*Original Research Article*

# Prevalence and Associated Factors of Internet Addiction among Clinical Medical Students of a Nigerian Private University


**ABSTRACT**

**Aim:** This study aimed to determine the prevalence and associated factors of internet addiction among undergraduate clinical medical students of a Nigerian private university.

**Study design:** Cross sectional descriptive study

**Place and Duration of study:** College of Medicine and Allied Health Sciences, Bingham University, Jos campus, Plateau state, Nigeria, between May and July 2021.

**Methods**: We included 383 (147 males and 236 females, age range 18 – 49 years) clinical medical students of Bingham University. Data was collected using a self-administered questionnaire which included questions about socio-demographic factors, the pattern of internet use and the standardized Internet Addiction Test questionnaire developed by Dr Kimberly S. Young in 1998. Logistic regression analysis was used to determine associations between internet addiction and various risk factors.

**Results:** Out of 402 students who were administered questionnaires, 383 completed the questionnaires giving a response rate of 95.3%. Of these, 145 (37.9%) were mildly addicted to the internet, 30 (7.8%) were moderately addicted and 1 (0.3%) was severely addicted to the internet. The mean age of the study participants was 22.7 ± 2.7 years. Logistic regression analysis showed that age ($P$ = .002), and having trouble sleeping ($P$ = .002) were significantly but negatively associated with the development of internet addiction while hours spend on social media ($P$ < .001) was significantly and positively associated.

**Conclusions**: Internet addiction is an emerging disorder in this era of almost global access to internet facilities.



***Key words**: Internet addiction, Medical students, Nigerian University, questionnaires*

## 1. INTRODUCTION

The internet is a major source of information in modern society and connects billions of people worldwide with a global internet penetration rate of almost 60% [1]. In Nigeria, there are about 104 million internet users with internet penetration rate of about 50% [2].

Internet addiction disorder (IAD) is also called problematic or pathologic internet use [3], and is becoming a problem in many societies in our world today. It has been rightly said that everything has advantages and disadvantages. The use of internet is not left out as it has its positive uses such as: to facilitate research, to seek information, for interpersonal communication, and for business transactions. On the other hand, it can also be used to indulge in negative habits such as pornography, excessive gaming, chatting for long hours, and even gambling [4]. Moreover, internet addiction results in greater expenditure of both time and money on internet by medical students which leads to poor performance in school and society and result in undesirable financial consequences, and deleterious social consequences [5,6].

With increasing access to the internet among adolescents and young adults, there is also a corresponding increase in the incidence of internet addiction which has been found to be generally associated with younger generation [6,7,8]. College students are especially vulnerable to developing dependence on the internet and it affects them at various levels of academics, interpersonal relationships and health [7,9]. This may be as a result of several contributing factors such as the ease of use, better access to the internet, limited parental supervision, feeling of independence, faster acquaintance with changing technology, and the psychological and developmental characteristics of young adulthood, among others. Moreover, some courses are internet-dependent, as the internet is a rich source of information to carry out assignments, projects and research as well as to communicate with peers and mentors [9]. In addition, in the face of the recent global COVID 19 pandemic, which led to lockdowns and stay-at-home quarantines in many areas of the world, there has been reports of high prevalence of internet addiction and excessive internet use among young people [10,11].

There is growing concern worldwide for what has been labelled “internet addiction” [4]. Internet addiction disorder was first proposed by Dr Ivan Goldberg in 1995 to introduce and recognize people who show problems following internet use [12,13]. It ruins lives by causing neurological complications, psychological disturbances, and social problems [14]. Internet addicts are known to prioritise the internet which can lead to severe stress on family, friends, work or the work environment [15]. As with other addictions, internet addiction provides a “high” feeling and addicts become dependent on that feeling [16].

Although the Diagnostic and Statistical Manual of Mental Disorders, 5th ed., has not included Internet addiction disorder [17], it is an important disorder which is often associated with many mental and psychological problems such as anxiety and depression, stress, attention deficit and obsessive compulsive disorders [18]. It has however, been formally recognized as a disorder by the American Psychological Association [3].

There are problems in the assessment of internet addiction as no clear gold standard exists based on which the status and severity of internet addiction symptoms can be evaluated, and neither is the usage of current tools standardized in such a way that cross-study comparisons are facilitated [19]. Young initially developed an 8- question Internet Addiction Diagnostic Questionnaire (DQ) based on DSM IV [20]. Later, she included 12 new items in addition to the 8 items to formulate an Internet Addiction Test (IAT) [21].The psychometric properties of Young’s IAT has been tested in Nigeria [22]. There are however, several other diagnostic test tools that have been developed over the years [19].

Although various prevalence rates have previously been suggested based on different screening methods (e.g. self-report questionnaires or clinical diagnostic interviews), the majority of the international prevalence rate reports suggests that teenagers and adults in their twenties are the population that suffer the most with internet addiction disorder or pathological internet use [6,17,23]. Previous studies among medical students, have documented a widely varied prevalence rate ranging from as low as 0.4% in an Indian study [14] to as high as 47.7% in Saudi Arabia [4]. Closer home in South west, Nigeria, a study using the Young’s Internet Addiction Test has documented prevalence for severe levels of internet addiction of 14% among university students [24].

Considering the shift towards online learning and increased use of the internet in the face of the global corona virus pandemic [25], the risk of internet addiction is potentially higher due to the high rate of internet penetration by university students across the nation [26]. The findings of this work will add to the existing pool of knowledge on internet addiction among undergraduate medical students and could be used to help mental health and educational agencies design programs aimed at preventing the occurrence of internet addiction. In addition, these findings can be used as an

advocacy tool that could possibly lead to development of screening protocols for early detection of internet addiction among medical undergraduates.
Alternate hypothesis: clinical medical students of Bingham University are addicted to the internet.
Null hypothesis: there is no internet addiction among clinical medical students of Bingham University, Jos, Nigeria. This study aims to establish the prevalence and associated factors of internet addiction among clinical medical students of Bingham University Teaching Hospital, Jos in the North central part of Nigeria.

## 2. MATERIALS AND METHODS

This descriptive cross-sectional study was carried out at the College of Medicine and Allied Health Sciences of Bingham University, Jos campus, a private university in the northern part of Nigeria during the period of May – July, 2021. The study population included fourth to sixth year undergraduate medical students of the University.

### 2.1 Study Protocols

The sampling method used was a stratified proportionate sampling of clinical medical students who consented to the study. In each level, a consecutive sampling of students was done until the sample size was obtained.

The minimum sample size was determined using the Fisher's formula [27].

$$n = \frac{(Z)^2(1-P)(P)}{d^2}$$

Where:
n = desired sample size

P = prevalence of internet addiction in medical students (47.7%) [5]

Z = 95% confidence interval = 1.96

d = absolute precision at 95% confidence interval = 0.05

$$n = \frac{(1.96)^2\ (1-0.477)\ (0.477)}{(0.05)^2} = 383$$

Allowing for a 5% attrition rate (n=19), a minimum sample size of 402 students were recruited for this study

Total number of students in 4th year is 217.

Total number of students in 5th year is 184.

Total number of students in 6th year is 101.

Using the proportionate formula: $\frac{A}{B}\ X\ C$

Where:
A= Total number of students in a level

B= total number of clinical students in the three levels

C= calculated sample size.

The number of students in 4th year selected was: (217/502) X 402 = 174 students

The number of students in 5th year selected was: (184/502) X 402 = 147 students

The number of students in 6th year selected was: (101/502) X 402 = 81 students

The grand total number of students selected was 174+ 147+ 81 = 402 students

After explaining the aim of the study and the questionnaire to the students in each class, questionnaires were distributed to the students who consent to participate in the study and they were asked to fill them. The time required to fill the questionnaire was 10–15 minutes. These questionnaires were anonymous to encourage participation and reduce respondents' bias. A total of 402 questionnaires were administered, out of which 383 were returned and completed giving a response rate of 95.3%.

The questionnaire (Appendix I) which was developed in English language had two sections, the first containing questions about the demographics of participants including age, gender, level of study and internet use pattern as well as sleeping troubles. The participants were further grouped based on their ages into three groups namely; less than 20 years, 20 to 25years and greater than or equal to 26 years of age. The second section was the standardized Internet Addiction Test (IAT) that addressed six potential factors of internet addiction: salience, excessive use, neglect of responsibility, a feeling of heightened anticipation, diminished self-control, and neglect of one's social life. The IAT was designed to measure the frequency with which problematic situations arise as a result of internet use. It was developed by Dr Kimberly S. Young in 1998 and is a 20- item 5- point Likert scale that measures the severity of self- reported compulsive use of the internet. The scale was originally scored on a 5-point Likert scale, but was later modified to a 6-point scale following the addition of one item [28]. The 6-point version of the scale was used for this study. The response options were: 0= does not apply; 1= rarely; 2 = occasionally; 3 = frequently; 4 = often and 5 = always. Total internet addiction scores are calculated, with obtainable scores ranging from 0 to 100. The scale showed good internal consistency, with an alpha coefficient of 0.892 in the present study. According to Young's criteria, total scores that range from 0 to 30 points are considered to reflect a normal level of Internet usage; scores of 31 to 49 indicate the presence of a mild level of Internet addiction; 50 to 79 reflect the presence of a moderate level; and scores of 80 to 100 indicate a severe dependence upon the Internet.

### 2.2 Inclusion Criteria

The inclusion criteria for the study include:

- Undergraduate clinical medical students of Bingham University, Jos campus.
- Consent to participate in the study.

### 2.3 Exclusion Criteria

The exclusion criteria for the study include:

- Students from a different institution
- Refusal to give consent

### 2.4 Statistical Analysis

Data were analysed using the Software Package for Social Science (SPSS) version 21.0 for Windows. Continuous variables were presented as means and standard deviations while categorical variables as frequencies and percentages. Fisher's exact tests were used to explore associations of gender, age and level of study with normal, mild, moderate and severe internet addiction. Multiple logistic regression model was used to explore factors independently associated with internet addiction. Factors included in the regression model were age, gender, level of study, using internet for study purposes, hours spent on social media, having trouble sleeping, time since first internet use. These factors were selected based on known or suspected associations in published literature. Significant levels were set with *P* value of <0.05.

## 3. RESULTS ~~AND DISCUSSION~~

There were 147 male and 236 female students giving a male to female ratio of 0.62:1. The participant's age ranged from 18 to 49 years with a mean age of 22.7 ± 2.7 years. Majority (43.3%) of the students were in the fourth year of study (Table 1).

**Table 1: Basic characteristics of study participants**

| Characteristics | n (%) |
|---|---|
| **Age (years)#** | |
| Male | 23.5 ± 3.3 |
| Female | 22.3 ± 2.2 |
| **Gender** | |
| Male | 147 (38.4) |
| Female | 236 (61.6) |
| **Year of study** | |
| 400 level | 166 (43.3) |
| 500 level | 140 (36.6) |
| 600 level | 77 (20.1) |

Using Young's criteria, 176 (46%) of the students had some form of addiction to the internet. However, majority of these were only mildly addicted (37.9%) with IAT scores of 31 – 49 (Table 2).

**Table 2: Degree of internet addiction**

| Internet Addiction Rating | Frequency (%) |
|---|---|
| Normal Internet use | 207 (54.0) |
| Mild internet addiction | 145 (37.9) |
| Moderate internet addiction | 30 (7.8) |
| Severe internet addiction | 1 (0.3) |

# Mean ± SD

The mean score on the adapted IAT was 30.57 with a standard deviation of 13.01 and median of 30.0, the highest score being 82 out of 100. Only 1 (0.3%) participant who was a male in fifth year had severe internet addiction (Table 3).

**Table 3: Relationship between Internet Addiction Rating and Gender, Age and Level of Study**

| Variables | Normal internet use | Mild internet addiction | Moderate internet addiction | Severe internet addiction | $\chi^2$/df | *P* value |
|---|---|---|---|---|---|---|
| **Gender*** | | | | | 5.1/3 | 0.13† |
| Male | 85 (57.8) | 54 (36.7) | 7 (4.8) | 1 (0.7) | | |
| Female | 122 (51.7) | 91 (38.6) | 23 (9.7) | 0 | | |
| Total | 207 (54.0) | 145 (37.9) | 30 (7.8) | 1 (0.3) | | |
| **Age group* (years)** | | | | | 34.8/15 | |
| <20 | 8 (40.0) | 10 (50.0) | 2 (10.0) | 0 | | |
| 20 – 25 | 168 (52.5) | 126 (39.4) | 25 (7.8) | 1 (0.3) | | |
| ≥26 | 31 (72.1) | 9 (20.9) | 3 (7.0) | 0 | | |
| **Level of study*** | | | | | 6.2/6 | 0.37† |
| 400L | 85 (51.2) | 65 (39.2) | 16 (9.6) | 0 | | |
| 500L | 73 (52.1) | 57 (40.7) | 9 (6.4) | 1 (0.7) | | |
| 600L | 49 (63.6) | 23 (29.9) | 5 (6.5) | 0 | | |

*Percentages add across †Fisher's exact test was applied

In logistic regression analysis, age and having trouble sleeping were negatively associated with internet addiction while hours spent on social media was positively associated (Table 4).

**Table 4: Multiple Logistic Regression of factors associated with Internet Addiction Among Medical Students**

| Variables | OR | 95% CI | Correlation Coefficient | P value |
|---|---|---|---|---|
| Age | 0.821 | 0.723 – 0.932 | - 0.197 | 0.002 |
| Gender | 0.973 | 0.615 – 1.539 | - 0.028 | 0.906 |
| Level | 1.030 | 0.718 – 1.477 | 0.029 | 0.873 |
| Using internet for study purposes | 1.400 | 0.073 – 26.739 | 0.337 | 0.823 |
| Hours spent on social media | 1.333 | 1.150 – 1.544 | 0.287 | 0.000 |
| Having trouble sleeping | 0.411 | 0.235 – 0.717 | - 0.890 | 0.002 |
| Time since first Internet use | 1.266 | 0.936 – 1.713 | 0.236 | 0.126 |

OR = odds ratio, CI = confidence interval

## 4. DISCUSSION

This study sought to investigate the prevalence of internet addiction as well as its associated factors among undergraduate clinical medical students. We found that 37.9%, 7.8%, and 0.3% had mild, moderate and severe internet addiction respectively. Our findings revealed a lower prevalence of severe internet addiction when compared with that of another study done in Southwest Nigeria, where a prevalence of 14.1% was reported [24]. Our much lower prevalence of severe internet addiction may be attributed to the narrower scope of students studied. While our study involved only clinical medical students theirs involved students across all faculties of the university. Another study carried out in South-eastern Nigeria among medical students demonstrated a low prevalence of 2.5% for severe internet addiction [29]. While other non- African studies carried out in India [14] and Iraq [30] have also documented similarly low prevalence of 0.4% and 0.9% respectively, for severe forms of internet addiction among medical students. This suggests that severe internet addiction may be lower in medical students than in other student populations.

The mean IAT score of 30.57 in this study corresponds to mild internet addiction and is comparable with the findings of a study done in Ekiti, Southwest Nigeria where a mean IAT score of 32.6 was found [26]. However, Omoyemiju et al [24] found a higher mean score of 48.16 in the same Southwest Nigeria. Other studies outside Nigeria have reported even higher mean IAT scores of 51.2 [31] and 53.49 [30].

This varying prevalence and mean scores may be as a result of differences in sociodemographic and cultural background. In addition, various studies employ diverse diagnostic criteria and scales for assessing internet addiction thereby limiting comparability.

The scale reliability in this study, was observed to have good internal consistency (Cronbach's alpha = 0.892). This finding suggests that the IAT is an excellent measure for estimating internet addiction and is in support of findings by other researches [8,12,32,33].

This study revealed that younger age was associated with a higher likelihood of developing internet addiction. This finding could be explained by the fact that younger individuals are more conversant with the use of the internet and thus more likely to develop internet addiction [34-36]. Some other researchers [5,26] have however, reported no association between age and internet addiction.

We found that those having trouble with sleeping were less likely to develop internet addiction. This finding is at variance with that from some previous studies [15,37] where they found a higher risk of

internet addiction among individuals with sleep disturbances. A possible explanation for our finding may be that, being medical students with large academic and clinical work load, those having trouble sleeping probably spend their pass time on these academic activities and not on the internet. This suggestion is however, not conclusive as our study did not answer this question.

There was a positive association between the hours spent on social media and internet addiction. This implies that the more time spent on social media, the more likely it is to develop internet addiction. Using internet for social networking has been found to be associated with increased risk for developing internet addiction in previous studies [33,35]. Social networking has become very common among young people in recent times. The need to develop intimate relationships could be the reason for excess internet use for social networking among university undergraduates.

The current research demonstrated that internet addiction was not significantly associated with gender thus, indicating that gender is not a determinant of internet addiction among undergraduates in Bingham University. This is comparable with the findings of other studies among university undergraduates [30,31,38]. However, some authors [8,35,39] have reported male gender as a risk factor for internet addiction, while another [32] reported female gender as a risk factor. It is important to note however, that the one student found to have severe internet addiction in this study, was a male. This could be explained by the fact that the males engage more in online activities like gambling, gaming and pornography which could result in pathological internet use leading to addiction.

Although the direction of association was positive, there was no association between the level of study and internet addiction in our study. Some researchers have reported a positive association, noting that the higher the level of study, the higher the risk of becoming addicted to the internet [32,39].

Though this study has given some insight into the prevalence and associated factors of internet addiction in a northern Nigerian private university, it is not without its limitations. Being a cross sectional study, although we found factors associated with internet addiction, the cause and effect relationship between associated factors and internet addiction could not be established. Secondly, being that the questionnaires were classroom administered, some students with severe internet addiction might have been missed as they are more likely to miss classes. Furthermore, all data were self-reported thus, it is subject to potential information bias. In addition, the IAT instrument used does not fully differentiate between different types of internet usage in relation to addiction. Some of the students may have been using the internet for study or research related purposes. Further research is needed to determine the specific nature of internet-based activities in order to determine the true level of internet addiction. Lastly, there is limited generalizability of the findings since this study was performed in only one medical school in northern Nigeria.

## 5. CONCLUSION

The findings of this study showed that though internet addiction is prevalent among medical undergraduates, there was a low prevalence of severe internet addiction. Younger age and spending long hours on social media were found to be associated factors for internet addiction. There is need to introduce regular counselling and proper guidance for medical students in the university in order to identify internet addiction early and institute measures to help curb it and improve their mental health. We recommend the development of preventive measures such as awareness campaigns on the negative effects of excessive internet use to minimize internet addiction among medical students.

## 6. CONSENT AND ETHICAL APPROVAL

The present study was approved by the Health Research Ethics Committee of Bingham University Teaching Hospital, Jos, Nigeria and was performed in accordance with the ethical standards laid down by the university. Also, informed consent was obtained from participants after explaining to them the study aims. They were assured of confidentiality and their right to privacy was assured and maintained.

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## Appendix I: Questionnaire

**Prevalence and Associated Factors of Internet Addiction among Clinical Medical Students of Bingham University, Jos Campus Nigeria.**

**SECTION A**

1. Serial No----------
2. Gender: Male [ ] Female [ ]
3. Age (as at last birthday): _____
4. Level of Study …. 400L [ ] 500L [ ] 600L [ ]
5. Do you use the internet to study? Yes [ ] No [ ]
6. For how long have you been using the internet? <5years [ ], 5-9years [ ], 10-14years [ ], ≥15years [ ]
7. When is your preferred time of use of the internet? Early hours of the morning [ ], Morning [ ], Afternoon [ ], Evening [ ], Late at night [ ]
8. Are you on social media? Yes [ ] No [ ]
9. On the average, how many hours do you spend on social media per day?
   Less than an hour [ ], One hour [ ], Two hours [ ], Three hours [ ], Four hours [ ], Five or more hours [ ]
10. Do you have trouble falling asleep? Yes [ ] No [ ]

11. How often do you delay your bedtime because you are surfing the internet?
Always [ ], Often [ ], Frequently [ ], Occasionally [ ], Rarely [ ], Never [ ]

**SECTION B**
**INTERNET ADDICTION TEST (IAT)**

This questionnaire consists of 20 statements. After reading each statement carefully, based upon the 5-point Likert scale, please select the response (0, 1, 2, 3, 4 or 5) which best describes you. If two choices seem to apply equally well, circle the choice that best represents how you are most of the time during the past month. Be sure to read all the statements carefully before making your choice. The statements refer to offline situations or actions unless otherwise specified.

0 = Not Applicable
1 = Rarely
2 = Occasionally
3 = Frequently
4 = Often
5 = Always

1.___How often do you find that you stay online longer than you intended?
2.___How often do you neglect household chores to spend more time online?
3.___How often do you prefer the excitement of the Internet to intimacy with your partner?
4.___How often do you form new relationships with fellow online users?
5.___How often do others in your life complain to you about the amount of time you spend online?
6.___How often do your grades or school work suffer because of the amount of time you spend online?
7.___How often do you check your email before something else that you need to do?
8.___How often does your job performance or productivity suffer because of the Internet?
9.___How often do you become defensive or secretive when anyone asks you what you do online?
10.___How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
11.___How often do you find yourself anticipating when you will go online again?
12.___How often do you fear that life without the Internet would be boring, empty, and joyless?
13.___How often do you snap, yell, or act annoyed if someone bothers you while you are online?
14.___How often do you lose sleep due to being online?
15.___How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?
16.___How often do you find yourself saying "just a few more minutes" when online?
17.___How often do you try to cut down the amount of time you spend online and fail?
18.___How often do you try to hide how long you've been online?
19.___How often do you choose to spend more time online over going out with others?
20.___How often do you feel depressed, moody or nervous when you are off-line, which goes away once you are back online?