RESEARCH ARTICLE

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Anxiety, Depression and Loneliness Due to Internet Addiction Among Selected Senior Secondary School Students of Bhopal

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Abstract

Background: The internet is being used extensively throughout the world, especially among adolescents and youth. Early detection of the adolescent population with internet addiction (IA) and prompt measures to redirect them towards sound use of technology is essential. The objectives of the study were to: i) identify the magnitude of depression, anxiety, and loneliness among senior secondary school students with IA; ii) assess the relationship between internet addiction and depression, anxiety, and loneliness; and iii) find the association of sociodemographic variables with depression, anxiety, and loneliness.

Materials and Methods: A cross-sectional survey was conducted among 220 participants from senior secondary schools in the Bhopal district. The Institutional Ethics Committee approved the study. Participants were selected using a convenient sampling technique. The tools used were the CHEN Internet addiction scale, Generalized Anxiety Disorder (GAD) scale, Patient Health Questionnaire-9 (PHQ-9), and UCLA loneliness scale. Data was analyzed using SPSS (v. 20)

Result: About 99 (45%) participants were internet addicted. Among the internet addicted, the majority had mild anxiety (35.4 %), moderate depression (39.4%), and loneliness (58.6%). The relationship of IA with depression was weak and negative (r = -0.32), but was positive with anxiety (r = 0.104) and loneliness (r = 0.053). There was no association of depression, anxiety, and loneliness with sociodemographic variables of the students with IA.

Conclusion: Internet addiction is prevalent among senior secondary school students in Bhopal. Context-specific causes and risk factors for IA should be identified and measures to address these need to be initiated.

Keywords: Anxiety, Depression, Internet addiction, Loneliness

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Introduction

Revolutions in the fields of information and communication technology, particularly the internet, have led to radical social changes.[1] Internet has become an essential part of a larger population, especially among adolescents and youth. Ever since the internet began revolutionizing work, social life, leisure time, and communication, it has been seen with optimism and apprehension. Some people have a hard time restraining their use to the extent that it impacts their lives negatively. This has sparked an extensive field of research, ranging from psychology and sociology to neurobiology.[2]

Several tags have been used to describe the problem, of which problematic internet use (PIU), internet addiction (IA), gaming disorder, and pathological internet use are the most common.[2] In the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the American Psychiatric Association presented internet gaming disorder as a probable future addition as a non-substance-related addictive disorder, given that it is reinforced by plenty of good research. The World Health Organization (WHO) introduced gaming disorder in the latest edition of its International Classification of Diseases, 11th revision.[3]

Pathological internet use can negatively affect the psychological, emotional, social, and physical quality of life.[4]

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Research shows that regular use of the internet causes a lot of psychological and mental disorders like stress, anxiety, depression, and Obsessive-Compulsive disorder (OCD).[5] IA is typically characterized by psychomotor agitation, anxiety, craving, depression, hostility, substance experience, preoccupation, loss of control, withdrawal, loneliness, impairment of function, reduced decision-making ability, and constant online surfing despite negative effects on social and psychological welfare.[6] As the level of internet addiction increased, the level of aggression, impulsivity, and depression also increased.[7] Young *et al* developed diagnostic criteria for IA in which withdrawal, poor scheduling abilities, tolerance,

obsession, impairment of control, and unnecessary online time were defined as core indicators.[2]

Worldwide prevalence of IA ranged from 1.6 to 18%.[8] As of December 2017, 560 million of the Indian population used the internet, and the prevalence of IA in India among adolescents ranged between 0.7 to 37%.[9] IA among adolescents increased during COVID-19 and will continue to rise.[10] Internet and technology use are very much necessary in the education sector where adolescents are in larger numbers. UNICEF (2021) recommended that central and state governments explore avenues to reduce the digital divide by increasing access to fast internet and technological devices.[11] However, as the review also reveals, dependency on digital technology showed several effects on health and impact on family life, and appropriate usage should be emphasized.

Early detection of IA among the adolescent population and prompt measures to redirect them towards sound use of technology are essential. As there were limited studies on the magnitude of IA among senior secondary school students in Bhopal District, central India, this study was planned. The objectives of the study were to: i) identify the magnitude of depression, anxiety, and loneliness among senior secondary school students with IA; ii) assess the relationship between internet addiction and depression, anxiety, and loneliness; and iii) find the association of sociodemographic variables of students with IA and depression, anxiety, and loneliness.

Materials and Methods

Ethical Consideration

The study was approved by the Institutional Human Ethics Committee for Post Graduate Research, AIIMS Bhopal (Ref No.: IHEC-PGR/2021/MSc Nursing/ July/28). Permission to collect data was obtained from the Principal of secondary schools in Bhopal. Participants were explained the objectives and nature of the study in person. Voluntary participation, anonymity, and confidentiality were assured. Assent from participants and Informed consent from the parents of the participants were obtained.

Study Design, Setting, and Sampling

A cross-sectional survey was conducted among senior secondary school students enrolled in 11th and 12th standards in Government or private schools in Bhopal. Students aged 15 to 18 years, willing to participate, able to read and write in the English language, and available at the time of data collection were included in Phase 1. The Sample size was calculated based on a previously published study by Preetha A *et al.*, in which the prevalence of IA was 82.8%. With an absolute precision of 5% points and a type 1 error of 5%, the estimated sample was 220. In phase 2, the participants with IA formed the sample. A non-probability convenience sampling technique was used.

Data Collection Tools

A background proforma, inclusive of age, gender, grade, residential area, type of family, father's employment, mother's employment, socio-economic status, place of access to the internet, duration of internet use, time of internet use, and reason for its use, was prepared by the researchers. Standardized tools were used to identify IA, depression, anxiety, and loneliness, as per the suggestions of a panel of experts from the fields of nursing, psychology, and psychiatry.

CHEN Internet Addiction Scale (CIAS)

CIAS scale is a 26-item rating scale developed by Chen S-H *et al.* (2003), assessing five dimensions of internet addiction, namely compulsive use, withdrawal, tolerance, problems with interpersonal relationships, and problems with health and time management. The reliability (Cronbach's alpha) was 0.94. The minimum and maximum scores were 26 and 104, respectively. A score of more than 64 was described as internet addiction.[12]

Generalized Anxiety Disorder (GAD) Scale

A seven-item, four-point rating scale (0 - not at all, 1 - several days, 2 - more than half the days, and 3 - nearly every day) was used to measure anxiety among the adolescents with IA. A score of less than 5 was classified as less anxiety, 5-10 as moderate anxiety, and 10 to 15 as severe anxiety. The reliability coefficient (Cronbach's alpha) for the GAD-7 scale was 0.76.[13]

Patient Health Questionnaire-9 (PHQ-9)

It is a nine-item, four-point scale (o - not at all, 1 - several days, 2 - more than half the days, and 3 - nearly every day) was used to assess depression. A score of 1–4 was categorized as minimal depression, 5–9 as mild depression, 10–14 as moderate depression, 15–19 as moderately severe, and 20–27 as severe depression. The reliability (Cronbach's alpha) of this scale was 0.72.[14]

UCLA loneliness scale

A 20-item, four-point rating scale (1 - never, 2 - rarely, 3 – sometimes, and 4- often) was used to measure loneliness as well as feelings of social isolation. The Higher the scores, the higher the loneliness. Reliability (Cronbach's alpha) of this scale was 0.89.[15]

Procedure of data collection

The Date and time for data collection were fixed with the school Principal. During the first visit, 11th and 12th-standard students were explained about the study purpose, objectives, and significance. Participant information sheets and parental consent forms were given to participants with instructions to discuss with parents about their participation and to seek parental consent. On the second visit, participants who obtained parental consent were administered the CIAS in person, in the school, in their respective classrooms, ensuring no discussion during the process of filling. The average time duration used to fill out questionnaires was 20 minutes. On the third visit, the participants who were found to be internet addicted (n = 99) were administered GAD, PHQ-9, and the UCLA loneliness scale. The time duration between the second and third visit was 3 days. The data was analysed using SPSS (version 20).

Results

Participant characteristics are presented in Table 1. Participants used either their own or their parents' devices to access the internet. A total of 99 participants had IA (Figure 1). The level of depression, anxiety, and loneliness of participants with IA is presented in Table 2. Table 3 reveals that the relationship of anxiety(r=0.104) and loneliness (r = 0.053) with IA was weak but statistically non-significant ($p < 0.05$). However, depression and IA showed an inverse relationship (r = -0.32). Tables 4, 5 and 6 show no association between the sociodemographic characteristics of participants with IA and depression, anxiety, and loneliness.

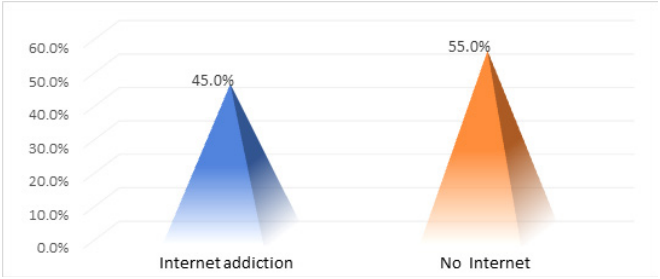

Figure 1: Pyramidal diagram showing the percentage distribution of senior secondary school students with internet addiction

Table 1: Frequency and percentage distribution of participants' characteristics n = 220

Variables	*Frequency*	*Percentage (%)*
Age (in years)		
15	48	22.0
16	62	28.0
17	75	34.0
18	35	16.0
Gender		
Male	107	49.0
Female	113	51.0
Grade		
11th	118	52.0
12th	102	48.0
Residential Area		
Rural	64	29.0
Urban	156	71.0
Type of Family		
Nuclear	172	78.0
Joint	48	22.0
Socio-economic Status		
Above poverty line (> 1,286 rupees per month)	165	75
Below poverty line (< 1,286 rupees per month)	55	25
Father's Employment		
Employed	180	82.0
Unemployed	40	18.0
Mother's Employment		
Employed	82	37.0
Unemployed	138	63.0
Place of access of internet		
Home	220	100.0
Duration of internet use		
1–2 years	22	10.0
3–4 years	198	90.0
Daily internet usage (on average)		
1–2 hours	32	15.0
3 hours and more	188	85.0
Purpose of use of the internet		
Education	115	52.0
Entertainment	105	48.0

Table 2: Frequency and percentage distribution of level of depression, anxiety and loneliness among students with internet addiction.n = 99

Variables	*Level of Scores*	*Frequency*	*Percentage (%)*
Depression	Severe	14	14.1
	Moderately severe	6	6.1
	Moderate	39	39.4
	Mild	19	19.2
	Minimal	21	21.2
Anxiety	Severe	32	32.3
	Moderately severe	32	32.3
	Mild	35	35.4
Loneliness	Moderately high	41	41.4
	Moderate	58	58.6

Table 3: Relationship between internet addiction, depression, anxiety and loneliness among senior secondary school students with internet addiction n = 99

Variable	*Anxiety*	*Depression*	*Loneliness*
Internet Addiction r value	0.104	-0.32	0.053
Internet Addiction p-value	0.305	0.752	0.603

Discussion

Internet use has become a part of everyday life. The prevalence of moderate problematic internet use among school-going adolescents in India was 21.5% in pre-COVID times.[16] The overall prevalence of IA ranged between 19.9 to 40.7% in India[17-19] and 30 to 43% in Madhya Pradesh (MP) in the pre-COVID times.[17] The post-COVID era has further reduced the gap in access to the internet and technology in India, especially among children and adolescents. The prevalence of IA in the present study is higher than that reported in other districts of MP or the national average, which implies that the availability of gadgets and internet access has risen substantially. The duration of its use in terms of years and number of hours per day, as well as its use for non-educational purposes among adolescents, justifies that the young are active users of social media in India. Though the relationship observed between internet addiction and anxiety, depression, and loneliness in the present study is mildly positive, which was statistically not

Table 4: Association between depression and characteristics of students with internet addiction n = 99

Variables		*Levels of depression*					*χ2 test/ FET*	*p-value*	*df*
		Severe	*Moderately Severe*	*Moderate*	*Mild*	*Minimal*			
Age (in years)	15	3	0	11	2	5	14.339**	0.280	12
	16	1	2	14	7	7			
	17	9	2	10	6	6			
	18	1	2	4	4	3			
Gender	Male	6	2	20	9	10	0.828**	0.935	4
	Female	8	4	19	10	11			
Grade	11th	7	2	24	9	11	2.361**	0.670	4
	12th	7	4	15	10	10			
Residential area	Rural	2	1	12	5	7	2.169**	0.705	4
	Urban	12	5	27	14	14			
Type of Family	Nuclear	10	6	32	16	17	2.434**	0.656	4
	Joint	4	0	7	3	4			
Socio-economic status	APL	12	3	27	13	19	6.623**	0.157	4
	BPL	2	3	12	6	2			
Father's Employment	Employed	14	4	30	13	19	7.624**	0.106	4
	Unemployed	0	2	9	6	2			
Mother's Employment	Employed	3	2	15	5	10	3.425**	0.489	12
	Unemployed	11	4	24	14	11			
Place of access of internet	Home	14	6	39	19	21			
Duration of internet use	1-2 years	3	2	3	3	3	3.811**	0.432	4
	3-4 years	11	4	36	16	18			
Daily internet use time (on an average)	Less than 2 hr.	2	1	6	4	5	0.910**	0.923	4
	3hr or more	12	5	33	15	16			
Reason for internet use	Education	5	3	21	12	15	4.924**	0.295	4
	Entertainment	9	3	18	7	6			

χ2 – Chi square (*)
FET- Fischer exact test (**)
df- degree of freedom

significant, one cannot underscore the likelihood of increasing the burden of psychological distress among adolescents in India.

It is essential to identify the risk factors of IA if measures to tackle the problem of IA are to be streamlined. Systematic reviews on internet addiction have identified a few risk factors of IA, such as male gender, younger age, higher family income, using social and gaming applications, psychosocial factors, namely impulsivity, neuroticism, and loneliness, as well as a few co-morbid symptoms such as depression, anxiety and psychopathology.[20] Studies in India report that 26.3% of adolescents used the internet for more than four hours per day (90% in the present study), 38.7% of users were less than 12 years old and 32 to 41%% were spending more than rupees 300-500 per month for using internet.[6,18] Saquib *et al*.[21] observed odds of having problematic internet use were 1.4 times higher among those with unhealthy dietary habits, and 1.2 times higher among smokers, those with less than excellent grade point average, and those with moderate to low religiosity. In the present study, adolescents who used the internet for a longer duration and had better socio-economic status (above the poverty line) showed moderate to severe forms of depression, anxiety, or loneliness. Further, the relationship between IA and depression was inverse, thus it is not clear whether IA was an outcome or a source of depression Though statistically no significant association was observed in the present study between IA, depression, loneliness, and anxiety, Merchant *et al*.[22] alerts on negative influences in terms of self-harm and mental distress out of high internet use and IA. Engaging adolescents in a discussion about internet use is very much needed as an effort to create awareness of the impact of IA. Health care providers should seek the history of internet use among adolescents at frequent intervals, irrespective of their reasons for seeking health care.

Mental disorders such as anxiety, depression, and loneliness often first develop in adolescence and continue into adulthood. The magnitude of anxiety, depression, and loneliness levels among adolescents in the present study was higher (nearly 60% with IA had moderate to severe anxiety or depression, and 41.4% had moderately high loneliness) than that of other studies in India and Southeast Asia.[23] Although the present study did not find an association of sociodemographic variables with depression or with internet addiction, a similar study in Bhopal identified a few risk factors of depression such

Table 5: Association between anxiety and characteristics of students with internet addiction n = 99

Variables		*Levels of anxiety*			*χ2 test FET*	*p-value*	*df*
		Severe	*Moderate*	*Mild*			
Age (in years)	15	7	8	6	0.903*	0.989	6
	16	10	10	11			
	17	11	10	12			
	18	4	4	6			
Gender	Male	17	17	13	2.318*	0.314	2
	Female	15	15	22			
Grade	11th	19	16	18	0.662*	0.718	2
	12th	13	16	17			
Residential area	Rural	12	7	8	2.502*	0.286	2
	Urban	20	25	27			
Type of Family	Nuclear	22	29	30	5.699**	0.058	2
	Joint	10	3	5			
Socio-economic status	APL	22	25	27	0.910*	0.635	2
	BPL	10	7	8			
Father's Employment	Employed	25	29	26	3.097**	0.213	2
	Unemployed	7	3	9			
Mother's Employment	Employed	9	15	11	2.826*	0.243	2
	Unemployed	23	17	24			
Place of access of internet	Home	32	32	35			
Duration of internet use	1-2 years	1	5	8	5.446**	0.066	2
	3-4 years	31	27	27			
Daily internet use time (on an average)	Less than 2 hr.	5	6	7	0.225*	0.893	2
	3hr or more	27	26	28			
Reason for internet use	Education	16	19	21	0.832*	0.660	2
	Entertainment	16	13	14			

χ2 – Chi square (*)
FET- Fischer exact test (**)
df- degree of freedom

as fights of parents, arguments with parents, peer pressure, female gender, pressure of examinations, academic satisfaction of parents, bullying in school, not performing well in studies, and loss of loved ones.[24] A study in northern India reported an association of anxiety with female gender, lower middle socio-economic status, and stressful events within the past year.[18] A Finnish study reports the risk factors for involuntary loneliness among adolescents, namely social transitions, isolation, not having anyone to contact, group differences, ill-being, social expectations, negative emotions, former destructive experiences, and a negative self-image.[25] Mental health issues affected academic performance and suicidal behavior among adolescents. As the tools and methodologies used in these studies across India are dissimilar, and hence the findings are not comparable, systematic inquiries using sound methodology to explore the risk factors for such psychological symptoms as well as their impact on the general health of the individual and family, in the Indian setting, across regions are necessary. Policymakers may use such data to plan appropriate, region-specific, and culture-sensitive strategies to eliminate the risk factors responsible for adverse health outcomes.

With 51% growth in e-commerce, and about 26.5% population under 15 years of age in India, one can anticipate the likely burden of psychosocial distress in India.[26] Arvind *et al*.[27] believed that about one-third of patients reporting to general health care services in India could have symptoms related to depression. Gaiha *et al*.[28] in a systematic view reported that young people in India are not able to recognize the causes and symptoms of mental health problems and are determined that recovery is impossible. Mental health issues often go undiagnosed and untreated in low-income countries like India, where many barriers to seeking mental health care exist, especially stigma associated with mental illness and limited access to mental health services. Misinformation and misunderstandings about behavioral and mental health problems and faith in traditional healers prevent them from seeking treatment from professionally trained health care providers. This suggests that mental health services in India must first address the barriers to seeking health care services. There is a need to integrate the National Mental Health Programme into general health services and at all levels of care. Universal health coverage and the use of a primary health approach should be the guiding principles.

The lifetime prevalence for any mental morbidity in India was 13.7% and for current mental morbidity, is 10.6% in the pre-COVID times.[29] However, the lower prevalence signifies

Table 6: Association between loneliness and characteristics of students with internet addiction n = 99

Variables		*Level of loneliness*		*χ2 test*	*p-value*	*df*
		Moderately high	*Moderate*			
Age (in years)	15	8	13	0.342	0.952	3
	16	14	17			
	17	13	20			
	18	6	8			
Gender	Male	16	31	2.004	0.157	1
	Female	25	27			
Grade	11th	22	31	0.000	0.984	1
	12th	19	27			
Residential area	Rural	9	18	0.999	0.318	1
	Urban	32	40			
Type of Family	Nuclear	36	45	1.686	0.194	1
	Joint	5	13			
Socio-economic status	APL	35	39	4.180	0.041	1
	BPL	6	19			
Father's Employment	Employed	32	48	0.344	0.558	1
	Unemployed	9	10			
Mother's Employment	Employed	14	21	45	0.833	1
	Unemployed	27	37			
Place of access of internet	Home	41	58			
Duration of internet use	1-2 years	9	5	3.516	0.061	1
	3-4 years	32	53			
Daily internet use time (on an average)	Less than 2 hr.	6	12	0.592	0.442	1
	3hr or more	35	46			
Reason for internet use	Education	20	36	1.726	0.189	1
	Entertainment	21	22			

χ2 – Chi square
df- degree of freedom

the tip of the iceberg, rather than the actual mental morbidity in India, given the attitude and belief related to mental illness and behavioral disorders. WHO in 2017 stated that one out of four children faces loneliness between 13 and 15 years of age.[30] Further, there is a gross shortage of mental health professionals, special educators, and counsellors in India. Kokane *et al.*[31] point out that the prevalence of any mental morbidity in MP is higher (16.7% for lifetime and 13.9% for current mental morbidity) than the national average and the treatment gap is 91%. Further, Bali *et al.*[32] report that there is low awareness and utilization of Adolescent Friendly Health Clinics in MP. It implies that trained community health workers at the grassroot level have a larger responsibility to cater to mental health services in the region. School administration, teachers, parents, health care providers, local leaders or religious organizations, and the local Government must collectively plan measures to build positive lifestyle behaviors among the young population such as outdoor activities, real-life family interactions, healthy competitions among youth, social gatherings inviting active involvement of youth, as well as guidance, counselling and awareness programs at school and health centers.

The findings of the present study should be interpreted in light of the limitations. The use of convenience sampling, the use of tools in a non-native language, and the likely social desirability bias from the use of rating scales limit the generalizability of findings. While an educational leaflet is prepared by the researchers, based on the findings from this study, and is provided to participants through schools' administration, the effectiveness of such an intervention may be evaluated. Translation of the standardized tools into the native language and assessment of their cross-cultural equivalence will be useful to determine their use for screening purposes in school or community settings. Such tools may be used in future inquiries, including all adolescents irrespective of their school enrolment.

Conclusion

Internet addiction is prevalent among senior secondary school students of Bhopal. Though depression, anxiety, and loneliness are not related to internet addiction, their prevalence among students invites attention from health workers to such problems at the institutional, family, and community levels.

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