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Review Article

Internet Addiction, Depression, Anxiety, and Stress among Young adults: a Cross-Sectional Study

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Received date: February 25, 2025; Accepted date: March 10, 2025; Published date: March 18, 2025

Citation: Abid Husain, Sakina Ali, Swaraj Dangwal, (2025), Internet Addiction, Depression, Anxiety, and Stress among Young adults: a Cross-Sectional Study, *Psychology and Mental Health Care*, 9(3): **DOI**:10.31579/2637-8892/324

Abstract

Internet addiction (IA) prevalence has been found to increase along with rising internet use, with young adults being more susceptible than anybody else. Internet addiction can be described as an impulse control disorder characterized by excessive or poorly controlled preoccupations, urges, or behaviours regarding computer use and internet access that lead to impairment or distress. Various studies reported internet addiction to be positively correlated with stress, anxiety, and depressive symptoms. Among these studies, some found that depressive symptoms predicted internet addiction or were at risk of engaging in internet addiction. The majority of studies on internet addiction and its link to depression, anxiety, and stress among Indian young adults have been conducted on students studying medicine, dentistry, nursing, or engineering, with very few studies done on young adults enrolled in other courses offered in India. Therefore, the current study's objective is to assess the relationship between young adults' internet addiction and their levels of stress, anxiety, and depression. Convenience sampling was used to select 150 participants (63 males and 87 women) between the ages of 18 to 25 for this cross-sectional study. Internet Addiction Test (IAT), Depression, Anxiety, Stress Scale-21 (DASS-21) was administered online through Google forms to assess internet addiction and depression, anxiety, and stress respectively. To see the gender difference on the above variables"t" test and correlation coefficient was used for assessing the relationship among the variables significant gender differences was found on Internet Addiction for the study and IA was found strongly related with Stress, Depression and Anxiety of the Participants.

Keywords: internet addiction; depression; anxiety; stress

1.Introduction

It is not possible to imagine life without the internet in today's world. Connecting billions of people worldwide, the internet is a core pillar of the modern information society. As of February 2022, China had more than a billion internet users, and India had approximately 658 million online users (Johnson, 2022). India's number of internet users increased by 47 million (+8.2%) between 2020 and 2021. Internet penetration in India stood at 45.0% in January 2021 (Kemp, 2022). In recent years, the Internet has become one of adolescents' and adults' most important academic and recreational tools. It provides an easy and immediate way for people to explore information and communicate with others worldwide. Although everyday use of the internet provides several advantages in professional and private activities, but the virtual environment also provides settings for new types of risk behaviours in individuals. Over the years, the ever-increasing use of the internet for work and leisure activities has led to its omnipresent presence across all activities of the day and this has disguised the boundaries between functional and dysfunctional internet use (Anand et al., 2018). The internet is used by all age groups, but it is extremely popular among children and young people, where it becomes an inevitable source of information, communication, and entertainment in the consumption of free time. Internet use comprises a range of activities, such as accessing social networking sites; online gaming and shopping; searches for work-related information; emailing; blogging; and browsing, downloading, or viewing websites offering television series, news, or pornography. In some cases, online interaction can promote social relationships and generate benefits in terms of socialization and self-esteem. However,

evidence indicates that maladaptive and excessive use of the Internet may lead to addiction, which in turn could lead to psychosocial health problems. An examination of the literature revealed various names for Internet addiction, including cyberspace addiction, Internet addiction disorder, online addiction, net addiction, Internet-addicted disorder, pathological Internet use, high Internet dependency, problematic internet use among others (Davis et al., 2002; Hur, 2006).

Despite a large body of research, Internet addiction per se has not been included either in the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*, 5th edition or in the *International Classification of Diseases-11 (ICD-11)*, however, Internet Gaming Disorder is added among disorders in ICD-11 and has been added under Section 1.3 of DSM-5 as a category needing further research. Nationally representative data suggest that about 20% to 40% of college students in India are at risk for IA (Joseph et al., 2021). Studies have linked internet addiction to increased sleep disturbances (Karimy et al., 2020; Alimoradi et al., 2019), the excessive use of social media and internet plays an important role in initiating and increasing sleep disturbances within the younger community. Internet Addiction is associated with decreased academic performance among students. Heightened time spent online is one of the probable reasons for poor academic performance among students. Still, other studies link IA to personality traits such as impulsivity, hostility, irritability, and lower self-esteem (Cao et al., 2007);. Among these studies, some found (e.g., Anand et al., 2018) that depressive symptoms predicted IA or were at risk of engaging in IA. Individuals with depressive symptoms understandably experience loneliness, low self-esteem, decreased energy, and lack of motivation which likely drives them to use internet to overcome these unpleasant emotions. Gaining social approval, enhancement of self-esteem, and overcoming loneliness can be achieved via the internet. On the contrary, an individual who starts diverting time meant for social meetings, outdoor activities, and family events towards internet use isolates oneself and predisposes oneself to depressive symptoms. Thus, both IA and depressive symptomatology can interact with each other and exacerbate both psychological conditions (Anand et al., 2018). Hostility and depression were noted to be the most associated symptoms with Internet addiction. It also suggested the possible bi-directional interaction between Internet addiction and psychiatric symptoms. On the one hand, heavy Internet use might be utilized to cope with or relieve psychiatric symptoms. On the other hand, maladaptive Internet use might also result in or further amplify psychiatric symptom (Yen et al., 2008). The individuals who suffer from IA may experience increased anxiety as a withdrawal symptom. Those suffering from anxiety may start using the internet excessively as a coping mechanism to relieve dysphoric mood (Khan et al., 2018). Khan et al. (2018) reported a positive correlation between stress level and IA among Indian undergraduates. Similar findings over different populations have been reported by many authors (e.g., Younes et al., 2016; Saikia et al., 2019; Feng et al., 2019). Some individuals with avoidant style of coping may start using the internet excessively to escape the stress arising out of real-world problems, leading to addiction (Khan et al., 2018). Although internet addiction is not a diagnostic category in *DSM-5* nor in *ICD-11* (only Internet Gaming Disorder have been included in *ICD-11*), piling evidence on its association with depressive symptoms, anxiety, poor performance, disrupted quantity and quality of sleep indicates its importance to be studied as a topic and its various associations to be researched on in vulnerable youth population in all domains of educational courses. To my knowledge, majority of studies on internet addiction and its relationship with depression, anxiety, and stress among Indian young adults have been done on medical, dental, nursing, or engineering students with very few studies on young adults from other courses available in India. So, the present study aims to assess the relationship of internet addiction with depression, anxiety, and stress among young adults.

Objectives

Following are the objectives undertaken in present study

1. To study the relationship between IA and Depression among young adults.

2. To study the relationship between IA and Anxiety among young adults.

3. To study the relationship between IA and Stress among young adults.

4. To study the difference between young adult male and female on IA.

Hypothesis

H_1. There would be significant relationship between IA and Depression among young adults.

H_2. There would be significant relationship between IA and Anxiety among young adults.

H_3. There would be significant relationship between IA and Stress among young adults.

H_4. There would be a significant difference between young adults Male and Female on IA.**2.**

2.Methods

2.1 Sample and Sampling

A total of 150 participant (N=150) were taken in this study, between age group of 18-25 years. Among them 63 were males (n_1) while 87 were females (n_2). Inclusion criteria for the study included participants who fall into the age range of 18-25 years, are Indian citizens, using internet services for the past one year, and were fluent in their ability to read, write and comprehend English. In this study non-probability sampling method was used, sample data was collected using convenience sampling.

2.2 Design

This study is a quantitative study employing cross-sectional design to assess relationship among variables included in the study. Data for the study was collected by administering standardized questionnaire via google forms (online) to measure variables and collect demographics.

2.3 Tools

Following tools were administered to participants simultaneously via Google forms:

Internet Addiction Test (Iat)

It is a 20-item self-report scale with a response range of 0 to 5 (0 = Not applicable; 1= Rarely; 2= Occasionally; 3= Frequently; 4 = Often, 5 = always) to assess IA and its severity.

Depression, Anxiety, Stress Scale-21 (Dass-21)

The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) is a self-report 4-point Likert scale (0–3), "0" denoting "did not apply to me at all" and "3" denoting "applied to me very much, or most of the time" and is

composed of three subscales: Depression (DASS-D), Anxiety (DASS-A), and Stress (DASS-S). It was developed by Lovibond and Lovibond, in 1995 at the University of New South Wales (Australia).

2.4 Procedure

Data was collected online by sharing Google forms for the questionnaire on different social media platforms. After getting their consent on time Firstly; in Google form itself participants were informed about what the study and assurance to confidentiality.

2.5 Statistical Analysis

Statistical analysis were done using IBM SPSS version 26. The correlation between Internet addiction and depression, anxiety and stress was assessed using Pearson correlation coefficient. Difference between males and females on Internet addiction was assessed using independent *t*-test. Stastical significance level (α) were defined at the 0.05 level, two-tailed.

Results

The sample consisted of 150 participants (N) aged between 18-25 years (*M*= 23.1; *SD*=2.2) among them 63 were males (n_1) (42%) and 87 were females (n_2) (58%).

Descriptive

Variables	*M*	*SD*
IA	40.7	16.6
D	15.0	10.9
S	15.2	9.4
A	13.0	10.1

Table 1: *Descriptive statistics of the data (N=150)*

***IA = Internet addiction, D= Depression, A= Anxiety level, S= Stress**

Table 1 shows the mean and standard deviation of IA, D, S, and A. The mean score on IA is 40.6 (*SD* = 16.6). For scores on Depression, *M* =15.0; *SD* =10.9, while for scores on Stress, *M* =15.2; *SD* = 9.4 and for scores on Anxiety, *M*=13.0; *SD*= 10.1

IA severity levels	Frequency	Percentage
Normal level of Internet usage	39	26.0
Mild level of Internet addiction	71	47.3
Moderate level of Internet addiction	36	24.0
Severe dependence upon the Internet	4	2.7

Table 2: *Frequency and percentage of IA severity levels*

Table 2, shows that the percentage of sample corresponding to Normal level of internet usage (i.e., absence of Internet addiction) is 26%, while Mild level of internet addiction is present in 47.3% of the sample and 24% have moderate level of internet addiction while only 2.7% are found to have severe dependence upon internet.

Depression severity levels	Frequency	Percentage
Normal	49	32.7
Mild	17	11.3
Moderate	44	29.3
Severe	18	12.0
Extremely Severe	22	14.7

Table 3: *Frequency and percentage of Depression (D) severity levels*

Table 3, shows that the percentage of sample corresponding to Normal level (i.e., absence of Depression) is 32.7%, while Mild level of depression is present in 11.3% of the sample and 29.3% have moderate level of depression while 12% are found to have severe depression and 14.7% of sample fall into category corresponding to extremely severe level of depression.

Stress severity levels	Frequency	Percentage
Normal	81	54.0
Mild	24	16.0
Moderate	22	14.7
Severe	16	10.7
Extremely Severe	7	4.7

Table 4: *Frequency and percentage of Stress (S) severity levels*

Table 4, shows that the percentage of sample corresponding to Normal level of stress severity is 54%, while Mild level of stress is present in 16% of the sample and 14.7% have moderate level of stress while 10.7% are found to have severe stress level and only 4.7% of sample fall into category corresponding to extremely severe level of stress.

Anxiety severity levels	Frequency	Percentage
Normal	46	30.7
Mild	15	10.0
Moderate	33	22.0
Severe	19	12.7
Extremely Severe	37	24.7

Table 5: Frequency and percentage of Anxiety (A) severity levels

Table 5, shows that the percentage of sample corresponding to Normal level of anxiety is 30.7%, while Mild level of anxiety is present in only 10% of the sample and 22% have moderate level of anxiety while 12.7% are found to have severe level of anxiety. 24.7% of sample fall into category corresponding to extremely severe anxiety level.

Bivariate Correlation

Variables		*r*	*P*	R^2
	D	.65*	<.001	.42
IA	A	.57*	<.001	.32
	S	.66*	<.001	.44

Table 6: Pearson correlation for IA with Depression, Anxiety, and Stress among young adults.

*Correlation coefficient significant at α = .05 level (2-tailed)
IA = internet addiction, D= Depression, A= Anxiety, S= Stress
R^2= Coefficient of determination

Table 6 indicates, that:

There is a significant positive correlation between IA and Depression among young adults, r (148) = .65, p<.001. As per Cohen's convention for correlation this falls under large effect size. Also, 42% of the variance in IA is shared by Depression, R^2= .42

There is a significant positive correlation between IA and Anxiety among young adults, r (148) = .57, p<.001. As per Cohen's convention for correlation this falls under large effect size. Also, 32% of the variance in IA is shared by Anxiety, R^2= .32

There is a significant positive correlation between IA and Stress among young adults, r (148) = .66, p<.001. As per Cohen's convention for correlation this falls under large effect size. Also, 44% of the variance in IA is shared by Stress, R^2= .44

***t*- test**

Table 7 *Independent sample t-test for difference in males and females on IA*

	Gender	N	*M*	*SD*	*t*	*df*	*p*	*d*
IA	Male	63	40.6	16.8	-0.04	148	.970	-0.006
	Female	87	40.7	16.5				

Table 7: Indicates that on average male participants report slightly lower IA (M = 40.6, SD = 16.8) than female participants (M =40.7, SD =16.5), this difference of -0.102 was found to be not significant, t (148) = -0.04, p = .970 and effect size was also found to be very small, d =

Discussion

This research aimed at studying Internet Addiction (IA) and its relationship with depression, anxiety and stress among young adults. One of its aims also follows to investigate whether there is significant difference among male young adults and female young adults in regard to IA. As hypothesized, findings indicate a significant positive correlation between IA and Depression among young adults, r (148) = .65, p<.001 (Table 6). As per Cohen's convention for correlation this falls under large effect size. Table 6 shows, 42% of the variance in IA is shared by Depression, R^2= .42. The findings of this study is supported by prior studies where too, researcher found strong positive correlation between IA and depression (Akin & Iskender, 2011; Anand et al., 2018; Khan et al., 2018). Among these studies, some found (e.g., Anand et al., 2018) that depressive symptoms predicted IA or were at risk of engaging in IA. This finding can be understood in light of explanation that, individuals with depressive symptoms understandably experience loneliness, low self-esteem, decreased energy, and lack of motivation which likely drives them to use internet to overcome these unpleasant emotions. Gaining social approval, enhancement of self-esteem, and overcoming loneliness can be achieved via the internet. On the contrary, an individual who starts diverting time meant for social meetings, outdoor activities, and family events towards internet use isolates oneself and predisposes oneself to depressive symptoms. Thus, both IA and depressive symptomatology can interact with each other and exacerbate both psychological conditions

(Anand et al., 2018). Correlation between IA and anxiety as well as between IA and stress were found to be significantly positive with r (148) = .57, p<.001 and r (148) = .66, p<.001 respectively, with both falling under large effect size. Table 6 shows, 32% of the variance in IA is shared by Anxiety, R^2= .32 and 44% of the variance in IA is shared by Stress, R^2=.44.. The findings of this study is supported by prior studies where too, researcher found strong positive correlation between IA and Anxiety (e.g., Khan et al., 2018; Younes et al., 2016; Khan et al., 2018; Saikia et al., 2019). The finding of this study can be understood in the light of explanation that, the individuals who suffer from IA may experience increased levels of anxiety as a withdrawal symptom as well as due to often found, comorbid depression. Those suffering from anxiety may start using the internet excessively as a coping mechanism to relieve dysphoric mood (Khan et al., 2018).The findings on IA and stress correlation is supported by prior studies. Khan et al. (2018) reported a positive correlation between stress level and IA among Indian undergraduates. Similar findings over different populations have been reported by many authors (e.g., Younes et al., 2016; Saikia et al., 2019; Feng et al., 2019). This finding can be understood in light of an idea that some individuals with avoidant style of coping may start using the internet excessively to escape the stress arising out of real-world problems, leading to addiction (Khan et al., 2018).Regarding gender differences on IA, findings were not significant, t (148) = -0.04, p = .970 (Table 7) hence the hypothesis drawn was not supported. Table 7 indicates, that on average male participants report slightly lower IA (M = 40.6, SD = 16.8) than female participants (M =40.7, SD =16.5), this difference of -0.102 was found to be not significant and effect size was also found to be very small, d = -0.006. This present finding is in line with some earlier studies (e.g., Khan et al., 2018; Marzilli et al., 2020) where too researchers reported no significant difference between male and female adults on IA. However, Anand et al. (2018) found significant difference among male and female on IA, where IA behaviors were significantly higher among male medical students in comparison to female medical students (p<.001). They also reported male gender predicted IA. Similar finding have been reported by many authors (e.g., Younes et al., 2016; Feng et al., 2019; Raj & Devi, 2018). While Saikia et al. (2019) reported IA significantly higher among females than males. The finding of present study can be understood in terms of changing social norms in accordance to gender as well as cultural differences in the places from where the sample data have been collected. In the light of these varied findings this issue warrants more research in future across culture.

Conclusion

The aim of this research was to study IA and to investigate its relationship with depression, stress and anxiety among young adults. The study also aspired to study whether there is any significant difference among male young adults and female young adults on IA. Most of the studies on IA and its correlation with depression, anxiety and stress focused on young adults enrolled in professional courses of engineering, medicine, and nursing in India with very scant research on understanding this pattern for Indian young adults in general and hence, the present study tries to bridge this gap. Results indicate the presence of significant positive correlation between IA and depression, between IA and stress and between IA and anxiety. However, t-test conducted to study difference between male young adults and female young adults on IA was not significant, i.e., no significant difference was found among male young adults and female young adults on IA. Previous research done to study whether there is any significant difference among male young adults and female young adults on IA produced varied results with some reporting male young adults have significantly higher rates of IA than female young adults, others reporting no significant difference among these two groups on IA while still other studies reporting higher rates of IA among female young adults than male young adults. In the light of these varied findings this issue warrants more research in future across culture.

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DOI:10.31579/2637-8892/324