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ORIGINAL ARTICLE

Prevalence and Determinants of Cyberbullying Perpetration among Adolescents in Rural and Urban Secondary Schools in Osun State South-Western Nigeria

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Keywords

Cyberbullying;

Peer victimization;

In-school adolescents;

Theory of Planned Behaviour;

South west Nigeria.

ABSTRACT

Background: Cyberbullying is typically defined as aggression that is intentionally and repeatedly carried out in an electronic context against a person who cannot easily defend himself or herself. This study compared the prevalence and determinants of cyberbullying perpetration using the theory of planned behaviour among in-school adolescents in rural and urban secondary schools in Osun State, Nigeria.

Methods: A comparative cross-sectional study design was employed. Using a multistage sampling technique, a total of 722 and 711 respondents were recruited respectively across rural and urban secondary schools in Osun State. Data collection was by facilitated self-administered questionnaire while data analysis was with IBM SPSS version 20. Determinants of cyberbullying perpetration were assessed using binary logistic regression. A p-value of < 0.05 was considered statistically significant.

Results: The preceeding three-month prevalence of cyberbullying perpetration was significantly higher in urban 220 (30.9%) than rural secondary schools 165 (22.9%), (p = 0.001). In terms of theory of planned behaviour, predictors of cyberbullying perpetration were similar in both locations: positive/favourable attitude towards cyberbullying perpetration [rural—OR = 1.645, 95%CI = 1.050-2.577, p = 0.030; urban—OR = 1.681, 95%CI = 1.107-2.552, p=0.015], having a high intention to perpetrate cyberbullying [rural—OR = 2.101, 95%CI = 1.336-3.305, p = 0.001; urban—OR = 1.819, 95%CI = 1.184-2.796, p = 0.006].

Conclusion: These findings indicate that engaging the adolescents in behavioural change communication interventions will foster negative attitude towards cyberbullying perpetration and promote positive coping mechanisms different from retaliation.

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INTRODUCTION

Bullying is a global phenomenon which has been studied extensively, internationally and culturally, and has been proven to have damaging psychological and physical effects on both the victims and their bullies alike.[1] It is considered to be an aspect of the wider concept of peer victimization and is defined as aggressive, intentional acts or behaviours that are carried out by an individual or a group, repeatedly and over

time against a victim, who cannot easily defend himself or herself.[2, 3] In this technology age, availability, accessibility and continued dependency on information and communication technology (ICT) gadgets is providing individuals, adolescents inclusive, a platform to engage in anonymous online bullying and harassment.[4] This phenomenon is called cyberbullying. Cyberbullying has been defined as a form of aggression involving the use of ICT such as mobile phones, video cameras, e-mails, and web pages to support deliberate, repeated, and hostile behaviour by an individual or group that is intended to harm others or to post or send harassing or embarrassing messages to another person.[2,5]

The prevalence of cyberbullying is a prominent topic in the media all over the world especially among adolescents. The proportion of adolescents who experience cyberbullying varies significantly based on the age and demographic makeup of those from whom the data were collected; the way cyberbullying was defined and measured; the period over which adolescents were asked to reflect when recounting their experiences (previous month, three months back, six months preceding the study, previous year, lifetime, etc.); and the way the data were collected (through interviews, focus groups, paper-based surveys, web-based surveys, etc.).[6] Several studies have reported the prevalence of cyberbullying among adolescents in the range of 1% and 46%.[6-10] Besides, some studies found factors such as age,[2] gender,[11] educational level,[12] duration of time spent online, proficiency of ICT use,[13] family characteristics,[13] location of school (urban or rural area),[9] and previous history of being a cyber-victim,[9] as being associated with cyberbullying perpetration.

Although, the prevalence and determinants of cyberbullying perpetration had been described in many parts of the world among adolescents, the use of the theory of planned behaviour to define the primary predictors of cyberbullying perpetration has not been sufficiently utilized in Nigeria. This study was aimed at assessing and comparing the prevalence and determinants of cyberbullying perpetration among in-school adolescents in rural and urban secondary schools in Osun State, Nigeria; using the theory of planned behaviour (TBP) proposed by Icek Ajzen in 1991.[14] According to this theory, intention to carry out a behaviour and perceived behavioural control over such a behaviour predict the actual performance of it. However, accurate prediction of such a behaviour requires that the measures of intention and of perceived behavioral control must be compatible with the behavior that is to be predicted. Likewise, intention and perceived behavioural control must remain stable in the interval between their assessment and observation of the behaviour; and then the accuracy of perceived behavioural control.[14] In addition, the TPB postulates three conceptually independent determinants of intention namely attitude towards the behaviour, subjective norm about the behaviour and perceived behavioural control over the performance of the behaviour. Attitude toward the behaviour refers to the degree to which a person has a favourable or an unfavorable evaluation or appraisal of the behaviour in question. Subjective norm refers to the perceived social pressure to perform or not to perform the behaviour. Perceived behavioural control refers to the perceived ease or difficulty of performing the behaviour and it is assumed to reflect past experience as well as anticipated impediments and obstacles. As a general rule, the more favourable the attitude and subjective norm with respect to a behaviour, and the greater the perceived behavioural control, the stronger should be an individual's intention to perform the behaviour under consideration.[14] Therefore, since an individual's choice to engage in cyberbullying relies mainly on his/her own volition, using a behavioural theory, can establish deeper insight into the primary predictors of cyberbullying, offer better understanding of the problem and inform more effective interventions. Besides, a rural-urban comparison could provide precise information with regards to the effect of setting on the burden, if any.

METHODOLOGY

Study Area: The study was conducted in Osun State, a land locked state in the south-western Nigeria. The state covers an area of approximately 14,875 square kilometres, 7°30'N 4°30'E. It is divided into three senatorial districts

namely Osun Central, Osun West and Osun East; and six administrative zones. The state has a total of 30 Local Government Areas (LGAs) categorized into 15 rural and 15 urban LGAs; and one Area office (in Modakeke, Ife) with Oshogbo being the state capital.[15] With the exception of the private schools in the state which were still operating the conventional 6-3-3-4 system adopted by the Federal Ministry of Education of Nigeria, the state operated a different educational system. This was as a result of a reform called for by the Governor Rauf Aregbesola-led administration in 2011. This reform led to the decentralization of the administrative structure of the Ministry of Education and re-classification of the state basic educational system. This re-classification included the elementary school (Grades 1 to 4) for the first four years of schooling, middle school (Grades 5 to 9) for the next five years of schooling; that is, the old primary 5 to junior secondary school class 3; and the last three years in high schools (Grades 10-12).[16] The state has 1,277 Elementary Schools, 236 Middle schools, 131 Middle/High Schools in the same compound, and 121 High Schools which are publicly owned; and 416 privately-owned Secondary Schools. In 2015, the enrolments for middle and high schools in the state were 138,151 and 127,178 respectively.[17] In 2017 report on telecommunication data released by the National Bureau of Statistics, the total active internet in Osun State was 2,260,163 out of the population of 4,536,87718 putting Osun State internet density at 49.8%.

Study design and population*:* Comparative cross-sectional study design was employed. Participants in the study comprised in-school adolescents (10-19 years) attending secondary schools located in rural and urban LGAs in the state. The eligibility criteria included owning or having access to mobile phone for at least six months prior to the study; having access to internet at least one hour once per week within the six months preceding the study; and giving consent or assent with parental consent to participate in the study. The minimum sample size (N) was calculated to get an absolute precision of ± 5% using the sample size formula for comparing two independent proportions[19] in which $N_{(pergroup)} = [2(Z_\alpha + Z_\beta)^2 \times p(1-p)]/d^2$, where Z_α is the standard normal deviation at 95% confidence level (1.96) and Z_β standard normal deviation at 80% power (0.84). The sample size was calculated based on the proportion of in-school adolescents in the rural (19.9%) and urban (26.8%) LGAs located secondary schools that perpetrated cyberbullying in a similar study conducted in Oyo State, Nigeria.[9] After correcting for anticipated non-response rate of 10%, a sample size of 650 per each group was obtained. This amounted to 1,320 in-school adolescents in both locations.

Sampling technique: The participants were selected via a multi-stage sampling method. Six LGAs (one rural and one urban from each of the three senatorial districts) were selected via simple random sampling technique, balloting. In the selected LGAs, a total of twelve schools (one private secondary school and one public mixed middle/high school each) were selected via simple random sampling technique, balloting. From the selected schools, an average of six classes (i.e. one arm per each class from Grades 7-12 or JSS 1-SSS 3 in the public and private secondary schools respectively) were selected via simple random sampling technique, balloting. In cases where the number of eligible students in a selected arm of a class was not sufficient for the allotted number of respondents, another arm of the class was selected still using simple random method, balloting, to complete the sample size. Participants who met the eligibility criteria were selected based on probability proportionate to size from the selected arms of class using systematic sampling method. A total of 722 respondents and 711 respondents were selected fron selected schools located in rural and urban areas respectively; making 1,433 in-school adolescents that participated in the study.

Data Collection: Facilitated self-administered questionnaire approach was employed in a classroom setting to collect data from eligible in-school adolescents. In this approach, after students were comfortably seated, each of them was given a copy of the questionnaire; then one of the investigators (either the researchers or the research assistants) stood in front of the class and

read out the questions while the respondents answered the questions on their own copy of the questionnaire by themselves. By this approach, respondents did not need to admit directly to an interviewer on a socially undesirable or negatively valued behaviour. Privacy was also encouraged as any respondent who needed assistance or a clarification was asked to raise his/her hand so the facilitator could pause and meet with him/her in his/her seat to clear his/her doubt. The questionnaire used for the study was adapted from the works of different authors.[9,20,21] The questionnaire was structured mainly as close-ended except for the section of socio-demographic characteristics which gave room for other responses not captured in the close ended response to a few questions in form of an open-ended response. The questionnaire consisted of three sections: Section A contained questions on the sociodemographic characteristics while section B assessed the prevalence of cyberbullying. Section C assessed determinants of cyberbullying perpetration. The questions in Section C were structured based on the construct of the theory of planned behaviour. This section of the questionnaire was designed in Likert scale format assessing determinants of cyberbullying viz-a-viz attitude, subjective norm, perceived behavioural control and intention. The questionnaire was pretested among in-school adolescents in some selected secondary schools in Ife-Central LGA, an area not involved in the main study. Data collection occurred in the months of November/December 2017 and February/March 2018.

Measures

Socio-demographic characteristics including age groups (10 -13 years as early adolescents, 14-16 years as middle adolescents, and 17-19 years as late adolescents),[9] gender, socio-economic class, who respondent lived with, school type (public or private), class category (junior or senior), were collected from each participant. The socio-economic status of the respondent's parent/guardian was determined using Oyedeji's socio-economic classification in which socio-economic index scores were awarded to each respondent, based on the occupation and educational attainment of the parents or their substitutes.[22]

Prevalence of cyberbullying perpetration: To measure this, the word cyberbullying (electronic media harassment) was first described to the respondents after which they were asked to respond to the question "How often have you bullied someone through mobile phone or internet in the last three months?" by ticking one of these options "never", "once or twice", "a few times", "several times" and "always".

The prevalence of cyberbullying perpetration was then determined by dichotomizing the responses to 'Yes' if the respondent mentioned that he/she had perpetrated cyberbullying 'Once' to 'Always' and 'No' if the response was 'Never'. Additional questions were asked to establish the prevalence of the specific form and the specific medium of cyberbullying perpetration. As regards form of cyberbullying perpetration, respondents were asked to respond 'Yes' or 'No' to ten set of questions that defined different forms cyberbullying perpetration can take. Likewise, they were asked to respond 'Yes' or 'No' to using medium such as text message, phone call, chatroom (Whatsapp, Black Berry Messenger), website/internet, email, and picture/online video clips, to perpetrate cyberbullying.

Cyberbullying perpetration using theory of planned behaviour

Attitude: Attitude towards perpetrating cyberbullying: To measure this, respondents were asked to rate their evaluation of cyberbullying by means of the following five semantic differential 7-point scale: "Bullying others via mobile phone or internet is": (i) Good—Bad, (ii) Fun—Not fun (iii) Exciting—Boring (iv) Brave—Cowardly (v) Mature—Childish. The item responses ranged between 1 and 7. An index score was generated for all the respondents with minimum score being 5 and maximum score being 35. A mean score was calculated for the respondents. High response values from mean and above indicated a negative attitude towards perpetrating cyberbullying whereas a low response value below the mean indicated a positive attitude towards cyberbullying.[20, 21] Negative attitude toward cyberbullying is when an individual is

unfavourably disposed to perpetrating cyberbullying whereas positive attitude is when a respondent is favourably disposed to perpetrating cyberbullying.

Subjective Norm: Subjective Norm towards cyberbullying was measured by asking four questions that assessed the respondents' perception of moral approval of people important to them (friends, superiors, parents, etc.) in carrying out cyberbullying behaviour. A seven-point Likert scale with items response ranging from 1 (Totally disagree) to 7 (Totally agree) was employed. An index score was generated for all the respondents with minimum score being 4 and maximum score being 28. A mean score was calculated for the respondents. High response values from mean and above indicated that respondents perceived positive social pressure and approval from their significant others to perform cyberbullying.[20,21]

Perceived Behavioural Control: Perceived Behavioural Control in carrying out cyberbullying was measured by asking two questions that assessed the students' perception of how capable and proficient in the use of electronic media to cyberbully others they consider themselves. A seven-point Likert scale with items response ranging from 1 (Totally disagree) to 7 (Totally agree) was employed. An index score was generated for all the respondents with minimum score being 2 and maximum score being 14. A mean score was calculated for the respondents. High response values from mean and above indicated that respondents perceived cyberbullying as easy for them to perform.[20,21]

Intention: Intention to actually perpetrate cyberbullying was measured by asking four questions that indicated how much an effort a student was planning to exert in order to perpetrate cyberbullying behaviour in the next three months. A seven-point Likert scale with items response ranging from 1 (Totally disagree) to 7 (Totally agree) was employed. An index score was generated for all the respondents with minimum score being 4 and maximum score being 28. A mean score was calculated for the respondents. High response values from mean and above indicated high intention to perpetrate cyberbullying.[20,21]

Data Analysis: Data were analysed using the IBM SPSS version 20 for windows. After descriptive and bivariate (chi-square) analyses, binary logistic regression was run for variables that were significant at bivariate level to investigate actual predictors of cyberbullying perpetration. A p-value < 0.05 was taken as statistical significance level. Odd ratio was used with 95% confident interval as test of association to compare reference values with other categories.

Ethical approval (IPHOAU/12/772) was sought and obtained from the Ethics and Research Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Nigeria. Permissions to carry out the research among the in-school adolescents in Osun State were also obtained from Osun State Ministry of Education and the schools' principals. Informed consent was obtained from students who were 18 years and above. In the case of the of students below 18 years of age who were minor, assent was obtained from them with their parental consent.

RESULTS

The overall mean age of the respondents in the study was 14.2±2.1 with age range 10-19 years. The adolescents attending secondary schools located in the rural areas (mean age = 14.5±2.0 years) were significantly older than their counterparts attending secondary schools located in the urban areas (mean age = 13.9±2.1 years), $p < 0.001$. However, in terms of all other socio-demographic variables of gender, school types, class category, religion, ethnicity and who respondent live with, the result was comparable in both locations, $p > 0.05$. (Table 1)

The preceding three months prevalence of cyberbullying perpetration among respondents attending secondary schools located in rural area 165 (22.9%) was significantly lower than that of their counterpart attending secondary schools located in urban area 220 (30.9%), $p = 0.001$. Similar pattern of specific form of cyberbullying

behaviour was reportedly perpetrated by in-school adolescents in secondary schools in both locations. Three commonest forms of cyberbullying perpetrated by the respondents include: making fun of, and calling someone a harsh and hurtful name [rural 109 (66.1%) and urban 128 (58.2%)]; followed by ignoring or excluding someone from an online group [rural 77 (46.7%) and urban 119 (54.1%)]; and then, pretending to be someone else online [rural 60 (36.4%) and urban 97 (44.1%)]. On the other hand, specific medium of cyberbullying perpetration was the same among respondents attending secondary schools in both locations. Text message was the commonest medium utilized by 105 (63.6%) and 133 (60.5%) respondents in both rural and urban secondary schools, respectively. Next to this was phone call reported to be utilized by 103 (62.4%) and 128 (58.2%) respondents located in rural and urban areas, respectively. The least use medium for cyberbullying perpetration was email; as this was reported by 32 (19.4%) and 52 (23.6%) respondents located in rural and urban areas respectively. (Table 2)

In both locations, cyberbullying perpetration was associated significantly with respondents' characteristics such as age category, class category, internet use, frequency of internet use and previous cybervictimization with at least $p < 0.001$. More specifically, in both locations, as age category in years increases from 10-13, to 14-16, to 17-19, the proportion of respondents who perpetrated cyberbullying also increases significantly statistically [rural: from 43 (18.5%) to 79 (21.6%) to 43 (26.1%) respectively, $p = 0.001$; urban: from 65 (21.0%) to 119 (38.0%) to 36 (40.9%) respectively, $p < 0.001$]. Likewise, a lower proportion of respondents in junior classes [rural = 63 (18.3%) respondents; urban = 78 (21.8%) respondents] compared to those in senior classes [rural = 102 (27.0%) respondents; urban = 142 (40.1%) respondents] were cyberbullying perpetrators. This is statistically significant with $p = 0.006$ and $p < 0.001$ in rural and urban secondary schools, respectively. Additionally, as frequency of internet use increases, from 'less than once a week user', to 'weekly users', to 'daily users' the proportion of respondents who perpetrated cyberbullying increases significantly statistically from 4 (7.0%), to 24 (21.6%), to 126 (31.0%) respectively [in rural with $p < 0.001$]; and from 9 (13.8%), to 54 (33.8%), to 156 (34.9%) respectively [in urban with $p < 0.001$]. On the other hand, while in the rural area, a non-statistically significant higher proportion of male respondents 92 (25.1%) than female respondents 73 (20.6%) perpetrated cyberbullying, $p = 0.150$; in the urban area, a statistically significant higher proportion of male respondents 126 (34.9%) than female respondents 94 (26.9%) perpetrated cyberbullying, $p = 0.020$. (Table 3)

In terms of the theory of planned behaviour, comparablely in both locations, cyberbullying perpetration was statistically significantly associated with all its constructs, $p < 0.001$ generally. In the rural secondary schools, a significantly higher proportion of respondents with positive (favourable) attitude towards cyberbullying perpetration 110 (29.9%) compared with 55 (15.5%) of their counterpart who had negative (unfavourable) attitude toward cyberbullying perpetration actually perpetrated cyberbullying, $p < 0.001$. Likewise, a statistically significant proportion of respondents with high intention to perpetrate cyberbullying 103 (38.4%) compared with those respondents with low intention to perpetrate cyberbullying 62 (13.7%) actually perpetrated cyberbullying, $p < 0.001$. In the urban secondary schools, a significantly higher proportion of respondents with positive (favourable) attitude towards cyberbullying perpetration 144 (41.7%) compared with 76 (20.8%) of their counterpart who had negative (unfavourable) attitude toward cyberbullying perpetration actually perpetrated cyberbullying, $p < 0.001$. Likewise, a statistically significant proportion of respondents with high intention to perpetrate cyberbullying 125 (47.7%) compared with those respondents with low intention to perpetrate cyberbullying 95 (21.3%) actually perpetrated cyberbullying, $p < 0.001$). (Table 4)

At the multivariate level, in rural secondary school, frequency of internet use ($p = 0.001$), cybervictimization ($p < 0.001$), attitude ($p = 0.030$) and intention ($p = 0.002$) were significant predictors of cyberbullying perpetration. The odds of cyberbullying perpetration among respondents who use internet daily (OR = 3.303,

95%CI = 1.592-6.850, p = 0.001) was three times more than the odds of the respondents not using internet. Likewise, the odds of cyberbullying perpetration among respondents who had been cyberbullying victims (OR = 5.956, 95%CI = 3.882-9.138, p < 0.001) was six times more than the odds of the respondents who had never been cyberbullying victims. Also, respondents who had positive (favourable) attitude towards cyberbullying perpetration were twice more likely to perpetrate cyberbullying compared to their counterparts who had negative (unfavourable) attitude towards cyberbullying perpetration (OR = 1.645, 95%CI = 1.050-2.577, p = 0.030). Besides, the odds of cyberbullying perpetration among respondents who had high intention to perpetrate cyberbullying (OR = 2.101, 95%CI = 1.336-3.305, p = 0.001) was two times more than the odds of cyberbullying perpetration among respondents who had low intention to perpetrate cyberbullying. (Table 5)

In urban secondary school, age category (p = 0.022), frequency of internet use (p = 0.007), cybervictimization (p < 0.001), attitude (p = 0.015) and intention (p = 0.006) were significant predictors cyberbullying perpetration. Respondents in the middle adolescents age category were twice likely to perpetrate cyberbullying compared to their counterparts who were in early adolescents age category (OR = 1.800, 95%CI = 1.088-2.976, p = 0.022). The odds of cyberbullying perpetration among respondents who use internet daily (OR = 18.078, 95%CI = 2.223-147.032, p = 0.007) and those who use it weekly (OR = 18.211, 95%CI = 2.187-151.626, p = 0.007) were eighteen times more than the odds of the respondents not using internet. Likewise, the odds of cyberbullying perpetration among respondents who had been cyberbullying victims (OR = 7.396, 95%CI = 5.264-11.906, p < 0.001) was seven times more than the odds in the respondents who had never been cyberbullying victims. Also, respondents who had positive (favourable) attitude towards cyberbullying perpetration were twice more likely to perpetrate cyberbullying compared to their counterparts who had negative (unfavourable) attitude towards cyberbullying perpetration (OR = 1.681, 95%CI = 1.107-2.552, p = 0.015). Besides, the odds of cyberbullying perpetration among respondents who had high intention to perpetrate cyberbullying (OR = 1.819, 95%CI = 1.184-2.796, p = 0.006) was two times more than the odds of cyberbullying perpetration among respondents who had low intention to perpetrate cyberbullying. (Table 6)

Table 1: Socio-demographic characteristics of respondents.

Socio-demographic Characteristics	Locations		Statistical indices
	Rural (n=722) n (%)	Urban (n=711) n (%)	
Mean Age	14.5 ± 2.0	13.9 ± 2.1	t = 5.051 **p < 0.001**
Age groups (in years)			
10 – 13 (Early adolescents)	233 (32.3)	310 (43.6)	x^2= 20.78 **p < 0.001**
14 -16 (Middle adolescents)	366 (50.7)	313 (44.0)	
17 – 19 (Late adolescents)		88 (12.4)	
Gender			
Male	367 (50.8)	361 (50.8)	x^2 = 0.000
Female	355 (49.2)	350 (49.2)	p < 0.983
School type			x^2= 0.082
Public	369 (51.1)	358 (50.4)	p = 0.775
Private	353 (48.9)	353 (49.2)	
Class category			
Junior	344 (47.6)	357 (50.2)	x^2= 0.944 p = 0.331
Senior	378 (52.4)	354 (49.8)	
Religion			
Christianity	482 (66.8)	496 (69.8)	x^2= 6.894[1] p = 0.075
Islam	234 (32.4)	214 (30.1)	
Traditional	4 (0.6)	0 (0.0)	
Other (Jehovah witness)	2 (0.3)	1 (0.1)	
Ethnicity			
Yoruba	670 (93.1)	670 (94.2)	x^2= 3.454[1] p = 0.327
Igbo	25 (3.5)	24 (3.4)	
Hausa	3 (0.4)	5 (0.7)	
Others[2]	22 (3.1)	12 (1.7)	
Who respondent lives with			
Both parents	507 (70.2)	511 (71.9)	x^2= 2.764[1] p = 0.251
Single parent	132 (18.3)	137 (19.3)	
Others[3]	83 (11.5)	63 (8.9)	
Socio-economic class[4]	**(n=713)**	**(n=701)**	x^2= 111.01[1] **p < 0.001**
Class 1	34 (21.8)	122 (78.2)	
Class 2	140 (45.0)	171 (55.0)	
Class 3	277 (49.1)	287 (50.9)	
Class 4	233 (67.3)	113 (32.7)	
Class 5	29 (78.4)	8 (21.6)	

123 (17.0)

χ^2 – chi-square, p- level of significance (< 0.05), [1]Likelihood ratio χ^2, [2]Others include Isobo, Delta, Ebira, Nupe, Fulani, Egede, etc; [3]Other relations and others not related, [4]Missing data in respondents (Rural = 9, Urban = 10)

Table 2: Prevalence, forms and medium of cyberbullying perpetrated among the respondents

Variables	Rural n (%)	Urban n (%)	Statistical Indices
Cyberbullying perpetration	**(n=722)**	**(n=711)**	
Yes	165 (22.9)	220 (30.9)	x^2= 11.93
No	557 (77.1)	491 (69.1)	**p = 0.001**
Forms of Cyberbullying Perpetration[1]	**(n=165)**	**(n=220)**	
Made fun of and called someone a harsh or hurtful name	109 (66.1)	128 (58.2)	
Completely ignored or excluded someone from an online group	77 (46.7)	119 (54.1)	
Pretended to be someone else online	60 (36.4)	97 (44.1)	
Threatened someone of harm or intimidation	46 (27.9)	60 (27.3)	
Disclosing secrets or embarrassing information	45 (27.3)	74 (33.6)	
Spread false rumours or rumours with sexual content about someone	30 (18.2)	48 (21.8)	
Circulated embarrassing or harassing picture or video clip of someone to him/her/others	29 (17.6)	52 (23.6)	
Circulated sexually explicit picture or video clip of someone to him/her/others	28 (17.0)	33 (15.0)	
Sent relationship related abuse or insult or solicited for sexual intercourse	27 (16.4)	30 (13.6)	
Hacked into another person email box	24 (14.5)	46 (20.9)	
Medium of cyberbullying perpetration[1]	**(n=165)**	**(n=220)**	
Text Message	105 (63.6)	133 (60.5)	
Phone call	103 (62.4)	128 (58.2)	
Chat room (Whatsapp, BBM[2])	72 (43.6)	126 (57.3)	
Website (Internet)	51 (30.9)	93 (42.3)	
Picture / Online video clips	47 (28.5)	76 (34.5)	
Email	32 (19.4)	52 (23.6)	

[1]Multiple responses [2]BBM - BlackBerry Messenger

Tables 3: Relationship between cyberbullying perpetration and selected respondents' characteristics

	Rural			Urban		
	Cyberbullying perpetration			Cyberbullying perpetration		
	No (n=557) n (%)	Yes (n=165) n (%)	Statistical Indices	No (n=491) n (%)	Yes (n=220) n (%)	Statistical Indices
Gender						
Male	275 (74.9)	92 (25.1)	x^2= 2.077	235 (65.1)	126 (34.9)	x^2=5.384
Female	282 (79.4)	73 (20.6)	p = 0.150	256 (73.1)	94 (26.9)	**p = 0.020**
Age group (years)						
10-13	190 (81.5)	43 (18.5)	x^2= 13.12	245 (79.0)	65 (21.0)	x^2= 25.86
14-16	287 (78.4)	79 (21.6)	**p = 0.001**	194 (62.0)	119 (38.0)	**p < 0.001**
17-19	80 (65.0)	43 (26.1)		52 (59.1)	36 (40.9)	
Class category						
Junior	281 (81.7)	63 (18.3)	x^2= 7.679	279 (78.2)	78 (21.8)	x^2=27.75
Senior	276 (73.0)	102 (27.0)	**p = 0.006**	212 (59.9)	142 (40.1)	**p < 0.001**
Who respondents live with						
Both parents	389 (76.7)	118 (23.3)	x^2= 3.988	364 (71.2)	147 (28.8)	
Single parent	109 (82.6)	23 (17.4)	p = 0.136	83 (60.6)	54 (39.4)	x^2= 5.753
Others	59 (71.1)	24 (28.9)		44 (69.8)	19 (30.2)	p = 0.056
School type						
Public	304 (82.4)	65 (17.6)	x^2= 11.75	237 (66.2)	121 (33.8)	x^2= 2.74
Private	253 (71.7)	100 (28.3)	**p = 0.001**	254 (72.0)	99 (28.0)	p = 0.097
Internet use						
Yes	420 (73.2)	154 (26.8)	x^2= 25.11	453 (67.4)	219 (32.6)	x^2= 15.55
No	137 (92.6)	11 (7.4)	**p < 0.001**	38 (97.4)	1 (2.6)	**p < 0.001**
Frequency of internet use						
Daily	280 (69.0)	126 (31.0)		291 (65.1)	156 (34.9)	
Weekly	87 (78.4)	24 (21.6)	x^2= 43.58	106 (66.2)	54 (33.8)	x^2= 27.46
Less than once a week.	53 (93.0)	4 (7.0)	**p < 0.001**	56 (86.2)	9 (13.8)	**p < 0.001**
Not using	137 (92.6)	11 (7.4)		38 (97.4)	1 (2.6)	
Cybervictimization						
No	448 (90.0)	50 (10.0)	x^2= 149.5	379 (88.1)	51 (11.9)	x^2= 185.4
Yes	109 (48.7)	115 (51.3)	**p < 0.001**	112 (39.9)	169 (60.1)	**p < 0.001**
Socio-economic class[1,2]	**n=548**	**n = 165**		**n=484**	**n=217**	
Class 1	25 (73.5)	9 (26.5)		91 (74.6)	31 (25.4)	
Class 2	99 (70.7)	41 (29.3)	x^2= 5.883	119 (69.6)	52 (30.4)	x^2= 5.86
Class 3	218 (78.7)	59 (21.3)	p = 0.208	200 (69.7)	87 (30.3)	p = 0.210
Class 4	186 (79.8)	47 (20.2)		70 (61.9)	43 (38.1)	
Class 5	20 (69.0)	9 (31.0)		4(50.0)	4 (50.0)	

[1]*Socio-economic class of respondents' parents/guardians*
[2]*Missing data in respondents' parents'/guardians' socio-economic class (Rural = 9, Urban = 10)*

Table 4: Relationship between cyberbullying perpetration and constructs of theory of planned behaviour (TBP)

TPB Constructs	Rural			Urban		
	Cyberbullying Perpetration			Cyberbullying Perpetration		
	No (n=557) n (%)	Yes (n=165) n (%)	Statistical Indices	No (n=491) n (%)	Yes (n=220) n (%)	Statistical Indices
Attitude						
Positive	258 (70.1)	110 (29.9)	x^2= 21.09	201 (58.3)	144 (41.7)	x^2= 36.56
Negative	299 (84.5)	55 (15.5)	**p < 0.001**	290 (79.2)	76 (20.8)	**p < 0.001**
Subjective Norm						
Positive	364 (83.7)	71 (16.3)	x^2= 26.48	300 (77.9)	85 (22.1)	x^2= 30.89
Negative	193 (67.2)	94 (32.8)	**p < 0.001**	191 (58.6)	135 (41.4)	**p < 0.001**
Perceived Behavioural Control						
Difficult	361 (86.4)	57 (13.6)	x^2= 47.83	328 (77.0)	98 (23.0)	x^2= 31.34
Easy	196 (64.5)	108 (35.5)	**p < 0.001**	163 (57.2)	122 (42.8)	**p < 0.001**
Intention						
Low	392 (86.3)	62 (13.7)	x^2= 58.68	352 (78.7)	95 (21.3)	x^2= 54.03
High	165 (61.6)	103 (38.4)	**p < 0.001**	137 (52.3)	125 (47.7)	**p < 0.001**

Table 5: Binary logistic regression to identify predictors of cyberbullying perpetration in rural secondary schools in Osun State

Variables	Odd ratio	95% CI for Odd Ratio		p-value
		Lower	Upper	
School type				
Public	Ref.			
Private	1.327	0.863	2.042	0.198
Age category				
Early adolescents	Ref.			
Middle adolescents	0.863	0.488	1.527	0.612
Late adolescents	0.955	0.465	1.961	0.899
Class category				
Junior	Ref.			
Senior	1.451	0.864	2.438	0.159
Frequency of internet use				
Not using internet	Ref.			
Daily	3.303	1.592	6.850	**0.001**
Weekly	2.004	0.847	4.739	0.114
Less than once a week	0.992	0.275	3.573	0.990
Cybervictimization				
No	Ref.			
Yes	5.956	3.882	9.138	**< 0.001**
Attitude				
Negative	Ref.			
Positive	1.645	1.050	2.577	**0.030**
Subjective Norm				
Negative	Ref.			
Positive	1.174	0.745	1.851	0.490
Perceived Behavioural Control				
Difficult	Ref.			
Easy	1.292	0.813	2.054	0.278
Intention				
Low	Ref.			
High	2.101	1.336	3.305	**0.001**

Ref. = Reference Category

Table 6: Binary logistic regression to identify predictors of cyberbullying perpetration in urban secondary schools in Osun State

Variables	Odd ratio	95% CI for Odd Ratio		p-value
		Lower	Upper	
Gender				
Female	Ref.			
Male	0.949	0.637	1.414	0.797
Age category				
Early adolescents	Ref.			
Middle adolescents	1.800	1.088	2.976	**0.022**
Late adolescents	1.161	0.581	2.320	0.672
Class category				
Junior	Ref.			
Senior	1.174	0.719	1.916	0.521
Frequency of internet use				
Not using internet	Ref.			
Daily	18.078	2.223	147.032	**0.007**
Weekly	18.211	2.187	151.626	**0.007**
Less than once a week	7.396	0.791	69.171	0.79
Cybervictimization				
No	Ref.			
Yes	7.917	5.264	11.906	**< 0.001**
Attitude				
Negative	Ref.			
Attitude				
Negative	Ref.			
Positive	1.681	1.107	2.552	**0.015**
Subjective Norm				
Negative	Ref.			
Positive	1.299	0.856	1.971	0.220
Perceived Behavioural Control				
Difficult	Ref.			
Easy	0.986	0.636	1.527	0.948
Intention				
Low	Ref.			
High	1.819	1.184	2.796	**0.006**

Ref. = Reference Category

DISCUSSION

Technology is rapidly advancing all over the world and adolescents both in the developed and developing countries are increasingly participating in mobile phone and internet-based communications. Although this advancement in technology provides numerous benefits to the adolescents, it also has a dark side in that these adolescents use it to perpetrate cyberbullying. This study was aimed at determining and comparing the prevalence and determinants of cyberbullying among adolescents attending secondary schools in rural and urban areas of Osun State, South-western Nigeria.

While the prevalence of cyberbullying perpetration three months preceding this study among in-school adolescents in the rural areas of Osun State was slightly above one-fifth, it was slightly below one-third among those in the urban areas of the state. This difference could be attributed to the fact that a higher proportion of in-school adolescents in the urban areas had access to the internet compared to their counterparts in the rural areas. However, findings in both locations fall within the range of 1% to 46% reported in two systematic reviews done in different part of the world among adolescents.[6, 10] The proportion of adolescents who perpetrated cyberbullying in the rural area was comparable to 23.9% which was reported in a study conducted among in-school adolescents in Oyo State, Nigeria;[9] and to 21.2% which was reported in another study conducted among in-school adolescents in Belgium.[23] Likewise, the proportion of in-school adolescents who perpetrated cyberbullying in the urban areas was also comparable to 29.7% and 33.7% reported in two separate studies conducted among in-school adolescents in Canada.[24, 25] However, the findings in both locations were far higher when compared to 11% prevalence thirty days preceding the study reported by adolecents in an online study conducted in the United States in 2006.[7] This variation may be due to the fact that the study was online internet-based conducted among adolescents over 10 years prior to this study using a time frame of 30 days preceding the survey; whereas, this was a school-based study measured over a longer time frame of three months preceding the study. Likewise, the difference in technology access and use between the two time periods may also explain the variation in the prevalence. The findings were also higher in both rural and urban secondary schools when compared to 15.4% prevalence of cyberbullying perpetration reported in another study conducted among adolescents in Belgium in 2011.[26] Although, three months preceding the study was also the time frame used as cut off in that study which was conducted six years before this study, the variation in the findings of the two studies may be due to the fact that, as we advance in years, and access to ICT device and its use increase, many more adolescents who are known for experimentation are engaging in cyberbullying perpetration.

This study also found that the most prevalent forms of cyberbullying perpetrated by respondents were similar in both rural and urban areas and included making fun of, and calling someone a harsh and hurtful name; completely ignoring or excluding someone from an online group; and pretending to be someone else online. This could be attributed to the fact that adolescents schooling in both locations are found within similar socio-cultural context which shapes their pattern of behaviour similarly. In addition, this finding was comparable to the findings of two studies conducted in Canada which indicated calling someone names; pretending to be someone else online and spreading rumours about someone as the most prevalent forms of cyberbullying perpetrated by in-school adolescents.[24,25]

The most prevalent media used by in-school adolescents to perpetrate cyberbullying in both rural and urban areas in this study were text message, phone calls and chat room in that order. This finding was closely similar to that reported in a study conducted in Oyo State, another southwestern state in Nigeria in which phone calls, chat room and text message were also reported as the most prevalent media of cyberbullying perpetration.[9] However, this finding was incongruent with chat rooms, computer text messages and e-mail reported as the most prevalent media of cyberbullying

perpetration in an online internet based study conducted in the United State of America (USA).[7] This variation could be attributed to the fact that, data collection in the USA's study was via internet through links from the official website of a popular music artist revered by the target age group whereas data collection in this study was in a classroom setting via facilitated-interviewer administered method.

Certain socio-demographic characteristics like gender, age category and class category were found to be significantly associated with perpetrating cyberbullying among in-school adolescents in both rural and urban areas of Osun State. This finding was comparable to that reported by other studies conducted in different parts of the world.[2, 9-11, 23, 27] Besides, all the predictors of behaviour—attitude, subjective norm, perceived behavioural control and intention—as postulated by theory of planned behaviour were significantly associated with in-school adolescents perpetrating cyberbullying in both rural and urban areas in this study. This is comparable to that reported in similar studies conducted among adolescents across the world.[20, 21, 23] Controlling for confounders, this study identified that frequency of internet use, being a previous victim of cyberbullying, having a positive (favourable) attitude towards cyberbullying and having a high intention to cyberbully were the actual predictors of cyberbullying among in-school adolescents in both rural and urban areas of Osun State, Nigeria. This was similar to that reported in a study conducted in Oyo State, Nigeria which established a higher odds of cyberbullying perpetration among previous victims of cyberbullying (OR = 21.77, 95% CI = 12.64 –37.47)[9] and another study in Belgium that established a higher odds of cyberbullying among previous victim of cyberbullying (OR = 9.348, p = 0.000).[23] This can be attributed to the fact that desire for revenge often motivates previous cyberbullying victim to perpetrate cyberbullying.[28]

Due to the self-reporting nature of the questionnaire and the sensitivity of the research subject, response biases could not be completely ruled out. However, this limitation was mitigated by encouraging privacy as much as possible while each student was responding to the questionnaire. The study may not be generalizable to students in secondary schools outside Osun State since different dynamics may operate in relation to the contextual influences of other states, for instance, different government policies on education. The study being a cross-sectional design could not establish a causal effect as a result of the inability to determine temporality between the outcomes and the explanatory variables in the study.

The study concluded that the prevalence of cyberbullying perpetration was significantly higher among adolescents attending secondary schools in urban than in rural area of Osun State. However, the patterns of specific forms and media of cyberbullying perpetration reported were not only comparable among adolescents attending secondary schools in both rural and urban areas of the state, but also comparable to what had been previously documented in other parts of the world. The predictors of cyberbullying perpetration in terms of constructs of theory of planned behaviour among adolescents in the study area were a positive attitude towards cyberbullying perpetration and having a high intention to perpetrate cyberbullying, irrespective of school location. Organizing behavioural change communication interventions to target adolescents' attitude may be a good approach to reducing its prevalence and curbing a vicious cycle that may escalate the problem.

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REFERENCES

1. Moon B, Hwang H-W, McCluskey JD. Causes of school bullying: Empirical test of a general theory of crime, differential association theory, and general strain theory. Crime Delinquency. 2011; 57(6): 849-77. doi.10.1177/0011128708315740

2. Ybarra ML, Mitchell KJ. Online aggressor/targets, aggressors, and targets: A comparison of associated youth characteristics. J of child Psychology and Psychiatry. 2004; 45(7): 1308-1316. doi.10.1111/j.1469-7610.2004.00328.x

3. Smith PK, Mahdavi J, Carvalho M, Fisher S, Russell S, Tippett N. Cyberbullying: Its nature and impact in secondary school pupils. J of Child Psychology and Psychiatry. 2008; 49(4): 376-385. doi.10.1111/j.1469-7610.2007.01846.x

4. Li Q. Cyberbullying in schools: A research of gender differences. Schl Psych Int. 2006; 27(2): 157-170. doi.10.1177/0143034306064547

5. Li Q. New bottle but old wine: A research of cyberbullying in schools. Comput Human Behav. 2007; 23(4): 1777-1791. doi.10.1016/j.chb.2005.10.005

6. Selkie EM, Fales JL, Moreno MA. Cyberbullying prevalence among US middle and high school–aged adolescents: A systematic review and quality assessment. J Adolesc Health. 2016; 58(2): 125-133. doi.10.1016/j.jadohealth.2015.09.026

7. Patchin JW, Hinduja S. Bullies move beyond the schoolyard: A preliminary look at cyberbullying. Youth Violence Juvenile Justice. 2006; 4(2): 148-169. doi: 10.1177/1541204006286288

8. Sangowawa A, Adebiyi AO. Electronic-media harassment among secondary school adolescents in Ibadan municipality Nigeria: myth or reality? Injury Prevention. 2010; 16(Suppl 1): A253-A254. doi.10.1136/ip.2010.029215.902

9. Olumide AO, Adams P, Amodu OK. Prevalence and correlates of the perpetration of cyberbullying among in-school adolescents in Oyo State, Nigeria. Int J Adolesc Med Health 2016; 28(2): 183-191. doi 10.1515/ijamh-2015-0009.

10. Zhu C, Huang S, Evans R, Zhang W. Cyberbullying among adolescents and children: A comprehensive review of the global situation, risk factors, and preventive measures. Front. Public Health 9: 634909. doi: 10.3389/fpubh.2021.634909

11. Holfeld B, Grabe M. Middle school students' perceptions of and responses to cyber bullying. Journal of Educational Computing Research. 2012; 46(4): 395-413. doi.10.2190%2FEC.46.4.e

12. Kowalski RM, Giumetti GW, Schroeder AN, Lattanner MR. Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. Psychological Bulletin. 2014; 140(4): 1073-1137. doi.10.1037/a0035618

13. Ybarra ML, Mitchell KJ. Youth engaging in online harassment: Associations with caregiver–child relationships, internet use, and personal characteristics. J Adolesc. 2004; 27(3): 319-336. doi. 10.1016/j.adolescence.2004.03.007

14. Ajzen I. The theory of planned behavior. Organizational Behavior and Human Decision Processes. 1991; 50(2): 179-211. doi.10.1016/0749-5978(91)90020-T

15. European Union (EU), United Nations Children's Fund (UNICEF), Federal Government of Nigeria. Water Supply and Sanitation Sector Reform Program : Overview of Osun State. [online]. 2007; [Last Accessed 24th December 2011]. www.wsssrp.org/state_osun.php.

16. Ministry of Education. List of Public secondary schools in Osun east Senatorial district. In: Planning, Research, & Statistics, eds. Osogbo: Ministry of Education,Osun State; 2015: 11.

17. Atolagbe AA, Umaru HA, Oyedeji NB and Oparinde OR. Evaluation of Innovation and Sustainable Development in Secondary School Education: Osun State Experience. KIU Journal of Social Sciences 2018; 4(2): 95-102 ISSN 2519-0474. Available at: <https://www.ijhumas.com/ojs/index.php/kiujoss/article/view/336>

18. National Bureau of Statistics. Telecoms Data: Active Voice and Internet per State, Porting and Tariff Information National Bureau of Statistics August 2017 Report.(Q2 2017): 1-59.

19. Katz DL, Elmore JG, Wild DMG and Lucan SC. Jekel's Epidemiology, Biostatistics, Preventive Medicine and Public Health. Fourth Edition Published by Elsevier Saunders. Pg 155

20. Pabian S, Vandebosch H. Using the theory of planned behaviour to understand cyberbullying: The importance of beliefs for developing interventions. European Journal of Developmental Psychology. 2014; 11(4): 463-477. doi.10.1080/17405629.2013.858626

21. Heirman W, Walrave M. Predicting adolescent perpetration in cyberbullying: An application of the theory of planned behavior. Psicothema. 2012; 24(4): 614-620. PMID: 23079360.

22. Oyedeji G. Socio-economic and cultural background of hospitalized children in Ilesha. . Nigerian Journal of Paediatrics. 1985; 12(4): 111-117.

23. Walrave M, Heirman W. Cyberbullying: Predicting ictimization and perpetration. Children & Society. 2011; 25(1): 59-72. doi.10.1111/j.1099-0860.2009.00260.x

24. Wade A, Beran T. Cyberbullying: The new era of bullying. Canadian Journal of School Psychology. 2011; 26(1): 44-61. doi.10.1177/0829573510396318

25. Mishna F, Cook C, Gadalla T, Daciuk J, Solomon S. Cyber bullying behaviors among middle and high school students. Am J Orthopsychiatry. 2010; 80(3): 362-374. doi.10.1111/j.1939-0025.2010.01040.x.

26. Heirman W. and Walrave M. Predicting adolescent perpetration in cyberbullying: An application of the theory of planned behavior. Psicothema. 2012; 24(4):614-620 PMID: 23079360

27. Hinduja S, Patchin JW. Bullying beyond the schoolyard: Preventing and responding to cyberbullying. Thousand Oaks, CA: Sage Publications Corwin Press. 2014.

28. Sabella RA, Patchin JW, Hinduja S. Cyberbullying myths and realities. Comput Human Behav. 2013; 29(6): 2703-2711. doi.10.1016/j.chb.2013.06.040.