ORIGINAL ARTICLE

Psychiatric Symptomatology is Associated with Polydrug Use and School Violence in Early Adolescence

Rodrigo Garcia-Cerde[1] · Camila W. Lopes de Oliveira[2] · Valdemir Ferreira-Junior[2] · Sheila Cavalcante Caetano[2] · Zila M. Sanchez[1]

Abstract

This study investigated the association between psychiatric symptoms and polydrug use, school violence, and sociodemographic factors among Brazilian early adolescents. Using the baseline data collection from the effectiveness evaluation of PROERD, a school-based drug use prevention program, implemented in 30 public schools in São Paulo (n = 2316, M age = 12.3 years, 48.5% girls), multinomial logistic regressions were performed using Strengths and Difficulties Questionnaire (SDQ) subscales as response variables, and polydrug use, school violence, and sociodemographic characteristics as explanatory variables. In most SDQ subscales, girls and older students were more likely to have psychiatric symptoms. A positive association was identified between polydrug use and psychiatric symptoms. It was found that those who suffered and perpetrated physical violence had a greater likelihood of presenting psychiatric symptoms. Preventive interventions should consider the greater vulnerability related to the mental health of girls, older students, and those who suffer and perpetrate physical violence at school.

Keywords Adolescents · Brazil · Drug users · Mental health · School

Introduction

Living in environments of poverty and abuse are known risk factors for the development of mental disorders [1] and harmful behaviors, such as substance abuse and physical violence [2]. Mental health problems in children and adolescents are the main difficulties in behavioral adaptation worldwide [3, 4], resulting in reduced productivity, poor school performance, difficulty in creating interpersonal relationships, and inability to deal with adversity or change [1, 5]. According to a meta-analysis [6], of 41 studies conducted in 27 countries from every world region, the worldwide prevalence of mental disorders was 13.4% in children and adolescents (95% CI 11.3–15.9). Compared with other chronic health conditions in childhood, such as obesity (18%) [7] and asthma (14.1%) [8], this number is worrisome. Mental disorders have become a priority health issue owing to the several negative associated outcomes.

Conway et al. [9] observed that 37.7% of adolescents experienced at least one mental disorder before their first use of alcohol, 47.6% before regular alcohol use, and 66.6% before alcohol abuse with or without dependence. For drug use categories, 41.2% of adolescents presented with at least one mental disorder before trying drugs and 66.8% before drug abuse with or without dependence. In Brazil, a survey with national data from 2010 found that 48.5% of high school students presented clinically significant psychiatric symptoms that were highly associated with drug use [10]. This association is worrying because of the prevalence of

✉ Zila M. Sanchez
zila.sanchez@unifesp.br

Rodrigo Garcia-Cerde
rodrigo.cerde@unifesp.com

Camila W. Lopes de Oliveira
cwl.oliveira@unifesp.br

Valdemir Ferreira-Junior
valdemir.ferreira@unifesp.br

Sheila Cavalcante Caetano
sheila.caetano@unifesp.br

1 Departamento de Medicina Preventiva, Universidade Federal de São Paulo, Rua Botucatu, 740, 4º Andar, São Paulo, SP, Brazil

2 Departamento de Psiquiatria, Universidade Federal de São Paulo, Rua Borges Lagoa, 570 - 1º Andar, São Paulo, SP, Brazil

both variables. According to the Brazilian Statistics Institute [11], 54% of Brazilian school children, aged between 13 and 15 years, had already tried alcohol, 21% reported at least one episode of drunkenness, 19% used tobacco, and 9% used other illicit drugs. In addition, the use of several different drugs, also known as polydrug use, is a particular risk for substance abuse disorders in adulthood [12]. One of the major concerns about polydrug use is that the effects of the individual drugs are boosted, and harmful physiological effects can accumulate in the body [13] and increase the chance of physical and physiological damage [14].

School violence is another important aspect of risk behavior in early adolescence. It can include different types of aggression (physical, psychological, sexual, or bullying) related to sex, social norms, or structural factors, such as cultural differences or income inequality [15]. When evaluated as an explanatory variable, school violence was associated with an increased risk of developing major depression (MD) in adolescents [16, 17] and an increased risk of using legal and illicit drugs [16, 18, 19]. In a recent study, the prevalence of violence in Brazilian schools was 62.2% for suffering aggression and 51.9% for perpetrating aggression [20]. This suggests that drug use and school violence can be hypothesized as potential explanatory variables for psychiatric symptomatology among adolescents, with polydrug use considered as a more severe pattern of drug use and potentially more prevalent among adolescents with clinical symptomatology.

Efforts to understand the associations between psychiatric symptoms/disorders, early drug use, and school violence remain crucial for effective interventions in adolescence, and these data may contribute to future fundamental health policies and changes in children's health systems. However, such studies are scarce in low-and middle-income countries, e.g., Brazil. According to Fatori et al. [21], the lack of scientific evidence makes it difficult to develop more effective prevention programs in more vulnerable countries or communities. Thus, the aim of this study was to investigate the relationship between psychiatric symptoms and polydrug use, school violence, and sociodemographic characteristics among Brazilian students. It is hypothesized that drug use and school violence are associated with psychiatric problems in early adolescence.

Methods

Design

This study is a cross-sectional survey nested in a randomized controlled trial (RCT) that evaluated a school-based drug and violence prevention program, named PROERD (Educational Program of Drug and Violence Resistance), among seventh graders of 30 public schools in São Paulo. PROERD is the most prevalent drug prevention program in Brazil, and the curriculum is a Brazilian adapted version of Keepin' it REAL [22]. The present study used baseline data from the RCT collected before any intervention.

Ethics

The study was registered in the Brazilian Ministry of Health Register of Clinical Trials (REBEC) under protocol 6q23nk. The study protocol was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (1327/2018). The questionnaire did not include any confidential information of the students, and they could participate anonymously, decline to participate, leave questions unanswered, and interrupt their participation at any time.

Sample

The participants were 2316 seventh-grade students from 30 public schools in São Paulo, Brazil. The schools were randomly selected from a group of state public schools that had not received PROERD in the last three years and offered elementary and middle schooling. A second random allocation determined whether each school would be assigned to the control or intervention group. All seventh graders of each of the selected schools contributed to the study, and all students present on the day of data collection were invited to participate.

According to the methodological postulates of Donner and Klar [23], the minimum sample size necessary for this study was 1,608 participants (67 per group) for 80% power, 5% significance level, 7% difference in proportions, and 0.02 interclass correlation for cluster randomized controlled trials. The parameters used were based on the results of a study by KiR USA [24, 25].

Instrument

A self-reported audio-guided questionnaire, applied by the researchers in the classroom, was completed anonymously by the students on smartphones, without the teacher's presence. It was decided to use smartphones because, besides making participation more enticing, they allowed the use of audio and images that facilitated the students' understanding of the questions and enabled the participation of students with low proficiency in reading and writing, a very common problem in Brazilian public schools [26].

Measures

The probable psychiatric symptomatology was the dependent variable, while the independent variables were sex, age,

Psychiatric Symptomatology: Strengths and Difficulties Questionnaire (SDQ)

The SDQ [27] was used to assess the probable psychiatric symptoms of the participants. The SDQ is a screening measure of emotional/behavioral difficulties (20 items) and prosocial skills (5 items) for 4- to 17-year-olds. It is composed of five subscales: emotional symptoms, conduct problems, attention-hyperactivity symptoms, peer relationship problems, and prosocial behavior. Each subscale has five items that can be answered with "not true," "somewhat true," or "certainly true." The value attributed to each answer (from 0 to 2) varied according to the item. The results of each subscale (from 0 to 10) were evaluated if at least three items were completed. Each score was added to calculate the total, resulting in values from 0 to 40. The total result was considered if at least 12 of the 20 "relevant items" were completed [27]. The prosocial behavior subscale was excluded from the total score because it does not assess symptoms or problems, but rather prosocial resources or skills. This questionnaire has already been translated into Portuguese and been validated for Brazilian children and adolescents in terms of discriminative validity, reliability, and internal consistency [28, 29].

The participants were classified according to their total score: 0–15 = "non-case" (normal); 16–19 = "subclinical" (borderline); and 20–40 = "case" (abnormal). Adolescents were also classified into these categories on each subscale using the following values: emotional symptoms: 0–5, 6, 7–10; conduct problems: 0–3, 4, 5–10; inattention-hyperactivity symptoms: 0–5, 6, 7–10; and peer relationship problems: 0–3, 4–5, 6–10. The "non-case" category was used as the reference in all models [30].

Confirmatory factor analysis (CFA) was performed to provide evidence for the construct validity of the four SDQ subscales. To evaluate the goodness of fit, the comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error approximation (RMSEA) were used. The cutoff criteria used to determine the goodness of fit were an RMSEA estimate near or less than 0.08, RMSEA probability near or equal to 1, and CFI and TLI near or greater than 0.90 [31]. Mplus version 8.0, was used to run the CFA analysis. The fit indices indicated a close fit, with $X^2 = 702.089$ and p-value < 0.001, RMSEA estimate $= 0.039$, RMSEA probability $= 1.000$, CFI $= 0.889$, and TLI $= 0.863$. Figure S1 presents the CFA diagram with the factor loadings of the four dimensions and their items.

Number of Drugs Used During Lifetime

For substance use and binge drinking assessment, a World Health Organization questionnaire was adapted for national use by the Brazilian Center for Information about Psychotropic Drugs (CEBRID) [32]. The variables of types of lifetime use of drugs (dichotomous variables) were named as follows: "none" category includes all those who have not yet experienced any type of drug; "one" contains those who have experienced only one type of drug; and "polydrug" category contains all those who have tried two or more drugs. The lifetime prevalence of drug use for each of these categories is shown in Table S1 (Supplementary Material). The binge drinking (the consumption of five or more doses of alcohol on one occasion) variable was analyzed as another drug.

School Violence: Olweus Bully/Victim Questionnaire

To assess school violence (verbal and physical, suffered, and perpetrated), questions from the Revised Olweus Bully/Victim Questionnaire [33, 34], inquired about the past 30 days. This scale has seven items corresponding to three domains: verbal violence, physical violence, and relational violence [35]. In this study, four items corresponding to verbal and physical violence were used. For the variable "suffered verbal violence" the item used was: "I was called mean names; I was made fun of or teased in a hurtful way"; for "suffered physical violence" we used the variable: "I was hit, kicked, pushed, shoved around, or locked indoors"; for "perpetrated verbal violence" we used the variable: "I called another student(s) mean names, made fun of or teased him/her in a hurtful way"; and for "perpetrated physical violence" we used the variable: "I hit, kicked, pushed, shoved him/her around or locked him/her indoors." All these four variables were used dichotomously: for a negative response: the answer was "never"; and for an affirmative response, the following answers were put together: "only once or twice," "2 or 3 times a month," "about once a week" and "several times a week."

Sociodemographic characteristics

Sex and age data were obtained through a questionnaire from the National Survey of Student Health (PENSE) used by the Brazilian Ministry of Health [36]. The students' socioeconomic status was assessed using the Brazilian Association of Research Companies (ABEP) scale, which varies from 1 to 100 points and takes into account the head of household's education level and the goods/services used, with scores ranging from A (highest) to D/E (lowest) [37].

Statistical Analysis

First, the psychiatric symptomatology, sociodemographic, and behavioral characteristics were described using weighted proportions or means. This descriptive analysis was performed as weighted proportions based on random levels of sampling and the records of the expected population in each school and in the city, taken from official data from the Anisio Texeira National Institute of Educational Studies and Research (INEP). This was followed by an exploratory analysis comparing proportions and means between the SDQ total or SDQ difficulties' scores and our independent variables using chi-square and one-way ANOVA tests. Finally, separate weighted multinomial logistic regression models (for complex samples) were run in each scale sample (SDQ total or SDQ difficulties) to estimate the association between SDQ total/difficulties, sociodemographic variables (sex, age, socioeconomic status score), and behavioral variables (types of drugs used during lifetime and verbal and physical violence suffered and perpetrated). "Non-case" was the reference category in all models.

Considering the complex sample procedures, all analyses were performed with Stata 16.0, to address the variance in the models and the 95% confidence intervals. Results are presented as weighted proportions (wgt%), weighted crude and adjusted relative risk ratios (cRRR/aRRR), weighted 95% confidence intervals, and p-values. The level of significance was set at 5%.

Results

Descriptive Analysis

Table 1 shows the sociodemographic and behavioral characteristics and psychiatric symptomatology of the 7th grade students who participated in the study (N = 2315). Boys represented half of the sample, mean age 12.28 years old (SD ± 0.02), and most of them belonged to the middle class. In the SDQ total score, 57.72% of students were "non-cases," 20.64% were "subclinical cases" and 21.64% were "cases." In the SDQ difficulties' score, the highest "case" prevalence was for the emotional symptoms (21.34%), and the highest "subclinical case" prevalence was for peer relationship problems (25.61%). The most frequent drugs were alcohol (37.55%) and inhalants (10.48%), and 8.46% reported that they had already practiced binge drinking. More than half of them had never tried any drug (57.24%), 28.45% had tried one type of drug, and 14.31% had tried two to six different drugs. Regarding school violence, 54.07% of the adolescents had suffered verbal violence, 12.56% had suffered physical violence, 33.39% had perpetrated verbal violence, and 9.62% had perpetrated physical violence.

Table 1 Sociodemographic characteristics, behavioral characteristics and psychiatric symptomatology of 7th grade students of São Paulo City public schools, participating in the baseline data collection of a study evaluating the PROERD school-based program, 2019 (N = 2315)

Variables	n	w% or mean	w95%CI
Sex			
Boys	1192	51.50	[49.73; 53.27]
Girls	1123	48.50	[46.73; 50.27]
Age			
10–11	84	3.68	[3.00; 4.50]
12–13	2053	89.31	[87.65; 90.76]
14–15	154	6.65	[5.55; 7.95]
16–17	8	0.37	[0.23; 0.61]
Average age		12.28 ± 0.02	
Socioeconomic status (SES)			
A (45–100)	131	5.65	[4.81; 6.62]
B (29–44)	775	33.78	[31.84; 35.77]
C (17–28)	1225	53.80	[51.97; 55.62]
D/E (1–16)	154	6.78	[5.79; 7.90]
Average of SES score		27.74 ± 0.24	
Lifetime drug use			
Alcohol	873	37.55	[35.24; 39.93]
Inhalants	240	10.48	[9.30; 11.79]
Binge drinking	196	8.46	[7.40; 9.67]
Tobacco	113	4.98	[4.34; 5.71]
Marijuana	78	3.41	[2.81; 4.13]
Cocaine	9	0.40	[0.26; 0.61]
Number of lifetime used drugs			
No one	1309	57.24	[54.83; 59.62]
One	656	28.45	[26.96; 29.99]
Polydrug (two or more)	329	14.31	[12.84; 15.91]
Suffer violence			
Verbal	1239	54.07	[52.14; 55.97]
Physical	287	12.56	[11.54; 13.65]
Perpetrate violence			
Verbal	769	33.39	[31.28; 35.56]
Physical	221	9.62	[8.59; 10.75]
SDQ scores			
Total			
Non case	1232	57.72	[55.23; 60.18]
Subclinical	443	20.64	[19.06; 22.31]
Case	465	21.64	[19.78; 23.61]
Emotional symptoms			
Non case	1441	66.91	[65.20; 68.58]
Subclinical	254	11.74	[10.87; 12.68]
Case	461	21.34	[19.88; 22.88]
Conduct problems			
Non case	1428	66.10	[63.93; 68.20]
Subclinical	307	14.31	[13.26; 15.43]
Case	426	19.59	[17.93; 21.36]

Table 1 (continued)

Variables	n	w% or mean	w95%CI
Inattention-hyperactivity symptoms			
Non case	1543	72.25	[70.63; 73.81]
Subclinical	253	11.77	[10.90; 12.69]
Case	344	15.98	[14.75; 17.30]
Peer relationship problems			
Non case	1334	62.13	[60.05; 64.17]
Subclinical	552	25.61	[24.14; 27.14]
Case	263	12.26	[11.10; 13.52]

Exploratory Analysis

Table 2 presents the proportional distribution of psychiatric symptomatology (SDQ total score and SDQ difficulties score) according to sociodemographic variables, and the chi-square test and one-way ANOVA test results. Total score, emotional symptoms, and inattention-hyperactivity symptoms were significantly associated with female sex. Total score, conduct problems, and peer problems were significantly associated with age.

Table 3 shows the distribution of psychiatric symptomatology (SDQ total score and SDQ difficulties score) according to behavioral variables and the chi-square test results. The total score and all SDQ subscales were significantly associated with polydrug use and all forms of violence. The highest proportion of polydrug use was reported among cases with conduct problems and the highest proportion of victimization by physical violence among cases with peer problems.

Multinomial Logistic Regression Analysis

Table 4 shows the weighted crude relative risk ratio and Table 5, the weighted adjusted relative risk ratio from multinomial logistic regressions, which evaluated the association between psychiatric symptomatology (SDQ total score and SDQ difficulties score) and sociodemographic and behavioral variables.

Regarding the SDQ total score, compared with boys, girls had 27% more chance of being "subclinical" and 97% of being "cases." For each one-year increase in age, students were 19% more likely to be "subclinical" and 32% to be "cases." Compared with adolescents who had never used drugs, one-drug users and polydrug users were more likely to be "subclinical" and "cases." However,

Table 2 Distribution of psychiatric symptomatology according to sociodemographic variables in 7th grade students of São Paulo City public schools, participating in the baseline data collection of a study evaluating the PROERD school-based program, 2019 ($N = 2315$)

SDQ scores	Girls w%[w95%CI]	Age Mean $\pm$ SD	SES Score Mean $\pm$ SD
Total (n = 2140)	$p < 0.001$*	$p < 0.001$**	$p = 0.548$**
Non case	43.85 [41.61; 46.13]	12.21 $\pm$ 0.65	27.72 $\pm$ 9.27
Subclinical	49.06 [46.24; 51.88]	12.32 $\pm$ 0.78	27.70 $\pm$ 8.86
Case	60.17 [56.55; 63.69]	12.37 $\pm$ 0.82	28.27 $\pm$ 10.99
Emotional symptoms (n = 2156)	$p < 0.001$*	$p = 0.409$**	$p = 0.991$**
Non case	41.86 [39.53; 44.23]	12.26 $\pm$ 0.72	27.83 $\pm$ 9.57
Subclinical	57.05 [52.41; 61.56]	12.31 $\pm$ 0.71	27.75 $\pm$ 8.84
Case	64.97 [61.79; 68.03]	12.29 $\pm$ 0.72	27.85 $\pm$ 10.09
Conduct problems (n = 2161)	$p = 0.824$*	$p < 0.001$**	$p = 0.302$**
Non case	48.29 [46.21; 50.37]	12.20 $\pm$ 0.62	27.60 $\pm$ 9.24
Subclinical	48.92 [44.81; 53.05]	12.32 $\pm$ 0.78	28.17 $\pm$ 9.50
Case	48.46 [45.58; 53.34]	12.47 $\pm$ 0.91	28.34 $\pm$ 10.73
Inattention-hyperactivity symptoms (n = 2140)	$p < 0.001$*	$p = 0.296$**	$p = 0.966$**
Non case	46.22 [43.96; 48.49]	12.25 $\pm$ 0.71	27.87 $\pm$ 9.58
Subclinical	49.41 [44.89; 53.94]	12.33 $\pm$ 0.75	27.70 $\pm$ 9.71
Case	57.90 [54.20; 61.51]	12.28 $\pm$ 0.73	27.82 $\pm$ 9.56
Peer problems (n = 2149)	$p = 0.121$*	$p < 0.001$**	$p = 0.623$**
Non case	50.01 [47.80; 52.21]	12.20 $\pm$ 0.64	27.86 $\pm$ 9.20
Subclinical	46.24 [43.19; 49.32]	12.35 $\pm$ 0.81	27.56 $\pm$ 9.81
Case	46.37 [40.63; 52.20]	12.45 $\pm$ 0.85	28.24 $\pm$ 11.01

*Pearson X^2 test.

**One-way ANOVA test.

Table 3 Distributions of psychiatric symptomatology according to behavioral variables in 7th grade students of São Paulo City public schools, participating in the baseline data collection of a study evaluating the PROERD school-based program, 2019 ($N=2315$)

SDQ scores	Number of lifetime used drugs			Suffer violence		Perpetrate violence	
	No one	One	Polydrug	Verbal	Physical	Verbal	Physical
	w% [w95%CI]	w% [w95%CI]	w% [w95%CI]	w% [w95%CI]	w% [w95%CI]	w% [w95%CI]	w% [w95%CI]
Total (n=2140)	$p<0.001$*			$p<0.001$*	$p<0.001$*	$p<0.001$*	$p<0.001$*
Non case	66.93 [64.21; 69.55]	24.56 [22.29; 26.99]	8.50 [7.15; 10.08]	44.99 [42.35; 47.65]	7.80 [6.93; 8.78]	24.53 [22.54; 26.63]	5.62 [4.73; 6.66]
Subclinical	48.70 [45.29; 52.13]	32.56 [29.59; 35.67]	18.74 [15.77; 22.12]	62.45 [59.26; 65.53]	16.36 [13.50; 19.68]	44.93 [41.29; 48.62]	15.63 [12.47; 18.79]
Case	41.05 [37.71; 44.46]	32.60 [29.94; 35.39]	26.35 [23.59; 29.31]	72.34 [68.88; 75.56]	20.23 [18.31; 22.29]	44.16 [41.17; 47.20]	14.97 [12.18; 18.26]
Emotional symptoms (n=2156)	$p<0.001$*			$p<0.001$*	$p<0.001$*	$p<0.001$*	$p=0.016$*
Non case	61.20 [58.37; 63.96]	26.41 [24.55; 28.36]	12.38 [10.71; 14.27]	48.67 [46.21; 51.13]	9.77 [8.63; 11.04]	30.00 [28.15; 31.92]	8.95 [7.83; 10.20]
Subclinical	56.61 [51.62; 61.47]	28.94 [25.50; 32.63]	14.46 [11.30; 18.31]	64.52 [60.35; 68.48]	15.78 [12.51; 19.72]	40.72 [36.81; 44.75]	9.87 [7.59; 12.75]
Case	46.24 [42.82; 49.70]	32.25 [29.52; 35.12]	21.50 [18.72; 24.58]	66.84 [64.27; 69.31]	18.52 [16.50; 20.72]	37.82 [34.17; 41.62]	12.07 [9.96; 14.56]
Conduct problems (n=2161)	$p<0.001$*			$p<0.001$*	$p<0.001$*	$p<0.001$*	$p<0.001$*
Non case	65.60 [63.08; 68.02]	25.42 [23.47; 27.47]	8.98 [7.64; 10.53]	48.93 [46.56; 51.30]	9.31 [8.52; 10.17]	24.70 [22.57; 26.97]	5.67 [4.75; 6.77]
Subclinical	45.44 [41.93; 49.54]	36.09 [33.11; 39.18]	18.47 [15.58; 21.76]	65.52 [62.14; 68.76]	18.56 [15.85; 21.62]	42.04 [38.14; 46.05]	11.90 [9.71; 14.50]
Case	38.79 [34.66; 43.09]	30.70 [26.61; 35.11]	30.51 [27.06; 34.19]	64.86 [61.15;68.40]	17.88 [15.48; 20.56]	54.11 [50.26; 57.91]	21.90 [18.64; 25.54]
Inattention-hyperactivity symptoms (n=2140)	$p<0.001$*			$p<0.001$*	$p<0.001$*	$p<0.001$*	$p<0.001$*
Non case	63.01 [60.36; 65.59]	25.83 [24.19; 27.54]	11.16 [9.76; 12.73]	50.64 [48.33; 52.94]	11.66 [10.49; 12.95]	27.57 [25.65; 29.58]	7.46 [6.50; 8.54]
Subclinical	47.46 [43.36; 51.60]	34.03 [30.45; 37.80]	18.51 [15.07; 22.53]	60.43 [54.97; 65.64]	10.04 [7.69; 13.01]	40.34 [35.37; 45.53]	13.39 [10.45; 17.00]
Case	40.41 [36.57; 44.36]	33.08 [29.38; 37.00]	26.51 [22.91; 30.45]	67.66 [63.24; 71.78]	16.58 [14.39; 19.03]	52.06 [48.08; 56.01]	16.83 [14.54; 19.40]
Peer problems (n=2149)	$p<0.001$*			$p<0.001$*	$p<0.001$*	$p=0.010$*	$p<0.001$*
Non case	60.62 [58.26; 62.92]	27.31 [25.42; 29.28]	12.08 [10.48; 13.87]	47.61 [45.32; 49.92]	8.34 [7.34; 9.46]	31.30 [28.98; 33.71]	8.13 [7.01; 9.42]
Subclinical	52.46 [48.88; 56.02]	29.32 [27.21; 31.53]	18.22 [15.47; 21.32]	62.18 [59.68; 64.61]	13.05 [11.56; 14.70]	35.74 [32.93; 38.64]	12.44 [10.22; 15.07]
Case	52.32 [47.51; 57.09]	28.48 [24.67; 32.61]	19.20 [15.62; 23.38]	72.61 [69.17; 75.80]	30.38 [26.69; 34.34]	35.91 [32.01; 39.99]	11.98 [9.31; 15.30]

*Pearson X^2 test.

polydrug users were most likely to appear in both groups. Those who suffered verbal or physical violence were more likely to be "subclinical," but their chances of being "cases" were even higher; and those who perpetrated verbal or physical violence had higher chances of being "subclinical."

In relation to emotional problems, girls were 91% more likely to be classified as "subclinical" and 151% to be "cases" For each one-year increase in age, students were

Table 4 Weighted crude relative risk ratios from multinomial logistic regressions evaluating the association between psychiatric symptomatology (SDQ total score and SDQ difficulties sub-scales score) and sociodemographic and behavioral variables in 7th grade students of São Paulo City public schools, participating in the baseline data collection of a study evaluating the PRO-ERD school-based program, 2019 (N=2315)

SDQ scores	Total (n=2140) Non case versus subclinical	Total (n=2140) Non case versus case	Emotional symptoms (n=2156) Non case versus subclinical	Emotional symptoms (n=2156) Non case versus case	Conduct problems (n=2161) Non case versus subclinical	Conduct problems (n=2161) Non case versus case	Inattention-hyperactivity symptoms (n=2140) Non case versus subclinical	Inattention-hyperactivity symptoms (n=2140) Non case versus case	Peer problems (n=2149) Non case versus subclinical	Peer problems (n=2149) Non case versus case
	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value	cRRR [w95%CI] / p-value
Sex										
Boys	1	1	1	1	1	1	1	1	1	1
Girls	1.23 [1.09; 1.40] p=0.002	1.93 [1.64;2.28] p<0.001	1.84 [1.50; 2.27] p<0.001	2.58 [2.20; 3.01] p<0.001	1.02 [0.86; 1.22] p=0.767	1.04 [0.89; 1.24] p=0.566	1.14 [0.91; 1.42] p=0.251	1.60 [1.37; 1.87] p<0.001	0.86 [0.74; 1.00] p=0.056	0.86 [0.68; 1.09] p=0.216
Age	1.25 [1.15; 1.36] p<0.001	1.34 [1.18;1.53] p<0.001	1.09 [0.95;1.25] p=0.187	1.05 [0.94; 1.18] p=0.333	1.28 [1.14; 1.45] p<0.001	1.58 [1.38; 1.82] p<0.001	1.13 [1.01; 1.26] p=0.036	1.03 [0.92; 1.17] p=0.527	1.37 [1.27; 1.48] p<0.001	1.53 [1.37; 1.72] p<0.001
Socioeconomic status	1.00 [0.99; 1.01] p=0.887	1.01 [0.99;1.02] p=0.331	1.00 [0.99;1.01] p=0.895	1.00 [0.99;1.01] p=0.900	1.01 [1.00; 1.02] p<0.001	1.01 [1.00; 1.02] p=0.069	1.00 [0.99; 1.01] p=0.991	1.00 [0.99; 1.01] p=0.870	1.00 [0.99; 1.01] p=0.462	1.00 [0.99; 1.02] p=0.444
Number of lifetime used drugs										
No one	1	1	1	1	1	1	1	1	1	1
One	1.82 [1.49; 2.23] p<0.001	2.16 [1.79; 2.62] p<0.001	1.18 [0.95; 1.48] p=0.133	1.61 [1.63; 1.92] p<0.001	2.05 [1.68; 2.50] p<0.001	2.04 [1.58; 2.64] p<0.001	1.75 [1.42; 2.15] p<0.001	2.00 [1.65; 2.42] p<0.001	1.24 [1.09; 1.41] p=0.002	1.21 [0.97;1.51] p=0.095
Polydrug	3.03 [2.34; 3.92] p<0.001	5.05 [3.87; 6.61] p<0.001	1.26 [0.88;1.81] p=0.196	2.30 [1.87; 2.82] p<0.001	2.97 [2.35; 3.75] p<0.001	5.74 [4.41; 7.48] p<0.001	2.20 [1.68; 2.88] p<0.001	3.70 [2.95; 4.66] p<0.001	1.74 [1.36;2.23] p<0.001	1.84 [1.38;2.47] p=0.095
Suffer violence										
Verbal	2.03 [1.74; 2.37] p<0.001	3.20 [2.63; 3.90] p<0.001	1.92 [1.63; 2.26] p<0.001	2.13 [1.83; 2.48] p<0.001	1.98 [1.65; 2.39] p<0.001	1.93 [1.62; 2.29] p<0.001	1.49 [1.20; 1.85] p=0.001	2.04 [1.63; 2.55] p<0.001	1.81 [1.63; 2.00] p<0.001	2.92 [2.41; 3.53] p<0.001
Physical	2.31 [1.82; 2.94] p<0.001	3.00 [2.53; 3.55] p<0.001	1.73 [1.25; 2.39] p=0.002	2.10 [1.73; 2.55] p<0.001	2.22 [1.80; 2.74] p<0.001	2.12 [1.76; 2.55] p<0.001	0.85 [0.61; 1.17] p=0.301	1.51 [1.21; 1.87] p=0.001	1.65 [1.37; 1.98] p<0.001	4.80 [3.86; 5.97] p<0.001

Table 4 (continued)

SDQ scores	Total (n=2140)		Emotional symptoms (n=2156)		Conduct problems (n=2161)		Inattention-hyperactivity symptoms (n=2140)		Peer problems (n=2149)	
	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case
	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]	cRRR [w95%CI]
	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value
Perpetrate violence										
Verbal	2.51 [2.15; 2.93]	2.43 [2.10; 2.82]	1.60 [1.36; 1.89]	1.42 [1.22; 1.65]	2.21 [1.80; 2.72]	3.59 [3.03; 4.27]	1.78 [1.42; 2.23]	2.85 [2.43; 3.35]	1.22 [1.05; 1.41]	1.23 [1.04; 1.46]
	$p<0.001$	$p<0.001$	$p<0.001$	$p<0.001$	$p<0.001$	$p<0.001$	$p<0.001$	$p<0.001$	$p=0.010$	$p=0.019$
Physical	3.04 [2.26; 4.11]	2.96 [2.20; 3.98]	1.11 [0.81; 1.53]	1.40 [1.11; 1.75]	2.24 [1.70; 2.96]	4.66 [3.55; 6.11]	1.92 [1.50; 2.46]	2.51 [2.02; 3.12]	1.61 [1.22; 2.11]	1.54 [1.10; 2.15]
	$p<0.001$	$p<0.001$	$p=0.487$	$p=0.006$	$p<0.001$	$p<0.001$	$p<0.001$	$p<0.001$	$p<0.001$	$p=0.013$

18% more likely to be "subclinical." One-drug users were 46% more likely to be classified as "cases," while 81% were more likely to be polydrug users. Adolescents who perpetrated verbal violence had a 43% higher chance of being "subclinical"; however, those who suffered violence—both verbal and physical—had more chances of being "subclinical" and even more chances of being "cases."

Regarding conduct problems, for each one-year increase in age, students were 22% more likely to be "subclinical" and 43% to be "cases." One-drug users were more likely to be "subclinical" and "cases," but polydrug users were even more likely to be in both groups. Those who suffered violence—both verbal and physical—had more chances to be "subclinical" than "cases"; however, those who perpetrated violence were more likely to be "cases" than "subclinical."

Concerning inattention-hyperactivity symptoms, girls had 50% more chance of presenting such. One-drug users were more likely to be "subclinical" and "cases"; polydrug users were even more likely to be classified as both. Those who suffered verbal violence had more chances of being classified as "subclinical" and "cases," while those who suffered physical violence were 33% less likely to be "subclinical." Regarding those who perpetrated verbal violence, they were more likely to be "cases," while those who perpetrated physical violence were more likely to be "subclinical".

Regarding peer problems, girls were 19% less likely to be "subclinical" For each one-year increase in age, students were 34% more likely to be "subclinical" and 57% more likely to be "cases" One-drug users were more likely to be "subclinical," and polydrug users were more likely to be "subclinical" and "cases". Students who suffered violence had more chance to be "subclinical" and even more to be "cases," especially those who suffered physical violence. Those who perpetrated verbal violence were 26% less likely to be a "case."

Discussion

This study identified how psychiatric symptoms in adolescents are associated with sociodemographic factors and risk behaviors, such as polydrug use and violence experienced and perpetrated at school. A direct association was identified between the number of drugs tried during their lifetime and reported psychiatric symptoms. Furthermore, those who suffered violence (both verbal and physical) were more likely to present with psychiatric symptoms, especially those who suffered physical violence. In addition, adolescents who perpetrated violence (both verbal and physical) were more likely to have psychiatric symptoms, especially those who perpetrated physical violence. Two exceptions to these general patterns were identified: those who suffered physical violence had less chance of being "subclinical" for

Table 5 Weighted adjusted relative risk ratios from multinomial logistic regressions evaluating the association between psychiatric symptomatology (SDQ total score and SDQ difficulties subscales score) and sociodemographic and behavioral variables in 7th grade students of São Paulo City public schools, participating in the baseline data collection of a study evaluating the PRO-ERD school-based program, 2019 (N=2315)

SDQ scores	Total (n=2140)		Emotional symptoms (n=2156)		Conduct problems (n=2161)		Inattention-hyperactivity symptoms (n=2140)		Peer problems (n=2149)	
	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case
	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]
	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value
Sex										
Boys	1	1	1	1	1	1	1	1	1	1
Girls	1.27 [1.11; 1.46] $p=0.001$	1.97 [1.64; 2.37] $p<0.001$	1.91 [1.56; 2.34] $p<0.001$	2.51 [2.15; 2.93] $p<0.001$	0.98 [0.82; 1.17] $p=0.810$	1.09 [0.91; 1.31] $p=0.330$	1.08 [0.86; 1.36] $p=0.502$	1.50 [1.27; 1.77] $p<0.001$	0.81 [0.68; 0.96] $p=0.017$	0.83 [0.66; 1.04] $p=0.103$
Age	1.19 [1.08; 1.31] $p=0.001$	1.32 [1.16; 1.50] $p<0.001$	1.18 [1.03; 1.34] $p=0.016$	1.09 [0.99; 1.21] $p=0.078$	1.22 [1.07; 1.39] $p=0.004$	1.43 [1.23; 1.65] $p<0.001$	1.06 [0.94; 1.21] $p=0.326$	0.95 [0.84; 1.06] $p=0.348$	1.34 [1.24; 1.44] $p<0.001$	1.57 [1.36; 1.81] $p<0.001$
Socioeconomic status	1.00 [0.99; 1.01] $p=0.646$	1.01 [0.99; 1.02] $p=0.333$	1.00 [0.99; 1.01] $p=0.565$	1.00 [0.99; 1.01] $p=0.589$	1.00 [0.99; 1.01] $p=0.438$	1.00 [0.99; 1.01] $p=0.575$	1.00 [0.99; 1.01] $p=0.647$	1.00 [0.99; 1.00] $p=0.322$	1.00 [0.99; 1.01] $p=0.448$	1.01 [0.99; 1.02] $p=0.320$
Number of lifetime used drugs										
No one	1	1	1	1	1	1	1	1	1	1
One	1.60 [1.30; 1.97] $p<0.001$	1.92 [1.56; 2.35] $p<0.001$	1.02 [0.82; 1.27] $p=0.849$	1.46 [1.20; 1.78] $p<0.001$	1.89 [1.52; 2.35] $p<0.001$	1.71 [1.30; 2.24] $p<0.001$	1.59 [1.28; 1.97] $p<0.001$	1.70 [1.39; 2.09] $p<0.001$	1.21 [1.06; 1.38] $p=0.007$	1.21 [0.95; 1.53] $p=0.116$
Polydrug	2.04 [1.52; 2.73] $p<0.001$	3.31 [2.49; 4.39] $p<0.001$	0.92 [0.63; 1.33] $p=0.643$	1.81 [1.46; 2.25] $p<0.001$	2.23 [1.69; 2.95] $p<0.001$	3.34 [2.54; 4.39] $p<0.001$	1.77 [1.31; 2.38] $p=0.001$	2.60 [2.02; 3.35] $p<0.001$	1.49 [1.13; 1.96] $p=0.007$	1.44 [1.02; 2.04] $p=0.040$
Suffer violence										
Verbal	1.57 [1.35; 1.82] $p<0.001$	2.52 [2.03; 3.11] $p<0.001$	1.59 [1.33; 1.90] $p<0.001$	1.73 [1.47; 2.04] $p<0.001$	1.64 [1.34; 2.00] $p<0.001$	1.44 [1.17; 1.76] $p<0.001$	1.36 [1.11; 1.67] $p=0.005$	1.49 [1.19; 1.87] $p=0.001$	1.86 [1.66; 2.09] $p<0.001$	2.70 [2.25; 3.23] $p<0.001$
hysical	1.72 [1.31; 2.26] $p<0.001$	2.09 [1.70; 2.56] $p<0.001$	1.51 [1.07; 2.13] $p=0.020$	1.82 [1.44; 2.30] $p<0.001$	1.69 [1.31; 2.18] $p<0.001$	1.44 [1.17; 1.78] $p=0.001$	0.67 [0.48; 0.92] $p=0.015$	1.09 [0.84; 1.41] $p=0.518$	1.29 [1.05; 1.57] $p=0.016$	3.53 [2.77; 4.50] $p<0.001$

Table 5 (continued)

SDQ scores	Total (n=2140)		Emotional symptoms (n=2156)		Conduct problems (n=2161)		Inattention-hyperactivity symptoms (n=2140)		Peer problems (n=2149)	
	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case	Non case versus subclinical	Non case versus case
	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]	aRRR [w95%CI]
	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value
Perpetrate violence										
Verbal	1.70 [1.44; 2.01]	1.39 [1.19; 1.63]	1.43 [1.19; 1.72]	1.06 [0.88; 1.26]	1.54 [1.22; 1.94]	2.17 [1.80; 2.61]	1.39 [1.13; 1.71]	2.05 [1.70; 2.47]	0.86 [0.73; 1.01]	0.74 [0.63; 0.87]
	$p<0.001$	$p<0.001$	$p<0.001$	$p=0.537$	$p=0.001$	$p<0.001$	$p=0.003$	$p<0.001$	$p=0.062$	$p=0.001$
Physical	1.95 [1.37; 2.76]	1.76 [1.21; 2.56]	0.87 [0.61; 1.26]	1.06 [0.81; 1.39]	1.42 [1.03; 1.98]	2.45 [1.79; 3.35]	1.51 [1.17; 1.95]	1.47 [1.14; 1.91]	1.34 [0.97; 1.84]	1.03 [0.71; 1.49]
	$p=0.001$	$p=0.004$	$p=0.451$	$p=0.675$	$p=0.035$	$p<0.001$	$p=0.002$	$p=0.005$	$p=0.074$	$p=0.871$

hyperactivity symptoms and those who perpetrated verbal violence reported fewer peer problems.

Further, our study found that in most SDQ scales, girls were more likely to have psychiatric symptoms. This finding agrees with recent studies, in which higher frequencies of depression, anxiety disorders, and adjustment disorders were observed among adolescent girls [38–40]. According to the literature, low satisfaction with appearance has been one of the most important explanations for sex differences in adolescents' mental health disorders [41, 42]. Girls on the other hand, are less likely to have peer problems than boys. According to Priess-Groben and Lindberg [43], young people develop different perceptions about their skills as a function of their exposure to social norms; specifically, girls value interpersonal relationships more than boys and are more self-conscious and complacent regarding their actions at school because of their socialization with their family and colleagues. It can also be seen that interactions between family and peers can teach girls more than boys the importance of establishing relationships and maintaining a positive reputation among their peers [44].

Regarding the association between psychiatric symptomatology and polydrug use, our findings indicated that adolescents who practiced polydrug use had twice as many chances to be "subclinical" and almost three times more chances to be "cases" in respect of the SDQ total score. In addition, an association was found between polydrug use and all the subscales of the SDQ. According to Poudel and Gautam [45], individuals who reported starting substance use before the age of 18 had more mental health problems. These included substance abuse, problematic behavior patterns, psychiatric disorders, problematic relationships with peers, and poor school performance. A meta-analysis by Esmaeelzadeh et al. [46] showed an association between depression and anxiety and the use of alcohol, marijuana, and tobacco. Fahimi et al. [47] found that adolescents with different psychiatric disorders were more likely to go to emergency rooms due to substance abuse. However, in another systematic review by Hussong et al. [48], there were no conclusive results for the association between internalizing mental symptoms (a broader construct that includes anxiety and depression) and substance use.

In our study, unlike previous studies, the emphasis was on polydrug use, which has been discussed as being responsible for most addiction problems worldwide, and is further associated with a greater probability of dependence, worse physical health, and other mental and social health problems [49, 50].

Regarding the violence variables, it was identified that the greater the verbal and physical violence suffered, the greater the chance of having psychiatric symptoms, especially amongst those adolescents who suffered physical violence. These results are in agreement with previous studies

that highlighted the association between school violence and poor mental health in adolescents [51–54], since victims of bullying are more likely to have depression symptoms, anxiety, stress, behavioral problems, and a reduction of prosocial behavior [55–57]. On the other hand, in the SDQ hyperactivity model, those who suffered physical violence were less likely to be "subclinical." An explanation for this could be found in previous studies that have suggested that children with attention deficit hyperactivity disorder (ADHD) are not only the main perpetrators, but are also the main victims of bullying [58–60], due to their impulsivity and difficulties with emotion regulation, learning, and social interactions [61]. In a recent study by Huh et al. [58], ADHD patients were usually more bullied than other students.

Finally, it was found that violence victimization and perpetration further increased the likelihood of presenting with psychiatric symptoms. According to the literature, victims have a greater chance of having mental disorders [16], such as depression and anxiety [62, 63], social phobia [64], and eating disorders [65]. In addition, victimization is an important risk factor for self-injury [66], suicidal ideation, and suicide attempts [62]. These results are in accordance with Oliveira et al. [67], who found in their study that school violence aggressors reported psychological distress expressed in feelings of loneliness and insomnia. Other studies have pointed out that aggressors have ADHD, opposition/conduct disorder [68], depression [69, 70], and signs of nervousness or tension [71]. Suffering physical violence within the family can explain the behavior of aggressors [67, 72, 73]. However, in the SDQ Peers problems subscale, it was observed that those who perpetrated verbal violence were less likely to be "cases." This finding agrees with other studies, which have reported that perpetrators of school violence found making friends easier, when compared with other children [74], and they also have greater self-esteem and popularity than the victims [75, 76].

In addition, school violence (suffering and perpetrating) is associated with increased risk behaviors, such as licit and illicit drug use [16, 18, 19]. According to Chau et al. [77], an explanation for this phenomenon is the intersectionality of school difficulties, violence, and mental health (SVMDs), which are common in early adolescence. As these difficulties are strongly interdependent, many adolescents may suffer simultaneously from several of them, so substance use is not a random event, but an association with the exposure of several SVMDs. Since SVMDs are usually not resolved [77, 78], affected adolescents may increase their substance use over time.

This study has several limitations. One of them is that this is a cross-sectional survey, so it is not possible to infer causality between psychiatric symptomatology and the explanatory variables that were included. The sample is composed of students from public state schools in the city of São Paulo, and the results cannot be generalized to rural or private schools. Furthermore, our results could vary according to the cutoff points of each SDQ scale. It is important to recognize that the partial use of a scale that measures bullying may limit the comparability of our findings; however, this analytical decision was taken, considering that the items corresponding to the domain of "relational violence" were beyond the scope of our study. Subsequent studies could use other instruments focused exclusively on measuring physical and verbal violence.

Our findings are relevant for social and health contexts in countries with high levels of social inequality, such as Brazil, as it helps to understand the lack of mental health services for this population. According to a multicenter cross-sectional study conducted by Paula et al. [79], only a small proportion of children and adolescents with psychiatric disorders have seen a mental health specialist in the last 12 months, which indicates the urgent need to implement programs that reduce this great unmet need for mental health treatment. Fatori et al. [80] emphasized the economic burden of mental disorders in children in Brazil, proposing to inform policy makers about the magnitude of the problem, to create an effective care system with low-cost treatment and prevention programs.

It is suggested that the psychological interventions provided in basic education should adapt their actions to simultaneously deal with drug use, school violence, and psychiatric symptoms. The main focus should consider the greater vulnerability of girls, older students, and those who suffer and perpetrate school violence (mainly physical violence).

Regarding future lines of research and other detection instruments, the use of the Revised Child Anxiety and Depression Scale (RCADS) has attracted significant research and clinical attention recently, as it is suitable for cross-cultural comparisons. The RCADS simultaneously captured several symptoms of anxiety and depression, considering the significant comorbidity between the two types of psychopathology, including separation anxiety disorder, social phobia, generalized anxiety disorder, panic disorder, obsessive-compulsive disorder, and major depressive disorder [81]. Future longitudinal studies could evaluate the role of drug use and school violence as mediators/moderators of self-reported psychiatric symptomatology in adolescent students.

Summary

This study investigated the association between psychiatric symptoms and polydrug use, school violence, and sociodemographic factors among Brazilian early adolescents. The baseline data were analyzed from a randomized controlled trial to evaluate the effectiveness of PROERD, a school-based drug use prevention program, implemented

in 30 public middle schools in São Paulo, Brazil (n = 2316, M age = 12.3 years, 48.5% girls). Multinomial logistic regressions were performed using Strengths and Difficulties (SDQ) subscales (total, emotional, conduct problems, inattention-hyperactivity, and peer problems) as response variables, and polydrug use, school violence, and sociodemographic characteristics as explanatory variables. The results showed that more than half of the adolescents had never tried any drug (57.24%), 28.45% had tried one drug, and 14.31% had tried two to six drugs. 54.07 and 12.56% had suffered verbal and physical violence, respectively; 33.39 and 9.62% had perpetrated verbal and physical violence, respectively. In most SDQ subscales, girls and older students were more likely to have psychiatric symptoms. A positive association was identified between polydrug use and psychiatric symptoms. It was found that those who suffered violence (both verbal and physical) had a greater likelihood of presenting psychiatric symptoms, and were more likely to have suffered physical violence. Adolescents who perpetrated violence (both verbal and physical) had a greater chance of having psychiatric symptoms, which were generally higher among those who perpetrated physical violence. These findings provide a scientific basis for improving health interventions in schools to prevent mental disorders, school violence, and drug use by targeting early adolescence. In their design and implementation, these interventions should consider the greater vulnerability related to the mental health of girls, older students, and those who suffer and perpetrate physical school violence.

Data Availability The data supporting the findings of this study are not public, but can be made available upon request to the corresponding author.

Declarations

Conflict of interest The authors are aware of the Journal's conflict of interest policy and have no related activities to disclose.

Research Involving Human Participants All procedures were in accordance with the ethical standards of the institutional committee and with the 1964 Helsinki Declaration and follow-up statements.

Ethical Approval The study protocol was approved by the Universidade Federal de São Paulo's Research Ethics Committee (1327/2018).

References

1. Patel V, Flisher AJ, Nikapota A, Malhotra S (2008) Promoting child and adolescent mental health in low and middle income countries. J Child Psychol Psychiatry 49:313–334. https://doi.org/10.1111/j.1469-7610.2007.01824.x
2. Dick B, Ferguson BJ (2015) Health for the World's adolescents: a second chance in the second decade. J Adolesc Heal 56:3–6. https://doi.org/10.1016/j.jadohealth.2014.10.260
3. Patel V, Kieling C, Maulik PK, Divan G (2013) Improving access to care for children with mental disorders: a global perspective. Arch Dis Child 98:323–327. https://doi.org/10.1136/archdischild-2012-302079
4. Kieling C, Baker-Henningham H, Belfer M et al (2011) Child and adolescent mental health worldwide: evidence for action. Lancet 378:1515–1525. https://doi.org/10.1016/S0140-6736(11)60827-1
5. Merikangas KR, He JP, Brody D et al (2010) Prevalence and treatment of mental disorders among US Children in the 2001–2004 NHANES. Pediatrics 125:75–81. https://doi.org/10.1542/peds.2008-2598
6. Polanczyk GV, Salum GA, Sugaya LS et al (2015) Annual research review: a meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. J Child Psychol Psychiatry 56:345–365. https://doi.org/10.1111/jcpp.12381
7. Levesque RJR (2011) Obesity and overweight. Encyclopedia of adolescence. Springer, New York, pp 1913–1915
8. Mallol J, Crane J, von Mutius E et al (2013) The International Study of Asthma and Allergies in Childhood (ISAAC) phase three: a global synthesis. Allergol Immunopathol (Madr) 41:73–85. https://doi.org/10.1016/j.aller.2012.03.001
9. Conway KP, Swendsen J, Husky MM et al (2016) Association of lifetime mental disorders and subsequent alcohol and illicit drug use: results from the National Comorbidity Survey–Adolescent Supplement. J Am Acad Child Adolesc Psychiatry 55:280–288. https://doi.org/10.1016/j.jaac.2016.01.006
10. Fidalgo TM, Sanchez ZM, Caetano SC et al (2016) The association of psychiatric symptomatology with patterns of alcohol, tobacco, and marijuana use among Brazilian high school students. Am J Addict 25:416–425. https://doi.org/10.1111/ajad.12407
11. IBGE (2016) Pesquisa nacional de saúde do escolar 2015 (PeNSE). Rio de Janeiro
12. Moss HB, Chen CM, Yi H (2014) Early adolescent patterns of alcohol, cigarettes, and marijuana polysubstance use and young adult substance use outcomes in a nationally representative sample. Drug Alcohol Depend 136:51–62. https://doi.org/10.1016/j.drugalcdep.2013.12.011
13. Quek L-H, Chan GCK, White A et al (2013) Concurrent and Simultaneous polydrug use: latent class analysis of an australian nationally representative sample of young adults. Front Public Heal. https://doi.org/10.3389/fpubh.2013.00061
14. Smith JP, Smith GC (2010) Long-term economic costs of psychological problems during childhood. Soc Sci Med 71:110–115. https://doi.org/10.1016/j.socscimed.2010.02.046
15. Ferrara P, Franceschini G, Villani A, Corsello G (2019) Physical, psychological and social impact of school violence on children. Ital J Pediatr 45:76. https://doi.org/10.1186/s13052-019-0669-z

16. Moore SE, Norman RE, Suetani S et al (2017) Consequences of bullying victimization in childhood and adolescence: a systematic review and meta-analysis. World J Psychiatry 7:60. https://doi.org/10.5498/wjp.v7.i1.60

17. Troop-Gordon W (2017) Peer victimization in adolescence: the nature, progression, and consequences of being bullied within a developmental context. J Adolesc 55:116–128. https://doi.org/10.1016/j.adolescence.2016.12.012

18. Lambe LJ, Craig WM (2017) Bullying involvement and adolescent substance use: a multilevel investigation of individual and neighbourhood risk factors. Drug Alcohol Depend 178:461–468. https://report.org/10.1016/j.drugalcdep.2017.05.037

19. Ttofi MM, Farrington DP, Lösel F et al (2016) School bullying and drug use later in life: a meta-analytic investigation. Sch Psychol Q 31:8–27. https://doi.org/10.1037/spq0000120

20. Beserra MA, Carlos DM, Leitão MNC, Ferriani MGC (2019) Prevalence of school violence and use of alcohol and other drugs in adolescents. Rev Lat Am Enfermagem. https://doi.org/10.1590/1518-8345.2124.3110

21. Fatori D, Salum GA, Rohde LA et al (2019) Use of mental health services by children with mental disorders in two major cities in Brazil. Psychiatr Serv 70:337–341. https://doi.org/10.1176/appi.ps.201800389

22. Kulis S, Marsiglia FF, Elek E et al (2005) Mexican/Mexican American Adolescents and keepin' it REAL: an evidence-based substance use prevention program. Child Sch 27:133–145. https://doi.org/10.1093/cs/27.3.133

23. Donner A, Klar N (2010) Design and analysis of cluster randomization trials in health research. Wiley, New York

24. Kulis S, Nieri T, Yabiku S et al (2007) Promoting reduced and discontinued substance use among adolescent substance users: effectiveness of a Universal Prevention Program. Prev Sci 8:35–49. https://doi.org/10.1007/s11121-006-0052-3

25. Marsiglia FF, Kulis S, Yabiku ST et al (2011) When to intervene: elementary school, middle school or both? Effects of keepin' It REAL on substance use trajectories of Mexican Heritage Youth. Prev Sci 12:48–62. https://doi.org/10.1007/s11121-010-0189-y

26. OECD (2018) PISA. In: e Program. Int. Student Assess. https://www.oecd.org/pisa/publications/PISA2018_CN_BRA.pdf. Accessed 17 Jun 2021

27. Goodman R (1997) The strengths and difficulties questionnaire: a research note. J Child Psychol Psychiatry 38:581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

28. Silva TBF, Osório FL, Loureiro SR (2015) SDQ: discriminative validity and diagnostic potential. Front Psychol 6:1–7. https://doi.org/10.3389/fpsyg.2015.00811

29. Woerner W, Fleitlich-Bilyk B, Martinussen R et al (2004) The strengths and difficulties questionnaire overseas: evaluations and applications of the SDQ beyond Europe. Eur Child Adolesc Psychiatry. https://doi.org/10.1007/s00787-004-2008-0

30. EHCAP (2014) SDQ. In: Scoring Strengths Difficulties Quest. age 4–17. https://www.ehcap.co.uk/content/sites/ehcap/uploads/NewsDocuments/236/SDQEnglishUK4-17scoring-1.PDF. Accessed 17 Jun 2021

31. Little T (2013) Longitudinal structural equation modeling. The Guilford Press, New York

32. Carlini E, Noto A, Sanchez Z et al (2010) VI Levantamento Nacional sobre o Consumo de Drogas Psicotrópicas entre Estudantes do Ensino Fundamental e Médio das Redes Pública e Privada de Ensino nas 27 Capitais Brasileiras 2010. Brasília, DF

33. Olweus D (1996) The Revised Olweus Bully/Victim Questionnaire. Mimeo. Research Center for Health Promotion. HEMIL Center), University of Bergen., Bergen, Norway

34. Solberg ME, Olweus D (2003) Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. Aggress Behav 29:239–268. https://doi.org/10.1002/ab.10047

35. Ferreira-Junior V, Coutinho-Lourenco F, Menezes AAS et al (2022) Psychometric validation of the audio-guided rBVQ instrument for bullying evaluation among students. Psico-USF 27:[In Press]

36. IBGE (2013) Pesquisa Nacional de Saúde do Escolar 2012. FapUNIFESP (SciELO), Rio de Janeiro

37. ABEP (2018) Critério de Classificação Econômica Brasil: Alterações na aplicação do Critério Brasil. http://www.abep.org/criterio-brasil. Accessed 21 Oct 2019

38. Conrad SM, Queenan R, Brown LK, Tolou-Shams M (2017) Psychiatric symptoms, substance use, trauma, and sexual risk: a brief report of gender differences in Marijuana-using juvenile offenders. J Child Adolesc Subst Abuse 26:433–436. https://doi.org/10.1080/1067828X.2017.1322017

39. Stevanovic D, Bagheri Z, Atilola O et al (2017) Cross-cultural measurement invariance of the Revised Child Anxiety and Depression Scale across 11 world-wide societies. Epidemiol Psychiatr Sci 26:430–440. https://doi.org/10.1017/S204579601600038X

40. Vadlin S, Åslund C, Hellström C, Nilsson KW (2016) Associations between problematic gaming and psychiatric symptoms among adolescents in two samples. Addict Behav 61:8–15. https://doi.org/10.1016/j.addbeh.2016.05.001

41. Holsen I, Kraft P, Røysamb E (2001) The relationship between body image and depressed mood in adolescence: a 5-year longitudinal panel study. J Health Psychol 6:613–627. https://doi.org/10.1177/135910530100600601

42. Paxton SJ, Neumark-Sztainer D, Hannan PJ, Eisenberg ME (2006) Body dissatisfaction prospectively predicts depressive mood and low self-esteem in adolescent girls and boys. J Clin Child Adolesc Psychol 35:539–549. https://doi.org/10.1207/s15374424jccp3504_5

43. Priess HA, Lindberg SM, Hyde JS (2009) Adolescent gender-role identity and mental health: gender intensification revisited. Child Dev 80:1531–1544. https://doi.org/10.1111/j.1467-8624.2009.01349.x

44. Tan K, Oe JS, Hoang Le MD (2018) How does gender relate to social skills? Exploring differences in social skills mindsets, academics, and behaviors among high-school freshmen students. Psychol Sch 55:429–442. https://doi.org/10.1002/pits.22118

45. Poudel A, Gautam S (2017) Age of onset of substance use and psychosocial problems among individuals with substance use disorders. BMC Psychiatry 17:10. https://doi.org/10.1186/s12888-016-1191-0

46. Esmaeelzadeh S, Moraros J, Thorpe L, Bird Y (2018) Examining the association and directionality between mental health disorders and substance use among adolescents and young adults in the U.S. and Canada—a systematic review and meta-analysis. J Clin Med 7:543. https://doi.org/10.3390/jcm7120543

47. Fahimi J, Aurrecoechea A, Anderson E et al (2015) Substance abuse and mental health visits among adolescents presenting to US Emergency Departments. Pediatr Emerg Care 31:331–338. https://doi.org/10.1097/PEC.0000000000000421

48. Hussong AM, Ennett ST, Cox MJ, Haroon M (2017) A systematic review of the unique prospective association of negative affect symptoms and adolescent substance use controlling for externalizing symptoms. Psychol Addict Behav 31:137–147. https://doi.org/10.1037/adb0000247

49. EMCDDA (2007) Health and social responses to drug problems. A European guide. Publications Office of the European Union, Luxemburgo

50. Trenz RC, Scherer M, Harrell P et al (2012) Early onset of drug and polysubstance use as predictors of injection drug use among adult drug users. Addict Behav 37:367–372. https://doi.org/10.1016/j.addbeh.2011.11.011

51. Bang YR, Park JH (2017) Psychiatric disorders and suicide attempts among adolescents victimized by school bullying.

Australas Psychiatry 25:376–380. https://doi.org/10.1177/1039856217715987

52. Brendgen M, Poulin F, Denault A-S (2019) Peer victimization in school and mental and physical health problems in young adulthood: Examining the role of revictimization at the workplace. Dev Psychol 55:2219–2230. https://doi.org/10.1037/dev0000771

53. Eastman M, Foshee V, Ennett S et al (2018) Profiles of internalizing and externalizing symptoms associated with bullying victimization. J Adolesc 65:101–110. https://doi.org/10.1016/j.adolescence.2018.03.007

54. Thumann BF, Nur U, Naker D, Devries KM (2016) Primary school students' mental health in Uganda and its association with school violence, connectedness, and school characteristics: a cross-sectional study. BMC Public Health 16:662. https://doi.org/10.1186/s12889-016-3351-z

55. Bottino SMB, Bottino CMC, Regina CG et al (2015) Cyberbullying and adolescent mental health: systematic review. Cad Saude Publica 31:463–475. https://doi.org/10.1590/0102-311x00036114

56. Estévez E, Estévez JF, Segura L, Suárez C (2019) The influence of bullying and cyberbullying in the psychological adjustment of victims and aggressors in adolescence. Int J Environ Res Public Health 16:2080. https://doi.org/10.3390/ijerph16122080

57. Kubiszewski V, Fontaine R, Huré K, Rusch E (2013) Le cyber-bullying à l'adolescence: problèmes psycho-sociaux associés et spécificités par rapport au bullying scolaire. Encephale 39:77–84. https://doi.org/10.1016/j.encep.2012.01.008

58. Huh S, Kim S, Lee J et al (2019) A study on the school violence experience of children with attention-deficit hyperactivity disorder in the context of bullying. Asia-Pacific Psychiatry. https://doi.org/10.1111/appy.12353

59. Jia M, Mikami AY (2015) Peer preference and friendship quantity in children with externalizing behavior: distinct influences on bully status and victim status. J Abnorm Child Psychol 43:957–969. https://doi.org/10.1007/s10802-014-9956-8

60. Liu T-L, Guo N-W, Hsiao RC et al (2017) Relationships of bullying involvement with intelligence, attention, and executive function in children and adolescents with attention-deficit/hyperactivity disorder. Res Dev Disabil 70:59–66. https://doi.org/10.1016/j.ridd.2017.08.004

61. Magnus W, Nazir S, Anilkumar A, Kamleh S (2021) Attention Deficit Hyperactivity Disorder. In: StatPearls. https://www.ncbi.nlm.nih.gov/books/NBK441838/. Accessed 17 Jun 2021

62. Strohacker E, Wright LE, Watts SJ (2019) Gender, bullying victimization, depressive symptoms, and suicidality. Int J Offender Ther Comp Criminol. https://doi.org/10.1177/0306624X19895964

63. Tognetta LRP, Rosário P (2013) Bullying: dimensões psicológicas no desenvolvimento moral. Estud em Avaliação Educ 24:106. https://doi.org/10.18222/eae245620132736

64. Wu W-C, Luu S, Luh D-L (2016) Defending behaviors, bullying roles, and their associations with mental health in junior high school students: a population-based study. BMC Public Health 16:1066. https://doi.org/10.1186/s12889-016-3721-6

65. Lie S, Rø Ø, Bang L (2019) Is bullying and teasing associated with eating disorders? A systematic review and meta-analysis. Int J Eat Disord 52:497–514. https://doi.org/10.1002/eat.23035

66. Fisher HL, Moffitt TE, Houts RM et al (2012) Bullying victimisation and risk of self harm in early adolescence: longitudinal cohort study. BMJ 344:e2683–e2683. https://doi.org/10.1136/bmj.e2683

67. de Oliveira WA, Silva MAI, da Silva JL et al (2016) Associations between the practice of bullying and individual and contextual variables from the aggressors' perspective. J Pediatr (Rio J) 92:32–39. https://doi.org/10.1016/j.jped.2015.04.003

68. Kumpulainen K, Räsänen E, Puura K (2001) Psychiatric disorders and the use of mental health services among children involved in bullying. Aggress Behav 27:102–110. https://doi.org/10.1002/ab.3

69. Binsfeld AR, Lisboa CS de M (2010) Bullying: Um estudo sobre papéis sociais, ansiedade e depressão no contexto escolar. Interpersona An Int J Pers Relationships 4:74–105. https://doi.org/10.5964/ijpr.v4i1.44

70. Kaltiala-Heino R, Fröjd S, Marttunen M (2010) Involvement in bullying and depression in a 2-year follow-up in middle adolescence. Eur Child Adolesc Psychiatry 19:45–55. https://doi.org/10.1007/s00787-009-0039-2

71. Garcia-Continente X, Pérez-Giménez A, Espelt A, Nebot Adell M (2013) Bullying among schoolchildren: differences between victims and aggressors. Gac Sanit 27:350–354. https://doi.org/10.1016/j.gaceta.2012.12.012

72. Oliveira WA de, Silva JL da, Querino RA et al (2018) Revisão sistemática sobre bullying e família: uma análise a partir dos sistemas bioecológicos. Rev Salud Pública 20:396–403. https://doi.org/10.15446/rsap.v20n3.47748

73. Smokowski PR, Kopasz KH (2005) Bullying in school: an overview of types, effects, family characteristics, and intervention strategies. Child Sch 27:101–110. https://doi.org/10.1093/cs/27.2.101

74. Nansel TR, Overpeck M, Pilla RS et al (2001) Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. JAMA 285:2094–2100. https://doi.org/10.1001/jama.285.16.2094

75. Taylor LD, Davis-Kean P, Malanchuk O (2007) Self-esteem, academic self-concept, and aggression at school. Aggress Behav 33:130–136. https://doi.org/10.1002/ab.20174

76. Chang F-C, Lee C-M, Chiu C-H et al (2013) Relationships Among cyberbullying, school bullying, and mental health in Taiwanese adolescents. J Sch Health 83:454–462. https://doi.org/10.1111/josh.12050

77. Chau K, Mayet A, Legleye S et al (2019) Association between cumulating substances use and cumulating several school, violence and mental health difficulties in early adolescents. Psychiatry Res 280:112480. https://doi.org/10.1016/j.psychres.2019.112480

78. Rice SM, Purcell R, McGorry PD (2018) Adolescent and young adult male mental health: transforming system failures into proactive models of engagement. J Adolesc Heal 62:S9–S17. https://doi.org/10.1016/j.jadohealth.2017.07.024

79. Paula CS, Bordin IAS, Mari JJ et al (2014) The mental health care gap among children and adolescents: data from an epidemiological survey from four Brazilian regions. PLoS ONE 9:e88241. https://doi.org/10.1371/journal.pone.0088241

80. Fatori D, Salum G, Itria A et al (2018) The economic impact of subthreshold and clinical childhood mental disorders. J Ment Heal 27:588–594. https://doi.org/10.1080/09638237.2018.1466041

81. Piqueras JA, Martín-Vivar M, Sandin B et al (2017) The Revised Child Anxiety and Depression Scale: a systematic review and reliability generalization meta-analysis. J Affect Disord 218:153–169. https://doi.org/10.1016/j.jad.2017.04.022