



ORIGINAL ARTICLE

Prevalence and Pattern of Mobile Gaming among Senior Secondary School Students in a Semi-Urban Town in Nigeria

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Keywords

Adolescent;

Mobile gaming;

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ABSTRACT

Background: Excessive mobile gaming among young people has become a global public health issue. This paper aimed to determine the prevalence and pattern of mobile phone gaming among secondary school students.

Methods: This was a descriptive cross-sectional study of 401 secondary school students in Orlu, selected using multistage sampling technique. A structured self-administered questionnaire was used to acquire information on the socio-demographic characteristics and pattern of gaming. The Internet Gaming Disorder Scale-Short-Form (IGDS9-SF) was used to assess problems related to gaming in the last 12 months. Data was entered and analyzed using Statistical Package for Social Sciences Version 21. Pearson's Chi-square test was used for categorical variables while Students t-test was used for continuous variables. $p < 0.05$ was regarded as significant.

Results: Two (0.6%) of the respondents met the criteria for Internet gaming disorder. Three hundred and fifty-seven (89%) respondents had played mobile games at least once in their lifetime while three hundred and thirteen (78.1%) had played mobile games at least once in the past 12 months. One hundred and ten respondents (35.1%) had played mobile games nearly every day in the past 12 months. Most respondents, 132 (42.2%) played games offline. Two hundred and twenty-nine respondents (73.2%) have betted with others on the outcome of games played.

Conclusion: Mobile gaming was common among secondary school students in Orlu, but the rate of gaming disorder was low. Measures targeted at adolescents should be developed to educate them on the potential dangers of mobile gaming.

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INTRODUCTION

Mobile games are games typically played on a mobile phone or a portable device.¹ Mobile gaming can be socially desirable as it improves mood, boosts brain power, causes relaxation, improves dexterity and brings people together.² Mobile gaming has also been explored to understand the possibility of its application to promote engagement and motivation for learning among students.^{3,4} Gaming is regarded

as excessive and problematic when the negative impact outweighs the positive impact.⁵ In the last few years a lot of negative consequences have been noted with mobile gaming especially when played excessively.⁶ Excessive gaming has been associated with physical and mental health issues including depression, loneliness, insomnia and dependence.^{7,8} It sometimes acts as a substitute for real-life interaction especially

among very shy people leading to isolation.⁹ Problematic gaming has been associated with aggression, low sociability and self-efficacy and lower satisfaction with life.¹⁰

As a result of deleterious effects noted with excessive gaming, 'Gaming Disorder' (GD) and 'Internet Gaming Disorder' (IGD) were added to the 11th revision of the International Classification of Diseases (ICD 11) and tentatively to the 5th revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM V) respectively as behavioural addictions.¹¹ Gaming disorder which is a component of Internet Gaming Disorder is manifested by a persistent gaming behavior that is characterized by a loss of control over gaming with increasing priority given to gaming despite the occurrence of negative consequences.¹¹ Gaming becomes the individual's leading or only interest with all free time taken up with gaming at the cost of other important activities.¹¹

In Africa there has been an unprecedented jump in the use of smartphones with over a billion Africans owning a smartphone and nearly 300 million having internet access.¹² A study done in some African countries has found that sub-Saharan Africa has the lowest percentage of internet access and smartphone users.¹³ About 51% South Africans, 35% Ghanaians, 34% Senegalese, 32% Nigerians, 30% Kenyans, and 13% Tanzanians have smart phones.¹³ These numbers are increasing rapidly with smartphone adoption expected to double by 2025.¹³ A study done in 2020 found that about 756 million Africans play mobile games.¹⁴ This number is expected to increase with increasing access to mobile phones and internet.

In Nigeria as of 2020, there were about 151 million total phone subscribers, 53 million smartphone connections with about 61.1 million mobile game players.¹⁵ This represents almost a quarter of Nigeria's entire population.¹⁵ With over 30 million youths in Nigeria, effect of COVID lockdown and lack of regulation, mobile gaming in Nigeria has turned to a very lucrative business with massive jump in smartphone, internet and mobile gaming penetration expected in the next few years.¹⁵ These numbers

indicate a great opportunity for development but are also a cause for worry in terms of the health of the users.

Globally, it is estimated that about 2.7 billion people play mobile games, slightly above half of these play ten or more times weekly while about a third play daily.^{16,17} Worries about the addictive potential of gaming have led some countries to put in place restrictive policies to control the number of hours spent on gaming.¹⁸ On average, gamers play two to five mobile games a month.¹⁹ In 2020, it was found that 49 percent of mobile users in the United States played mobile games once to several times a day while 16 percent played once to several times per week.²⁰ An online survey in Finland found that about 85% of the respondents played internet games on a regular basis and that this was associated with living with a friend.²¹

A wide range of variation in rate has been reported for problematic gaming which has been attributed to methodological differences.²² Studies using nationally representative samples of young persons reported that the prevalence rates of Internet Gaming Disorder ranged between 1-9% among American and Europeans.²² About 69% Caucasians, 13% Asians, and 18% of other ethnicities are reportedly addicted to mobile gaming.²³ Studies carried out in Finland and Belgium report that though about a third of the population played mobile games, the use does not appear to be problematic.¹ A study carried out in Germany found that only 3.9% can be considered problematic gamers while Canada reported about 10%.^{10, 24} In China there are over 700 million gamers with over 100 million of these aged below 18 years and a substantial proportion of these believed to be addicted to gaming.¹⁸

In 2021, it was estimated that over 60% of all mobile gamers were female.¹⁶ But reports show that being male, increasing age and influence by friends to play games are risk factors for mobile game addiction.^{7, 11, 24} Those who are at most risk for gaming addiction are males aged between 18-24 years.^{7, 23} However, there are other reports that adolescents are more prone to gaming disorder.^{25, 26, 27} Students who reside on school

campuses and those with no friends are at greater risk of developing problematic game playing.²¹ Over half of all mobile games played are puzzle games.¹⁷

Adolescents constitute a significant proportion of the population in Nigeria and are vulnerable to risky behaviors such as excessive gaming and addiction to gaming.^{28, 29} Nigeria has a huge number of secondary school students and keeping them healthy and in check is of importance to the future of the country. Despite the growing problems of excessive mobile gaming internationally, information on its current prevalence and pattern among secondary school students in our environment remains sparse. Information obtained from this study will increase the body of knowledge on gaming among adolescents in Nigeria which could be utilized in the development of intervention measures to prevent excessive gaming among students. This study was conducted to assess the prevalence and pattern of mobile gaming among secondary school students in Orlu.

METHODOLOGY

Study design

This was a school-based descriptive cross-sectional study of secondary school students in Orlu Local Government Area (LGA), Imo State, Nigeria.

Study area

This study was conducted in secondary schools located in Orlu LGA of Imo state between March and April, 2021. Orlu LGA has a semi-urban setting with 18 secondary schools. Out of these, ten are public secondary schools while eight are private schools. Internet connectivity and services in the LGA are challenging.

Study population

The study population comprised secondary school students enrolled in schools in Orlu LGA, Imo State.

Eligibility criteria

Students were eligible for the study if they were below 18 years, owned or had access to a mobile

device, were currently in senior secondary and were enrolled in secondary school in Orlu LGA. Those who were absent from school at the time study took place were excluded.

Sample size and sampling technique

The minimum sample size was calculated using the Cochran formula³⁰ for sample size calculation Z^2pq/d^2 where Z was the normal standard deviation (1.96), d was the degree of desired accuracy [5%], p was the proportion of the population with mobile game addiction (40%)⁷ and q was equivalent to $1-p$. The total calculated sample size putting into consideration 10% attrition was 404.

A two stage sampling technique was used for the selection of respondents. Stage one was the selection of schools. The secondary schools in Orlu LGA served as the sampling frame. During the first stage, four secondary schools were selected from a list of the most populous private and government owned schools using a simple random technique of balloting. Two of these were government owned while the other two were private schools. Stage two was the selection of respondents. The total calculated sample size was distributed to the selected schools and then to the classes proportionately based on number of students enrolled in each of the schools and in each class. Eligible respondents were then selected from each class using simple random sampling by balloting to make up the required sample size. The male to female ratio in each class was also considered during the selection such that a proportionate number of both sexes were selected.

Instruments for data collection

A self-administered structured questionnaire was used to collect information on the socio-demographic characteristics and pattern of gaming. Internet Gaming Disorder Scale-Short-Form (IGDS9-SF) which is a self-administered questionnaire that includes 9 items was adopted to assess problems related to gaming in the last 12 months.³¹ This was the first brief standardized psychometric tool to assess Internet Gaming Disorder. This scale is valid and reliable. Each item is rated on a five-point Likert response scale (ranging from 1 = never to 5 = very often. Total

scores were gotten by summing up all responses given to all nine items and ranged from a minimum of 9 to a maximum of 45 points. Higher scores were indicative of a higher degree of Internet gaming disorder. To differentiate disordered gamers from non-disordered gamers, participants must endorse at least five criteria out of the nine. The optimal cut-off score for the positive diagnosis of IGD was 32.

Lifetime gaming was defined as having played mobile game at least once during the lifetime while 12-month gaming was defined as having played mobile game at least once in the preceding 12-months. The outcome variable 'gaming' was dichotomized into yes/no.

Study procedure

Copies of the questionnaires were administered during school hours and collected immediately after they were filled by the investigators for reasons of privacy. It was explained to the respondents that participation was purely voluntary and they were free to withdraw at any time from the study. All information obtained was held confidential.

Data Analysis

Data was entered and analyzed using Statistical Package for Social Sciences Version 21.³² Descriptive statistics (mean \pm SD, frequencies, and percent) were used to describe the study population, pattern of gaming, prevalence of mobile gaming and gaming disorder. Chi-square test was used to assess the association between socio-demographic factors and past year gaming for categorical variables while Students t-test was used for continuous variables. Analysis of variance (ANOVA) was used to test the difference for means for more than two groups. The level of significance for all the tests was set at $p < 0.05$. Data was presented using frequency tables.

Ethical consideration

Ethical approval was gotten from the research and Ethics committee of Imo State University

Teaching Hospital, Orlu (IMSUTH/CS/121/000347). Permission to carry out the study was obtained from the head of each selected school. Written informed consent was obtained from the parents/guardians before the administration of the questionnaires. The respondents' identity and personal information were kept confidential.

RESULTS

Four hundred and four respondents were recruited for the study. Three questionnaires were incompletely filled and had to be discarded. Therefore, (401) 99.2% of the questionnaires were analyzed. Table 1 shows the socio-demographic characteristics of the respondents. More of the respondents, 204 (50.9%) were male. Age range was between 13 and 19 years (mean age 16.32 ± 1.42 years). Most of the respondents were Catholics, 233 (58.1%) and majority, 362 (90.3%) resided at home with their parents or guardians. Two hundred and five respondents (51.1%) attended a Government owned school. Eighty-nine respondents (22.2%) were first born children. Most, 275 (68.6%) are sponsored in school by both parents, 51 (12.7%) by mothers, 42 (10.5%) by guardians and 33 (8.2%) by fathers. Majority, 280 (68.9%) had 1000 naira as their pocket money per week. Most, 296 (73.8%) owned a smart phone. Of those who owned a smart phone, most, 238 (80.4%) spent less than 1000 naira on data every week and most, 138 (46.6%) did extra chores to obtain pocket money for data.

Table 2 showed the rate of mobile gaming among the respondents. Out of the 401 respondents, 357 (89.0%) had played mobile game at least once in their lifetime. Three hundred and thirteen (78.1%) had played mobile games in the last 12 months. Out of those who had played mobile games in the past 12 months, only two (0.6%) met the criteria for internet gaming disorder.

Table 3 showed the 12 month pattern of gaming. It shows that 110 (35.1%) of the respondents played mobile games nearly every day in the past 12 months. Most, 132 (42.2%) played games

offline. Two hundred and twenty-nine (73.2%) have betted with others on the outcome of games played and this was mainly with friends outside of school, 100 (31.9%).

Table 4 showed the mean internet gaming disorder scores among the respondents who had played mobile games in the past 12 months. The respondents in the Government owned schools

had higher mean internet gaming disorder score (19.92 ± 4.62) compared to 17.85 ± 5.12 among those in the private schools ($t=18.11, p=0.001$).

Table 5 showed the association between socio-demographic factors and past year gaming. None of the variables studied was significantly associated with past year gaming.

Table 1: Socio-demographic characteristics of respondents

Variable	Frequency	Percent
Sex		
Male	204	50.9
Female	197	49.1
Age (years)		
13-16	223	55.6
17-19	178	44.4
Mean age \pmS.D(years)	16.32 \pm 1.42	
Religion		
Catholic	233	58.1
Pentecostal	112	27.9
Others	56	14.0
Type of school		
Private	196	48.9
Government	205	51.1
Class		
Ss1	133	33.2
Ss2	138	34.4
Ss3	130	32.4
Place of residence		
Resides at home	362	90.3
Hostel	39	9.7
Birth position		
First	89	22.2
Second	89	22.2
Others	223	55.6
Pocket money for the week		
Less than 1000 naira	280	69.8
1000-5000 naira	104	25.9
Above 5000 naira	17	4.2
Owns a Smartphone		
Yes	296	73.8
No	105	26.2
Weekly amount spent on data (n=296)		
Less than 1000 naira	238	80.4
1000-5000 naira	46	15.6
Above 5000 naira	12	4.0
Source of money for data (n=296)		
Father	52	17.6
Mother	63	21.3
Sibling	43	14.5
Part time jobs	138	46.6

Table 2: Prevalence of mobile gaming and gaming disorder among respondents

Variable	Frequency (n=401)	Percent
Lifetime prevalence		
Yes	357	89.0
No	44	11.0
12-month prevalence		
Yes	313	78.1
No	88	21.9
Internet gaming disorder (n=313)		
Yes	2	0.6
No	311	99.4

Table 3: Patterns of gaming among secondary school students in Orlu

Variables	Frequency (n=313)	Percent
Frequency of gaming		
Less than once a month	51	16.3
Once a month	23	7.4
Once a week	97	31.0
Nearly everyday	110	35.1
Everyday	32	10.2
Time spent playing games on mobile device per day		
5-10 minutes	102	32.5
10-30 minutes	121	38.7
30 minutes-1 hour	54	17.3
More than 1 hour	36	11.5
Form of game played		
Online	61	19.5
Offline	132	42.2
Both	120	38.3
Ever betted with others on outcomes of games played		
Yes	229	73.2
No	84	26.8
Who you betted with		
Friends outside of school	100	31.9
School mates	44	14.1
Siblings	57	18.2
Other online gamers	28	8.9

Table 4: Socio-demographic characteristics and 12-month Internet gaming disorder scores among the respondents

Variable	Mean IGD score	Stat	p-value
Sex			
Male	19.09±5.15	t=1.81	0.18
Female	18.61±4.81		
Class			
Ss1	18.46±5.01	F=1.79	0.17
Ss2	18.91±4.72		
Ss3	19.17±5.26		
School type			
Private	17.85±5.12	t=18.11	<0.001*
Government	19.92±4.62		
Religion			
Catholic	18.53±5.41	F=0.66	0.72
Pentecostal	18.08±5.52		
Others	18.09±5.33		
Parents marital status			
Married	18.91±5.04	t=0.34	0.56
Not married	18.13±4.09		
Place of residence			
Home	18.95±5.11	t=0.23	0.64
Hostel	18.12±3.79		
Sponsor in school			
Father only	19.13±5.38	F=0.86	0.46
Mother only	17.65±5.51		
Both parents	18.96±5.73		
Guardian	19.49±5.61		
Birth position			
First	18.18±4.69	F=0.60	0.55
Second	18.86±4.54		
Others	19.15±5.27		

Not married=divorced/separated *=*significant* F=*ANOVA* t = *student's t-test*

Table 5: Socio-demographic factors and 12-month gaming among respondents

Variable	12 month gambling		Test Statistic	p-value
	Yes (n=313) n (%)	No (n=88) n (%)		
Gender				
Male	163 (79.9)	41 (20.1)	$\chi^2=0.83$	0.36
Female	150 (76.1)	47 (23.9)		
Age ±S.D(years)	16.37±1.46	16.22±1.49	t=0.80	0.37
Class				
SS1	95 (71.4)	38 (28.6)	$\chi^2=5.11$	0.08
SS2	112 (81.2)	26 (18.8)		
SS3	106 (81.5)	24 (18.5)		
School type				
Private	160 (81.6)	36 (18.4)	$\chi^2=2.87$	0.09
Government	153 (74.6)	52 (25.4)		
Religion				
Catholic	183 (78.5)	50 (21.5)	$\chi^2=0.08$	0.78
Others	130 (77.4)	38 (22.6)		
Parents marital status				
Married	294 (79.0)	78 (21.0)	$\chi^2=2.87$	0.09
Not married#	19 (65.5)	10 (34.5)		
Place of residence				
Home	280 (77.3)	82 (22.7)	$\chi^2=1.09$	0.30
Hostel	33 (84.6)	6 (15.4)		
Sponsor in school				
Father only	24 (72.7)	9 (27.3)	$\chi^2=1.24$	0.73
Mother only	40 (78.4)	11 (21.6)		
Both parents	214 (77.8)	61 (22.2)		
Guardian	35 (83.3)	7 (16.7)		
Birth position				
First	72 (80.9)	17 (19.1)	$\chi^2=0.55$	0.76
Second	69 (77.5)	20 (22.5)		
Others	172 (77.1)	51 (22.9)		

#= *divorced/separated* t=*student's t-test*

DISCUSSION

This present study assessed the prevalence and pattern of mobile gaming among secondary school students in Orlu. We found a 0.6% rate for internet gaming disorder among the gamers. This is quite low compared with rates in the United States, Asia and Europe.^{10, 22, 23, 24} The low rate of internet gaming disorder found in this study was similar to what was reported in a study carried out in Finland and Belgium.¹ The lower rate of internet gaming disorder reported in this present study could be attributed to differences in the accessibility to mobile phones and internet, socio-economic factors limiting the affordability of data, study of a younger population, and differences in the instruments used to measure internet gaming.²² The rate of internet gaming disorder found in this study is low and dependent use currently cannot be regarded as problematic, but with increasing internet penetration, exposure to mobile phones and gaming, the same cannot be said for years to come.^{1,15}

This implies the urgent need to put in place proactive interventions and policies to avert a disorder that could potentially be a massive burden on families and the society. Some policies that should be considered include regulation of the availability and accessibility of mobile devices to persons under 18 years (e.g. time-of-day limits) as well as implementing restrictions on marketing and advertisements of mobile games.³³ Policies set up by certain countries that have recognized gaming disorder as an emerging public health problem include the "Gamer guard" in Thailand, and the "Fatigue system" policy in China whereby players gain no more points in the game of choice after five hours of playing, the South Korea's Health Internet Game Policy and the Nighttime Shutdown Policy, which force online games providers to shutdown their services for teenagers under 16 years from midnight to 6am.³³ These policies are geared towards reducing and regulating accessibility to gaming. There is also need to engage in awareness campaigns so that parents and guardians are made aware of the potential dangers of excessive gaming in their wards and the need to regulate their use of mobile devices. There is also a need to design instruments that

will measure the prevalence, quality and psychosocial implications of gaming and gaming disorder in our environment. These have to take into consideration the pattern of gaming when the negative impacts start to manifest.

According to this present study, majority of those who played games played offline. This is contrary to previous researches that reported a preference for online gaming especially in developed countries where it is used to foster social interaction among peers.³⁴ It has been reported that online gaming causes more problematic gaming behaviors than offline gaming.³⁴ In the environment of the present study, students accessibility to internet is poor and students freely interact with each other physically thus limiting the use of online games as a means of bonding socially. These could be the factors that possibly explain the lower rate of problematic gaming among the respondents in this study. Most of the respondents spent over two hours a week on games. This is low compared with another study in Europe where the average time spent playing games per week was 10.5hrs.¹ This could be due to the technological gap seen between Nigeria and Europe, greater access to mobile devices, electricity, internet, and differences in the social environment based on technology use.

Students in the Government owned schools had significantly higher Internet gaming disorder scores compared to those in the private schools. This significant difference could be attributed to better discipline in private schools, greater burden of homework with more time spent on after school studies, and more individualized attention from the teachers in the private schools due to lesser number of students.^{35,36}

This was a cross-sectional study so causality cannot be determined. The pattern of mobile gaming was determined through self-report, so 100% objectivity cannot be guaranteed, and there was no validity check to ensure complete recall of gaming. The findings cannot be generalized as the study was carried out among senior secondary students enrolled in schools located in a semi-urban setting.

This study showed that mobile gaming is common among secondary students in Orlu but the rate of gaming disorder was low. It is recommended that further studies be carried out among students in urban settings and children enrolled in high profile private schools to determine the pattern of gaming among these groups.

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