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CIÊNCIAS DA SAÚDE / HEALTH SCIENCES

Prevalence and factors associated to the use of illicit drugs and psychotropic medications among brazilian undergraduates

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ABSTRACT. The aim of this study was to verify the prevalence of use of psychoactive substances (PS) and its associated factors in undergraduate students of a university in southern Brazil. The study was carried out with 830 undergraduate students in the year 2016. The individuals answered a self-administered questionnaire about the PS and its prevalence of daily use, in the last 30 days or at any time of their lives, as well as socioeconomic conditions and academic variables. Caffeine-based energy drinks was the most consumed psychoactive substance (96.3%) among undergraduates in the last 30 days, followed by alcohol (64.0%). Among the illicit drugs most consumed in the last 30 days was marijuana (17.3%), while anxiolytics and amphetamines were the most prevalent psychoactive medicaments in the last 30 days. The prevalence of lifetime illicit drugs used by these students was 41.5%, where we highlight besides marijuana (38.6%) the high consumption of cocaine (7.8%), ecstasy (9.3%) and solvents. Socioeconomic and demographic factors such as gender, have children, religion, and financial background as well as academic variables were associated to recent consumption of these substances. This study concluded there is a high prevalence of use of PS among the undergraduate students, including illicit drugs.

Keywords: use disorder; university; alcohol abuse; Education – Psychiatric; drugs.

Introduction

According to the World Drug Report (United Nations Office on Drugs and Crime [UNODC], 2018), one in 20 adults used drugs in the year 2015 (prevalence above 5%), and *Cannabis* was the most widely used drug in the World (UNODC, 2018). Although there are numerous studies that focus on the prevalence of use of illicit drugs by the college individuals, government or official reports do not focus in this population. College admission can be considered a vulnerable moment to start the use of psychoactive substances. It is emphasized that in college, drug use differs from high school (HS) once in HS the use of Psychoactive Substances (PS) is done at night, usually on weekends or at sporadic parties (Pillon, O'Brien, & Chavez, 2005).

Studies around the world have pointed out a prevalence of illicit drug use among undergraduates higher than the average presented by World Drug Report (2018) for adults (Bitancourt, Tissot, Fidalgo, Galduróz, & Silveira Filho, 2016; Donald, 2017; Holloway & Bennett, 2018). In addition, studies comparing the temporal evolution of illicit drug use report an escalate in the prevalence within the same institution (Oliveira et al., 2009; Silva, Malbergier, Stempliuk, & Andrade, 2006; Stempliuk, Barroso, Andrade, Nicastri, & Malbergier, 2005). The same studies and others have showed a high prevalence of non-prescription psychoactive drugs, whether recreational (Arria et al., 2010) or self-medication (Silva, Soares, & Muccillo-Baisch, 2012), as well as legal psychoactive drugs (such as alcohol, tobacco, caffeine and other power drinks).

Several factors have been associated with the use of psychoactive substances, such as gender, sexual behavior, income, religion, poly-drug consumption, academic performance and college time (Kerr, Ding, Burke, & Ott-Walter, 2015; Lucas et al., 2007; Silva et al., 2006; Wagner & Andrade, 2008). On the other hand, some gaps still remain within this subject, such as the use of licit psychoactive drugs, the factors

associated with the use of psychotropic medications by this population, and responses in undergraduate students from all areas of knowledge.

Most of the studies have been conducted with students from health courses (Lucas et al., 2007), mainly medical students (Lemos et al., 2007). The greatest number of studies have reported on legal drugs such as tobacco and alcohol use (Peuker, Fogaça, & Bizarro, 2006; Rondina, Gorayeb, & Botelho, 2007). The prevalence of illicit drugs use in studies is variable, mainly regarding the use of marijuana in this population (Puryer & Wignall, 2016; Silva et al., 2006; Wagner & Andrade, 2008), as well as the use of psychotropic medications (Karam et al., 2000).

Since 2011, for college admission Brazil has been using a system, called SISU (Unified Selection System), based on a unified examination for the entire national territory. According to data from the Ministry of Education (2017), in 2017 more than 200,000 students were admitted in the universities via this system. The SISU favored students from all regions of Brazil to study in a College away from home. In the case of Federal University of Rio Grande, only slightly over 40% of the students were born in Rio Grande (the University's headquarters). A recent study conducted at the same college of the present study (Demenech, Dumith, Paludo, & Neiva-Silva, 2019) associated distance from the city prior to college admission with recent marijuana use.

Therefore, the aim of the study was to evaluate the prevalence of illicit drugs use and psychotropics medications in undergraduate students, as well as factors associated with the use of these substances, considering socioeconomic, demographic and academic variables, and social behavior of the students.

Material and methods

Type of Study, Sampling and Inclusion Criteria

A cross-sectional study was performed and the sample consisted of undergraduate students of both genders, minimum 18 years of age, who were attending a course at the Federal University of Rio Grande (FURG) between March and November 2016. The sample comprised of 23 undergraduate courses from FURG, divided into the Exact, Human and Biological / Health areas.

The sample calculation considered the total number of students in the year 2015 in the different areas: Human (n = 3248), Exact (n = 3985) and Biological / Health (n = 1269), totaling 8,505 students. For the calculation it was considered 95% confidence interval (95% CI) and significance level 5% and, considering the population of each area as homogeneous. Upon finishing calculation, it was concluded that, the right number of students participating in the study divided into three areas were: Human 229, Exact: 232, Biological/Health: 356: totaling 817 individuals, but 830 questionnaires were applied.

The socioeconomic and demographic profile as well as the academic variables of the students were collected through a self-administered questionnaire in the classroom. The data collection instrument contained 49 open and closed questions.

The daily use prevalence of PS has been estimated as well as prevalence in the last 30 days, or at any time of the life. Psychoactive substances such as caffeine, power drinks, alcohol, nicotine (tobacco), Marijuana, anxiolytics, amphetamines, ecstasy, cocaine, solvents, morphine, heroin, LSD, crack, cocaine and others were the ones investigated.

To study associated factors we use prevalence of use in the last 30 days and students were divided into four groups: Group 1 – students who did not use illicit drugs or psychoactive medicaments in the last 30 days; Group 2 – students who took illicit drugs (not consumer of psychoactive medicaments in the last 30 days); Group 3 – students who took psychoactive medicaments (but did not use illicit drugs) in the last 30 days) and Group 4 – students who took both illicit drugs and psychoactive medicaments in the last 30 days. Those students who did not respond to any information regarding the use of psychoactive substances contained in the questionnaire were excluded from the analysis of the associated factors.

The independent variables were age, gender, skin color, marital status, children, religion practice, resident city, residency, asset index, year of undergraduate course, graduation area, hours of sleep per day, frequency of delays in class, frequency of sleep in class, average grades and sleeping trouble.

To estimate the socioeconomic level characteristics of domicile, presence of maid and household goods (bathroom, maid, car, microcomputer, refrigerator, washer, DVD, microwave, motorcycle and clothes dryer) were taking into consideration.

Data analysis

Data was analyzed by statistical analysis software STATA, version 11.0 from a Microsoft Excel file with questionnaire responses, which were previously double-typed in Epi-Data 3.4. STATA 11.0 program was used for the analysis. Prevalence was calculated based on the 820 questionnaires applied because 10 questionnaires ignored questions regarding the use of PS and were excluded from the analysis of the associated factors. Subsequently, the association between different variables was tested by Chi-square test, Fisher's test and ANOVA with a statistical significance level of 5% for two-tailed tests.

Ethical aspects

This research respected the ethical precepts recommended by Resolution 466/2012 of the National Health Council of the Ministry of Health, which regulates research involving human beings. Thus, the present study was submitted to the Committee of Ethics in Research in the Health Area of the Federal University of Rio Grande (CEPAS / FURG) by this committee (195/2015).

Results and discussion

The data of prevalence of lifetime use, recent use and regular use of PS are summarized in Table 1. In all three scenarios, caffeine was the most consumed PS among undergraduate students. The use of alcohol at any time of the life was prevalent in more than 80% of the study population, although their daily use is low in this population. The use of nicotine-based cigarettes at any time of the life had a prevalence of more than 40% individuals, but daily use was slightly more than 4%.

Among the illicit drugs most consumed at any time of the life were: marijuana (38.6%), ecstasy (9.3%), solvents (9.2%) and cocaine (7.8%), while the overall prevalence of illicit drug used at any time of the life was 41.5 %. Anxiolytics and amphetamines were the psychoactive drugs most experienced by undergraduate students, but their continuous and daily use had low prevalence in this population. About 39% of the respondents indicated that they had used psychotropic medications at some point in their lives.

Table 1. Prevalence of daily use, use in the last 30 days or at any time of the life of psychoactive substances among university students (n = 820).

Psychoactive Substance	Lifetime use	Recent use (last 30 days)	Daily use
Caffeine	97.4 % (799)	95 % (779)	66.1 % (542)
Alcohol	87.2 % (715)	64.0 % (525)	1.2 % (10)
Energetic drinks	87.8 % (687)	33.0 % (271)	2.1 % (17)
Nicotine (Tobacco)	45.4 % (372)	15.9 % (130)	4.1 % (34)
Marijuana	38.6 % (317)	17.4 % (143)	2.2 % (18)
Anxiolytics	26.8 % (220)	8.0 % (66)	1.7 % (14)
Amphetamines	18.5 % (152)	6.4 % (53)	0.7 % (6)
Ecstasy	9.3 % (76)	2.2 % (18)	0% (0)
Solvents*	9.1 % (75)	1.2 % (10)	0 % (0)
Cocaine	7.8 % (64)	0.7 % (6)	0% (0)
Morphine	5.0 % (41)	0.2 % (2)	0% (0)
LSD	2.2 % (18)	0.7 % (6)	0% (0)
Heroin	1.7 % (14)	0.2 % (2)	0% (0)
Crack cocaine	0.5 % (4)	0.1% (1)	0% (0)
Other	1.8 % (15)**	0.8 % (7)***	0% (0)
Psychoactive medicaments	38.7 % (317)	13.5 % (111)	2.3 % (19)
Illicit drugs	41.5 % (340)	18.2 % (149)	2.2 % (18)

*Includes "lança perfume" - ethyl chloride-based drug; "cola de sapateiro" - toluene-based drug and "loló" - drug based on ether and chloroform; ** Includes anorectic (5), antidepressants (2 (3), mushroom tea (5); *** Includes anorectic (1), mushroom tea (5), "loló" (1).

The mean age of the students was 24.7 years of age (median 22). Most of the interviewees were female, white, single and without children. Less than 17% of them live alone and the others live with relatives, colleagues, their partner, or others. Approximately half of them follow some religion. The predominant income class is C (C1 + C2), with monthly average family income of 1,451 dollars (Table 2).

Regarding the academic variables, about 40% were in the first year of college, almost 58% did not perform activities other than studying. Almost half of the students reported no studying or just studying in

the exam period. At the time of exams, college students usually studied 5 hours/day. Half the students were scarcely or never late for classes, but almost half reported having slept during class. Most students considered their academic performance to be average or good and their scores ranging from average to above average (Table 3).

Table 2. Association between sociodemographic and economic variables and use of psychoactive substances in undergraduate students (N = 820).

Variables	% (N)*	Group 1 N	Group 2 N	Group 3 N	Group 4 N	p
Age						
Mean ± Standard deviation	24.7 ± 7.2	25.2 ± 7.8	22.7 ± 4.7	24.7 ± 6.8	21.7 ± 3.7	0.003
Median	22	22	21	22	21	
Sex						0.01
Male	42% (344)	40% (236)	49% (58)	39% (30)	59% (20)	
Female	58% (474)	60% (352)	51% (60)	61% (48)	41% (14)	
Skin						0.02
White	74% (590)	74% (420)	76% (86)	71% (54)	88% (30)	
Others	26% (203)	26% (150)	24% (27)	29% (22)	12% (4)	
Marital status						0.2
Single	80% (654)	78% (458)	85% (100)	83% (65)	91% (31)	
Others	20% (162)	22% (129)	15% (17)	17% (13)	9% (3)	
Have children						0.003
No	86% (695)	83% (488)	93% (109)	85% (66)	97% (32)	
Yes	14% (118)	17% (97)	7% (8)	15% (12)	3% (1)	
Religion practice						0.04
No	49% (389)	47% (269)	62% (69)	43% (33)	53% (18)	
Yes	51% (400)	53% (299)	38% (42)	57% (43)	47% (16)	
Who do you live with						0.35
Alone	16% (134)	15% (90)	20% (24)	20% (15)	15% (5)	
Parents / siblings or grandparents	40% (323)	40% (236)	37% (44)	36% (28)	44% (15)	
Colleagues	22% (180)	21% (121)	26% (30)	24% (18)	32% (11)	
Partner	17% (143)	19% (112)	14% (16)	17% (13)	6% (2)	
Others	5% (37)	5% (30)	3% (4)	3% (2)	3% (1)	
Income class						0.11
A	4% (29)	3% (22)	4% (5)	3% (2)	0% (0)	
B1 + B2	33% (270)	32% (190)	33% (39)	33% (26)	44% (15)	
C1 + C2	59% (487)	60% (351)	60% (70)	63% (49)	50% (17)	
D + E	4% (34)	5% (27)	3% (4)	1% (1)	6% (2)	
Monthly household income (in dollars)						0.203
Mean ± Standard deviation	1,451 ± 1,473	1,489 ± 1,547	1,261 ± 1005	1,312± 1,462	1,807 ± 1,534	
Median	1,015	1,016	952	952	1,270	

Almost half reported sleeping problems and two-thirds said that other people in their home use PS. Among those interviewed, 17.1% made continuous use of medications, 64.4% had recently used alcohol and 15.9% had recently used cigarettes (Table 4).

The investigation of the associated factors was made based on sociodemographic and economic, academic and behavioral variables among undergraduates. Among sociodemographic variables, age was a factor associated with the use of PS, where students in groups 2 (use of illicit drugs) and 4 (use of illicit drugs and psychoactive drugs) were significantly younger than students who did not recently used PS. Still, males were associated with illicit drug use either alone (Group 2) or combined with medication (Group 4), while medicaments use (Group 3) was associated with female gender. White skin color was associated with the combined use of illicit drugs and psychoactive drugs.

The fact of not having a child has been shown to be a variable associated with the use of illicit drugs (combined or not with drugs), as well as the fact of not being a religious person. The PS use was not associated with the marital status or with whom the student lives in the residence. Income and social class also did not show to be factors associated with the use of PS.

Among the academic variables, only the year of the course and the area of study were factors associated with the use of PS (Table 3). Students of the first year of college make use of illicit psychoactive medicaments (alone or combined with illicit drugs), while students of final years using more illicit drugs (combined or not with psychoactive drugs).

Table 3. Association between academic variables and use of psychoactive substances in undergraduate students (N = 820).

Variables		Group 1	Group 2	Group 3	Group 4	p
Year of the course						0.015
1st		40% (320)	39% (225)	37% (44)	45% (35)	47% (16)	
2nd		28% (229)	29% (169)	22% (26)	36% (28)	18% (6)	
3rd		18% (144)	18% (103)	23% (27)	11% (9)	15% (5)	
4th or more		14% (118)	14% (84)	18% (21)	8% (6)	20% (7)	
Graduation area						0.017
Exact Sciences		27% (219)	27% (161)	25% (29)	24% (19)	29% (10)	
Human Sciences		29% (242)	32% (190)	28% (33)	19% (15)	12% (4)	
Biological / Health Sciences		45% (358)	41% (238)	47% (56)	57% (44)	59% (20)	
Perform some activity besides the undergraduate course						0.54
No		58% (472)	56% (329)	64% (75)	60% (46)	65% (22)	
Yes		42% (345)	44% (259)	36% (43)	40% (31)	35% (12)	
Hours of study per week						0.128
Do not study		28% (214)	28% (151)	32% (36)	29% (20)	22% (7)	
Between 1 and 5 hours		24% (186)	27% (147)	18% (20)	19% (13)	18% (6)	
Between 5 and 10 hours		28% (210)	25% (138)	28% (31)	40% (27)	42% (14)	
Above 10 hours		2% (14)	2% (11)	2% (2)	2% (1)	0% (0)	
Only studying for exams		18% (136)	18% (101)	20% (22)	10% (7)	18% (6)	
Study time per day, except classes (in minutes)						0.208
Mean ± Standard deviation		301.1 ± 186.8	298.0 ± 185.9	281.7 ± 163.9	347.7 ± 223.9	312.7 ± 172.2	
Median		240	240	240	300	300	
Frequency of class delay						0.283
Never/ Scarcely		51% (416)	53% (312)	47% (57)	45% (35)	35% (12)	
Sometimes		36% (297)	35% (205)	38% (46)	39% (30)	47% (16)	
Frequently/ Always		13% (107)	12% (71)	15% (18)	16% (12)	18% (6)	
Frequency of sleep in classroom						0.211
Never / Scarcely		18% (146)	19% (112)	15% (18)	12% (9)	21% (7)	
Sometimes		47% (387)	47% (278)	53% (62)	44% (34)	38% (13)	
Frequently /Always		35% (284)	34% (199)	32% (37)	44% (34)	41% (14)	
Self-assessment of academic achievement						0.566
Very bad/ Bad		10% (77)	9% (54)	8% (10)	11% (9)	12% (4)	
Median		37% (304)	39% (226)	30% (35)	38% (29)	41% (14)	
Good/ Very good		53% (431)	52% (304)	62% (72)	51% (39)	47% (16)	
Exam scores						0.19
Below average		23% (181)	23% (132)	20% (23)	22% (16)	31% (10)	
Average		52% (411)	50% (283)	58% (67)	58% (43)	56% (18)	
Above average		25% (198)	27% (154)	22% (25)	20% (15)	13% (4)	

Table 4. Association between social behaviors and use of psychoactive substances in undergraduate students (N = 820).

Variables		Group 1	Group 2	Group 3	Group 4	p
Trouble sleeping						0.03
No		51% (408)	53% (305)	53% (61)	36% (28)	42% (14)	
Yes		49% (391)	47% (268)	47% (54)	64% (50)	58% (19)	
Use of PS by another person in the residence						0.28
No		37% (291)	62% (216)	39% (44)	28% (21)	31% (10)	
Yes		63% (493)	38% (348)	61% (69)	72% (54)	69% (22)	
Continued use of medication						0.01
No		83% (670)	85% (494)	83% (97)	69% (54)	74% (25)	
Yes		17% (138)	15% (85)	17% (20)	31% (24)	26% (9)	
Alcohol use in the last 30 days						0.003
No		36% (290)	38% (225)	23% (27)	40% (31)	21% (7)	
Yes		64% (525)	62% (361)	77% (91)	60% (46)	79% (27)	
Tobacco use in the last 30 days						<0.0001
No		84% (688)	89% (525)	66% (78)	87% (67)	53% (18)	
Yes		16% (130)	11% (64)	34% (40)	13% (10)	47% (16)	

Among the behavioral variables, sleeping problems, use of continuous medications, recent consumption of alcohol and cigarettes were associated with the use of PS (Table 4). Sleeping problems and continued use

of medications were associated with the use of psychoactive drugs (combined or not with illicit drugs), while recent alcohol and cigarette use was associated with the use of illicit drugs (combined or not with psychoactive drugs).

The prevalence of PS in the studied population was elevated, both for licit and illicit substances and psychotropic medications. We highlight the high consumption of energy drinks containing caffeine, alcohol and tobacco among the legally consumed substances. Marijuana, ecstasy, solvent and cocaine among the illicit drugs and anxiolytics and amphetamines among psychotropic drugs. The study contributes to the elucidation of factors associated with drug use, illicit drugs and psychotropic drugs, such as age, skin color, gender, marital status, religious practice, use of tobacco and alcohol, and medications for continuous use, difficulty sleeping, and academic as well as time, such as socioeconomic and demographic variables of college and area of knowledge. On the other hand, it showed that for this population, factors that are commonly reported were not associated to the uses of IDs and PMs. Among them it is income, social class, academic performance and PS use by a roommate (Dahlin, Joneborg, & Runeson, 2005; Galduróz, Noto, Nappo, & Carlini, 2004; Picolotto, Libardoni, Migott, & Geib, 2010).

These issues are discussed in different epidemiological studies reporting the prevalence of drug use among college and high school students, showing that that population represents a group with high susceptibility to abuse (Galduróz et al., 2004; Miranda, Demenech, & Miranda, 2018). Regarding psychoactive in general, studies indicate variation in prevalence of recent use (last 30 days) and over a lifetime (Galduróz et al., 2004; Gebreslassie, Feleke, & Melese, 2013; Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005), may be associated with different cultural, social and economic factors. This pattern of variation was also seen in the different studies conducted with Brazilian college students, where the prevalence of PS use in the present study was also divergent (Lamberti et al., 2017; Silva et al., 2006; Wagner & Andrade, 2008).

Among the psychoactive substances, caffeine-based energy drinks had the highest prevalence of use, but this topic is still little explored in the scientific literature, perhaps because they are substances that are legally commercialized (Chang, Peng, & Lan, 2017; Donald, 2017; Teixeira et al., 2007). In general, studies with the student and college population have addressed the prevalence of power drinks and their association with factors such as parental education and living alone (Azagba, Langille, & Asbridge, 2014; Oteri, Salvo, Caputi, & Calapai, 2007). However, the extent of the issue on the use of caffeine and college, has not been well elucidated. Few articles address the use of caffeine in college populations (Chang et al., 2017; Penafort et al., 2016). One of them was the study by Chang et al. (2017) conducted with Taiwanese college students who observed a higher prevalence of caffeine-containing tea (95%) than coffee use (57%). In a Brazilian scenario, Penafort et al. (2016) observed a high prevalence (72.3%) of caffeine use among college students but did not address its associated factors. However, in despite of the high prevalence, the present study showed a higher rate and great part of the use refers to the consumption of coffee and 'chimarrão' (a typical Brazilian drink based on *Ilex paraguariensis* (Bracesco, Sanchez, Contreras, Menini, & Gugliucci, 2011).

The behavioral and academic factors experienced by the college population, such as graduation time, delay, sleep and low performance on classes were already associated with the use of PS (Cabrita et al., 2004; Dahlin et al., 2005; Nascimento & Avallone, 2013). As for academic factors, such as undergraduate time, we indicate here that first-year students consume more drugs combined or not with illicit drugs. This behavior may be associated with daily stress and different problems that may result in emotional and academic failure (Dahlin et al., 2005). In addition, among the studies (Cabrita et al., 2004; Nascimento & Avallone, 2013) to which the use of marijuana reported that a great part of the interviewees who had already made use of some substance (alcohol and psychoactive drugs) felt sleep during the classes. These results are like those found in the present study, to which most individuals reporting sleep in the classroom made use of all substances.

As for the prevalence and association with the use of psychotropic drugs, the female sex has been associated with the use of these substances, while the male sex has been associated with the use of illicit drugs alone or in conjunction with medications. The use of anxiolytics and amphetamines by the female sex may be due to a greater occurrence of physical and mental illnesses and why female students are considered to be more stressed than male students (Tavolacci et al., 2013; Wagner & Andrade, 2008). This pattern was similar to that found in the present study and in the others, such as, Passos, Alvarenga, Santos, and Aquino (2006), Cabrita et al. (2004) and Wagner & Andrade, 2008), for which females made significant use of these substances.

However, this relationship may also be influenced by self-medication. Silva et al., (2012) reported that self-medication among students at the same university studied in this study is high. This behavior is associated with several factors, such as gender, marital status, children, drug use, last year in a health course, and availability of medication.

Another factor associated to the use of these substances, mainly illicit drugs, is the non-practice of religion, which has already been mentioned in different studies (Silva et al., 2006; Tavares, Béria, & Lima, 2004). This same scenario was identified in the present study where the use of drugs with potential for abuse was seen in a greater proportion among individuals who do not practice religion, whereas a large portion of the population that does not consume IDs and MPs is practicing of some religion.

The lifetime prevalence of marijuana use was high when compared to other studies, where prevalence ranged from 16% to 27% (Arria et al., 2010; De Micheli & Formigoni, 2004; Furtado et al., 2017; Lamberti et al., 2017). On the other hand, the study of Stempliuk et al. (2005) reported a prevalence of 39% in Brazilian college students, a value like that presented in the present study. Regarding the prevalence of recent use, the results presented were similar to previous studies, which showed a variation between 2% and 4% (Atwoli, Mungla, Ndung'u, Kinoti, & Ogot, 2011; Dantas et al., 2017; Makanjuola, Daramola, & Obembe, 2007). The high prevalence presented by this population may be associated with different factors already related to the use of illicit drugs in general. These factors are demonstrated in detail by Demenech, Dumith, Paludo, and Neiva-Silva, L (2019), to which marijuana use was associated with males, the migration of students, the highest age, living alone and having family members.

The use of cocaine and crack within the university can discern how much the different effects of these drugs have spread without social barriers, thus causing an impact on public health as a whole (Kessler & Pechansky, 2008). Among illicit drugs, cocaine is widely used and different studies address prevalence between 0 and 4.4% (Furtado et al., 2017; Makanjuola et al., 2007; Neto, Fraga, & Ramos, 2012), for use in college population. These data differ from the results found in the present study, which showed a high prevalence of recent and lifetime use (0.7 and 7.9%). Regarding the use of crack in the academic environment the prevalence found in previous studies were 0.2 and 0.6% (Makanjuola et al., 2007; Neto et al., 2012) corroborating the results evidenced in the present study.

Among the illicit drugs as marijuana, cocaine and crack are drugs that have a wide distribution and commerce throughout the world and its consumption can cause serious health damage (Teo & Fenech, 2008). Although, the prevalence of illicit drug use in general varies among studies, here the prevalence of lifetime use varies between 25% and 45% (Bitancourt et al., 2016; Stempliuk et al., 2005). The present study showed higher rates found for the Brazilian population. The studies indicate as factors associated with going to parties at least twice a week, poor parenting, permissive parents or disinterested in academic achievement, poor school performance, friends or parents also users. Nevertheless, there are differences, mainly regarding the economic factor where different studies report the association of abuse with the fact of working and have a high socioeconomic level, unlike studies that report that only studying and having low income is a risk factor (Furtado et al., 2017; Picolotto et al., 2010).

Based on the factors associated with the use of the substances studied, we emphasize that the basic profile of the student who does not consume drugs and psychoactive medications is of a student who has children, practices a religion, older than the average presented, and black skin color. On the other hand, females and students that attend the initial years characterize students who make use mainly of psychoactive medicines. The use of illicit drugs is mainly related to the male gender, the whites, younger than the average presented and attending the last year of college.

Conclusion

Prevalence of psychoactive substance use among undergraduates was elevated, both for legally accepted substances and for illicit drugs and psychotropic drugs. Socioeconomic and demographic variables (age, gender, children and religion), academic (college time and area of knowledge) and behavioral (sleep in class combined with alcohol and continued use) were associated with the use of illicit drugs and psychotropic medications. We emphasize the need for studies that identify the effects on health in this population, as well as actions and programs of prevention and health education within the universities, developed as health promotion measures.

References

Arria, A. M., Caldeira, K. M., Kasperski, S. J., O-Grady, K. E., Vincent, K. B., Griffiths, R. R., & Wish, E. D. (2010). Increased alcohol consumption, nonmedical prescription drug use, and illicit drug use are associated with energy drink consumption among college students. *Journal of Addiction Medicine*, *4*(2), 74-80. Doi: 10.1097/ADM.0b013e3181aa8dd4

Atwoli, L., Mungla, P. A., Ndung'u, M. N., Kinoti, K. C., & Ogot, E. M. (2011). Prevalence of substance use among college students in Eldoret, western Kenya. *BMC Psychiatry*, *11*(34). Doi: 10.1186/1471-244X-11-34

Azagba, S., Langille, D., & Asbridge, M. (2014). An emerging adolescent health risk: Caffeinated energy drink consumption patterns among high school students. *Preventive Medicine*, *62*, 54–59. Doi: 10.1016/j.ypmed.2014.01.019

Bitancourt, T., Tissot, M. C., Fidalgo, T. M., Galduróz, J. C., & Silveira Filho, D. X. d. (2016). Factors associated with illicit drugs' lifetime and frequent/heavy use among students results from a population survey. *Psychiatry Research*, *237*, 290-295. Doi: 10.1016/j.psychres.2016.01.026

Bracesco, N., Sanchez, A. G., Contreras, V., Menini, T., & Gugliucci, A. (2011). Recent advances on Ilex paraguariensis research: Minireview. *Journal of Ethnopharmacology*, *136*(3), 378-384. Doi: 10.1016/j.jep.2010.06.032

Cabrita, J., Ferreira, H., Iglesias, P., Baptista, T., Rocha, E., Silva, A. L. d., & Miguel, J. P. (2004). Patterns and determinants of psychoactive drug use in Lisbon University students--a population-based study. *Pharmacy World and Science*, *26*(2), 79-82. Doi: 10.1023/B:PHAR.0000018597.46246.34

Chang, Y.-J., Peng, C.-Y., & Lan, Y.-C. (2017). Consumption of energy drinks among undergraduate students in Taiwan: related factors and associations with substance use. *International Journal of Environmental Research and Public Health*, *14*(9), 954. Doi: 10.3390/ijerph14090954

Dahlin, M., Joneborg, N., & Runeson, B. (2005). Stress and depression among medical students: A cross-sectional study. *Medical Education*, *39*(6), 594-604. Doi: 10.1111/j.1365-2929.2005.02176.x

Dantas, L. R., Gomes, M. C., Lima, L. C. M. d., Cruz-da-Silva, B. R., Dantas, L. R., & Granville-Garcia, A. F. (2017). Abuse of legal and street drugs among Brazilian university students. *Journal of Public Health*, *25*(6), 645-651. Doi: 10.1007/s10389-017-0813-4

De Micheli, D., & Formigoni, M. L. O. S. (2004). Drug use by Brazilian students: Associations with family, psychosocial, health, demographic and behavioral characteristics. *Addiction*, *99*(5), 570-578. Doi: 10.1111/j.1360-0443.2003.00671.x

Demenech, L. M., Dumith, S. C., Paludo, S. d. S., & Neiva-Silva, L. (2019). Academic migration and marijuana use among undergraduate students: evidences from a sample in southern Brazil. *Ciência & Saúde Coletiva, 24*(8), 3107-3116. Doi: 10.1590/1413-81232018248.27292017

Donald, C. C. (2017). Psychoactive substance use among nigerian students; patterns and sociodemographic correlates. *American Journal of Psychiatry and Neuroscience*, *5*(2), 22-25. Doi: 10.11648/j.ajpn.20170502.13

Furtado, I. M., Araujo, L. G., Almeida, J. M., Miranda, A. M. O., Ferreira, D. T., Oliveira, G. C. S., & Oliveira Filho, A. B. (2017). Use of marijuana and cocaine among students in the municipality of Breves, Marajó Archipelago, Brazilian Amazon. *Journal of Drug Abuse*, *3*(1), 1-6. Doi: 10.21767/2471-853X.100041

Galduróz, J. C. F., Noto, A. R., Nappo, S. A., & Carlini, E. A. (2004). Trends in drug use among students in Brazil: Analysis of four surveys in 1987, 1989, 1993 and 1997. *Brazilian Journal of Medical and Biological Research*, *37*(4), 523-531. Doi: 10.1590/S0100-879X2004000400009

Gebreslassie, M., Feleke, A., & Melese, T. (2013). Psychoactive substances use and associated factors among Axum university students, Axum Town, North Ethiopia. *BMC Public Health*, *13*(1). Doi: 10.1186/1471-2458-13-693

Hall, K. M., Irwin, M. M., Bowman, K. A., Frankenberger, W., & Jewett, D. C. (2005). Illicit use of prescribed stimulant medication among college students. *Journal of American College Health*, *53*(4), 167–174. Doi: 10.3200/JACH.53.4.167-174

Holloway, K., & Bennett, T. (2018). Characteristics and correlates of drug use and misuse among university students in Wales: a survey of seven universities. *Addiction Research and Theory*, *26*(1), 11–19. Doi: 10.1080/16066359.2017.1309031

Karam, E., Melhem, N., Mansour, C., Maalouf, W., Saliba, S., & Chami, A. (2000). Use and abuse of licit and illicit substances: Prevalence and risk factors among students in Lebanon. *European Addiction Research*, *6*(4), 189-197. Doi: 10.1159/000052045

Kerr, D., Ding, K., Burke, A., & Ott-Walter, K. (2015). An alcohol, tobacco, and other drug use comparison of lesbian, bisexual, and heterosexual undergraduate women. *Substance Use & Misuse*, *50*(3), 340-349. Doi: 10.3109/10826084.2014.980954

Kessler, F., & Pechansky, F. (2008). Uma visão psiquiátrica sobre o fenômeno do crack na atualidade. *Revista de Psiquiatria do Rio Grande do Sul, 30*(2), 96-98. Doi: 10.1590/S0101-81082008000300003

Lamberti, M., Napolitano, F., Napolitano, P., Arnese, A., Crispino, V., Panariello, G., & Di Giuseppe, G. (2017). Prevalence of alcohol use disorders among under- and post-graduate healthcare students in Italy. *PLoS ONE*, *12*(4), e0175719. Doi: 10.1371/journal.pone.0175719

Lemos, K. M., Neves, N. M. B. C., Kuwano, A. Y., Tedesqui, G., Bitencourt, A. G. V, Neves, F. C. S., … Lima, M. M. (2007). Psychoactive substance use by medical students from Salvador (BA). *Archives of Clinical Psychiatry, 34*(3), 118-124. Doi: 10.1590/S0101-60832007000300003

Lucas, R., Lunet, N., Carvalho, R., Langa, J., Muanantatha, M., Nkunda, L.-P., & Barros, H. (2007). Patterns in the use of medicines by university students in Maputo, Mozambique. *Cadernos de Saúde Pública*, *23*(12), 28452852. Doi: 10.1590/S0102-311X2007001200005

Makanjuola, A. B., Daramola, T. O., & Obembe, A. O. (2007). Psychoactive substance use among medical students in a Nigerian university. *World Psychiatry : Official Journal of the World Psychiatric Association (WPA)*, *6*(2), 112–114.

Ministério da Educação. (2017). *Censo na educação superior no Brasil*. Retrieved February 6, 2020, from http://portal.mec.gov.br/component/tags/tag/32044-censo-da-educacao-superior

Miranda, L., Demenech, D., & Miranda, L. (2018). Academic migration and marijuana use among undergraduate students: Evidences a sample in southern Brazil. *Ciência & Saúde Coletiva, 24*(8), 1–10. Doi: 10.1590/1413-81232018248.27292017

Nascimento, M. O. d., & Avallone, D. D. M. (2013). Prevalência do uso de drogas entre adolescentes nos diferentes turnos escolares. *Adolescência e Saúde*, *10*(4), 41–49.

Neto, C., Fraga, S., & Ramos, E. (2012). Illicit substances use by Portuguese adolescents. *Revista de Saúde Pública*, *46*(5), 808-815. Doi: 10.1590/S0034-89102012000500007

Oliveira, L. G. d., Barroso, L. P., Wagner, G. A., Ponce, J. D. C., Malbergier, A., Stempliuk, V. D. A., & Andrade, A. G. d. (2009). Drug consumption among medical students in São Paulo, Brazil: Influences of gender and academic year. *Brazilian Journal of Psychiatry*, *31*(3), 227-239. Doi: 10.1590/S1516-44462009000300008

Oteri, A., Salvo, F., Caputi, A. P., & Calapai, G. (2007). Intake of energy drinks in association with alcoholic beverages in a cohort of students of the School of Medicine of the University of Messina. *Alcoholism Clinical and Experimental Research*, *31*(10), 1677-1680. Doi: ACER464 [pii]\r10.1111/j.1530-0277.2007.00464.x

Passos, S. R. L., Alvarenga, P. E., Santos, M. A. B. d., & Aquino, M. T. C. d. (2006). Prevalence of psychoactive drug use among medical students in Rio de Janeiro. *Social Psychiatry and Psychiatric Epidemiology, 41*(12), 989–996. Doi: 10.1007/s00127-006-0114-7

Penafort, A. G., Carneiro, I. B. P., Carioca, A. A. F., Sabry, M. O. D., Pinto, F. J. M., & Sampaio, H. A. C. (2016). Coffee and Caffeine Intake among Students of the Brazilian Northeast. *Food and Nutrition Sciences*, *7*(1), 30-36. Doi: 10.4236/fns.2016.71004

Peuker, A. C., Fogaça, J., & Bizarro, L. (2006). Expectations and problematic drinking among college students. *Psicologia: Teoria e Pesquisa*, *22*(2), 193-200. Doi: 10.1590/S0102-37722006000200009

Picolotto, E., Libardoni, L. F. C., Migott, A. M. B., & Geib, L. T. C. (2010). Prevalência e fatores associados com o consumo de substâncias psicoativas por acadêmicos de enfermagem da Universidade de Passo Fundo. *Ciência & Saúde Coletiva*, *15*(3), 645-654. Doi: 10.1590/S1413-81232010000300006

Pillon, S. C., O'Brien, B., & Chavez, K. A. P. (2005). The relationship between drugs use and risk behaviors in brazilian university students. *Revista Latino-Americana de Enfermagem*, *13*(spe2), 1169-1176. Doi: 10.1590/S0104-11692005000800011

Puryer, J., & Wignall, R. (2016). Tobacco, alcohol and drug use among dental undergraduates at one UK university in 2015. *Dentistry Journal*, *4*(1), 2. Doi: 10.3390/dj4010002

Rondina, R. C., Gorayeb, R., & Botelho, C. (2007). Características psicológicas associadas ao comportamento de fumar tabaco. *Jornal Brasileiro de Pneumologia*, 33(5), 592-601. Doi: 10.1590/S1806-37132007000500016

Silva, L. V. E. R., Malbergier, A., Stempliuk, V. D. A., & Andrade, A. G. d. (2006). Fatores associados ao consumo de álcool e drogas entre estudantes universitários. *Revista de Saúde Pública*, *40*(2), 280-288. Doi: 10.1590/S0034-89102006000200014

Silva, M. G. C. d., Soares, M. C. F., & Muccillo-Baisch, A. L. (2012). Self-medication in university students from the city of Rio Grande, Brazil. *BMC Public Health*, *12*. Doi: 10.1186/1471-2458-12-339

Stempliuk, V. d. A., Barroso, L. P., Andrade, A. G. d., Nicastri, S., & Malbergier, A. (2005). Comparative study of drug use among undergraduate students at the University of São Paulo - São Paulo campus in 1996 and 2001. *Brazilian Journal of Psychiatry*, *27*(3), 185-193. Doi: 10.1590/S1516-44462005000400006

Tavares, B. F., Béria, J. U., & Lima, M. S. d. (2004). Fatores associados ao uso de drogas entre adolescentes escolares. *Revista de Saúde Pública*, *38*(6), 787-796. Doi: 10.1590/S0034-89102004000600006

Tavolacci, M. P., Ladner, J., Grigioni, S., Richard, L., Villet, H., & Dechelotte, P. (2013). Prevalence and association of perceived stress, substance use and behavioral addictions: A cross-sectional study among university students in France, 2009-2011. *BMC Public Health*, *13*(1). Doi: 10.1186/1471-2458-13-724

Teixeira, L. R., Lowden, A., Turte, S. L., Nagai, R., Moreno, C. R. d. C., Latorre, M. d. R. D. d. O., & Fischer, F. M. (2007). Sleep and sleepiness among working and non-working high school evening students. *Chronobiology International*, *24*(1), 99-113. Doi: 10.1080/07420520601139763

Teo, T., & Fenech, M. (2008). The interactive effect of alcohol and folic acid on genome stability in human WIL2-NS cells measured using the cytokinesis-block micronucleus cytome assay. *Mutation Research*, *657*(1), 32-38. Doi: 10.1016/j.mrgentox.2008.08.002

United Nations Office on Drugs and Crime [UNODC]. (2018). *World Drug Report 2018*. Retrieved from https://www.unodc.org/unodc/en/about-unodc/annual-report.html?ref=menutop

Wagner, G. A., & Andrade, A. G. d. (2008). Uso de álcool, tabaco e outras drogas entre estudantes universitários brasileiros. *Archives of Clinical Psychiatry*, *35*(suppl. 1), 48-54. Doi: 10.1590/S0101-6083200800070001