi	90	42%
Place of Stay	Home	52	24%
	Hostel	127	**59%**
	Outside	20	9%
	Local Guardians	16	7%
Family Type	Nuclear	123	**57%**
	Joint	79	37%
	3-Generation	13	6%
Socioeconomic Status	I	126	**58.6%**
	II	38	17.6%
	III	19	8.8%
	IV	22	10%
	V	10	4.6%
Social Problems	Chronic Illness in Family	11	5%
	Father Alcoholic	6	3%
	Single Child	3	1%
	Single Parent	6	3%
	Single Parent & Single Child	1	0.46%
	No Parents	1	0.46%
	Economical Problem	1	0.46%
	Not Applicable	186	**87%**
Self-injurious Behaviour	Present	8	4%
	Not Present	207	**96%**

Notes: N - Number of subjects

The prevalence of internet addiction was 24%, out of which only one female student was severely addicted (0.5%), while 76% of students were not addicted and had complete control of internet use (Figure-1). The mean score of internet addiction for medical students was 39.01 with SD ±16.99, which showed mild internet addiction but towards the higher side.
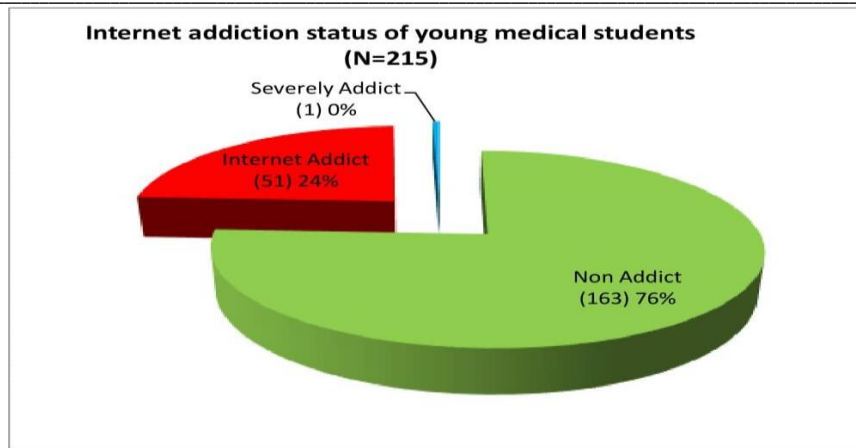
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Fig. 1: Internet addiction status of young medical students (N=215)

The association of internet addiction with various independent variables is presented in Table-2. It reveals a statistically significant difference (*P*=0.038) in internet addiction among medical students those residing with parents or local guardians, then those living in the hostel or outside of campus. Students who lived with parents or local guardians were statistically more internet addicted than their counterparts. Similarly, students who had self-injurious behaviour were found statistically more internet addicted than the other students without such behaviour (*P*=0.031).

In other dependent variables though statistically non-significant but still high predominance of internet addiction was found in male participants (1.4 times) and younger students (1.6 times), from Hindi medium of school education background (1.2 times), and those having no social problem (1.5 times). Students living with parents or local guardians (1.7 times) and having self-injurious behaviour (2.7 times) were statistically more internet addicted than their respective counterparts. While no difference in the pattern of distribution regarding internet addiction with respect to socioeconomic status and parental residence (Urban / Rural) was observed (Table 2).

Table 2: Association of Internet Addiction with various variables in young medical students

Variables		Internet Addiction Status		χ^2 test *P*-value *df*=1	Odds Ratio *(CI 95%)*
		Yes (IAS≥50) Number (%)	No (IAS<50) Number (%)		
Gender	Male (N=135)	37(27%)	98(73%)	1.60 *P*=0.205	1.63 (0.8, 3.2)
	Female(N=80)	15(19%)	65(81%)		
Age (Years)	<20 (N=156)	42(27%)	114 (73%)	1.810 *P*=0.178	1.80 (0.8, 3.8)
	≥20 (N=59)	10(17%)	49(83%)		
Parental Residence	Urban(N=113)	28(25%)	85(75%)	0.003 *P*=0.957	1.07 (0.5, 2.0)
	Rural(N=102)	24(24%)	78(76%)		
Medium of Study	English(N=125)	28(22%)	97(78%)	0.31 *P*=0.576	0.79 (0.4, 1.5)
	Hindi (N=90)	24(27%)	66(73%)		
Place of Stay	Parents / local Guardians(N=68)	23(34%)	45(66%)	4.29 *P*=0.038*	2.08 (1.1, 3.9)
	Hostel / Outside (N=147)	29(20%)	118(80%)		
Social Problem	Present (N=29)	5 (17%)	24(83%)	0.49 *P*=0.480	0.62 (0.2, 1.7)
	Absent (N=186)	47(25%)	139(75%)		
Self-Injurious Behaviour	Present (N=8)	5(62.5%)	3(37.5%)	4.65 *P*=0.031*	5.67 (1.3, 24.6)
	Absent (N=207)	47(23%)	160(77%)		
Family Type	Nuclear (N=123)	27 (22%)	96 (78%)	0.52 *P*=0.469	0.75 (0.4, 1.4)
	Joint/extended/3-generation(N=92)	25(27%)	67(73%)		
Socioeconomic Status	Upper (Group I) (N=126)	30(24%)	96(76%)	0.001 *P*=0.993	0.95 (0.5, 1.8)
	Lower (Group II, III, IV, V) (N=89)	22(25%)	67(75%)		

Notes: IAS-Internet Addiction Scores; χ^2- Chi-Square test; *P*-value < .05 as Significant; *df* - Degree of Freedom; CI-Confidence Interval; N-Number of subjects

Multinominal logistic regression status of Internet addition with various factors like type of family, social problem in the family, place of stay, medium of study and self-injurious behaviour inferred that there was a significant difference (*P*=0.019) in intercept only and final of LR statistics (Likelihood Ratio). So at least one of the regression coefficients in the model was not equal to zero. In other words, status of Internet addition was significantly affected by one or more studied factors (Table 3).

Table 3: Multinominal logistic regression of status of Internet addition with various# factors (Model Fitting Information)

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	χ^2 test	*df*	*P*-value
Intercept Only	68.276			
Final	54.721	13.555	5	.019*

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Notes: #Type of family, Social problem in the family, Place of stay, Medium of study and Self injurious behaviour; χ^2- Chi-Square test ; *df* - Degree of Freedom ;* *P*-value < .05 as Significant

On further analysis, LR ratio was found higher of every studied variable but it was found significant only for place of stay (*P* =.006) and self-injurious behaviour (*P* =.032) (Table 4).

Table 4: Likelihood Ratio Tests of Various Factors# with Internet Addiction

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	χ^2 test	df	P -value
Intercept	54.721[a]	.000	0	.
Family Type	56.186	1.466	1	.226
Social Problem	55.582	.861	1	.353
Medium of Study	55.009	.288	1	.591
Place of Stay	62.207	7.486	1	.006*
Self-Injurious Behaviour	59.298	4.577	1	.032*
Notes: #Type of family, Social problem in the family, Place of stay, Medium of study and Self injurious behaviour; χ^2 - Chi-Square test; *df* - Degree of Freedom; **P*-value< .05 as Significant; [a] This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.				

Among the medical students, the place of stay and self-injurious behaviour had a significant impact on internet addiction. As the place of stay (B=.927, Wald=7.470, *P*=.006) and self-injurious behaviour (B=1.633, Wald=4.422, *P*=.035) increased by 1 unit the probability to increase the internet addiction by 2.526 and 5.122 times, respectively. It was revealed that students staying at home were having 2.526 time more chances of internet addiction than those staying at hostel home.

Likewise, the students having internet addiction had 5.122 times more chances of self-injurious behaviour than their counterparts. In fact, place of stay was the factor which affect the status of Internet addition and self-injurious behaviour may be the effect of internet addiction. All other parameters (family type, medium of study, social problem) of medical students was not statistically significant (Table 5).

Table 5: Multinominal logistic regression of status of Internet addition with various# factors

Parameter Estimates									
Internet Addiction Status[a]		B	Std. Error	Wald	df	P -value.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Internet Addict	Intercept	-1.014	.293	11.937	1	.001			
	[Family type=1] Nuclear	-.403	.334	1.460	1	.227	.668	.347	1.285
	[Family type=2] Joint	0[b]	.	.	0	.	.	.	.
	[social problem=1] Present	-.452	.502	.812	1	.368	.636	.238	1.702
	[social problem=2] Absent	0[b]	.	.	0	.	.	.	.
	[Medium of study=1] English	-.180	.335	.289	1	.591	.835	.433	1.610
	[Medium of study=2] Hindi	0[b]	.	.	0	.	.	.	.
	[Place of stay=1] Home	.927	.339	7.470	1	.006*	2.526	1.300	4.909
	[Place of stay=2] Hostel	0[b]	.	.	0	.	.	.	.
	[Self-injurious behaviour=1] Present	1.633	.777	4.422	1	.035*	5.122	1.117	23.475
	[Self-injurious behaviour=2] Absent	0[b]	.	.	0	.	.	.	.

Notes: #Type of family, Social problem in the family, Place of stay, Medium of study and Self-injurious behaviour; *df* - Degree of Freedom; *P*-value < .05 as Significant; [a]The reference category is: Not Addicted; [b]This parameter is set to zero because it is redundant;

Discussion

The present study depicts 24% (52 out of 215) of the medical students were internet addicted with internet score more than 50 indicating the overuse of internet with frequent problems and full impact on life. The distribution pattern of internet showed that young males, living with parents or local guardians, with no social problem, from Hindi medium of school education and joint family, and having self-injurious behaviour were more addicted to the internet than their counterparts while no difference with respect to socioeconomic status and parental residence was observed among medical students.

The global prevalence of internet addiction reported in a meta-analytic study (from 1996 to 2012) was 6.0 % among 31 countries included 89,281 participants with the highest (10.9%) in the Middle East and lowest prevalence (2.6%) in Northern and Western Europe[3]. In China, the rates of internet addiction ranged from 6% to 10% (9-11). Few studies conducted in Europe and the United States found prevalence of Internet addiction from 7.9% to 25.2% among adolescents[12-15] while in the Middle-East and Africa it ranged from 17.3% to 23.6%[16,17]. High variation in prevalence (ranging from 8.1% to 50.9%) was shown among young people and adolescents of Asia[18,19].

According to a study, the addiction problem in India is real and at least 24.6 per cent of adolescents in 2016 have problematic internet use or internet addiction disorder (IAD)[20]. Several smaller studies, restricted to particular cities found more inclination of students towards internet[5,7,21-23]. Internet addiction among high school students of Jaipur city[5] was 28.57%, while in undergraduate medical students of Wardha, Maharashtra[21] it was 19.85%, with

moderate and severe addiction being 19.5% and 0.4%, respectively, and at Jabalpur Medical College[22] internet addiction score was towards normal still at higher side (mean 31.99 ±18.20). A cross sectional study conducted among 140 first year medical students of Bengaluru Medical College showed prevalence of internet addiction 47.14%[7]. While Nagpur Medical College of Maharashtra showed 34.83% of medical students were possibly addicted and 3.68% were severely addicted[23].

Present study on Ist year MBBS students shows a moderate level of internet addiction among medical students, 23.5% are found addicted and 0.5 % severely addicted. The finding of the study is consistent with Shyam H R which indicates 24.6% prevalence of internet addiction in India[20]. As per the present study, the prevalence of internet addiction in Ist year medical students is higher than the medical students of Wardha Maharashtra[21], and lower in comparison to high school students of Jaipur city (28.57%)[5], medical students of Bengaluru (47.14%)[7] and Nagpur Maharashtra (34.83%)[23].

Possible mechanism

As a result of affordability and easy access to touch screens mobiles, tablet devices and WiFi, India is witnessing overuse of the internet, especially among students. In the present study, male subjects were more internet addicted than their counterparts with a non-significant effect than in contrast to the study of Khan MA *et al* that showed no difference of gender[24]. In this survey, younger students were more inclined towards internet addiction as the young age students are more enthusiastic to explore and surf more on the internet.

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The students belonging to the Hindi medium of school education were more addicted to the internet may be to overcome the language problems in studies as they face relatively high pressure to cope with studies. Also, students living with parents or local guardians were more addicted to the internet significantly than those living in the hostel and outside.

Students with self-injurious behaviour were significantly addicted to the internet than their counterpart. Above may be their personality influences the addictive behaviour. Due to the easy and cheap availability of the internet and smartphones, no difference in socioeconomic status was observed.

The present study found 24% internet addictive behaviour among medical students, more in young males living with parents or local guardians with no social and family problems.

Strengths & Limitations

The strength of the present study was that the majority of Ist Phase MBBS students (86%) participated in the survey, only one form was incomplete, remaining (34) students were absent on the date of data collection may be due to some personal reasons. We were unable to collect internet addiction data from all medical students and to follow up the addiction level with time.

Implications

After calculating the scores of internet addiction, we informed the students about their internet status and advised them to control its usage so that it does not affect their study, personal and social life. The students who suffer from self-injurious behaviour were advised to consult a psychiatrist, who is one of the researchers of the study. The early detection and appropriate prevention for the individual, prone to internet addiction at an earlier stage, can facilitate better treatment. Awareness and identification are key to control addictive behaviour and this survey helps medical students to suggest the judicial use of the internet.

Recommendation

There should be a regular practice for all medical students to check their internet addiction behaviour and dialogues to address hesitation in taking counselling with the psychiatrist. The mechanism will create confidence in students that addiction is not any stigma, it is the normal tendency of a human being but one should be vigilant about it.

Conclusion

Internet addiction behaviour was prevalent in 24% of medical students, that too comparatively more among young males residing with the parents or local guardians and suffering from self- injurious behaviour. In fact, the place of stay was the factor that affects the status of Internet addition and self-injurious behaviour may be the effect of internet addiction as revealed by multiple logistic regressions analysis than the students staying at home were having 2.526 time more chances of internet addiction than those staying at the hostel. Likewise, the students having internet addiction had 5.122 times more chances of self-injurious behaviour than their counterparts. The study suggests that parents need to be vigilant towards the internet addictive behaviour of their children.

Acknowledgements

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