CYBERAGGRESSION AMONG YOUNG STUDENTS IN THE DEMOCRATIC REPUBLIC OF THE CONGO (DRC): PREVALENCE AND RISK FACTORS

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ABSTRACT

Intentionally aggressive acts perpetrated on the Internet are steadily increasing. In the digital lexicon, these acts are known as cyberaggression. Contrary to what some may think, these behaviors are also very present in Africa, particularly in the Democratic Republic of the Congo (DRC) where young Africans are becoming more and more addicted to their smartphones connected to the Internet almost continuously. This study aimed to examine the prevalence of and factors affecting online aggression in The Democratic Republic of the Congo. We undertook a field work among 1,500 university students about cyberaggression and we found that students who undertake highly risky behavior online such as sharing the internet connection with others, publishing contents online or having dates with virtual friends, are among those who experience higher probability of being victim and/or perpetrator of online attacks. Parental control of students Internet use is also consistent with the literature, as students living within families where there is family communication around the internet have lower probability of being victim and/or author of online attacks. However, psychological based attributes such as student self-esteem seem not to be significantly associated with online aggression. Based on the findings we formulated some recommendations that can help reduce the prevalence of cyberaggression.

KEYWORDS

Cyberaggression, Digital Behavior Risk, Hyperconnectivity, Parental Control on Student Internet Use, Cyberbullying, Self-Esteem, University Students, The Democratic Republic of The Congo (DRC)

1. INTRODUCTION

Nowadays, cyberaggression or online aggression is gaining more and more ground, particularly among children, teenagers and young adults (Bauman and Baldasare, 2015; UNICEF,2019). This is a vulnerable and Internet-avid population, “digital natives” or “digital children”, as they are sometimes called. Born with a mouse in hand, young people find it difficult to separate themselves from the Internet, which is an integral part of their lives. This is not just about children in Western countries; those of the countries of the South are also involved. But browsing the Internet also exposes them to attacks of all kinds. Why are these young people victims and/or perpetrators of online aggression? Is it because of their hyperconnectivity? Is this a consequence of a lack of awareness of the dangers that the Internet can represent? Or is this the expression of new forms of violence that find favorable ground among young people? The theories on the subject are juxtaposed and overlapped to try to understand this social phenomenon.

Two types of studies are currently of interest to researchers working on attacks on the Internet. On the one hand, methodological approaches are developing to better define and better assess online aggression among young people (Baldwin et al., 2015; Bauman and Baldasare ; Blaya, 2011; Menesini et al., 2012; Yusuf et al. 2021); and on the other hand, more and more studies are moving towards the identification, if not the causes, of the risk factors at the origin of this online phenomenon (Blaya, 2013; Etudes du Center Jean Gol, 2017; Macilotti, 2019).

The present study aimed to evaluate the prevalence of cyberaggression among university/college students in the Democratic Republic of the Congo (DRC) and examine risk factors associated with cyberaggression among these students. The paper is organized around six sections. In the first section, we have summarized the problem statement of the study by specifying why we decided to conduct it. In the second section we have

summarized our conceptual framework based on a review of literature around online aggression towards the World. We have described our materials and methods used to analyze data and the study participants in the third section before presenting the main findings in the fourth section. Those results are briefly discussed in the fifth and last section, where study limitations and recommendations are also presented.

2. PROBLEM STATEMENT

Attacks on the Internet, mobile phones and other digital platforms, such as Facebook, SnapChat, Instagram, Pinterest, WhatsApp, Twitter and Tiktok, are becoming a worrying societal phenomenon, especially when they affect children, adolescents and young adults. They often take the form of insults, threats and other forms of harassment towards their victims and they can have various mental, educational and psychosocial repercussions (European Parliament, 2016; Macilotti, 2019; UNICEF, nd; Yusuf et al., 2021). On the school level, for example, some scholars (Even, 2019; Yusuf et al., 2021) mention, among other things, school and psychosomatic disorders which considerably affect the development of adolescents and young adults, not to mention situations such as the ingestion of drugs and other substances to escape the threat of these assaults of shame. Indeed, and as clearly mentioned by Yusuf et al. (2021, p240), youths who were attacked online "reported eating disorders, alcohol, drugs and substance abuse".

Several studies (Bauman and Baldasare, 2015; Li et al., 2020; Lee, C., & Shin, 2017), resulting from theoretical reflections or field surveys, have tried to understand the prevalence, the etiology, the characteristics as well as the numerous consequences of this new form of crime or violence on young victims, but these remain still limited in the face of the constantly growing scale of the phenomenon. Although we did not perform a systematic literature review, that was beyond the scope of our study, we know from similar research (Chen et al., 2016; Even, 2019; Li et al., 2020; Maron-Cortés et al., 2019; Menesini et al., 2012) that most of studies on cyberaggression have focused more on children and in particular schoolchildren and adolescents, especially in developed countries, where the frequency of use of the Internet is particularly high (Petrosyan, 2022). However, these studies have paid less attention to what happens among young adults, especially among those who attend higher education institutions or universities; one of exceptions might be the study by Bauman and Baldasare (2015). As everyone knows well, these students are very keen on the Internet, video games and social networks, in particular because of (i) their level of education, (ii) their easier access to new information and communication and (iii) their relative autonomy. Furthermore, although they highlight various factors as being at the origin of these behaviors, studies on cyberaggression have not focused much on the role of the digital profile of young people (more or less use of Internet and social media sites for example) in the online aggression (Yusuf et al., 2021).

This study, based on an exploratory survey performed on a sample of Congolese students, has attempted to fill some of these gaps. The objectives of the study were threefold. First, it tries to determine the extent of the phenomenon of online aggression among university students before indicating how the prevalence of this phenomenon varies according to a certain number of socio-demographic variables. Second, it tries to identify the factors influencing participation as a victim or perpetrator of these online attacks before examining the respective impact of the hyperconnectivity of young people themselves. It provides some recommendations that can help reduce this phenomenon among college students in the Democratic Republic of the Congo (DRC). The study is be based on a conceptual framework presented in the next section and developed from our previous knowledge about aggression online and its effects (Chen et al., 2016; Even, 2019; Li et al., 2020; Maron-Cortés et al., 2019; Menesini et al., 2012).

3. CONCEPTUAL FRAMEWORK

Following are a couple of ideas around our study; they will be our logical line of reasoning in this investigation. First, studies on online attacks distinguish the victims from the perpetrators of these criminal acts, thus making it possible to highlight the profile of the aggressors and that of the victims. Our study combines the two groups and talks instead about young people involved in cyberaggression as victims and/or aggressors (or better perpetrators) with the aim of assessing the real extent of this phenomenon in our society. Second, to designate these acts of aggression on and via the Internet, several synonymous concepts are used in studies and research

on the phenomenon. Thus, we sometimes speak of online aggression (cyberaggression), online violence (or cyberviolence), cyberharrassment, and especially cyberbullying, to distinguish them from traditional forms of violence between young people (Menesini et al., 2012; Yusuf et al. 2021). For our part, we prefer the concept of online aggression or cyberaggression, which seems to encompass various acts falling within this register, whether insults, dissemination of rumors, humiliating images, acts of harassment or identity theft on and via the Internet.

In this sense, despite the abundance of definitions encountered in the literature, we retain the following definition of online aggression: "*an aggressive, intentional act perpetrated by an individual or a group of individuals by means of electronic forms of communication in a whether or not repeated against a victim who cannot easily defend himself*" (Smith et al., 2008, p376). Such a definition highlights three important aspects of the phenomenon: (i) the existence of humiliating and nauseating acts on the net (Internet, social networks and other digital platforms) and recognized as such, (ii) the presence of a perpetrator (or group of perpetrators) and a victim, (iii) the intention to harm others, although this aspect is difficult to operationalize in studies. However, the repetitive nature will not be retained in this study, in the face of all forms of aggression, occasional or repeated.

To understand the development of these aggressive acts in cyberspace and grasp the main determinants among young Internet users, there are various analytical perspectives put forward in the scientific community. The first perspective considers that aggression online or on the Internet characterizes the new way of experiencing conflict between young people, given that they spend more and more time in the digital world and have the majority of their friends and acquaintances there (Mendez-Baldwin et al., 2015; Vale et al., 2018). All the conflicts and problems they encounter in the real world are mainly resolved in cyberspace. It is in this context that Vale et al. (2018) as well as Macilotti (2019) mentioned that "cyberaggression is the new form of interpersonal violence among adolescents". It appears that online attacks against young people are often "the result of arguments, teasing and face-to-face actions which are then continued on the internet". According to Macilotti (2019), these attacks are characterized by "a continuity between online and offline experiences".

Another perspective, no less attractive, tends to underline that the increasingly frequent online attacks reflect the hyperconnectivity of young people (Athanasiades et al., 2016; Alvarez-Garcia et al., 2015 ; Beyazit et al., 2017; Çakir et al., 2016; Cho et al., 2019; Gozlan, 2018; Park et al., 2014; Peker, 2015; Stahel and Weingartner, 2019; You and Ah Lin, 2016). According to the proponents of this thesis, cyberspace is now considered an extension of oneself. Social networks have changed communications, relationships and the very notion of intimacy (Gozlan, 2018). Authors like Tisseron (2003) even argues that these young people have "a desire for extimacy", which he defines by a "desire to communicate about his inner world to be validated in his existence, in his originality. This hyperconnectivity thus pushes young people to vent their anger and resentment there, as they would do offline, in the real world". There are other representations of cyberaggression among young people, ideas that deviate from these two mainstreams.

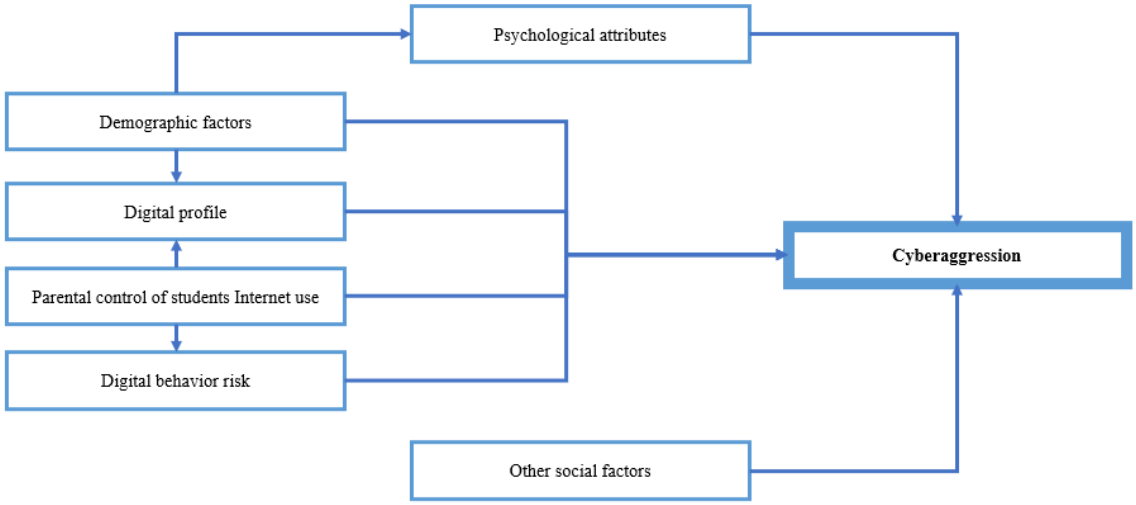
One could also mention the idea that online aggression characterizes a certain specific category/profile of young people, although the phenomenon does not spare anyone. As such, young people with a certain profile are more likely to commit or suffer attacks online (Lee and Shin, 2017; Merril and Hanson, 2016; Mishna et al., 2010). This perspective, which could be described as social determinants (Li et al., 2020 ; Stahel & Weingartner, 2019), underlines the existence of a certain number of factors at the origin of these attacks and which are more or less present among the perpetrators and/or victims of this phenomenon. This is the perspective we adopt in this study, the one that consists of examining the determinants of online aggression among young people.

In this very context, several studies (Alvarez-Garcia et al., 2015 ; Cho et al., 2019; Mendez-Baldwin et al., 2015; Val et al., 2018) conducted among children and adolescents have shown that those who use more social networks and other digital platforms are more likely to experience online violence, but also to commit it. Val et al. (2018), for example, showed that "a higher frequency of information and communication technology and cyber-practices/risks were associated with victim-perpetrators". Other studies have not found a strong link between the frequency of Internet connection and online aggression, but researchers are not ready to abandon this hypothesis, given the ambivalence of the results of the available studies. The question, which is also at the heart of our study, is therefore whether the probability of being the victim/perpetrator of an online attack depends on the digital profile of those concerned.

Another aspect refers to the parental control or intrafamilial communication. The role of parental control on children's digital practices has been pointed out in many studies (Mendez-Baldwin et al., 2015; Palermiti et al., 2017; Wright 2017; Val et al., 2021; Zang et al., 2016) considering, among others, that the existence of

such control or of inter-family communication around this phenomenon reduces the risk of perpetrating or suffering aggression online. Although this awareness, little is known about the mechanisms (of this factor ‘s effect. Some studies also point to the role of parental control on children's digital practices and consider that the existence of such control or of inter-family communication around this phenomenon reduces the risk of committing or suffering aggression online, but mechanisms of the effect of this factor are not yet clearly elucidated. Although cyberaggression can affect all ages and populations, it has been reported in some countries and regions around the world that girls are more affected by the phenomenon than their male counterparts (Li et al., 2020). These studies do not make it possible to decide on this gender inequality in terms of online aggression, in particular because of the lack of control of other variables such as age, social background and family control.

Other authors mention, not without surprise, the overexposure of racial and ethnic minorities to violence on the Internet, particularly in terms of intimidation, but once again, this is not yet sufficiently supported by data from the field (Bauman and Baldasare, 2015; Merril and Hanson, 2016). While demographic factors such as age and sex, digital profile and parental control are cited as determinants of online aggression, other authors (Chang et al., 2015; Sasson and Mesh, 2017) also mention the risky behavior of some young people which overexposes them to this type of aggression or attacks. Among these behaviors we usually point out the exposure of young people to video games with violent content, the meeting with unknown virtual friends, the sharing of the connection with third parties, the publication of personal information. The more young people engage in these acts, the more likely they may commit and/or suffer attacks online. However, it is also necessary to take into account the personality traits of these young people which could contribute to the reinforcement or, on the contrary, to the reduction of the risks incurred (Antipina et al., 2020; Brewer and Kerslake, 2015 ; Festl and Quandt, 2016; Malinowska-Cies’lik et al., 2022). In this regard, no one is unaware of the impact that men's psychological attributes (openness, conscientiousness, extroversion, friendliness and narcissism to consider the big five personality traits, as defined by McCrae and Costa (1987), exert on the human actions and behaviors. Instead of these key traits of personality, some authors (Brewer and Kerslake, 2015; Palermiti et al., 2017; You and Ah Lim, 2016; Yusuf et al., 2021) point out the role of self-esteem as key psychological determinant of online aggression.



Source: developed by the authors.

Figure 1. Our proposed conceptual scheme for the study of cyberaggression factor risks

As we can notice it, online aggressions (or cyberaggression) can be the result of different factors of various kinds, and the most important of them would be, according to some literature, the digital profile, the degree of parental control of students Internet use, some demographic factors, digital behavior risk, personality type and other social factors, as we have schematized in the above diagram (Figure 1). To what extent do these factors influence online aggression among Congolese students? This is one of the two research questions addressed in this study and outlined above. After these theoretical considerations, we are going to describe how we have tried to gather relevant data and analyze them to try to answer our research questions.

4. PARTICIPANTS AND METHODS

4.1 Participants

Data used in this study have been collected from a sample of 1,500 participants who are currently university students from two Congolese universities (Catholic University of Congo, CUC, https://ucc.ac.cd/ and New Horizons University, NHU, https://www.unhorizons.org/) located respectively in Kinshasa and Lubumbashi, the two biggest cities of the DRC; more information around the survey can be found in (Mbaki Luzayisu and Zamwangana Tungu, 2023). As shown in the Table 1, there is a balanced number of female and male participants. Participants ages range between 18 and 30, with a higher share of those aged less than 20 years old. Students aged more than 24 years made up 14% of the total sample. Furthermore, participants mostly live with their (biological or non-biological) parents and are from large families (families with 5 children and more). Of the students surveyed, the majority (75%) is studying first grade of university, 10% are in second grade, 15% in higher grades (Table 1).

All the participants have been selected at random among those who have been enrolled in both Universities and have followed any computer science course since 2020 with one of the two paper's authors; he keeps a long list of email addresses made up of more than 8,000 students. The field work took place in November 2022.

Table 1. Breakdown of study participants by various socio-demographic attributes

Variable	Category	Frequency	Percentage*
Age group	18-20	705	48%
	20-22	400	27%
	22-24	170	11%
	24+	207	14%
Sex	Female	747	50%
	Male	748	50%
Family residence	Live with biological parents	1086	72%
	Live with other parents	131	9%
	Live with friends & acquaintances	26	2%
	Live with other persons	258	17%
Nb of siblings	1	57	4%
	2	88	6%
	3	184	12%
	4	229	15%
	5	287	19%
	6+	652	44%
Elder position or not	Elder	472	32%
	Other position	1025	68%
University grade	First grade	1128	75%
	Second grade	154	10%
	Third grade	91	6%
	Higher grades	128	9%

* Percentages calculated from the total number of participants (1500) with valid answers.

Source: developed by the authors using survey data.

4.2 Questionnaire

An ad hoc questionnaire with sixty-five questions/items has been prepared and submitted online to all the participants who filled in it without any human assistance (self-administered questionnaire). This questionnaire contains ten questions concerning students' attributes (date of birth, gender, number of siblings, mother language, school grade, family residence to name only a few) and use of electronic devices, Internet and social media sites as well as the usage frequency and duration of Internet. The questionnaire also contains students experience about posting/publishing contents on the Internet and friendship management online to assess their online behavior risk in terms of online aggressions. One questionnaire's module has been devoted to cyberaggression measurement using a set of items likely to occur online. Along with items regarding parental control and student knowledge and attitudes towards online aggression, a few questions have been also used to evaluate student self-esteem and their sociability level.

4.3 Data Analysis

Gathered data were analyzed using the SAS software package, especially its SAS/STAT module (version 15.2). Firstly, all the distribution of participants by study questions/items have been examined to ensure data quality and gather preliminary insights. That also allowed (i) to evaluate composite indicators such as online behavior risk, propensity to be victim and/or author of online aggression and connectivity level; (ii) and to better understand students digital usage patterns. Secondly, the prevalence of cyberaggression was analyzed in terms of frequency and percentages as well as associations between cyberaggression and various participants attributes. Finally, the factors associated with the cyberaggression were identified using logistic regression analysis.

We used logistic regression technique to examine the effect of different explanatory variables on the probability of being a victim and/or perpetrator of online aggression. This last variable is based on two values: if the student has already been a victim and/or perpetrator, the variable takes the value 1, otherwise 0. The binary nature of the variable makes it favorable to logistic modelling. We had six groups of explanatory variables: demographic factors (age group, sex, siblings, promotion and rank in the family, used separately in the model), digital profile (low user, medium and heavy Internet user), the digital risk characterizing the students in 3 groups (low risk, medium risk and high risk), the psychological factors grouped around self-esteem and the conflicting nature or not of the student in his living space, parental control of students Internet use as well as other variables such as knowledge of articles and laws on cyberaggression as well as the attitudes to adopt at the University in the face of an online attack. Results of logistic regression are interpreted in terms of odds ratios, obtained by the exponentials of regression coefficients (exp. (ß)), along with their associated p-values to evaluate their statistical significance. Only direct effects of different factors are considered. Hence, the main focus was to present the effect of each retained factors on cyberaggression; no interaction effects have been included in the final model, because the level of interrelationships (or associations) between risk factors was low. Data also showed that following logistic regression assumptions were met (independence of observations and no perfect multicollinearity of risk factors). To cope with the lack of linearity, each of the categorical variables has been transformed into buckets and then into dummy variables that were included in the model. Main results obtained using logistic regression are presented in the next section.

5. RESULTS

5.1 Digital Usage Patterns Among Participants

Before reporting our main findings on the prevalence of and factors affecting online aggression s, we first give some digital usage patterns characterizing participants (Table 2). The results show that most of the participants (94%) use smartphones to navigate on the Internet and only a few of them still go to cybercafés for that (Table 2). Participants also use the Internet almost daily (93% use it at least 5 days per week) for things other than university work. They reported also have used social media sites in the previous 12 months before the survey:

WhatsApp is the most used application with 99% reporting this usage and Twitter being the least used one. The majority of the participants (63%) reported spending more than 2 hours online and at least 10 dollars per week when they go on Internet. Most of them (77% in total) reported that they regularly publish various contents (photos, images, videos and personal info) on the net (Table 2). An important share of participants do share the internet connection with other when they are running out of credit. Our surveyed students also reported that they mainly use WhatsApp to communicate with their parents: the channels such as text messages (SMS), phone calls and emails are less and less used in the students ecosystem. We'll talk about the prevalence of cyberaggression among study participants in the next section.

Table 2. Key digital usage patterns among study participants

% of students accessing the web via their smartphones	99%
% of students who access the web via cybercafés	19%
% of students reported have used the following social media sites in the previous 12 months	
-WhatsApp	99%
- Facebook	78%
-Tiktok	73%
-Instagram	76%
-Snapshot	78%
-Twitter	38%
% of students communicating with parents via WhatsApp	90%
% of students spending at least 2 hours online per day	53%
% of students using the web between 5 and 7 days per week	93%
% of students spending at least 10$ per week for the internet	68%
% of students who have published contents on the internet in the previous 12 months	77%
% of students who have used Excel or Word applications in the previous 12 months	70%

Source: developed by the authors using the survey data.

5.2 Prevalence of Cyberaggression Among Participants

Based on the combination of all items related to cyberaggression submitted to the participants to evaluate and characterize the rate of participants being victim or authors of cyberaggression during the previous 12 months preceding the survey, the following results have been gathered:

- 61% of participants did not report any experience of cyberaggression during the reference period;
- 32% of participants have reported at least one of the aggression experiences as victim only;
- 5% of participants have reported any experience of the aggregation experiences as both victim and author during the period of reference;
- 2% of participants have reported any experience of cyberaggression as perpetrator only

Putting all together, the overall prevalence of cyberaggressions has been estimated to 39% of participants having involved in cyberaggression as victims and/or author during the study period. This relatively high prevalence of cyberaggressions among surveyed students could be linked to different factors such as their high connectivity and high risky of their digital behavior, as suggested in our conceptual framework. The results concerning these relationships are developed in the following section of the paper.

5.3 Factors Associated with Cyberaggression Among Participants

Table 3 provides information about the effect of the factors investigated in the analysis using logistic regression. Among others, the table highlights all the odds ratios (OR hereafter) and p-values associated with each of the variables. To evaluate if the effects are statistically significant, we have relied on the p-values less than 0.05. Such small p-values mean that there is a small probability that the effect observed is due to chance. In other words, it's the probability that the null hypothesis is true, as usual.

Considering digital behavioral risk, one of the facets of students connectivity, we found the following 3 groups: (i) students with low digital risk (19%), (ii) those with moderate digital risk (58%) and (iii) those

belonging to the high digital risk group (23%). As we can see, nearly 80% of the students surveyed are in fact in a situation of moderate or high risk of cyberaggression. Results showed a significant correlation (OR=1.51; p-value=0.0001) between high digital risk and probability of being victim or author of cyberaggression. Furthermore, as already mentioned, the majority of the participants (80%) have high or medium digital connectivity that results from their usage frequency and duration of Internet and social media sites use in the previous 12 months. There is a good correlation between digital connectivity and cyberaggression, but it's not statistically significant (OR for high digital connectivity is 1.14; p-value=0.1488 and OR for medium connectivity is 1.05; p-value=0.5746). Results also showed that 43% of participants belong to families where parents or tutors discus with their children about the risk of online aggressions (Table 3). Significant correlation was found between parental control of internet usage and probability to be victim and/or author (OR =0.878; p-value=0.045). Speaking about parental control, it is also important to mention the effect of living together with biological or non-biological parents vs. other relatives or friends. Results revealed that participants who live in the former type of environments are significantly less likely to be victim and/or author of cyberaggression than their counterparts living without parents (Table 3).

Results also revealed the effects of psychological attributes used in the study (Table 3). There is a significant correlation between associability level and online aggression. Compared to those who are conflict averse, participants who tend to have hot discussion or arguments with their friends are more likely to be victim and/or author of cyberaggression (OR=1.873; p-value=0.001), but participants self-esteem measured through the Rosenberg scale (Rosenberg, 1965) and cyberaggression are not significantly linked. With regard to the demographic variables analyzed, gender obtained an unexpected result. According to prior available evidence, female exhibit higher cyberaggression than male students, but the data obtained in this study showed that every other things being equal there is no significant correlation between gender and the probability of being a victim and/or author of cyberaggression (OR=0.942; p-value=0.373). However, results revealed significant effect for age and university grade. Participants studying in first university grade do experience high probability of being victim and/or perpetrators than those enrolled in the highest grade (Table 3). Those key results will be discussed in the next section.

Table 3. Results of logistic regression of students' attributes on the propensity of being victim and/or author of online aggression

Variable	Parameter	Standard Error (SE)	Chi-Square (Wald stat.)	P-value	(Odds ratio)**
Intercept	-0.2588	0.316	0.6712	0.4126	
High internet user	0.127	0.088	2.08	0.1488	1.136
Medium internet user	0.049	0.089	0.31	0.5746	1.051
Low internet user (ref..)	****				1.000
High digital	0.4081	0.104	15.34	0.0001	1.504*
Moderate digital risk	0.0369	0.085	0.19	0.6636	1.038
Low digital risk (ref.)	****				1.000
Knows laws & instructions	0.051	0.073	0.486	0.486	1.052
Do not know laws & instr. (ref.)	****				1.000
Agree with academic sessions	-0.059	0.088	0.448	0.503	0.943
Do not agree (non) (ref.)	****				1.000
First grade	0.3904	0.163	5.737	0.017	1.478*
Second grade	0.1298	0.212	0.375	0.541	1.139
Third grade	-0.2366	0.252	0.882	0.348	0.789
Forth grade	-0.2672	0.397	0.452	0.501	0.766
Fifth grade (ref.)	****				1.000
18-20 years old	-0.2376	0.3257	0.5323	0.4656	0.788
20-22 years old	0.4948	0.1801	7.5447	0.0060	1.640*
22-24 years old	-0.1253	0.1906	0.4318	0.5111	0.882
24+ (ref.)	****				1.000
Female	-0.0594	0.066	0.794	0.373	0.942
Male (ref.)	****				1.000
Parental control (oui)	-0.013	0.065	4.017	0.045	0.878*
No parental control of internet use	****				1.000
Elder among siblings	0.0801	0.071	1.284	0.257	1.083

Other position among siblings (ref.)	****				1.000
Nb of siblings	0.0133	0.026	0.286	0.611	1.013
Strong self-esteem	0.0639	0.0914	0.488	0.4848	1.066
Medium self-esteem	0.0848	0.0911	0.867	0.352	1.089
Low self-esteem (ref.)	****				
Argue much with friends	0.6276	0.1342	21.88	0.0001	1.873*
Argue a little with friends	-0.1320	0.0935	1.993	0.1580	0.876
Do not argue with friends (ref.)	****				1.000
Live with biological parents	-0.2861	0.1515	3.5654	0.059	0.751*
Live with other parents	-0.2817	0.2052	1.8844	0.170	0.754
Live with friends or acquaintances	0.5979	0.3664	2.6622	0.103	1.818
Live with other persons (ref.)	****				1.000
Have many friends	-0.1244	0.1226	1.029	0.3104	0.883
Have few friends	-0.1919	0.1245	2.377	0.1231	0.825
Do not have friends (ref.)	****				
Sample size	1500				
Number of valid responses	1235				
Pearson's Chi-Square	91.3				
Pr>ChSq	<0.0001				

*Regression coefficient is statistically significant at 5% ; ref = reference category.
Source: developed by the authors using survey data.

6. DISCUSSION, STUDY'S LIMITATIONS AND RECOMMENDATIONS

The aim of this study was to examine the prevalence and risk factors of online aggression among university students in Congo. Online aggression is becoming a serious problem among young people and adults who are avid of Internet and undertake risky behavior online that overexposing them to various attacks. Up to date, a lot of studies have been conducted to better evaluate and understand this social phenomenon. While most previous studies addressed the phenomenon among children and adolescents in Europe, America and Asia, our study has been undertaken among university students in Africa; those students intensively use Internet for both university work and entertainment such as sending and receiving text messages, publishing contents and other personal information on the web. Our study also put a specific focus on the students hyperconnectivity as the key driver of their involvement in cyberaggression context as suggested by many researchers. In the same vein, and contrary to many previous studies, we have built a clear conceptual framework which suggests that cyberaggression among students could be considered as an output of a combination of several and different factors including demographic factors, digital behavior risk, digital profile, parental control of students' internet use and psychological attributes that describe students personality. Finally, the study relies on an exploratory fieldwork; we developed an ad hoc questionnaire that we submitted to the participants who freely answered online without any human assistance, although they were not selected through a clear random sampling procedure.

First results do not necessarily confirm all the suggested hypotheses, while a few of them are consistent with the literature and our conceptual framework. Most of the previous researches emphasizes the gender differences, but we did not find any evidence of significant correlation between sex and online aggression. Hyperconnectivity that some researchers considered as key driver of online aggression find echo in our study. We found that students who undertake highly risky behavior online such as sharing the internet connection with others, publishing contents online or having dates with virtual friends, are among those who experience higher probability of being victim and/or perpetrator of online attacks. Parental control of students Internet use is also consistent with the literature, as students living within families where there is family communication around the internet have lower probability of being victim and/or author of online attacks; this finding echoes previous researches in the parental involvement in the cyberbullying reductions (Mendez-Baldwin et al., 2015). Psychological based attributes such as student self-esteem seem not to be significantly associated with the aggression in the Internet, although the clear theoretical mechanisms suggested in the literature and some empirical researches (Brewer and & Keslake, 2015; Palermiti et al., 2017). Beyond risk factors of cyberaggression, the results contribute to a better understanding of students use of Internet and social media

sites. They also raise the need for deeper researches on cyberaggression among students in DRC to better understand mechanisms underlying the effects of different risk factors identified in this study; they have not been addressed here.

Although those contributions, some limitations should be considered. First, this study was not based on a random sample; this fact limits the inference of our results to all Congolese students. Second, methodology used to define victim and/or author of cyberaggression is prone to error of underestimation of cyberaggression authors/perpetrators; this should be improved in future research. Finally, the study was a cross-sectional design; such an approach makes it difficult to investigate causal relationships between risk factors and online aggression. Longitudinal approach would be more appropriate in this context, echoing what has been done by You and Ah Lim (2016) among Korean middle school students.

Based on our findings the following are some of the main recommendations that can help reduce the prevalence of online aggression among university students in the Republic Democratic of the Congo. First, parents should have open communications with their children about Internet usage and cyberaggression; they should also suggest them to limit time presence on Internet and social media networks. Second, Universities and colleges should regularly organize meetings, forums and conferences around the dangers of Internet and set up concrete measures to mitigate risk of online aggressions between students. Finally, professors and lecturers should have time in their teaching programs to talk students about cyberaggression.

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