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Prevalence of Pathological Internet Use during Coronavirus Pandemic Lockdown and its Determinants amongst M.B.B.S. Undergraduates of Himachal Pradesh, India

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Abstract

Background: Recent studies showed that excessive internet use is associated with depression, hostility, low self-esteem, and emotional instability. To further delve into the untouched domain of Internet Addiction, this study was conducted.

Aims:

1. The prevalence of Internet Addiction Disorder amongst medical students of Himachal Pradesh during the COVID-19 lockdown.
2. To determine the association of personal, social and internet-related factors with internet-addiction.
3. To determine association of various neurotic traits with Internet Addiction Disorder.

Methods: Out of 2020 medical students from government medical colleges of Himachal, 366 participated via a semi- structured proforma which included questions about usage of internet along with Internet Addiction Test (20-item self-reported questionnaire scale) and DSM-V Criteria for Pathological Internet Gaming. Epi-Info Version 7.2.4.0 was used for statistical analysis.

Results: Amongst 218 female and 148 male students with mean age 20.91 years (±1.5) the prevalence of internet addiction amongst male and females turned out equal after the lockdown (85.8%) while before lockdown it was less for males (81.8%) than females (82.6%). The score was found high after the lockdown in those students who have one sibling, mother profession as house maker and those who primarily use internet for gaming.

Conclusion: As majority of medical students at Himachal Pradesh are internet addict, attention should be focused at this behavioural addiction and awareness should be increased among students and faculties of college to detect students at risk.

Keywords: Addiction, Covid-19, Depression, DSM-V

Introduction

As of November 2019, India has about 504 million Internet users[1] compared to 42 million in 2008[2]. Thus, there has been explosive growth of internet use in India in last decade. Although these figures seem to be a sign of advancement of our country but, as pointed out by Young, 1996, technology is changing the nature of problems.

The excessive use of internet has been described in literature since 1970s but it was Ivan Goldberg who in 1995 first proposed that excess use of internet may be considered as Internet Addiction (IA)[3].

Young was the first to construct diagnostic criteria for "Problematic Internet Use" and she did so by modifying the diagnostic criteria for "Pathological Gambling of Diagnostic and Statistical Manual of Mental Disorders Version IV (DSM-IV)[4]. Internet Addiction Test (IAT) appears in her book, Caught In The Net.

The maladaptive use of internet has been referred by different labels by different researchers such as internet addiction[5,6], internet dependency[7], pathological internet use (PIU)[8,9], or internet addiction disorder (IAD)[3].

According to the American Centre for Online Addiction, indeed, five specific types of Internet Addictions have been identified in general terms:

1) Cyber Sexual Addiction. Addicted people download, use and trade cyber pornographic materials and they are also very often involved in adult chat rooms, obsessed by cyber-sex and cyber pornographic materials.

2) Cyber Relationship Addiction. Addicted people turn out to be too much involved with cyber relationships and they can even be caught up in cyber adultery (Lavenia, Marcucci, 2005).

3) Social Network Addiction. All virtual communities' which people can create public or semi-public profiles. Facebook is the most famous social network; it counts 60 million of users constantly growing.

4) Net Gaming Addiction. It includes a wide range of behaviours like gambling, video games, shopping and obsessive e-trading.

5) Information Overload. Also known as information overload addiction. The abundance of information on the Internet creates a new compulsive behaviour which is related to the web surfing or searching of databases. Addicted people use more and more time to search and organize data. An obsessive-compulsive tendency and a reduction of work productivity are connected with this type of addiction.

6) Computer Addiction. In the 80s, computer games such as Solitaire and Minesweeper were programmed into computers and researchers found that obsessive computer game playing became problematic in organizational settings (Guerreschi, 2011).[10]

Although Pathological Internet Gaming is recognised by DSM-V under Section-III: Conditions for Further Study and by ICD-11 under gaming disorder, but none of them recognise Pathological Internet Use as a disorder in itself; nor does ICD-11. But DSM-V notes that only nongambling internet games are included in this disorder. Use of internet for required activities in a profession, recreational and social internet use and sexual internet sites are excluded from this disorder.[18, 19]

Recent studies showed that excessive internet use is associated with depression, hostility, low self-esteem and emotional instability.[11]

During recent times due to outbreak of Covid-19 and implementation of lockdown all over the world have given birth to a hidden current of behavioural addictions,

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which is sufficient enough to exert its powerful shock affecting predominantly adolescents and young adults. Lockdown, isolation, loss of job, financial burden, stress, depression, anxiety, phobia and lastly availability of plenty of leisure time all together put forward a fertile field on which behavioural addictions start growing relentlessly.[12] During this lockdown, most of the medical colleges were also closed and classes were taken thorough online platforms which increased screen time of students over the internet. Availability of internet increased and leisure time along with anxiety, phobia, stress and depression led this behavioural addiction to grow.

Prevalence of Internet Addiction

Prevalence of Internet addiction amongst students vary from 8.1% - 39.6% in different countries and the variation can be attributed to different instruments used for studies. According to a study, the addiction problem in India is real and at least 24.6 % of adolescents have problematic internet use or IAD.[16]

The prevalence of Internet addiction as resulted in various studies is shown in Table 1[13]

Table 1: Prevalence of Internet addiction amongst students

Year	Author	Country	Subject	Number of subjects	Percentage of Internet addiction	Assessment tools
1997	Scherer	South America	College	531	13.0	Internet Dependence
2000	Chou and Hsiao	Taiwan	College	910	5.9	IAS
2000	Morahan-Martin and Schumacher	US	College	283	8.1	PIU scale
2001	Anderson	US	College	1300	9.8	Internet Dependence
2001	Wang	Australia	College	293	9.6	IAD
2002	Mingyi	China	College	500	6.4	IAD
2002	Lin and Tsai	Taiwan	High school	753	11.7	Chinese IAS
2004	Johansson and Gotestam	Norway	12-18years	3237	10.7	IAS 40 or more
2004	Sato	Japan	College	242	9.1	IAS 40 or more
2005	Niemz et al	UK	College	371	18.3	PIU scale
2006	Kim et al.	Korea	High school	1573	39.6	IAS 40 or more
2013	Deepak Goel et al.[14]	India	College(16-18 years)	987	74.5%(Moderate users) 24.8% (Possible Addicts) 0.7%(Addicts)	IAT
2015	Bhushan Chaudhary et al.[15]	India	College (Medical students)	282	51.42%(Mild) 7.45%(Moderate) 0%(Severe)	IAT
2015	Arun Vijay Paul. R Chellavel Ganapathi. K Duraimurugan .M et al.[20]	India	College students	596	41.3% (Mild) 15.2%(Moderate) 0%(Severe)	IAT

2017	Sachin R Gedam et al.[17]	India	College (Medical students)	846	19.5%(Moderate) 0.4%(Severe)	IAT

(IAS: Internet Addiction Scale, PIU: Pathological Internet Use, IAD: Internet Addiction Disorder, IAT: Internet Addiction Test)

Objective of the Study

We undertook the study with objectives to estimate:

1. The prevalence of internet addiction disorder and subtypes of internet addiction disorder, amongst medical students during lockdown which was undertaken due to Covid-19 pandemic, in Himachal Pradesh, which had 2020 medical students as in 2020.
2. Also, the objective of study is to find out which subtype of this addiction is most prevalent amongst the students.
3. The study determines the association of personal, familial, social and internet related factors with internet addiction and its consequences on the students.
4. Prevalence of various neurotic traits and variables which are usually associated with addiction behaviour and to determine its association with Internet Addiction Disorder.

Design

We conducted a retrospective cohort study among undergraduates of MBBS students in six government medical colleges of Himachal Pradesh, India. We conducted study in January 2021, while lockdown regarding Covid-19 was effective from 15th March 2020 till 30th November 2020. after approval from Institutional Ethics Committee; a total of 370 students participated in the study. Only students who gave informed consent were included in the study. We assured participants that the information given by them would be anonymous and confidential to avoid reporting bias.

Materials and Methods

We used the following tools followed for taking samples:

1. Semi- Structured proforma that contained details about age of student, most visited domain on the internet by the student, money and time spent by participant over internet, and other details which may signify underlying psychiatric conditions including sibling rivalry[23] via asking number of siblings and age difference from younger sibling, history of childhood verbal/physical/sexual abuse and bullying[24], history of Morbid fears of persons/ animals / Darkness, Nailbiting[22], Nightmares, Night terrors, Temper tantrums, Obstinacy, Enuresis, Encopresis >3yrs, history of addiction behavior in family and hours for which participant sleep in a day.
2. Internet Addiction Test (IAT; Young, 1998)[21] is a 20 -item self-reported questionnaire scale. Each question is answered in points from 0 to 5 where 0 signify 'Doesn't Apply' and 5 signify 'Always.' Score of 20-49 represent mild addiction, 50-79 represent moderate and between 80 to 100 signify severe addiction, whereas score less than 20 signify no addiction.
3. DSM-V Criteria for Pathological Internet Gaming [18] a 9 -item questionnaire. It is asked to be filled by those students who answered gaming as their primary reason for using internet.

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4. The Epi-Info Version 7.2.4.0 was used for statistical analysis.

Results

370 students participated in the study amongst total of 2020 medical students studying in government medical colleges of Himachal Pradesh. Amongst these, we excluded 4 students because they didn't fill the questionnaire correctly. Out of total of 366 students, 218 are females and 148 students are from Indira Gandhi Medical College, Shimla. Mean age of students is 20.9126 years with standard deviation of 1.5235.

In present study, total prevalence of internet addiction before lockdown was 82.24% which increased to 92.62% during lockdown and came down to 85.79% after lockdown. While 82.57% female students were addicted before lockdown, only 81.76% male students were addicted before lockdown. Prevalence of Internet Addiction Disorder amongst students, during different timelines is given in Table 2.

While amongst these students, only 15 students (4.1%) classified for Pathological Internet Gaming according to DSM-5 criteria and we found that amongst these 10 (66.67%) students are males.

Most visited domain by the students include online chat rooms, but its frequency decreased subsequently during and after the lockdown, while that of online gaming and data gathering from internet increase over the period [Table 3, x].

Most of the students learned about the internet domain they visit mostly from their friends and mostly they started visiting the domain at age of equal to 12 to 15 years. Minimum age for start of internet use is 7 years and maximum are 20 years, while mean age is 14.46 (±2.668) years. Only 7.4% of students has positive family history of addiction disorder. Mother of 59.9% of the students is housemaker and most of the mothers has spent more than or equal to 10 hours with their children during first 18 months of their life. [Table 3; 5]

64.8% students have one sibling and 57.4% of the students with siblings has age difference equal to or more than 3 years. Most common neurotic trait amongst all the students and amongst females is nightmare (12.6% and 12.9% respectively), but amongst males, the most common neurotic trait is morbid fear of person/ animals/ darkness (14.9%). History of childhood sexual abuse amongst students is 4.1%, being higher in males (4%) than in females (3.7%). But most common is history amongst students is that of bullying (10.4%). [Table 4]

Most of the students are spending Rs. 300 or less on internet per month and most of them are spending 2 to or equal to 4 hours over the internet per day (41.5%). Most of them sleep 6-9 hours (85.2%) [Table 5].

Table 6 shows various variables that may have positive association with internet addiction.

Those students spending more money over internet, spend more time over internet, sleep less per day and negative correlation with family history of addiction disorder. Those students who have siblings; spend less money over internet [Table 7].

Those students who have more age difference from younger sibling and also those who has working mother, learnt about internet later in life. Those who learnt about internet early in life are spending more time over internet and has negative correlation with family history of addiction disorders. Those students who are single child sleep less compared to those who has siblings [Table 7].

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Table 2: Prevalence of Internet Addiction Before, During and After Lockdown, MBBS Students, Himachal Pradesh, India, 2020.

	Score on Young's criteria	Before lockdown		During lockdown (March 15 to 30th November, 2020)		After lockdown	
		N	%	N	%	N	%
N (366)	No addiction[1]	65	17.8	27	7.4	52	14.2
	Mild Addiction[2]	232	63.4	194	53.0	227	62.0
	Mod. Addiction[3]	65	17.8	127	34.7	84	23.0
	Severe Addiction[4]	4	1.1	18	4.9	3	0.82
Girls N (218)	No addiction[1]	38	17.4	14	6.4	31	14.2
	Mild Addiction2	140	64.2	118	54.1	136	62.4
	Mod. Addiction[3]	37	17.0	76	34.9	48	22.0
	Severe Addiction[4]	3	1.4	10	4.6	3	1.4
Boys N (148)	No addiction1	27	18.2	13	8.8	21	14.2
	Mild Addiction2	92	62.2	76	51.4	91	61.5
	Mod. Addiction3	28	18.9	51	34.5	36	24.3
	Severe Addiction4	1	0.7	8	5.4	0	0

[1] Score <20

[2] Score 20-49

[3] Score 50-79

[4] Score >80

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Table 3: Most Common Domain Used by study Participants

Variables		Total students(n=366)		Boys (n=148)		Girl(n=218)	
		Frequency	%	Frequency	%	Frequency	%
Most visited domain before lockdown							
	Cyber porn	1	0.3	1	0.7	0	0.0
	Chat room	277	75.7	85	57.4	192	88.1
	Online gambling	22	6.0	7	4.7	11	5.1
	Online games	64	17.5	53	35.8	15	6.9
	Data gathering	2	0.6	2	1.4	0	0.0
Most visited domain During lockdown							
	Cyber porn	13	3.6	10	6.8	3	1.4
	Chat room	212	57.9	57	38.5	155	71.1
	Online gambling	17	4.6	6	4.1	11	5.1
	Online games	73	20.0	56	37.8	17	7.8
	Data gathering	51	13.9	19	12.8	32	14.7
Most visited domain After Lockdown							
	Cyber porn	5	1.4	3	2.0	2	0.9
	Chat room	217	59.3	72	48.7	145	66.5
	Online gambling	14	3.8	5	3.4	9	4.1
	Online games	38	10.4	31	21.0	7	3.2
	Data gathering	92	25.1	37	25.0	55	25.2

Table 4: Risk Factors (n=366)

Profession of mother		Frequency	Percentage
	Home maker	216	59.0
	Working	150	40.1
Family History of Addiction Disorder			
	Yes	26	7.1
	No	340	93.0
Have sibling			
	Yes	330	90.2
	No	36	9.8
Number of the Siblings n=330			
	Less than or equal to 2	310	94.0
	More than	20	9.1

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Age difference from sibling n=330			
	Less than or equal to 1 year	27	8.2
	More than 1 year	303	91.8
From where did you learn about the internet domain you visit mostly? n=366			
	Sibling	32	8.7
	Friends	273	74.6
	Parents	8	2.2
	School	39	10.7
	Myself	14	3.8
At which age did you first start using the Internet? n=366			
	less than 14	122	33.3
	equal to 14 to less than 17	158	43.2
	equal to 17 or more	86	23.5
Do you have history of following? n=366			
	h/o physical/verbal abuse	22	6.01
	childhood sexual abuse	10	2.73
	bullying	34	9.29
	h/o physical/verbal abuse and bullying	2	0.55
	h/o physical/verbal abuse and childhood sexual abuse and bullying	2	0.55
	h/o physical/verbal abuse and childhood sexual abuse	2	0.55
	None of the above	294	80.33

Table 5: Consequences of IAD (n=366)

Average monthly expenditure on internet		Frequency	%
	equal to 300 or less	234	64.2
	More than 300 to equal to 500	71	19.4
	more than 500	61	16.4
How much hours do you spend on internet on daily basis?			
	2 or less hours	86	23.5
	More than 2 to or equal to 4 hours	133	36.3
	More than 4 hours	147	40.2

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Average duration of sleep (hours)?			
	less than or equal to 6 hours	80	21.9
	More than 6 to less than 9 hours	237	64.8
	equal to or more than 9 hours	49	13.4

Table 6: Associations between different variables with Internet Addiction

Variable	Non-Addicted Students	Addicted students	p- value (significant <0.05)	Uncorrected Chi Square Test
Sleeping for > 6 hours	16	322	.002	11.3
Profession of Mother as housewife	9	209	0.02	5.4
Having one sibling	17	162	0.02	3.2
Learning about most visited domain from friend	18	253	0.014	8.5
Internet Addiction before lockdown	35	305	.001	112.4
Internet addiction after lockdown	22	318	.001	117.6
Online Gaming	0	74	.01	6.6

Table 7: Relation amongst various other variables

Variable 1	Variable 2	p: probability coefficient	P: Pearson Coefficient
How much money do you spend on Internet on monthly basis?	How many hours do you spend on internet on daily basis?	0.001	0.29
	How Many Hours do you sleep on daily basis?	0.004	-0.15
	Family H/O Addiction Disorder	0.02	-0.12
	How many siblings Do you have?	0.017	-0.12
At Which Age did you first start using Internet?	Profession of your mother	0.035	0.11
	How Many Hours do you sleep on daily basis?	0.043	-0.11
	Family H/O Addiction Disorder	0.006	-0.14
	Age difference from younger sibling	0.001	0.374
How many siblings Do you have?	How Many Hours do you sleep on daily basis?	0.01	0.134

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Variables	Total students(n=364)		For Males(n=148)	For Females(n=216)
Do you have history of following neurotic traits?	Variable	Frequency (Percentage)	Frequency (Percentage)	Frequency(Percentage)
	Morbid fear of person/animals/darkness	38(10.4)	22(14.9)	19(8.8)
	Nail-biting	24(6.5)	8(5.4)	16(7.4)
	Nightmare	46(12.6)	16(10.8)	28(12.9)
	Night terrors	30(8.2)	8(5.4)	22(10.2)
	Temper Tantrums	29(7.9)	17(11.4)	14(6.5)
	Obstinacy	43(11.8)	16(10.8)	21(9.7)
	Enuresis	10(2.7)	1(0.7)	14(6.5)
	Encopresis	2(0.5)	1(0.7)	1(0.5)
	None of the above	229(62.9)	92(62.2)	137(63.4)

Table 8: Change in trends of Internet Domain Visited by Students

n=366	Before lockdown to during lockdown	during lockdown to after lockdown	before lockdown to after lockdown
Total students Domain	Percentage Change (+ means increase and – means decrease)	Percentage Change (+ means increase and – means decrease)	Percentage Change (+ means increase and – means decrease)
Cyber Porn	+3.28	-2.18	+1.1
Chat Room	-17.76	+1.37	-6.39
Online Gambling	-1.37	-0.81	-2.18
Online Games	+2.46	-9.57	-7.11
Data Gathering	+13.38	+11.21	+24.59
Males n=148 Domain	Percentage Change (+ means increase and – means decrease)	Percentage Change (+ means increase and – means decrease)	Percentage Change (+ means increase and – means decrease)
Cyber Porn	+6.08	-4.73	+1.35
Chat Room	-18.92	+10.14	-8.78
Online Gambling	-0.68	-067	-1.35
Online Games	+2.03	-16.89	-14.86
Data Gathering	+11.49	+12.16	+23.65
Females n = 218 Domain	Percentage Change (+ means increase and – means decrease)	Percentage Change (+ means increase and – means decrease)	Percentage Change (+ means increase and – means decrease)
Cyber Porn	+1.38	-0.46	+0.92
Chat Room	-16.97	-4.59	-21.56
Online Gambling	0	-1.9	-1.9
Online Games	+0.92	-4.59	-3.67
Data Gathering	+14.68	+10.55	+25.23

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Table 9:

Shift in trends of Internet Addiction During different time periods, n=366 students	Change in percentage from Before lockdown to during lockdown (+ means increase and – means decrease)	Change in percentage from during lockdown to after lockdown (+ means increase and– means decrease)	Change in percentage from before lockdown to after lockdown (+ means increase and – means decrease)
No addiction (<20)	-10.36	+6.83	-3.55
Mild Addiction (= >20-49)	-10.38	+9.01	-1.37
Mod. Addiction (= >50-79)	+16.94	-11.75	+5.19
Severe Addiction (= >80)	+3.83	-4.1	-0.27
For Females(n=218)			
No addiction (<20)	-11.01	+7.8	-3.21
Mild Addiction (= >20-49)	-10.09	+8.26	-1.83
Mod. Addiction (= >50-79)	+17.89	-12.84	+5.05
Severe Addiction (= >80)	+3.21	-3.21	0
For Males(n=148)			
No addiction (<20)	-9.46	+5.41	-4.05
Mild Addiction (= >20-49)	-10.81	+10.14	-0.67
Mod. Addiction (= >50-79)	+15.54	-10.14	+5.4
Severe Addiction (= >80)	+4.73	-5.41	-0.68

Discussion

The present study investigated the problem of internet addiction amongst medical students of Himachal Pradesh, at three periods of time, i.e., before lockdown, during lockdown and after lockdown during Covid-19 Pandemic along with various other factors that could have influenced this behavioural problem. We found that there was substantial rise in moderate addiction amongst medical students when compared form before to after lockdown, while severe addiction decreased amongst males, there was rise of 0.7% amongst females. Overall prevalence before lockdown was more amongst males when compared to females and this result is in accordance with other similar studies[17,25] but contrary to earlier results, the prevalence of internet addiction amongst females

Thus, students who were not addicted or were falling in the category of mild addiction before lockdown; decreased after lockdown, while students in the category of moderate addiction increased after the lockdown, while only female students had increase in the severe addiction following lockdown. became more than males during and after lockdown [Table 2].

Overall prevalence of internet addiction during lockdown was 53.8% as mild addicts, 34.6% as moderate addicts and 4.9% as severe addicts, while after lockdown it was 63.7% as mild addicts, 22.5% as addicts and 1.1% as severe addicts. This prevalence is higher

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than similar studies conducted amongst medical students in India over various years. It may be attributed to the fact that over the years, availability of Internet and its use has increased.

Over the course of lockdown, prevalence of data gathering and visiting pornographic material has increased and internet gaming is positively associated with increase in the internet addiction [Table 3]. While occupation of mother as housemaker, sleeping more than 6 hours per day, having one sibling, learning about most visited domain from friend which correlate to peer influence came out to be influential factors for internet addiction. While having history of neurotic traits, having history of physical/ verbal/ sexual abuse or bullying did not had any influence over this behaviour.

It is seen that prevalence of Pathological Internet Gaming is more amongst females (18.75%) compared to males (7.1%) but overall prevalence of visiting internet gaming domain decreased over the course of time. Also, males have more family history of addiction disorder (10.1%s) compared to females (5.6%).

The most common neurotic trait selected by females was nightmares (12.6) by males was morbid fear of person/ animals/ darkness (14.9%) and least common trait selected by both male and females was Encopresis (0.7% by males and 0.5% by females). Males has more prevalence of childhood sexual abuse but may be attributed to fact that history of sexual abuse goes untold many times.

Those students spending more money over internet, spend more time over internet, this may lead to financial problems and also these students sleep less per day and negative correlation with family history of addiction disorder. Those students who have siblings; spend less money over internet [Table 7].

It is reported that students who are not addicted are not found to have the history of following:

1. Enuresis
2. Encopresis
3. Age difference from younger sibling of less than 1 year
4. Single child of their parents
5. Time spent by their mother during first 18 months of life to be less than 4 hours.
6. Most used domains during lockdown: Gaming and cyber-pornographic material
7. Classify for Internet Gaming Disorder.
8. Learning about Internet use at or after 18 years.

Conclusion

The present studied revealed that majority of medical students at Himachal Pradesh are internet addict, as found in other studies and lockdown which was aimed to prevent the spread of Covid-19 actually perpetuated this behavioural disorder. Attention should be focused at this behavioural addiction and awareness should be increased amongst students and faculties of college to detect at risk students, and appropriate steps should be taken before it becomes pathological.

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