Problematic Internet Use and Its Association with Anxiety, Substance Use, and Academic Performance among Secondary School Students in Nigeria

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Abstract

Background: Internet addiction is increasingly recognized as a public health concern among children and adolescents. Its psychological and behavioural associates should be closely investigated in Nigeria. The present study aimed to report how prevalent problematic internet use is and examine its associations with psychological problems, such as depression and anxiety, and neuro-behavioural issues like drug use.

Methods: Two public and two private schools were selected by convenience. Thereafter, a total of 420 secondary school students were randomly selected to fill a questionnaire. The data collection sheet comprised a socio-demographic section, the WHO Questionnaire for Student Drug Use Survey, Hospital Anxiety and Depression Scale, and the Internet Addiction Test. Frequency was used to determine the prevalence, while a Chi-square and an independent t-test were conducted to examine the relationship between problematic internet use and other variables.

Results: A total of 378 questionnaires were analysed. Eighty-eight (23.3%) of the participants had scores indicating problematic internet use. While participants who had cases of anxiety (P<0.001), poor academic performance (P=0.04), used alcohol (P=0.03), and caffeine (P=0.04) over the past 30 days were associated with problematic internet use. Following a logistic regression, only students with cases of anxiety had a significant independent association with problematic internet use (AOR=1.09, 95%CI:1.02-1.16).

Conclusions: Problematic internet use is not only common among students, it also has a relationship with commonly occurring worrisome psycho-behavioural variables, requiring further research.

Keywords: Adolescent, Anxiety, Caffeine, Internet, Nigeria

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1. Introduction

The number of internet users in Nigeria is growing. It is estimated that by 2023 this number would reach 187.8 million in Nigeria whereas it was 92.3 million in 2018 (1). It has been reported that 56% of secondary school students use the internet and 49% are weekly users (2). Despite the numerous benefits related to the use of the internet by secondary school students, it is also associated with certain problems (3).

Problematic internet use may ensue as a complication of internet use. Its synonyms are internet addiction, pathological internet use, compulsive internet use, and internet dependence (4, 5). Problematic internet use describes the compulsive use of the internet that leads to the impairment of socio-psychological functions (6). Problematic internet use are becoming increasingly disturbing worldwide.

In a research study from Italy, a western country, Vigna-Taglianti and colleagues reported that the prevalence of problematic internet use among male secondary school students was 14.2% while it was 10.1% for females (7). A similar prevalence (12.2%) was reported from China, an Eastern Bloc country (8). In Africa (Morocco), a comparative study reported a prevalence of 15.8% for problematic internet use (9).

In Nigeria, few works with a wide range of prevalence were discovered in our search, and they were mainly carried out among university students (10-12). One of the studies that found a high prevalence of problematic internet use was done among university undergraduate students in South-East Nigeria; it reported 29% for mild, 20% for moderate, and 10.2% for severe internet addiction (10). However, in another study carried out in the same region among medical students, a low prevalence of problematic internet use (2.5%) was reported (11). One study conducted in South-West Nigeria among undergraduates reported a prevalence of 14.1% of a severe level of problematic internet use (12).

Researchers have also shown interest in the

relationship between problematic internet use and psychiatric morbidities and psychoactive substance use. A study that drew participants from five universities in Japan reported that depression and anxiety might predispose to problematic internet use (13). Similarly, individuals with problematic internet use were shown to have significant levels of anxiety and depression (14). As for the relationship between problematic internet use (a kind of behavioral addiction) and substance use, experts hold that any entity capable of stimulating someone can be addictive, be it a behavior or a substance (15). Therefore, it is not surprising that substance use has been reported to predict a high risk for problematic internet use (16).

This study was carried out owing to the dearth of data on problematic internet use among secondary school students in Nigeria, particularly in the south -south of the country. The specific objectives were to investigate the prevalence of problematic internet use among secondary school students in Benin City, Nigeria, and the socio-demographic factors associated with it. The present study also examined the association of problematic internet use with anxiety, depression, and substance use.

2. Methods

2.1. Study Location and Population

This cross-sectional study was conducted in Benin City, the capital of Edo State, located in the South-South geopolitical zone of Nigeria. Within the city, there are schools owned either by the government (public) or by individuals (private). The school system is such that the secondary school education is divided into junior and senior, each with a three-year program. The study population consisted of students from both levels of secondary schools.

2.2. Sampling Method

A minimum sample size of 324 was calculated with a G*power 3.1.9.8 software using a previous Nigerian study reporting one of the highest prevalence (30.2% of at least moderate problematic internet use) of internet use addiction among students (10). Sampling was based on convenience, and four gender-mixed schools (two public and two private schools) were selected from the schools in the city. The selection was purposefully done to ensure representation of the government-owned (public) and private schools. Afterwards, students were randomly selected from both junior and senior

secondary levels of the chosen schools.

2.3. Study Criteria

The following criteria were applied in recruiting the students for the study:

1. Students 18 years and above who consented and those under 18 years who assented to participating in the study. However, very few students refused to participate, mostly due to unwillingness to forfeit their break time by filling the questionnaire.

2. Students with sufficient knowledge of English language to properly fill the questionnaire.

2.4. Ethical Issues

Approval to carry out the study was obtained from the Research and Statistics Department of the Ministry of Education, and permission was sought from the authorities of the schools involved. Informed consent was obtained from the participants and their parents/ teachers if they were under 18 years of age. Anonymity was duly observed while filling the questionnaires.

2.5. Investigation Instruments

We used a questionnaire consisting of four sections as follows:

i) A sociodemographic characteristics section which was used to obtain information regarding the gender, age, family structure, school type, religion, ethnicity, parental figure (categorized as both parent, single parent and guardian), and academic performance rated by the students.

ii) The Internet Addiction Test by Kimberly Young which is a 20-item scale (17). It assesses the general pattern of internet use and its impacts on the respondent's social behaviour and life at home, work, and school. Responses were provided based on a six-point Likert scale (0-5); thus, the possible scores ranged between 0 and 100. A score of 50 and above indicated potential internet addiction (18). The scale has been widely used among students, and the scale recorded a Cronbach alpha of 0.93 in the current study.

iii) The Hospital Anxiety Depression Scale. The scale is employed to screen for the presence of anxiety or depressive state in both clinical and non-clinical populations. It comprises each seven depression and

anxiety items and was previously validated for use in Nigeria (19). A higher score on each scale indicates higher anxiety and depression levels. A cut-off point of 8 and above on either of the two components is regarded as a case. The Cronbach alpha for the scale in the current study was 0.51, and the mean inter-item correlations were 0.35, which is satisfactory.

iv) The World Health Organisation Questionnaire for Student Drug Use Survey. This instrument was developed by several individuals from different parts of the world including Nigeria (20). Respondents were required to indicate whether or not they had used each drug over the past thirty days (current use) and state the frequency of use within this period. A high validity and a mean test-retest reliability of 86.7% were reported for all questionnaire items (21). For this study, only the sections of the instrument enquiring on current use of alcohol, tobacco, caffeine, opioid, benzodiazepine, and inhalants in the past thirty days were used. Reliability test of the scale in this study revealed an internal consistency of 0.62 and mean inter-item correlations of 0.25, which is acceptable.

2.6. Procedure

Following approval/permission by the relevant authorities to proceed with the study, one adequately trained research assistant was employed for data collection and assisting the students when necessary. The questionnaire was administered in the classroom mostly during the break period.

2.7. Data Analysis

The collected data were analysed using the Statistical Package for Social Sciences (SPSS), version 22. Frequency of variables, such as gender, school, and family structure was determined in percentages and displayed in tables. Some variables, such as religion, were dichotomised into Christianity and others because Christianity was the most common religious practice; meanwhile, other variables such as current substance use were dichotomised into use/no use to enable a sufficient number of participants for analysis. Cut-off points were utilized to determine the prevalence rates of depression, anxiety, and problematic internet use although the raw (continuous) scores were used in further analyses involving the same variables.

Bi-variates analyses included the Chi-square test which was used to determine the association between problematic internet use and categorical variables, including gender, family structure, school type, academic performance, and current use of substances. The independent t-test was applied to examine the differences between the two groups of internet users (normal and problematic) regarding the mean scores of age, depression, and anxiety. A binary logistic regression was done and significant variables on bi-variates analyses such as anxiety, academic performance, and current substance (alcohol and caffeine) use were included in the model.

3. Results

A total of 420 students filled the questionnaire, but 378 (90%) were analyzed. The rest were discarded due to inconsistent responses or a significant number of unfilled data. The participants comprised 174 (46.2%) males and 203 (53.8%) females. Age ranged between 10 and 21 years with a mean of 14.78±1.83 years. The sample included 189 students from the public schools while 183 (49.2%) belonged to private schools. The majority (79.4%) of the respondents used a phone to browse whereas 12.1% used a computer. Very few went to an Internet café to browse. Other characteristics of the participants are summarized in Table 1.

The current substance use among the students for caffeine, alcohol, benzodiazepine, and tobacco was 39.4%, 23.3%, 6.3%, and 6.1% respectively. Opioid and inhalant were each 4.5%. One hundred and twelve (29.6%) and 48.4% of participants scored above the cut-off point of 8, indicating depression and anxiety, respectively. The prevalence of those with problematic internet use was 23.3% (Table 1).

A significant correlation was detected between problematic internet users and current alcohol use (P=0.03), current caffeine use (P=0.04), and academic performance (P=0.04), (Table 2). Furthermore, participants with problematic internet use had significantly higher scores of anxiety (P<0.001) compared to those with normal internet use (Table 3).

A binary logistic regression of current alcohol and caffeine uses, academic performance, and anxiety were carried out on problematic internet use. After all the variables were controlled for, the result showed that only the association between anxiety and problematic internet use remained significant (Table 4).

Table 1: Students' sociodemographic characteristics

Variables	Characteristics	Frequency (%)
Gender*	Male	174 (46.2)
	Female	203 (53.8)
School*	Public	189 (50.8)
	Private	183 (49.2)
Ethnicity*	Bini	159 (43.9)
	Non-Bini	203 (56.1)
Family*	Monogamy	294 (80.5)
	Polygamy	71 (19.5)
Religion*	Christianity	359 (95.7)
	Others	16 (4.3)
Parental figure*	Single parent	77 (20.4)
	Both parent	242 (64.2)
	Guardian	58 (15.4)
Academic performance*	Above average	285 (77.2)
	Average & below	84 (22.8)
Current alcohol use	No	290 (76.7)
	Yes	88 (23.3)
Current caffeine use	No	229 (60.6)
	Yes	149 (39.4)
Current benzodiazepine use	No	354 (93.7)
	Yes	24 (6.3)
Current tobacco use	No	355 (93.9)
	Yes	23 (6.1)
Current opioid use	No	358 (95.5)
	Yes	17 (4.5)
Current inhalant use	No	361 (95.5)
	Yes	17 (4.5)
Depression	Non-cases	266 (70.4)
	Cases	112 (29.6)
Anxiety	Non-cases	195 (51.6)
	Cases	183 (48.4)
Internet user	Normal	290 (76.7)
	Problematic	88 (23.3)

Mean 14.78±1.83 years *Missing data

Table 2: Chi Square associations between problematic internet use and students' characteristics

Variables		Internet use		P value
		Normal (%)	Problematic (%)	
Gender	Male	132 (75.9)	42 (24.1)	0.74
	Female	157 (77.3)	46 (22.7)	
School	Public	140 (74.1)	49 (25.9)	0.24
	Private	145 (79.2)	38 (20.8)	
Family	Monogamy	226 (76.9)	68 (23.1)	0.54
	Polygamy	57 (80.3)	14 (19.7)	
Academic performance	Above average	227 (79.6)	58 (20.4)	0.04
	Average & below	58 (69.0)	26 (31.0)	
Current alcohol use	No	230 (79.3)	60 (20.7)	0.03
	Yes	60 (68.2)	28 (31.8)	
Current caffeine use	No	184 (80.3)	45 (19.7)	0.04
	Yes	106 (71.1)	43 (28.9)	

Table 3: T-test difference between normal and problematic internet use in students' age, anxiety, and depression scores

Variables	Internet use	Mean±SD	T	P value
Age	Normal	14.68±1.84	-1.84	0.07
	Problematic	15.11±1.77		
Depression	Normal	5.97±3.33	0.42	0.68
	Problematic	5.81±2.91		
Anxiety	Normal	7.08±3.97	-2.98	0.00
	Problematic	8.50±3.80		

Normal use (n=290), problematic use (n=88), df=376, T - independent T test, SD - standard deviation

Table 4: Binary logistic regression of current alcohol and caffeine use, academic performance, and anxiety on problematic internet use

Independent Variable	B	S.E.	df	Sig.	AOR (95% CI)
Academic performance	-0.43	0.29	1	0.13	0.65 (0.37-1.14)
Current alcohol use	-0.31	0.31	1	0.33	0.74 (0.40-1.36)
Current caffeine use	-0.35	0.28	1	0.20	0.70 (0.41-1.21)
Anxiety	0.08	0.03	1	0.00	1.09 (1.02-1.16)

B – Unstandard Regression, SE – Standard Error, DF – Degree of Freedom, AOR – Adjusted Odd Ratio

4. Discussion

We investigated the prevalence of problematic internet use and its association with certain sociodemographic and clinical factors such as depression, anxiety, and substance use. Based on our findings, 23.3% of the adolescents rated themselves as problematic internet users. Moreover, problematic internet use had significant associations with below-average academic performance, current use of alcohol and caffeine, and anxiety among the students.

The prevalence of problematic internet use in the current study was well within 2.5% and 30.2% range (10, 11). Meanwhile, this research reported a prevalence lower than a study conducted among university students in Enugu, Nigeria (10); we found a prevalence rate higher than the reports among secondary school students in China (8) and Morocco (9).

Several methodological factors may account for the different prevalence rates reported by various researchers such as different assessment instruments, study populations, and sample sizes. For instance, the sample size of the present study was far smaller than the Chinese study. Secondly, the Chinese study drew participants from four cities while ours was conducted in one city. Thirdly, China is at a much higher socioeducational level compared to Nigeria; accordingly, the students there are more likely to have information or training devices that may protect against problematic internet use. This possibly explains the very low rate among Nigerian medical students who are also expected to be better informed on internet use (11).

Demographic factors did not significantly differ between participants with normal internet use and problematic internet users. This finding is similar to a study performed in Egypt, in that the mean age and gender of students with problematic internet use had no significant difference with that of students with no problematic internet use (22). Similar to the Egyptian study, we found the prevalence of problematic internet use to be non-significantly higher among males. The findings on gender prevalence among problematic internet users have not been consistent. Some authors have observed problematic internet use to be more common among males; others have reported more prevalence among females while some have not reported any gender difference (8, 9, 23-25). The Egyptian authors opined that the slightly higher problematic internet use prevalence among males might be because they are more likely to engage in online games, cybersex, and gamble (22).

The high reported prevalence of problematic internet use is a cause for concern due to the likely negative impact on academic excellence and attainment. As found in the current study, below-average academic performance was significantly higher in students with problematic internet use compared to non problematic internet users. This is in keeping with studies where a negative correlation was reported between school performance and internet use (26), and poor academic performance was associated with problematic internet use (22, 23). Consequently, stakeholders including parents, schools authorities, and medical practitioners would need to have a high index of suspicion to prevent and manage problematic internet use.

In this study, there was an alarming association between problematic internet use and certain substances, such as past month use of alcohol and caffeine which they are the most commonly used drugs among students (27, 28). The significant association between current alcohol and caffeine and problematic internet use is also not unique to the current study; other researchers have reported substance use to be significantly correlated with problematic internet use (23, 25, 29, 30). The association between problematic internet use and substance use may not come as a surprise since both constructs have been known to share similar psychopathological features (25), neurobiological characteristics (31), and impulsivity personality trait (32).

The significant association between problematic internet use and mood disorders like anxiety underscore the need to take the issue of problematic internet use more seriously due to the high prevalence of mood disorders reported in this study and previous ones (33, 34). Based on the binary logistic regression done in the current study, only anxiety significantly differentiated students with problematic internet use from others. The lack of a statistically significant association between depressive symptomatology and problematic internet use has been documented (35); however, anxiety symptomatology has been reported to be correlated with and predict internet addiction (36, 37). According to research, anxiety can be either a cause or consequence of problematic internet use. While some researchers have reported that internet use by adolescents makes them feel lonely and develop problematic behaviours (8), others have reported that social anxiety and inadequacy may be responsible for problematic internet use (35). Regardless of which is primary, whether it is problematic internet use that causes anxiety or it is anxiety that leads to problematic internet use, there is an existing relationship between the two which demands attention.

There are some limitations to consider in the present study. A study confined to only one region of the country cannot be generalised to the entire country. Secondly, participants self rated their academic performance, which might be misleading. Determining the students' performances based on the opinion of their class teachers would have been more objective. Thirdly, current substance use is not the same as substance abuse; it would have been more clinically useful to investigate the latter. Also, it would be preferable to apply a diagnostic tool, although the rating scale used in this study to identify anxiety and

depression had acceptable sensitivity and specificity. Furthermore, two of the scales had moderately low-reliability scores, but the mean inter-item correlation was optimal. Finally, cross-sectional studies such as this should be interpreted with caution because they cannot be used to determine the direction of cause. Whether anxiety is the cause or the consequence of problematic internet use in this study is indeterminate.

5. Conclusion

The findings revealed the high prevalence of problematic internet use among secondary school students and its relationship with academic performance, current use of drugs, such as alcohol and caffeine, and anxiety. Only anxiety had an independent association when others were controlled for. These findings call for immediate attention and have to be taken seriously by various stakeholders. The relationship between anxiety and problematic internet use where the evidence of association is stronger should be further investigated; in this regard, secondary schools, where there is lack of information, should be targeted.

Ethical Approval:

Conflicts of interest: None to declare.

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