

**BRIEF REPORT**

Being bullied and using drugs are associate with eating disorder symptoms in Brazilian students

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Abstract

Objective: This study's main purpose is to evaluate factors associated with eating disorder (ED) symptoms among Brazilian adolescents.

Method: The sample consisted of 5,213 students, mean age 13.24 ($SD \pm 0.01$), in the eighth grade of 93 public schools from three Brazilian cities. Data were collected through an anonymous self-report questionnaire, assessing: sociodemographics, use of alcohol, tobacco, illicit drugs, binge drinking, bullying, and ED symptoms. We used confirmatory factor analysis and multivariate linear regression.

Results: We found that high levels of bullying victimization, binge drinking and the use of unprescribed weight-loss substances were associated with higher levels of ED symptoms to both genders. However, only among girls, the higher age ($\beta = .10$; 95% CI = 0.02; 0.17) and the use of illicit drugs ($\beta = .21$; 95% CI = 0.094; 0.34) were associated with increase in the ED symptoms.

Discussion: We demonstrate a significant association of ED symptoms with drug use and bullying, highlighting the importance of addressing these factors in the development of ED prevention strategies.

KEYWORDS

adolescents, bullying, drugs, eating disorder, epidemiology, prevention

1 | INTRODUCTION

Adolescents are increasingly involved in the pursuit of social patterns, including associating thinness with success; consequently, they may use harmful strategies to control weight, leading to negative health outcomes, such as disordered eating behaviors (Holt, Green, Tsay-Vogel, Davidson, & Brown, 2017). In addition, disordered eating behaviors are also associated with substance use (Peleg-Oren, Cardenas, Comerford, & Galea, 2012) and bullying (Lee, 2018), which may aggravate the prognosis (Bahji et al., 2019).

There are many common symptoms associated with eating disorders (ED) and substance use, including disruption of appetite and satiation, cravings, preoccupation with food, self-destructive behavior, denial, and serious medical consequences. Furthermore, this association is more frequently observed in ED forms that present binge eating and/or compensatory behaviors (Mann et al., 2014; Munn-Chernoff et al., 2020).

Another important factor correlated with ED is bullying. According to the United Nations, *bullying* is a global issue, and about 50% of adolescents reported having suffered this practice, which may cause several psychological damages, and affect mental health in adolescence, with lifelong consequences (Malta et al., 2019; Rech, Halpern, Tedesco, & Santos, 2013; Scutti, Seo, Amadeu, & Sampaio, 2014). Bullying is also related to substance use (Woo et al., 2019).

Trial registration: The study was registered in the Brazilian Ministry of Health's Registry of Clinical Trials (Registro Brasileiro de Ensaios Clínicos—REBEC) under number RBR-8cnkww. The study protocol was approved by the Universidade Federal de São Paulo's research ethics committee (protocol 2.806.30).

Considering that behaviors such as the use of alcohol and other drugs and bullying in school environment have been reported to be co-occurring (Horta et al., 2018; Walters & Espelage, 2018), and that both behaviors seem to be associated with ED, the current knowledge gap is related to the need of an integrated assessment of these behaviors in a sample of adolescents. Another important gap in the ED literature is the evaluation of adolescents in Latin America, a region where there are also cultural influences on body appreciation (de Sousa, de Araújo, & do Nascimento, 2016; Palavras, Kaio, Jesus Mari, & Claudino, 2011). The prevalence of ED and associated factors may differ from other countries (Straatmann, Almquist, Oliveira, Rostila, & Lopes, 2018; UNESCO, 2018). Moreover, many studies that analyzed ED were clinical and used small samples, limiting their statistical power and representativeness (Lie, Rø, & Bang, 2019). Therefore, this study intends to elucidate the association between ED symptoms, drug use, and bullying in a large community sample in a middle-income country, according to gender.

2 | METHODS

2.1 | Study design

This study is a cross-sectional study nested in a randomized controlled clinical trial by cluster to evaluate the second Brazilian version (culturally adapted in 2018) of a school drug prevention program based on the European program *Unplugged* (Sanchez et al., 2019; van der Kreeft et al., 2009). This study examined the baseline data of #Tamojunto2.0, which were gathered before applying the intervention. The sample consisted of 5,371 eighth grade students from 73 public schools in three Brazilian cities. This study was approved by the Ethics Committee of the Federal University of São Paulo, number 2.806.301, and for more information on study design and sampling procedures, see Sanchez et al. (2019).

2.2 | Instruments and variables

Data were collected through a self-report anonymous questionnaire administered by researchers in the classroom without the teacher's presence. The questionnaire had been adapted from the one developed and tested by the European Union Drug Abuse Prevention (EU-DAP) program, and it had been used in previous studies on the effectiveness of *Unplugged* (Faggiano et al., 2008). We used a version translated into and adapted for Brazilian Portuguese (Prado et al., 2016). Further details regarding this instrument are presented in previous studies (Sanchez et al., 2019).

For the analyzed **outcome variable**, ED symptoms were collected through the SCOFF (Sick/Control/One stone/Fat/Food) questionnaire. It is a screening tool developed by Morgan, Reid, and Lacey (1999) and includes five (dichotomous) questions about ED addressing core features of anorexia nervosa and bulimia nervosa. The outcome variable was evaluated as one continuous latent

dimension of ED symptoms, ranging from 0 to 5 (the higher the score, the greater the amount of ED symptoms). Evidence of validity from this study based on internal consistency obtained through confirmatory factor analysis is shown in this article's Section 3.

The **explanatory variables** analyzed were: (a) Adolescent's drug use: occurrence (yes or no) over the previous year of binge drinking (five or more doses of alcohol in one occasion), tobacco, unprescribed weight-loss substances, and illicit drugs (marijuana, inhalants, cocaine). (b) Sociodemographic data: gender, age, and socioeconomic status (scale of the Brazilian Association of Research Companies; ABEP, 2018). (c) Bullying victimization and perpetration variables: collected through Olweus Bully/Victim Questionnaire (Solberg & Olweus, 2003), which consists of two scales that investigate episodes of bullying in school (bullying victimization and bullying perpetration). The bullying variables used in the analysis were two latent dimensions of bullying victimization and perpetration (ranging from 0 to 7; the higher score, the more intense the bullying victimization or perpetration). The internal consistency obtained through the confirmatory factor analysis is shown in Section 3 of this article. All variables used in this study were collected at the initial (baseline) time and were, therefore, neither randomized nor influenced by the intervention.

2.3 | Statistical analysis

The descriptive analysis was performed using weighted data to correct unequal probabilities of sample selection using the survey prefix command (`svy`) in the Stata 16 software.

We conducted a confirmatory factor analysis to estimate the latent factors and provide evidence for the construct validity of continuous measures: ED symptoms, and bullying victimization and perpetration. The cutoff criteria used to determine the quality of fit were based on Little, Rhemtulla, Gibson, and Schoemann (2013).

Multiple imputations (MI) were implemented using the Bayes estimate of an unrestricted variance-covariance model to impute the missing values (Muthén & Muthén, 2010). We then performed univariate and multivariate linear regression with the exploratory variables (adolescents' drug use, bullying victimization and perpetration latent factor, ABEP score, gender, and age) affecting the outcome measure (latent factor of ED symptoms). Possible interactions between these variables were analyzed using a direct selection method (You & Zhou, 2010), and the interaction was included in the model. All analyses were performed in Mplus version 7.4. Inferential point estimates were computed for the regression coefficient (β) with their respective 95% CIs and *p*-values. The adopted level of significance was 5%.

3 | RESULTS

3.1 | Descriptive analysis

The demographic characteristics of the students participating in the study ($N = 5,213$) are in Table S1. There was a balance between male

and female students; most students were aged between 12 and 14 years and belonged to the middle socioeconomic class. Moreover, alcohol was the drug most frequently used by these students in the previous year (30.94%), 44% were victims of bullying, and 45.7% presented more than one symptom of ED.

Table 1 shows that girls who are victims of bullying had more symptoms of ED (mean 2.02) than boys (mean 1.67). Similarly, more symptoms of ED were also found among girls who used some substances (binge drinking, tobacco, illicit drugs, and weight loss drugs) than among boys that used the same substance.

The most prevalent ED symptom was the worry about losing control over how much you eat, for both genders. Most of the boys have zero to one symptom of ED, while most girls have 1 or 2 (Table S2).

3.2 | Construct validity and fit of the dimensional models

The result of the psychometric evaluation of the SCOFF scale showed that our model had a good fit as a one-dimensional model, meaning that all five observed items of the SCOFF scale are assumed to reflect only one common latent factor of general ED symptoms ($\chi^2 = 9.060$ and p -value = .0596, RMSEA estimate = 0.017, RMSEA probability = 1.000, CFI = 0.994, and TLI = 0.984). The analysis of the model fit indices for the Olweus Bully/Victim Questionnaire indicated that our model had a good fit as a two-dimensional model. The bullying construct is assumed to reflect two latent factor of bullying, seven observed items reflecting bullying victimization, and other seven observed items reflecting bullying perpetration ($\chi^2 = 227.353$ and p -

TABLE 1 Distribution of eating disorder symptoms by gender according to sociodemographic variables, bullying and drug use in a sample of students participating in the baseline assessment of cluster randomized controlled trial (N = 5,213)

	Eating disorders symptoms					
	Boys			Girls		
	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>
Age						
12–14	1.31	1.15	.70	1.70	1.25	.68
15–17	1.34	1.31		1.74	1.30	
ABEP score^a						
A	1.40	1.40	.001	1.78	1.38	.059
B	1.31	1.13		1.80	1.21	
C	1.33	1.16		1.64	1.23	
D/E	1.21	1.16		1.76	1.31	
Bullying						
Victimization						
No	1.10	1.07	<.001	1.38	1.18	<.001
Yes	1.67	1.24		2.02	1.23	
Perpetration						
No	1.19	1.11	<.001	1.58	1.21	<.001
Yes	1.62	1.25		2.04	1.28	
Adolescent past-year drug use						
Binge drinking						
No	1.29	1.15	.021	1.58	1.22	<.001
Yes	1.45	1.26		2.14	1.26	
Tobacco						
No	1.31	1.16	.953	1.68	1.24	<.001
Yes	1.32	1.28		2.08	1.27	
Illicit drugs						
No	1.30	1.16	.151	1.65	1.23	<.001
Yes	1.42	1.22		1.99	1.32	
Weight loss drugs						
No	1.31	1.16	.004	1.68	1.24	<.001
Yes	2.50	1.77		2.90	1.33	

^aSocioeconomic classification according to the scale of the Brazilian Association of Research Companies (Associação Brasileira de Empresas de Pesquisa—ABEP).

TABLE 2 Characteristics of eating disorder symptoms factors by gender, identified through confirmatory factor analysis, in a sample of students participating in the baseline assessment of a cluster randomized controlled trial (N = 4,926)

	Univariate regression—EDS ^a				Multivariate regression—EDS ^a							
	Boy		Girl		Boy		Girl					
	β	95% CI	p	β	95% CI	p	β	95% CI	p			
Age	.01	[-0.06; 0.06]	.950	.13	[0.08; 0.19]	<.001	—	—	.10	[0.02; 0.17]	.029	
ABEP score ^b	.03	[-0.04; 0.08]	.447	.02	[-0.04; 0.08]	.581	—	—	—	—	—	
Bullying												
Victimization	.58	[0.51; 0.64]	<.001	.64	[0.56; 0.71]	<.001	.56	[0.49; 0.63]	<.001	.54	[0.47; 0.62]	<.001
Perpetration	.54	[0.44; 0.63]	<.001	.44	[0.32; 0.55]	<.001	—	—	—	—	—	
Adolescent past-year drug use												
Binge drinking	.37	[0.23; 0.52]	<.001	.76	[0.63; 0.88]	<.001	.42	[0.28; 0.56]	<.001	.65	[0.52; 0.79]	<.001
Tobacco	.17	[-0.08; 0.42]	.273	.55	[0.32; 0.78]	<.001	—	—	—	—	—	
Illicit drugs	.20	[0.06; 0.34]	.017	.42	[0.31; 0.54]	<.001	—	—	—	.21	[0.09; 0.34]	.005
Weight loss drugs	1.58	[0.64; 2.51]	.006	1.63	[1.11; 2.16]	<.001	1.67	[0.74; 2.59]	.003	1.58	[1.10; 2.05]	<.001

Note: The dash refers to the variables that did not remain in the final model due to $p > .05$.

^aEating disorders symptoms.

^bSocioeconomic classification according to the Brazilian Association of Research Companies (Associação Brasileira de Empresas de Pesquisa—ABEP).

value .0001, RMSEA estimate = 0.018, RMSEA probability = 1.000, CFI = 0.989, and TLI = 0.987).

3.3 | Linear regression

Table 2 shows that higher levels of bullying victimization, the practice of binge drinking, and the use of unprescribed weight-loss substances were associated with more ED symptoms to both genders. An increase of one point in the scale of bullying victimization increases half of a point in the symptoms of ED for both genders. Only among girls, the age ($\beta = .10$; 95% CI = 0.02; 0.17) and the use of illicit drugs ($\beta = .21$; 95% CI = 0.094; 0.34) were associated with increase in the ED symptoms scale. The most significant association for both genders was the use of weight-loss medicines.

4 | DISCUSSION

This study's strength is a representative large-scale community sample of adolescents in three cities of a middle-income country aiming to investigate the association between symptoms of ED, drug use and bullying according to gender. This study demonstrated that higher levels of victimization by bullying, the practice of binge drinking, and the use of nonprescribed weight loss substances were associated with more ED symptoms for both genders among adolescents. Moreover, girls have more factors, including older age and the use of illicit drugs, associated with a higher number of ED symptoms.

This study shows that girls of mean age of 13 years have more symptoms of ED than boys of the same age, as documented in previous literature in different age groups (Gutiérrez et al., 2015; Micali et al., 2017; Pisetsky, Chao, Dierker, May, & Striegel-Moore, 2008).

In this study, the increase of ED symptoms is positively correlated to an increase in bullying episodes in both genders. Some studies, such as the one by Bandeira and Hutz (2010) report that some episodes of bullying have implications for the self-esteem of girls and boys and, therefore, prevention programs that reduce bullying can reduce the frequency of ED.

We also found a higher score of ED symptoms among binge drinkers of both genders and, only to adolescents' girls, the use illicit drugs. This association may depend on underlying mechanisms, such as trauma or impulsivity, as a way to escape adverse emotions, like in the case of drug use and alcohol consumption; or to appetite suppression or weight reduction, as in the case of some illicit drugs (Davison, Marshall-Fabien, & Gondara, 2014; Pisetsky et al., 2008). Therefore, a behavioral approach is important to assess the functional relationship between ED symptoms and substance use (Wolfe & Maisto, 2000).

It is noteworthy that the number of ED reports in developing countries is increasing, and body dissatisfaction seems to occur in the same proportion among different ethnicities (Oliveira & Hutz, 2010). This suggests that interventions to prevent ED are increasingly necessary for this population, especially focusing on pre-adolescents, the phase before these symptoms start to appear (Kremer, Kremer, & Kremer, 2019).

The study presents some limitations. A cross-sectional survey is nested in a randomized controlled trial; this does not determine the temporal sequence of the analyzed events. In addition, this study represents students in three cities in Brazil; thus, it cannot be generalized for all cities. On the other hand, a large number of participants were analyzed simultaneously and stratified by gender.

In conclusion, our study suggests that ED symptoms are more prevalent among girls and are associated with bullying and substance use during adolescence. For this reason, interventions should target these three types of behavior simultaneously. In addition, longitudinal studies with specific diagnoses of ED should be performed to understand the causal relationship between this clinical condition, bullying, and substance use.

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CONFLICTS OF INTEREST

The authors have no conflict to declare.

DATA AVAILABILITY STATEMENT

Data Availability Statement: data is available on request

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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