

## Depressive symptoms and alcohol and marijuana use among adolescents

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### Abstract

Risk behaviors are common in adolescence and demonstrates an association with depressive symptoms. Considering the psychological health implications of this phase in adult life, the aim of this study was to verify associations between depressive symptoms and consumption of alcohol and marijuana, self-injurious behavior, health self-perception, life satisfaction, anxiety symptoms and suicidal ideation in adolescents. A total of 298 adolescents, aged 12 to 14 years (61.1% girls), participated in the study. The measures were the translated Health Behavior in School-aged Children questionnaire (HBSC – BR) and the Children's Depression Inventory (CDI). The chi-square test, student's t test and binomial logistic regression ( $p < 0.05$ ) were used. Depressive symptoms were associated with anxiety symptoms and self-injury. Higher risk for alcohol use and consumption, self-injury, negative health self-perception, anxiety and depression related to females. The findings of this population suggest worrying health outcomes, especially for girl.

**Keywords:** risk behavior; adolescence; depression; suicidal ideation; nonsuicidal self injury

### Síntomas Depressivos e Uso de Álcool e Maconha em Adolescentes

#### Resumo

Comportamentos de risco são comuns na adolescência e demonstram associação com sintomas depressivos. Considerando as implicações da saúde psicológica dessa fase na vida adulta, o objetivo deste trabalho foi verificar associações entre sintomas depressivos e consumo de álcool e maconha, comportamento autolesivo, autopercepção de saúde, satisfação com a vida, sintomas ansiosos e ideação suicida em adolescentes. Participaram 298 adolescentes, de 12 a 14 anos (61,1% meninas). Os instrumentos utilizados foram o questionário traduzido *Health Behavior in School-aged Children* (HBSC – BR) e o Inventário de Depressão Infantil (CDI). Utilizou-se os teste Qui-Quadrado, t de *student* e regressão logística binomial ( $p < 0,05$ ). Sintomas depressivos associaram-se com sintomas ansiosos e autolesão. Maior risco para uso e consumo de álcool, autolesão, autopercepção de saúde negativa, ansiedade e depressão em relação ao sexo feminino. Os achados desta população sugerem resultados preocupantes de saúde, sobretudo para o sexo feminino.

**Palavras-chave:** adolescência; comportamento de risco; depressão; ideação suicida; autolesão não suicida

### Síntomas depresivos y uso de alcohol y marihuana en adolescentes

#### Resumen

Las conductas de riesgo son comunes en la adolescencia y demuestran una asociación con síntomas depresivos. Considerando las implicaciones psicológicas para la salud de esta fase en la vida adulta, el objetivo de este estudio fue verificar asociaciones entre síntomas depresivos y consumo de alcohol y marihuana, autolesión, autopercepción de salud, satisfacción con la vida, ansiedad e ideação suicida em adolescentes. Participaron 298 adolescentes de 12 a 14 años (61,1% niñas). Los instrumentos utilizados fueron el cuestionario traducido *Health Behavior in School-aged Children* (HBSC – BR) y el Inventario de Depresión Infantil (CDI). Se utilizaron las pruebas de chi-cuadrado, t de Student y regresión logística binomial ( $p < 0,05$ ). Los síntomas depresivos se asociaron con síntomas de ansiedad y autolesiones. Mayor riesgo de uso y consumo de alcohol, autolesiones, autopercepción negativa de la salud, ansiedad y depresión en relación con el sexo femenino. Los hallazgos de esta población sugieren resultados de salud preocupantes, especialmente para las mujeres.

**Palabras clave:** conducta de riesgo; adolescencia; depresión; ideação suicida; autolesión no suicida

### Introduction

Adolescence is the period of maturation from childhood to adulthood, characterized by intense physical, cognitive, psychological and social changes. For most adolescents, the phase is marked by several

opportunities for development, but for approximately 20%, the trajectory is marked by risks to health and well-being. It is considered a period of greater psychological vulnerability in comparison to childhood, with an increase in psychiatric disorders and risk behaviors being observed (Sadock et al., 2017).

Risk behaviors can be defined as any action that increases the likelihood of harm or loss, such as the development of disorders or illnesses (American Psychiatric Association's [APA], 2010). Substance use, dangerous driving, and violent conduct are some of these behaviors, which are often observed in adolescents and young adults (Cohen et al., 2019; Romer et al., 2017; Sadock et al., 2017; Steinberg, 2008). Despite being part of human development, they can manifest as inadequate coping mechanisms for adversities faced at this age, such as, for example, the use of psychoactive substances to join a group of peers or manage social anxiety (Hurrelmann & Richter, 2006).

The use of psychoactive substances tends to happen for the first time in adolescence (APA, 2014; Instituto Brasileiro de Geografia e Estatística [IBGE], 2016; Inchley et al., 2020; Sadock et al., 2017), and can happen frequently as one of these inadequate coping mechanisms. The licit psychoactive substance most consumed worldwide among adolescents is alcohol, while marijuana is the illicit substance most consumed. Experimentation with alcohol (a dose greater than one sip) before the end of high school was observed in 66% of North American adolescents, and daily use of marijuana was reported by 5.8% of senior students (Johnston et al., 2019).

The cross-national Health Behavior in School-aged Children (HBSC) survey (Inchley et al., 2020) found that 32% of 13-year-old adolescents had already consumed alcohol at some point in their lives, and 14% had consumed alcohol in the 30 days prior to the study. Consumption shows a significant increase among 15-year-olds, jumping to 59% who had consumed alcohol at some point and 37% in the previous 30 days. Regarding marijuana, 13% had tried it at some point by the time they were 15 years old. Consumption was higher for both substances among boys.

Brazilian data from the PeNSE survey (National School Health Survey, 2015) also indicates that alcohol is the most consumed psychoactive substance among adolescents. Alcohol consumption at some point in life was observed by 55.5% of 9th grade adolescents, and marijuana consumption by 46.1%. Moreover, 23.8% of adolescents reported having drunk alcohol and 4.1% having used marijuana in the 30 days prior to the survey. Brazilian data shows that marijuana consumption is higher among males and alcohol consumption among females (IBGE, 2016).

Alcohol use in adolescence appears to be associated with other risk behaviors, such as use of other substance, violence and risky sexual behavior (Boden

& Fergusson, 2011; Graves et al., 2005) and changes in brain structure and functioning (Ewing et al., 2014), as well as with clinical symptoms and depressive disorder throughout life (McLeod et al., 2016; Pang et al., 2014) and suicidal ideation (Sellers, Iriarte, Battlalen, & O'Brien, 2019). Marijuana use by adolescents is associated with an increased risk of developing depression and suicidal behavior, in addition to its impacts on school performance and increased absenteeism (Carlini et al., 2010; Gobbi et al., 2019; Sellers et al., 2019).

Mental health is affected with the onset of adolescence. Along these lines, depressive disorders are estimated to increase from childhood to adolescence and affect between 1 to 20% of the adolescent population. Environmental stressors and adverse events have an influence as important as heredity, and suicidal behaviors are associated with greater severity of the disorder (Beirão et al., 2020; Sadock et al., 2017; Thapar et al., 2012). In its turn, the prevalence of anxiety disorders in adolescence varies between 10% and 31.9% (Merikangas et al., 2010).

In Brazil, minor depression was observed in 17% of adolescents (Munhoz et al., 2015), and severe levels of anxiety in 23.6% (Lopes & Rezende, 2013). Suicidal ideation, associated with depressive disorders, was found in 7.9% of the sample of students from Sousa et al. (2020), with percentages up to 17% for suicidal ideation, planning, and suicidal behavior in other low- and middle-income countries (Uddin et al., 2019). Depression also shows an association with non-suicidal self-injurious behaviors. In a Brazilian study, which also adopted the Brazilian HBSC instrument, an association of non-suicidal self-harm behaviors with greater depressive symptoms was observed, with 23% of positive responses for this behavior (Oliveira et al., 2020). In the data from the Portuguese HBSC, the response frequency was 20.3% (Matos et al., 2015). The high frequency of these behaviors is prospectively associated with suicidal ideation and attempt, being an important indicator of adolescent mental health (Guan et al., 2012).

The female gender is seen as a risk group for the development of anxiety disorders (Lopes & Rezende, 2013; Merikangas et al., 2010), depressive disorders (Munhoz et al., 2015; Thapar et al., 2012), suicidal attempts (Guan et al., 2012; Uddin et al., 2019) and self-harm behavior (Matos et al., 2015). In Brazilian studies, however, divergences are found with adolescents regarding the association of depressive and anxiety symptoms and gender: no significant differences between boys and girls were found for depressive

symptoms assessed by the Childhood Depression Inventory (CDI) (Barbosa et al., 1996; Cruvinel et al., 2008), anxiety symptoms assessed by the Spence Childhood Anxiety Scale (SCAS) (DeSousa et al., 2014) or in relation to self-injury (Oliveira et al., 2020).

Despite the significant percentage of adolescents engaged in risk behavior and with negative health outcomes, national and international literature demonstrates that most adolescents report having good perception of health and life satisfaction, with 73% of Brazilian students classifying their state of health as good or very good (IBGE, 2016; Inchley et al., 2020). The self-perception of the state of life satisfaction has been considered a predictor of psychiatric, physical and also interpersonal issues. Thus, the study of this construct seems to be an important variable for research on mental health at this stage, since it can promote the identification of young people in a more vulnerable situation, as well as prevent or improve quality of life conditions (Huebner et al., 2004).

Mental health and risk behaviors established at this age have direct implications on developmental trajectories in adult life. Identifying the main challenges of this population and most vulnerable groups allows the construction of more effective interventions and more focused prevention strategies. Furthermore, the present work uses the HBSC-BR questionnaire. Knowing the Brazilian scenario from an instrument adapted from consolidated international surveys, such as the WHO-HBSC task force, can increase the evaluation and comparison possibilities at a national and international level. Thus, the objective of this study was to analyze the associations between depressive symptoms and risk behaviors (alcohol and marijuana consumption, self-harm behavior), as well as other health indicators, which are self-perception of health, life satisfaction, anxiety symptoms and suicidal ideation.

## Method

### *Participants*

Data from this study are an excerpt from a larger Brazilian study that runs as an International Linked Project of Health Behavior in School-aged Children study of World Health Organization (HBSC/WHO). For data collection, the city of Ribeirão Preto-SP was stratified by regions, with an estimated population of 6523 students distributed in the 7th and 8th grades of 40 state schools – 47% students in the West, 31% in the North, 13,2% in the East, 5,7% in the Central and

3,5% in the South region of the city. Approximately 1750 students within this age group were invited, and 900 showed an interest. In the end, only 360 returned the authorizations. Of these, 30 did not meet the sample selection criteria, and 32 did not want to participate or were not present for data collection.

The final sample of this study consisted of 298 adolescents, 61.1% female, with a mean age of 13.4 years (SD=0.3). Students enrolled in the West region accounted for 58.4% of the sample, followed by the North (27.5%) and the East (14.1%) regions. 59.7% of the adolescents were enrolled in the 8th grade. The assessment of economic status (conducted from a scale of the HBSC Protocol) indicated that 37.6% of adolescents are in the low level and 12.4% in the high level. The assessment considers the number of vehicles and computers owned by the family, teen's single room and family vacations in the last year.

### *Instruments*

#### *Health Behavior in School-aged Children (HBSC) Protocol – Brazilian version*

The HBSC Protocol used was adapted to Brazilian Portuguese (Maltoni et al., 2019) with the addition of three items compared to the original Portuguese instrument used for adaptation (Matos et al., 2015) – self-reported color, self-harm and parental supervision. The HBSC Protocol is self-applicable and aims to assess indicators and behaviors related to health and well-being in adolescents aged 11, 13 and 15 years old, based on 16 thematic axes arranged in approximately 80 close-ended questions: sociodemographic factors, food security, oral hygiene, Body Mass Index, diet, substance use, school, satisfaction and quality of life, physical and psychological well-being, physical activity, sedentary lifestyle, sexual behavior, teasing, injuries, family relationships, relationship with peers, free time and communication through electronic media. The economic level is calculated on a scale from the number of transport vehicles and computers the family owns, availability of an individual room for the adolescent, and family vacations in the past year. For the data presented in this study, two questions refer to alcohol consumption, one to marijuana consumption, satisfaction with life, self-perception of health, substance use and self-harm.

#### *Spence Children's Anxiety Scale*

The version adapted to Portuguese by DeSousa et al. (2014) from the original Spence Children's

Anxiety Scale (SCAS) instrument (Spence, 1998) was used. The instrument is self-administrable and contains 44 close-ended questions that assess anxiety symptoms in children and adolescents categorized into six subscales. The internal consistency was considered good (Cronbach's alpha of 0.88). The answers range between "never", "sometimes", "often" and "always", with a maximum score of 114. There are 6 positive questions to reduce the negative answer bias. The evaluation was based on the scores by gender from Muris et al. (2000), with clinical anxiety considered if the score was greater than or equal to 25 for boys and greater than or equal to 36 for girls.

#### *Children's Depression Inventory*

This instrument was adapted to Portuguese by Gouveia et al. (1995) (Cronbach's alpha of 0.81) from the original Children's Depression Inventory (CDI) instrument (Kovacs, 1983). The original instrument is self-administrable and contains 27 close-ended questions that assess depressive symptoms in children and adolescents categorized into five factors (negative mood, interpersonal problems, ineffectiveness, anhedonia and negative self-esteem). Responses may vary between 0 (absence of symptom), 1 (presence of symptom) and 2 (aggravated symptom), with a maximum score of 81. The evaluation was based the instrument with 27 items and three factors (affective-somatic, interpersonal relationship, performance) as proposed in the factor analysis study of Wathier, et al. (2008) (Cronbach's alpha of 0.85), based on sex and age group scores. Clinical depression was considered if the score was greater than or equal to 14 for boys and 18 for girls. Item 9, related to suicidal ideation, was individually assessed for the analysis of the present study.

#### *Procedures*

This work is part of the larger multicenter project entitled "Survey of social environments, health behaviors and well-being in adolescents", from which the respective data, collected between 2015 and 2017, come from. The larger project takes place in partnership with the HBSC/WHO study (<http://www.hbsc.org>), a cross-national survey with adolescents aged 11, 13 and 15 years that is ongoing for over 30 years. This primary effort carried out in Brazil aims at adapting the HBSC research protocol so that it can in the future integrate the task force of cross-national surveys, and it is aided by the Portuguese HBSC team from the University of Lisbon.

The present work is a survey developed through stratified sampling of the city's regions. First, the city's state schools were surveyed, and the number of students belonging to the 7th and 8th grades was estimated. Following this step, the invitation to the institutions and to the students was carried out in random order after their acceptance. The data collection took place in the days after in a reserved place during the school hours indicated by the school.

The adolescent's participation in the study was subject to the delivery of the signed Free and Informed Consent Form by the parents and/or guardians and to the adolescent's consent through the Consent Form. A Database Building Term was also delivered to parents/guardians, but its authorization was optional. Parents and/or guardians of adolescents who presented clinical scores of anxiety and depression and/or suicidal ideation were notified by telephone and advised about free psychological care services. This project was approved by the Ethics Research Committee of Faculty of Philosophy, Sciences and Letters at Ribeirão Preto under the CAAE number 45947415.5.1001.5407.

#### *Data analysis*

Descriptive analyses were conducted for all variables (percentage, mean and standard deviation). The Chi-Square test was used to analyze the relationship between the depression rating and the independent variables of alcohol use and consumption, marijuana use, self-harm, health rating and suicidal ideation. Student's *t*-test was used to analyze the relationship between life satisfaction and depression rating. Binomial logistic regression, the "ENTER" method, was used to analyze the influence of the independent variables in the depression ratings of adolescents. The statistical analyses were conducted using SPSS version 24. A threshold level for significance of  $p < 0.05$  was adopted.

## **Results**

The study variables and measures are presented in Table 1. The research took into consideration the participants who were 13 years of age. The sociodemographic variables (gender and school grade) and the depression rating in adolescents were evaluated. The variables analyzed were alcohol use in life, alcohol consumption, marijuana use in life, self-harm, health rating, life satisfaction, anxiety rating and suicidal ideation.

The sociodemographic characteristics of the participants are shown in Table 2. The female participants

Table 1.  
Description of study variables

Variables	Measure	
	1= Boy	2= Girl
Gender		
School grade*	1= 7th grade ES; 2= 8th grade ES;	3= 9th grade ES; 4= 1st year HS
Use of alcohol (in life)*	1= Never (...)	7= 30 days (or more)
Consumption of alcohol (last 30 days)*	1= Never (...)	7= 30 days (or more)
Use of marijuana (in life)*	1= Never (...)	7= 30 days (or more)
Self-harm	1= Yes;	2= No
Health rating*	1= Excellent; 2= Good; 3= Moderate; 4= Bad	
Life satisfaction	Minimum = 0	Maximum = 10
Anxiety rating*	Spence Children's Anxiety Scale (SCAS); $\alpha$ 0,92. Answers vary between never, sometimes, often and always, with a maximum score of 114. Cutoff points for clinical anxiety were 25 or higher for boys and 36 or higher for girls.	
Depression rating*	Children's Depression Inventor (CDI); $\alpha$ 0,81. Answers vary between 0 and 81 points. Cutoff points for clinical depression were 14 or higher for boys and 18 or higher for girls.	
Suicidal ideation*	Children's Depression Inventor (CDI); $\alpha$ 0,81. Answers referring to item 9.	

Abbreviation = ES= Elementary School; HS= High School

\*This variable has been recoded.

showed higher risks for alcohol use in life, at 52.7% (96); alcohol consumption, at 26.7% (47); self-harm, at 36.8% (67); negative health rating, at 30.9% (56); depression rating, at 30.2% (55) and anxiety rating, at 61.5% (112). The male participants showed higher risks of marijuana use, at 10.3% (12). The factors life satisfaction ( $\bar{x}$ =7.7;  $SD$ =1.23) and suicidal ideation, at 29.2% (87), were similar for both genders.

The results of the bivariate analyses are shown in Table 3. Among female participants, the factors alcohol use and consumption, marijuana use, self-harm, health rating and clinical anxiety rating showed a relationship with clinical symptoms of depression.

The results of the binary logistic regression for the association between depression rating and risk behaviors in adolescents are shown in Table 4. Depression rating was positively associated with self-harm and clinical anxiety rating. The model was statistically significant at 28% ( $\chi^2$  (8) = 62.641,  $p$  < 0.001) in the variation of indicators to explain depression rating in adolescents. In this model, the condition of presenting depressive symptoms has a positive relationship with

the variable self-injury (increased self-injury increases by 4.73 times the chance of being in this group) and anxiety (increased anxiety increases by 2.30 times the chance of being in this group).

## Discussion

This study aimed to analyze the associations between depressive symptoms and risk behaviors (alcohol and marijuana consumption and self-harm behavior), among other health indicators, such as self-perceived health, life satisfaction, anxiety symptoms and suicidal ideation.

Regarding risk behaviors, 50.3% of adolescents reported having tried alcohol at some point in life, and 22.7% reported alcohol consumption during the week. The use of marijuana at some point in life was reported by 7% of participants. The results for frequency of use are similar to other surveys (IBGE, 2016; Inchley et al., 2020; Johnston et al., 2019) and confirm the prevalence of alcohol consumption over marijuana. Self-harm behaviors were identified in 28.5% of the sample,

Table 2.  
Chi-square analysis of variables by sex

Variables	Total	Boys	Girls	<i>p</i>
	% (n) or M±SD	% (n) or M±SD	% (n) or M±SD	
	100 (298)	100 (116)	100 (182)	
School grade				0.200
7th grade ES	59.7 (178)	44.8 (52)	62.6 (114)	
8th grade ES	40.3 (120)	55.2 (64)	37.4 (68)	
Use of alcohol (in life)				0.297
Yes	50.3 (150)	46.6 (54)	52.7 (96)	
No	49.7 (148)	53.4 (62)	47.3 (85)	
Consumption of alcohol (last month)				<b>0.043</b>
Yes	22.7 (66)	16.5 (19)	26.7 (47)	
No	77.3 (225)	83.5 (96)	73.3 (129)	
Use of marijuana (in life)*				0.076
Yes	7 (21)	10.3 (12)	4.9 (9)	
No	93 (277)	89.7 (104)	95.1 (173)	
Self-harm				<b>&lt;0.001</b>
Yes	28.5 (85)	15.5 (18)	36.8 (67)	
No	71.5 (213)	84.5 (98)	63.2 (115)	
Health rating				<b>0.025</b>
Positive	73.6 (218)	80.9 (93)	69.1 (125)	
Negative	26.4 (78)	19.1 (22)	30.9 (56)	
Life satisfaction	7.17 ± 2.23	7 ± 2.25	7.27 ± 2.22	0.309
Anxiety rating				0.516
Clinical	60.1 (179)	57.8 (67)	61.5 (112)	
Nonclinical	39.9 (119)	42.2 (49)	38.5 (70)	
Depression rating				<b>0.030</b>
Clinical	25.8 (77)	19 (22)	30.2 (55)	
Nonclinical	74.2 (221)	81 (94)	69.8 (127)	
Suicidal ideation				0.821
Yes	29.2 (87)	28.4 (33)	29.7 (54)	
No	70.8 (211)	71.6 (83)	70.3 (128)	

Abbreviations: M – Mean; SD – Standard Deviation; ES= Elementary School;

\*  $p < 0.05$

which is higher than national Brazilian (Oliveira et al., 2020) and Portuguese (Matos et al., 2015) data.

Regarding health indicators, 60.1% of adolescents scored for depressive symptoms, 25.8% for clinical symptoms of anxiety and 29.2% responded positively for suicidal ideation. The percentage of depressive symptoms was higher compared to the

national Brazilian study with the CDI (22%) (Barbosa et al., 1996). The rates of clinical symptoms observed in this study were also higher than the prevalence of depressive and anxiety disorders in the area (Lopes & Rezende, 2013; Merikangas et al., 2010; Munhoz et al., 2015; Thapar et al., 2012), as well as suicidal ideation (Guan et al., 2012; Sousa et al., 2020; Uddin et al.,

Table 3.  
*Bivariate analyses of depression, consumptions and risk behaviors in adolescents by gender.*

Variables	Depression Rating					
	Non-clinical	Clinical	<i>p</i>	Non-clinical	Clinical	<i>p</i>
	Boys			Girls		
	% (n) or M±SD			% (n) or M±SD		
School grade <sup>1</sup>			0.681			0.605
7th grade ES	45.7 (43)	40.9 (9)		38.6 (49)	34.5 (19)	
8th grade ES	54.3 (51)	59.1 (13)		61.4 (78)	65.5 (36)	
Use of alcohol (in life) <sup>1</sup>			0.719			<b>&lt;0.001</b>
Yes	45.7 (43)	50 (11)		43.3 (55)	74.5 (41)	
No	54.3 (51)	50 (11)		56.7 (72)	25.5 (14)	
Consumption of alcohol (last 30 days) <sup>1</sup>			0.383			<b>0.020</b>
Yes	15.1 (14)	22.7 (5)		21.5 (26)	38.2 (21)	
No	84.9 (79)	77.3 (17)		78.5 (95)	61.8 (34)	
Use of marijuana (in life) <sup>1</sup>			0.269			<b>0.031</b>
Yes	5.3 (5)	0		0	3.6 (2)	
No	94.7 (89)	100 (22)		100 (127)	96.4 (53)	
Self-harm <sup>1</sup>			0.091			<b>&lt;0.001</b>
Yes	12.8 (12)	27.3 (6)		22 (28)	70.9 (39)	
No	87.2 (82)	72.7 (16)		78 (99)	29.1 (16)	
Health rating <sup>1</sup>			0.280			<b>0.002</b>
Positive	82.8 (77)	72.7 (16)		76.2 (96)	52.7 (29)	
Negative	17.2 (16)	27.3 (6)		23.8 (30)	47.3 (26)	
Life satisfaction <sup>2</sup>	7.09 ± 2.20	6.64 ± 2.48	0.400	7.39 ± 2.21	7 ± 2.22	0.279
Anxiety rating <sup>1</sup>			0.535			<b>&lt;0.001</b>
Clinical	43.6 (41)	63.6 (14)		52.8 (67)	18.2 (10)	
Nonclinical	56.4 (53)	36.4 (8)		47.2 (60)	81.8 (45)	
Suicidal ideation <sup>1</sup>			0.697			0.552
Yes	27.7 (26)	31.8 (7)		28.3 (36)	32.7 (18)	
No	72.3 (68)	68.2 (15)		71.7 (91)	67.3 (37)	

Abbreviations: M – Mean; SD – Standard Deviation; ES= Elementary School

\*  $p < 0.05$

<sup>1</sup>Chi-squared test;

<sup>2</sup>Student's *t*-test

2019). Although there was no evaluation for depressive disorder, clinical symptoms may indicate the onset of a psychopathology.

The binary logistic regression results corroborate the positive association between depression rating and self-harm (Guan et al., 2012) and clinical anxiety rating (Cummings et al., 2014). Despite the health indicators showing high rates of psychological symptoms,

self-perceived health was classified as negative by a minority of adolescents (26.4%), and satisfaction with life showed a mean of 7.17 points ( $\pm 2.23$ ), corroborating the literature in the area (IBGE, 2016; Inchley et al., 2020).

The female gender had more negative results regarding engagement in risk behaviors, except for marijuana use, as well as for all health indicators,

Table 4.

*Association between depression, consumptions and risk behaviors in adolescents, binomial logistics regression model*

	Depression Rating OR (95% CI) <i>p</i>
	Model $\chi^2= 62.641$ NRSquare 0.28 <0.001
Use of alcohol (in life)	0.092 1.84 (0.91-3.73)
Consumption of alcohol (last 30 days)	0.876 0.94 (0.43-2.06)
Use of marijuana (in life)	0.374 0.41 (0.06-2.93)
Self-harm	<0.001 4.73 (2.52-8.90)
Health rating	0.100 0.58 (0.30-1.11)
Anxiety rating	0.013 2.30 (1.19-4.45)

Abbreviations: OR= odds ratio; CI= confidence interval

Analyses were adjusted by age and gender;

\*  $p < 0.05$ 

demonstrating that this group should have a different focus on interventions in the area. However, males also presented behaviors and indicators that are also worrying. Corroborating Brazilian (IBGE, 2016), but not international data (Inchley et al., 2020; Johnston et al., 2019), girls in this sample drank more alcohol than boys. Self-harm was associated with the female gender, as observed by Matos et al. (2015), but not in relation to the national HBSC survey (Oliveira et al., 2020). Clinical symptoms of depression were also significantly higher among girls. Some studies demonstrate this association (Guan et al., 2012; Munhoz et al., 2015; Wathier et al., 2008), but others do not (Barbosa et al., 1996; Cruvinel et al., 2008). The girls in this study also perceive their health less positively (Inchley et al., 2020; Matos et al., 2015). Being a girl and having clinical symptoms of depression was also shown to be a risk factor, as more negative results were observed in relation to all variables in this group, with the exception of life satisfaction and suicidal ideation.

The findings for this population suggest worrying indicators and behaviors for adolescent health. Furthermore, the female gender shows worse health outcomes, as observed in the literature. It can be said that the girls in the studied sample have greater

psychological vulnerability and should be the focus of actions in the area in relation to the behaviors and indicators investigated in this study. One of the limitations of this work is that the HBSC is a self-report instrument, and as such may be prone to biases towards socially accepted responses or even a concern with the responses due to the research being carried out in the school environment. The investigations in this phase should continue to be carried out, given the constant transformations and risk factors of the adolescent context. As part of a transnational survey under development, this study promotes the assessment of the adolescent population in Brazil, supporting recommendations for professionals of prevention and clinical intervention and public policies focused on youth.

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