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Internet Addiction and Online Activities among Secondary School Adolescents in North East Nigeria

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ABSTRACT

Introduction: This study was conducted to determine the prevalence of internet addiction (IA), Pattern of online activities and socio-demographic factors associated with internet addiction among secondary school adolescents in Gombe, North East Nigeria. **Method:** A total of 395 secondary school adolescents between the ages of 13-18 years were recruited using a multistage sampling technique. Internet addiction and internet activities were assessed using Young's Internet Addiction Tool and a tool adapted from Canbaz et al respectively. **Results:** Of the 395, the response rate was 95.4% (377). The overall prevalence of internet addiction was 59.2% (213/377), 1.6% (6/377) had severe IA. Male subjects were three times more likely to develop IA than females, (OR 3.03, CI 0.18-0.62). Adolescents who were not under their parents' care, those in senior class and in private school had higher odd. The three highest-ranked activities were information searching, chatting and watching of video. Risk of IA is higher in subjects that engaged in online chatting (OR= 1.65; CI= 1.396- 1.961) and those who watched pornography (OR= 1.463; CI= 1.092-4.170). **Conclusion:** There is high burden of IA in Gombe. Male sex, Chatting and watching of pornography were predictors of IA among adolescents.

keywords: Adolescents. Internet Addiction. Online activities. Gombe, Nigeria

INTRODUCTION

The Internet is a worldwide interconnection of a computer network which serve as a mechanism for information dissemination and a medium for interaction between individuals. Although the Internet brings lots of convenience to modern life, the growth in internet usage has made some people compulsive users. Also, the availability of mobile technology and social web which serve as new means of communication has led to increase in internet access worldwide.

Internet addiction (IA) is the excessive time spent on internet activities to the extent of incurring adverse effects on user's physical and psychological health, expressed in his or her academic, professional, social, marital relationship, and other facets of life. Internet addiction is an emerging social and clinical disorder due to the dramatic increase in the use of the internet.² Also, the availability of mobile technology and social web which serve

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The criteria for the diagnosis of IA were developed by and were derived from the criteria of Young pathological gambling in the Diagnostic and Statistical Manual - Fourth Edition (DSM-4). These include preoccupation with the Internet, need for a longer amount of time online, repeated attempts to reduce Internet use, withdrawal when reducing Internet use, time management issues, environmental distress (family, school, work, and friends), deception around time spent online, and mood modification through Internet use. The prevalence of IA varies across countries. Prevalence of IA among adolescents in Asia ranges from 5-10.7%., In South Africa, the general prevalence was reported to be 5.2%. Studies among adolescents in Nigeria have reported the prevalence of severe IA of 3.3% and 11% in Southern and Eastern part on Nigeria respectively.,

Adolescence is a period of development during which dramatic changes in the physical appearance, psychological and social functioning occur. Adolescents are at the risk of developing an addiction because frontal cortical development occurs later in adolescence. This development contributes to the refinement of reasoning, goal and priority setting, impulse control and evaluating long and short term rewards.¹² Also decision- making and risk- taking behaviour undergo developmental changes during adolescence. During risky decision-making tasks, adolescents show increases in striatal activation during receipt of reward compared to children and adults, suggesting sensitivity to feedback.¹⁴ The imbalance between immature cognitive control and reward process during adolescence may allow incentive modulation to supersede cognitive control, leading to increased susceptibility to the motivational properties of appetitive behaviour like internet addiction. -

Familial and parental factors also contribute to the development of IA. Children with conflict with their parents and those who are not living with their mother have been shown to have increased risk of IA. - Den et

as new means of communication has led to increase in al^{16} in the Netherlands reported that qualitatively good communication regarding internet use is a promising tool for parents to prevent their teenage children from developing IA. It has also been shown that mother's neglect, lack of parental monitoring of internet use and conflict between two parents were associated with IA.¹⁶ Other risk factors include male gender and environmental factors like access and affordability. 10-11,16 Studies of IA among adolescents have reported high prevalence among males and older adolescents.^{9,10}, This could be because male experience higher motivational drives than the females in internet use rendering them to learn reward values. Environmental factors like accessibility due to the availability of mobile technology, social web which serve as new means of communication, affordability, and motivation may also make adolescent to be at higher risk of IA.

> Internet addiction is a newly emerging social and clinical disorder that affects psychological wellbeing and social activities. The dramatic increase in the use of internet has led to pathologic use. Internet addiction is a new disorder that many practitioners are not aware of and not ready to treat despite persistent and explosive rise in the numbers of internet users.²¹ It is mental health issues that could impact the adolescent population negatively. In developed countries, many studies have been done to established internet addiction disorder as a public health problem. There are few studies from Africa including Nigeria despite increasing accessibility to internet and evidenced based adolescent vulnerability to addiction. In addition, internet addiction affects adolescent development including the cognition and interpersonal relationship. This study could determine the burden of IA among secondary school adolescents in Gombe and stir up clinical interest in the assessment of adolescents for possible IA and early referral to minimize the impact.

Objective

Determine the prevalence of internet addiction, pattern of online activities and socio-demographic factors associated with internet addiction among secondary school adolescents in Gombe LGA, North East Nigeria

MATERIALSAND METHODS

The study was conducted in Gombe state, North eastern Nigeria in 2018 over a period of 6 months. The study population comprised of secondary school adolescents who had access to internet. The sample size was 395 and was calculated by Fischer formula using reported prevalence of internet addiction in adolescent in Enugu, Nigeria ,10 Three hundred and ninety-five adolescents in 30 secondary schools, both private (18 schools) and public (12 schools), were selected using a multistage sampling technique. In each of the selected schools, the number of students recruited for the study was determined by proportionate probability sampling method. The proportion was computed by dividing Index School population by the total population in the 30 selected schools. In each school, the names of students who are internet users were listed, and the list was used as the sampling frame. The subjects were recruited from this sample frame and the sampling interval was determined by dividing number of internet users in each school by the number of subjects selected from each school. Assent was sought from the subjects after the parents consented.

Ethical clearance was obtained from the Federal Teaching Hospital Gombe Research Ethics Committee. Written approval was sought from the Gombe State Ministry of Education and the management of the selected schools. Verbal permission was obtained from school principals and class teachers.

Two tools were used for data collection (internet addition and internet activity tools). Young's Internet Addiction Tool $(IAT)^4$ was used to measure internet addiction. It is a self-reported instrument that consists of 20 items questionnaires on a Likert scale of 0-5. It was used to classify addictive internet behaviour into mild IA- Scores of 31-49, moderate IA- Scores of 50-79 and Severe IA- Scores of 80-100. Internet activities was assessed using a tool adapted from Canbaz *et al.*²⁴ A structured questionnaire was used to obtain socio-demographic characteristics. All data generated were processed and analysed using the IBM Statistical Package for the Social Science Statistical Software

version 23. Proportions and percentages were computed for categorical variables. The means and standard deviations of the quantitative variables that were normally distributed such as age were calculated. Chisquare test was used for association of categorical variables with p-value set at 0.05.

RESULTS

A total of 395 adolescents who are internet users were enrolled in the study. Eighteen subjects who had incomplete data (incomplete response in either the questionnaire or the research tools) were excluded. Information from a total of 377 adolescents, who had complete data, were analysed.

There were 230 males and 147 females, M: F ratio of 1.5:1. The mean age of study subjects was 16.2 ± 1.4 years, higher proportion (73.5%) were middle adolescents, majority (55.4%) of them attended public schools and were in the senior class. Phone was commonly used by the participants to access internet.

The overall prevalence of internet addiction was 59.2% (223/377). The overall prevalence of internet addiction was 59.2% (223). Of these, mild, moderate and severe IA constitutes 32.4%, 25.2% and 1.6% respectively, Figure 1 and Figure II.



Figure 1: Pie chart showing the prevalence of internet addiction among the study subjects.

Male subjects had a higher total mean IA score (39.5 \pm 19.8) than the female (31.1 \pm 21.4) and, there was a

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significantly higher mean IA score among the late adolescents compared to other age groups, table 1



Figure 2: Severity levels of Internet addiction among the study sublects

 Table 1: Mean Internet Addiction Score by Age and Sex of the Study Subjects

Mean IA score ±SD						
Age	Male	Female	p- value			
13	57.5±6.4	16.2±15.9				
14	32.6±23.9	41.5±21.1				
15	37.6±21.8	31.4±21.4				
16	40.6±18.6	27.8±22.0				
17	39.0±18.2	31.3±20.6				
18	41.7±19.1	36.9±20.3				
Total	$39.5 \pm \! 19.8$	31.1±21.4				
Age groups						
Early Adolescents	$26.5\pm\!\!23.5$		0.019			
Middle Adolescents	$34.9{\pm}21.0$					
Late Adolescents	41.1±19.2					

Tables 2 and 3 presents the bivariate and multivariate analysis of IA by socio-demographic characteristics of the respondents. The burden of IA was significantly higher among males (p-value 0.003). Adolescents who were not under their parents' care had significantly higher prevalence of IA as compared to those who were being cared for by their parents (p 0.042). Subjects in private school and those in senior class also had a higher prevalence (p 0.002 & 0.001 respectively (Table 2).

Internet Addiction					
Socio-demographic	Present	Absent	Total	χ^2	p-value
Variables	n(%)	n(%)	n(%)		
Age Group					
Early Adolescence	3 (37.5)	5 (62.5)	8 (100.0)	5.565	0.062
Middle Adolescence	157 (56.7)	120 (43.3)	277 (100.0)		
Late Adolescence	63 (68.5)	29 (31.5)	92 (100.0)		
Gender					
Male	150 (65.2)	80 (34.8)	230 (100.0)	8.983	0.003*
Female	73 (49.7)	74 (50.3)	147 (100.0)		
Social Class					
High	83 (62.9)	49 (37.1)	132 (100.0)	3.445	0.179
Middle	88 (61.1)	56 (38.9)	144 (100.0)		
Low	52 (51.5)	49 (48.5)	101 (100.0)		
Device for Accessing	()	· · /	. ,		
Internet					
Phone	175 (60.8)	113 (39.2)	288 (100.0	5.476	0.065
Laptop	19 (43.2)	25 (56.8)	44 (100.0)		
Both	29 (64.4)	16 (35.6)	45 (100.0)		
Caregiver	()	· · /	. ,		
Parents	198 (57.6)	146 (42.4)	344(100.0)	4.128	0.042*
Others	25 (75.8)	8 (24.2)	33 (100.0)		
School types	()	(· ·)	()		
Private	114 (67.9)	54 (32.1)	168 (100.0)	9.506	0.002*
Public	109 (52.2)	100 (47.8)	209 (100.0)		
Class		()	()		
Junior	21 (32.8)	43 (67.2)	64 (100.0)	20.867	< 0.001*
Senior	201 (64.3)	112 (35.7)	313 (100.0)		
Exam performance +		()			
Pass	219 (59.0)	152 (41.0)	371 (100.0)	0.143	1.000
Fail	4 (66 7)	2 (33 3)	6 (100.0)		1.500

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Table 3: Logistic regression	analyses for	· internet	addiction
by Socio-demographic	-		

	Inter	net Addictio	n		
Socio-demographic	Present	Absent	p-value	OR	CI
Variables	n(%)	n(%)			
Age Group					
Early Adolescence	3 (37.5)	5 (62.5)	0.447	1.232	0.72-2.11
Middle Adolescence	157 (56.7)	120 (43.3)			
Late Adolescence	63 (68.5)	29 (31.5)			
Gender					
Male	150 (65.2)	80 (34.8)	0.014*	3.03	0.18-0.62
Female	73 (49.7)	74 (50.3)			
Social Class					
High	83 (62.9)	49 (37.1)	0.568	1.081	1.83-1.41
Middle	88 (61.1)	56 (38.9)			
Low	52 (51.5)	49 (48.5)			
Device for Accessing					
Internet					
Phone	175 (60.8)	113 (39.2)	0.482	1.124	0.64-1.23
Laptop	19 (43.2)	25 (56.8)			
Both	29 (64.4)	16 (35.6)			
Caregiver					
Parents	198 (57.6)	146 (42.4)	0.030*	2.725	0.15-0.91
Others	25 (75.8)	8 (24.2)			
School types					
Private	114 (67.9)	54 (32.1)	0.005*	2.033	1.23-3.35
Public	109 (52.2)	100 (47.8)			
Class					
Junior	21 (32.8)	43 (67.2)	0.001*	3.303	0.18-0.62
Senior	201 (64.3)	112 (35.7)			
Exam performance +					
Pass	219 (59.0)	152 (41.0)	0.475	1.098	086-1.38
Fail	4 (66.7)	2 (33.3)			
*Significant n-values	School Types	Class in School	+ Grade	in the la	st exam

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Multivariable analysis revealed that males are three times more likely to develop IA than females, (OR 3.03, CI 0.18-0.62), subjects who were not under their parents' care had 2.7 times higher odd (OR 2.725, CI 0.15-0.91), those in senior secondary school presented a 3.3fold greater risk (OR 3.303, CI 0.18-0.62) than those in junior class and those in private school were 2.7 times more likely to develop IA than those in secondary school, (OR 2.033, CI 1.23-3.35), (Table 3).

Male involvement in both online and offline activities was higher than the females. The prominent activities among both male and female subjects were information searching (83%), followed by chatting (82.2%) and watching of video (82.2%). Online chatting was more common among subjects in late adolescent age group while early adolescents involved mainly in information searching and online chatting. About two-third of subjects in each of the age groups watched online videos. Although viewing/watching of pornography was the least online activity (26.3%), it increases with age, table 3 and 4. Subjects that are addicted to the internet significantly engaged more in all the internet activities as compared to normal internet users, Table 5

Table4. Online and Online activities according to the Stages of Adolescence					
Internet activities	Early adolescence	Middle	Late adolescence	Total	
		auoicscence		1//17/01	

Table 4: Online and Offline activities according to the Stages of Adole

	8 (%)	277 (%)	92 (%)	
A. Online				
Chatting	5 (62.5)	225 (81.2)	80 (87)	310 (82.2)
Information Searching	5 (62.5)	230 (83.0)	78 (84.8)	313 (83.0)
Gaming	4 (50)	191 (69.0)	65 (70.6)	260 (69.0)
E-Mail	3 (37.5)	191 (69.0)	62 (67.4)	256 (67.9)
Online Video	5 (62.5)	173 (62.5)	60 (65.2)	238 (63.1)
Pornography	0 (0%)	71 (25.6)	28 (30.4)	99 (26.3)
B. Offline				
Internet Programme	2(25)	191 (69)	66 (71.7)	259 (68.7)
Offline Gaming	5 (62.5)	217 (78.3)	68 (73.9)	290 (76.9)
Music	5 (62.5)	215 (77.6)	73 (79.3)	293 (77.7)
Offline video	5 (62.5)	230 (83.6)	76 (82.6)	311 (82.5)

Table	4:	Internet activities amo	ng the study	participants	by gender

Gender					
	Male	Female	Total	p -value	
	230 (%)	147 (%)	377 (%)		
Internet Activities					
A. Offline					
Internet Programme	173 (75.2)	86 (58.5)	259 (68.	7) 0.001	
Offline Gaming	198 (86.1)	92 (62.6)	290 (76.	9) <0.001	
Music	196 (85.2)	97 (66.0)	293 (77.	7) <0.001	
Watching videos	202 (87.8)	108 (73.	5) 310 (82.	2) <0.001	
B. Online					
## Chatting	202 (87.7)	108 (73.	5) 310 (82.	2) <0.001	
Information Searching	203 (88.3)	110 (74.8	3) 313 (83.	e) 0.001	
Gaming	179 (77.8)	81 (55.1)	260 (69.	0) <0.001	
E mail	169 (73.5)	87(44.0)	256 (68.	2) 0.004 *	
Online videos	154(67.0)	84(57.1)	238(63.1	l) 0.054	
Pornography	64(27.8)	35 (23.8)	99 (26.3) 0.387	

*Significant chi-square p - values

Table 5: Association between Activities on the Internet and Internet Addiction

Internet Addiction					
Activities	Yes	No	Total	p-value	
Online	n (%)	n (%)	n=377	_	
Chatting	194 (63.0)	114 (37.0)	308 (81.7)	0.001*	
Information searching	197(63.1)	115 (36.9)	312 (82.8)	0.001*	
Gaming	166 (63.7)	94 (36.3)	260 (69.0)	0.001*	
Email	167 (65.5)	88 (34.5)	255 (67.6)	0.001*	
Watching Videos	152 (63.9)	86 (36.1)	238 (63.1)	0.015*	
Pornography	70 (70.9)	29 (29.3)	99 (26.3)	0.006*	

*Significant chi-square p-values

The internet activities which were all found to be significant in bivariate analysis were harvested and subjected to multivariate analysis to rule out confounders. The logistic regression analysis showed that the subjects who engaged in chatting were 1.7 times more likely to be addicted to the internet than subjects who did not engage in chatting, (OR= 1.65; CI= 1.396-1.961; p< 0.001). Subjects who viewed or watched pornography were 1.5 times more likely to be addicted to the internet than subjects to the internet than subjects who did not (OR= 1.463; CI= 1.092-4.170; p= 0.012), table 6.

Table 6 : Logistic regression anal	ysis showing Internet Activities
Associated with Internet	Addiction in Study Subjects

Independent variables	Odds ratio	95% Confid	ence	P value		
Chatting		Interval	l			
Normal users	1					
Addicted users	1.654	1.396	- 1.961	< 0.001*		
Pornography						
Normal users Addicted users	1 1.463	1.092	- 4.170	0.001*		

*Statistically significant

DISCUSSION

The overall prevalence of internet addiction among subjects in this study was 59.2%. This is similar to that reported by Okwaraji *et al*¹⁰ in Enugu, South East Nigeria. The similarity in the prevalence may be due to the use of a similar study population (secondary school adolescents) and a similar methodology adopted in measuring the IA.

The overall prevalence of IA in this study is higher than the overall prevalence of 23.6% reported in Ibadan by Adiele *et al*^{\circ} The higher prevalence in this study as compared to the report by Adiele *et al* might be due to the difference in the study populations. Whereas Adiele *et al*^{\circ} studied IA in undergraduates and postgraduates that involved a mixed population of adolescents and adults, the current study recruited only adolescents. Adolescents are more vulnerable to IA because of the imbalance between immature cognitive control and reward process which allows incentive modulation to supersede cognitive control. *16-17* Furthermore, the overall prevalence reported by Adiele et al did not include mild IA. Thus, the lower overall prevalence as compared to the present study.

The overall prevalence of IA in this study is similar to report by Okwaraji *et al*,¹⁰ however, the prevalence of severe internet addiction (11%) reported by Okwaraji is higher compared to this study. The significant difference in the prevalence of severe IA between Okwaraji *et al* report and this present study could be attributable to a higher proportion of older adolescent in Okwaraji *et al* study and these older adolescents demonstrated a significantly higher level of severe IA, thus higher reported the prevalence of severe IA. This was also demonstrated in this study as there was a significantly higher mean IA score among the late adolescent. The significantly higher mean IA scores found in this study and the higher level of severe IA reported in the earlier report underscores the role of age in the IA during adolescence. As adolescent grows, they are more detached from the parent and seek more privacy.¹² This might reduce the parental monitoring of duration on the internet and the content of adolescent internet use, thus enhancing excessive use.

This study showed a higher prevalence of IA among male as compared to females. This is in tandem with the findings in other studies¹⁰⁻¹¹ in which male gender was found to be a significant risk factor for IA. This finding may be attributed to higher preoccupation with internet use in males than the females due to the former higher motivational drive for reward seeking behaviours.¹⁹ This was evident in the present study through the demonstration of higher involvement in all the internet activities by male participant compared to the females. The male participants also had significantly higher engagement in online chatting and gaming in this present study. Online gaming and social networking are activities that are associated with higher motivational drives for internet use and might render males more likely to learn reward value and use the internet more, culminating in higher IA.

Another finding in this study is the relationship of a parental factor with IA. Adolescents who are not cared for by their biologic parents had a higher prevalence of IA compared to those cared for by their parents. This finding is in tandem with previous studies which reported that lack of parental monitoring of internet use is a risk factor for IA in adolescents and adolescents who did not live with a biologic parent were 3 times more like to be addicted to internet compared to those who lived with a biologic parent¹⁹ The similar observation in this study might be attributable to low parental involvement and lack of parental rules regarding the content of internet activities experienced by adolescents who are not under the care of their parents, thus increasing the

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risk of addictive internet use.18,19

Higher prevalence of IA found among adolescents in the senior class in this study corresponds to the report by Okwaraji *et al*¹⁰ in Nigeria and Yen *et al* in Taiwan which showed more addiction in subjects in the senior class. This might be explained by the acquisition of more education and thus more ability to surf the internet by the subjects in senior classes.

In this study, there was no relationship between internet addiction and academic performance. This is in contrast to the study that has shown that IA is associated with poor academic performance.²¹ The difference observed between the finding of the earlier report and this study might be because this study only assessed the grade in the exam preceding the study, previous grades were not obtained for comparison. Also, Intelligence quotient of the internet addicts was not compared with non addicts in the present study.

CONCLUSION

There is high burden of IA in adolescents. Male sex, non-biologic parent as a caregiver, enrollment in private school and being in senior class are factors associated with IA. The three highest-ranked online activities were information searching, chatting and watching of video. Chatting and watching of pornography were online predictors of IA among adolescents.

Recommendation

Health education campaign in the secondary schools, community and on the media which focuses adolescents and enlightens them on Internet Addiction, a newly emerging clinical condition. The parents/guardians and teachers should monitor adolescents' activities while on the internet and should encourage healthy use of internet through modification of online activities.

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