

## Cyberbullying among Brazilian schoolchildren: data from the National Student Health Survey, 2019

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**Abstract** *This cross-sectional study assessed data from Brazil's 2019 National Student Health Survey to investigate associations between cyberbullying and sociodemographic, family, mental health, and behavioural factors among Brazilian schoolchildren. Multivariate analysis by Poisson regression found 13.2% prevalence of cyberbullying, which was higher among adolescents who felt nobody cared about them (PR=1.47; 1.36-1.59); felt sad (PR=1.5; 1.4-1.7); reported that life was not worth living (PR=1.71; 1.59-1.84); had no friends (PR=1.68; 1.50-1.87); suffered parental aggression (PR=1.54; 1.45-1.65); missed classes without permission (PR=1.13; 1.06-1.20); used tobacco (PR=1.19; 1.10-1.30); alcoholic beverages (PR=1.16; 1.08-1.25); or illicit drugs (PR=1.14; 1.04-1.25); or had sexual intercourse (PR=1.23; 1.14-1.33). Prevalence was lower among boys (PR=0.85; 0.80-0.91); those 16-17 years old (PR=0.88; 0.82-0.95); and who reported having parental supervision in their free time (PR=0.78; 0.73-0.83). Cyberbullying has a high prevalence, highlighting the importance of monitoring this practice and establishing prevention measures in schools.*

**Key words** *Cyberbullying, Adolescent, Violence, Epidemiologic studies, Mental health*

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## Introduction

Bullying characteristically involves systematic aggression practiced intentionally and in person<sup>1-3</sup> and includes physical, verbal, or relational aggression<sup>4</sup>. It can be considered a type of violence and is an important risk factor for adolescent physical and mental health<sup>4,5</sup>. This format is being treated in the literature as “traditional bullying”, given the emergence of new forms of victimization, such as aggression practiced in virtual form or “cyberbullying”. The latter, a new form of violence described in the past decade, is characterized by aggression via the Internet involving the publication of offensive images, videos, or messages about an individual or group<sup>4,6</sup>.

With the constant advances in communications technology, children and teenagers have been increasingly exposed to smartphones. Studies have shown that more than 90% of teenagers from 13 to 17 years old have constant access to smartphones<sup>4</sup> and spend increasingly longer time online<sup>7</sup>, both on mobile phones and using computers<sup>7</sup>. Mobile phones or computers have been used to send messages, videos, telephone calls, e-mails, comments in chatrooms, and messages on social media<sup>8,9</sup>. Hamm *et al.*<sup>10</sup> note that increasing use of the Internet is associated with increased frequency of cyberbullying.

A meta-analysis of 42 studies and 266,888 participants aged from 8 to 22 years found parallels in situations of victimization: two-thirds of young people who suffered cyberbullying also suffered traditional bullying<sup>4</sup>. Victims of cyberbullying may suffer various kinds of harm, including anxiety, loneliness, depression, psychosomatic symptoms, and suicidal behaviour, while cyberbullies tend to display other kinds of aggressive and delinquent behaviour, as well as more frequent abusive consumption of psychoactive substances<sup>11</sup>. Moreover, when practiced by peers, both victims and authors of cyberbullying score lower on psychological and physical health tests, perform poorly at school<sup>12</sup>, and display low self-esteem<sup>13</sup>.

Cyberbullying is a contemporary phenomenon and studies of its occurrence, especially on a national scale, are still scarce. In 2019, for the first time, Brazil's National Student Health Survey (*Pesquisa Nacional de Saúde do Escolar*, PeNSE in Portuguese) included a question on cyberbullying and found that 13.2% of schoolchildren reported having been victimized by virtual means<sup>1</sup>. It is thus time to examine the factors associated with this practice. This is the first article to examine the issue at the national level.

In that light, the purpose of this study was to investigate associations between cyberbullying and sociodemographic, family, mental health, and behavioural factors in Brazilian schoolchildren from 13 to 17 years old.

## Methods

The analysis assessed data from PeNSE 2019, which was conducted by the official bureau of statistics, the *Instituto Brasileiro de Geografia e Estatística* (IBGE), in partnership with the Brazilian Ministry of Health.

Students were informed in advance of the goals and main characteristics of the survey and that participation was voluntary and could be interrupted at any time. Those who agreed to take part in it answered a self-applied structured questionnaire via smartphone under the supervision of IBGE researchers. The questionnaire addressed information on socioeconomic position, family context, trying and using cigarettes, alcohol and other drugs, violence, security, accidents, and other conditions of their lives<sup>14</sup>.

The sample comprised schoolchildren from 13 to 17 years old in public and private, lower and upper secondary schools, at the following geographical levels: Brazil, Subnational Regions, Federative Units, Municipalities of State Capitals, and the Federal District. The study sampling plan was defined as a two-stage cluster sample, in which the schools represented the first stage of selection and classes of enrolled students, the second. The set of students in the classes selected formed the sample of students. Data were collected from 4,242 schools, 6,612 classes and 159,245 schoolchildren<sup>14</sup>. Sampling loss from enrolled, non-respondent students was 15.4% in 2019. Further details of the methodology can be found in other publications<sup>1,14</sup>.

This study assessed the indicator “suffering cyberbullying”, which was collected through the question: “In the past 30 days, have you felt threatened, offended or humiliated on social media or mobile phone apps?” The response options were “Yes” or “No”.

The explanatory variables selected were:

- 1) Sociodemographic: a) sex: male or female;
- b) age range: 13-15, 16-17 years;
- c) race/colour of skin: white, black, yellow, brown or Indigenous;
- d) type of school: public or private;
- e) mother's schooling: none, primary (incomplete/complete), secondary (incomplete/complete), higher (incomplete/complete).

2) Relationship with parents and relatives: a) suffer parental violence/aggression: “In the past 12 months, how many times have you suffered physical aggression from your mother, father, or guardian?”. Categories: No (never in the past 12 months); Yes (Once; 2 to 5 times; 6 times or more); b) family supervision: “In the past 30 days, how often did your mother, father or guardian really know what you were doing in your free time?”. Categories: No (Never; Rarely); Yes (Sometimes; Most times; Always); c) living with father and/or mother: Categories: No and Yes; d) missing classes without permission: “In the past 30 days, how many days have you missed classes or school without permission from your mother, father, or guardian?”. Categories: No (None in the past 30); Yes (1 or 2 days; 3 to 5 days; 6 to 9 days; 10 or more days).

3) Mental health: a) feeling that no one cared: “In the past 30 days, how often have you felt that no one cares about you?”. Categories: No (Never; Rarely); Yes (Sometimes; Most times; Always); b) feeling sad: “In the past 30 days, how often have you felt sad?”. Categories: No (Never; Rarely) and Yes (Sometimes; Most times; Always); c) close friends: “How many close friends do you have?”. Categories: None; 1 or more; d) feeling that life is not worth living: “In the past 30 days, how often have you felt that life is not worth living?”. Categories: No (Never; Rarely); Yes (Sometimes; Most times; Always).

4) Lifestyle: a) regular use of alcoholic beverages: “In the past 30 days, how many days have you had at least one glass or shot of an alcoholic drink?”. Categories: No (None in the past 30 days); Yes (1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; every day); b) regular use of drugs: “In the past 30 days, how many days have you used a drug?”. Categories: No (None in the past 30 days); Yes (1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days); c) cigarette smoking: “In the past 30 days, how many days have you smoked cigarettes?”. Categories: No (None in the past 30 days); Yes (1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; every day); d) use of tobacco: “In the past 30 days, have you used cigarettes or other forms of tobacco?” (No and Yes); e) Sexual intercourse: “Have you ever had sexual intercourse?”. Categories: Yes or No.

For the descriptive analysis, prevalences of cyberbullying and respective 95% confidence intervals (95%CI) were estimated, by each explanatory variable. Associations between outcome and variables were identified by bivariate analysis to assess the effect of each variable in isolation. The

metric of association estimated was the crude prevalence ratio (PR), and 95%CI. Multivariate analysis was then performed by Poisson regression, and variables with  $p < 0.05$  were retained in the final model, and PR was calculated. Statistical analyses were performed using Stata software, version 14.1 (StataCorp LP, College Station, United States), applying the “svy” procedure with weighting. As this was a population-based study, Poisson regression was used with prevalence ratio results, so that the estimates of the variable studied could be better expressed.

The PeNSE was approved by the Brazilian National Research Ethics Commission of the Ministry of Health (CONEP/MS), with ethics appraisal application certificate (*Certificado de Apresentação para Apreciação Ética*, CAAE) No. 3.249.268<sup>14</sup> and complies with Brazil’s guidelines and regulatory standards for research involving human subjects.

## Results

Prevalence of cyberbullying was 13.2% (12.8-13.7), being higher among females (16.2%; 95%CI: 15.6-16.8), schoolchildren at public schools (13.5%; 95%CI: 13.0-14.0) and children of mothers with no schooling (16.2%; 95%CI: 14.2-18.4). Prevalence was also higher among schoolchildren who reported suffering parental aggression (22.6%; 95%CI: 21.6-23.7), without family supervision (18.1%; 95%CI: 17.3-18.9), who did not live with their parents (15.4%; 95%CI: 13.9-17.1), who missed classes without their parent’s permission (18.4%; 95%CI: 17-3-19.4), who felt that no one cared about them (18.6%; 95%CI: 18-19.2), who felt sad (17.0%; 95%CI: 16.5-17.6), who had no friends (26.1%; 95%CI: 23.8-28.6) and who felt that life was not worth living (22.3%; 95%CI: 21-5-23.2). Prevalence of cyberbullying was also higher among schoolchildren who used alcoholic beverages (19.1%; 95%CI: 18.1-20.1), cigarettes (24.8%; 95%CI: 22.4-27.4), tobacco (22.4%; 95%CI: 20.9-24.1) and illicit drugs (26.4%; 95%CI: 23.9-29.1) and who reported having had sexual intercourses (17.1%; 95%CI: 16.2-18.0) (Table 1).

In the multivariate analysis, higher prevalence of cyberbullying was found in adolescents who suffered parental aggression (PR=1.54; 1.45-1.65), who missed classes without their parent’s permission (PR=1.13; 1.06-1.20), who felt that no one cared about them (PR=1.47; 1.36-1.59), who felt sad (PR=1.53; 1.38-1.68), who report-

ed having no friends (PR=1.68; 1.50-1.87), who felt that life was not worth living (PR=1.71; 1.59-1.84), who used alcoholic beverages (PR=1.16; 1.08-1.25), tobacco (PR=1.19; 1.10-1.30) and illicit drugs (PR=1.14; 1.04-1.25) and who had had sexual intercourses (PR=1.23; 1.14-1.33). On the other hand, cyberbullying was less prevalent among male adolescents (PR=0.85; 0.80-0.91), those who were 16-17 years old (PR=0.88; 0.82-0.95), and those with family supervision (PR=0.78; 0.73-0.83) (Table 2).

## Discussion

For the first time, this study assessed factors associated with cyberbullying in Brazil nationwide. Cyberbullying was found to be more prevalent among schoolchildren who reported feeling sad and that no one cared about them, having no friends and feeling that life was not worth living, suffering parental aggression, missing classes without their parents' permission and engaging in risky behaviour, such as using tobacco, alcohol

**Table 1.** Prevalence and crude prevalence ratio for cyberbullying in adolescents, by explanatory variables. PeNSE 2019.

Variable	Cyberbullying						p
	%	CI(95%)		cPR	CI(95%)		
		Lower	Upper		Lower	Upper	
Total	13.2	12.8	13.7				
<b>Sociodemographic</b>							
Sex							
Male	10.2	9.6	10.8	0.6	0.6	0.7	<0.001
Female	16.2	15.6	16.8	1.0			
Age							
13 to 15 years	13.2	12.6	13.8	1.0			
16 to 17 years	13.3	12.7	14	1.0	0.9	1.1	0.916
Race							
White	13.5	12.9	14.2	1.0			
Black	13.1	12	14.2	1.0	0.9	1.1	0.492
Yellow	14.1	12.3	16.1	1.1	0.9	1.2	0.555
Brown	13	12.4	13.6	1.0	0.9	1.0	0.131
Indigenous	13.4	11.6	15.5	1.0	0.8	1.2	0.9
Type of school							
Public	13.5	13	14	1.0			
Private	11.8	11.3	12.2	0.9	0.8	0.9	<0.001
Mother's schooling							
None	16.2	14.2	18.4	1.0			
Primary (incomplete/complete)	14.7	13.7	15.7	0.9	0.8	1.1	0.177
Secondary (incomplete/complete)	13	12.1	13.9	0.8	0.7	0.9	0.002
Higher (incomplete/complete)	13	12.3	13.8	0.8	0.7	0.9	0.003
<b>Relations with parents and relatives</b>							
Parental violence/aggression							
No	10.7	10.3	11.2	1.0			
Yes	22.6	21.6	23.7	2.1	2.0	2.2	<0.001
Familiar supervision							
No	18.1	17.3	18.9	1.0			
Yes	11.2	10.7	11.7	0.6	0.5	0.7	<0.001
Lives with mother and/or father							
No	15.4	13.9	17.1	1.0			
Yes	13.1	12.6	13.5	0.8	0.7	0.9	<0.001
Missing classes without permission							
No	12	11.6	12.5	1.0			
Yes	18.4	17.3	19.4	1.5	1.4	1.6	<0.001

it continues

**Tabela 1.** Prevalência e razão de prevalência bruta para *cyberbullying* em adolescentes segundo variáveis explicativas. PeNSE 2019.

Variable	Cyberbullying						p
	%	CI(95%)		cPR	CI(95%)		
		Lower	Upper		Lower	Upper	
<b>Mental health</b>							
Feels that no one cares							
No	7	6.6	7.6	1.0			
Yes	18.6	18	19.2	2.6	2.8	3.3	<0.001
Feels sad							
No	6.2	5.7	6.9	1.0			
Yes	17	16.5	17.6	2.7	2.5	3.0	<0.001
Close friends							
1 ou mais	12.7	12.3	13.2	1.0			
Nenhum	26.1	23.8	28.6	2.1	1.9	2.3	<0.001
Feels life is not worth living							
No	7.7	7.3	8.2	1.0			
Yes	22.3	21.5	23.2	2.9	2.7	3.1	<0.001
<b>Lifestyle</b>							
Uses alcoholic beverages							
No	11	10.5	11.4	1.0			
Yes	19.1	18.1	20.1	1.7	1.6	1.9	<0.001
Uses drugs							
No	12.5	12.1	13	1.0			
Yes	26.4	23.9	29.1	2.1	1.9	2.3	<0.001
Smokes							
No	12.4	12	12.8	1.0			
Yes	24.8	22.4	27.4	2.0	1.8	2.2	<0.001
Uses tobacco							
No	11.7	11.2	12.1	1.0			
Yes	22.4	20.9	24.1	1.9	1.8	2.1	<0.001
Has sexual intercourses							
No	11.1	10.6	11.7	1.0			
Yes	17.1	16.2	18	1.5	1.4	1.7	<0.001

cPR = crude prevalence ratio.

Source: Authors.

and drugs and having sexual intercourses. Family supervision, being male and from 16 to 17 years old were associated with lower prevalence of cyberbullying.

In Brazil, the PeNSE found that the prevalence of traditional bullying was 23.0% (22.4-23.6)<sup>14</sup>, nearly twice as high as cyberbullying. That data agrees with a meta-analysis that estimated the global prevalence of victimization by bullying was 24.3% (95%CI: 20.3-28.8%) and by cyberbullying, 11.1% (95%CI: 9.12-13.44%)<sup>4</sup>.

This study found higher prevalence of cyberbullying among younger adolescents (13 to 15 years old). This finding disagrees with those of some international studies, which have pointed

to greater exposure among older children. Tarpdar and Kellett<sup>15</sup> noted that English children from 14 to 16 years old were more often victims of cyberbullying than children from 12 to 13 years old, and that the practice got more complex and “creative” forms, such as filming the victims and posting the videos on the Internet.

This study found that girls suffered more cyberbullying, a controversial issue in the literature. A meta-analysis by Barlett and Coyne<sup>16</sup>, which examined 122 articles, showed that men were slightly more likely to cyberbully than women; nonetheless, the overall effect was moderated by age. Accordingly, the girls engaged more in cyberbullying in early and mid-adolescence, while

**Table 2.** Final model of the multivariate analysis of suffering cyberbullying in adolescence. PeNSE 2019.

Variable	PR*	CI(95%)		P
		Lower	Upper	
<b>Sociodemographic</b>				
Age				
13 to 15 years	1.00			
16 to 17 years	0.88	0.82	0.95	0.001
Sex				
Male	0.85	0.80	0.91	<0.001
Female	1.00			
<b>Relations with parents and relatives</b>				
Parental violence/aggression				
No	1.00			
Yes	1.54	1.45	1.65	<0.001
Familiar supervision				
No	1.00			
Yes	0.78	0.73	0.83	<0.001
Missing classes without permission				
No	1.00			
Yes	1.13	1.06	1.20	<0.001
<b>Mental health</b>				
Feels no one cares				
No	1.00			
Yes	1.47	1.36	1.59	<0.001
Feels sad				
No	1.00			
Yes	1.53	1.38	1.68	<0.001
Close friends				
1 or more	1.00			
None	1.68	1.50	1.87	<0.001
Feels life is not worth living				
No	1.00			
Yes	1.71	1.59	1.84	<0.001
<b>Lifestyle</b>				
Uses alcoholic beverages				
No	1.00			
Yes	1.16	1.08	1.25	<0.001
Uses drugs				
No	1.00			
Yes	1.14	1.04	1.25	0.002
Uses tobacco				
No	1.00			
Yes	1.19	1.10	1.30	<0.001
Has sexual intercourse				
No	1.00			
Yes	1.23	1.14	1.33	<0.001

PR\* = Adjusted prevalence ratio.

Source: Authors.

the boys showed higher levels of cyberbullying towards the end of adolescence. They hypothesised that the cognitive development necessary

for more subtle and sophisticated forms of aggression arrives earlier in girls than in boys<sup>16</sup>. We found higher prevalences among girls, which

should be explored in greater depth in qualitative studies. Nonetheless, we agree that earlier maturity in girls may be an important factor in the earlier onset of this practice.

Cyberbullying was strongly associated with indicators of worse mental health. Adolescents who reported having no friends, feeling that no one cared about them, and that life was not worth living reported more cyberbullying. These findings agree with the literature, which has indicated that victims of cyberbullying were at significantly greater risk of depression, suicidal ideation and attempted, and self-harm<sup>4,17-19</sup>, that is, returned worse indicators of mental health, as in this study.

Cyberbullying was also associated with consumption of substances including tobacco, alcoholic beverages and illicit drugs. The literature also indicates that experiences of cyberbullying can lead to substance abuse, poorly academic performance and other health problems<sup>4</sup>.

The World Health Organization (WHO) emphasises that cyberbullying is complex, globally growing issue, and that violence perpetrated online against children is diversifying. Not only cyberbullying, but online child sexual exploitation and abuse, and the production and transmission of material containing child sexual abuse and other forms of victimization are also increasing. The WHO specifies strategies for tackling cyberbullying, including programmes on prevention for young people, online safety programmes for children and adolescents, Internet regulation and security measures<sup>20</sup>.

In Brazil, one encouraging development came in January 2024, with the passing of the new Law 14.811/2024 stipulating that municipal governments must introduce protocols for the protection of children and adolescents against all forms of violence in school environments, as well as providing capacity-building for teachers<sup>21</sup>. These measures are to be carried out in partnership with states and the Union. The law specifies penalties and fines against adults who bully children or adolescents and, in cases of aggression by adolescents,

they will be subject to socio-educational measures and, in cases involving children, their legal guardians will be liable to prosecution. With cyberbullying, in the event intimidation occurs via the Internet, social media, applications or games, the penalty will be 2 to 4 years' detention, plus a fine<sup>21</sup>.

The limitations of this study include its cross-sectional design, meaning that the associations found are not necessarily causal, in that the outcome and explanatory variables were measured at the same time, precluding conclusions as to cause and effect. Accordingly, the findings should be confirmed by other means, such as cohort or other studies. The variable "cyberbullying" was measured by only one question, following the model used by the WHO in the Global School-Based Student Health Survey (GSHS)<sup>22</sup>. Other models of questionnaire, addressing different aspects of the issue<sup>23</sup> and with larger numbers of questions, do exist and can be recommended and validated in future versions of the PeNSE. The variables contemplated in the mental health section may also have limited associations, with possible correlations among them; nonetheless, their effect on the variable "cyberbullying" is of major importance and significant in related interpretations.

In conclusion, this study found high prevalence of cyberbullying, which was greater among girls and younger adolescents and associated with worse indicators of mental health, use of psychoactive substances and parental aggression. It is important to monitor cyberbullying, just as it is important to think about how to face it effectively, given that offensive messages can spread and persist permanently in virtual environments. Also, as it is difficult to identify aggressors on the Internet, this form of violence is even more challenging, as few are punished, and perpetrators' identities remain hidden<sup>24</sup>. These facts underline the need for inter-sector action involving health-care, education, society and families, with a view to advancing on the 2030 agenda for adolescent wellbeing and to stop all forms of violence<sup>25,26</sup>.

## Collaborations

DC Malta participated in the study conception, planning, design, interpretation of statistical analyses and results, drafting of the first version of the article and critical review of the article. JB Souza participated in the statistical analyses, drafting of the findings and critical review of the article. NM Vasconcelos, FCM Mello, JB Buback, CS Gomes and CA Pereira participated in the analysis and interpretation of the results and in critical review of the article.

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