

# Pattern of alcoholic beverage consumption and academic performance among college students

Padrão de consumo de bebidas alcoólicas e desempenho acadêmico entre universitários

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**Received:** 3/16/2012 - **Accepted:** 12/2/2013

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## Abstract

**Background:** Alcoholic beverages are widely available in the university environment, particularly at the parties. There are few studies addressing the relationship between alcohol consumption and academic performance among college students. **Objective:** This study evaluated the behavior of college students regarding the profile of alcohol consumption and its academic consequences. **Methods:** The volunteers (343 students) answered a questionnaire about their pattern of alcohol consumption and possible related behaviors, especially academic performance. Participants were classified as “non-drinkers” (ND), “non-binge drinkers” (nBD), “binge drinkers” (BD) and “heavy drinkers” (HD). **Results:** 88.1% of the students reported ingesting alcoholic beverages, 44% as BD. Most of the drinker students (75.5% – nBD, BD or HD) stated getting intoxicated at least once a month. Binge drinking was the predominant pattern (66.2% of those who drank). HD students presented a risk 9.2 times higher of not being in the ideal period of the course. **Discussion:** The college students evaluated presented high rates of alcohol abuse. Binge drinking might have interfered in their academic performance. Organic, social and behavioral consequences were also reported.

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**Keywords:** Drugs, alcohol abuse, schools.

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## Resumo

**Contexto:** Bebidas alcoólicas estão amplamente disponíveis no ambiente universitário, principalmente nas festas. Há poucos estudos abordando a relação entre o consumo de bebidas alcoólicas e o desempenho acadêmico entre estudantes universitários. **Objetivo:** Este trabalho avaliou o comportamento de estudantes universitários quanto ao padrão de consumo de bebidas alcoólicas e sua consequência acadêmica. **Métodos:** Os voluntários (343 estudantes) responderam a um questionário sobre o padrão de consumo de álcool e possível comportamento relacionado a esse consumo, especialmente sobre o desempenho acadêmico. Os participantes foram classificados como não bebedores (ND), bebedores não em *binge* (nBD), bebedores em *binge* (BD) e bebedores pesados (HD). **Resultados:** 88,1% dos estudantes relataram ingerir bebidas alcoólicas, sendo 44% bebedores em *binge*. A maioria dos bebedores (75,5% – nBD, BD ou HD) ficou embriagada pelo menos uma vez por mês. O padrão predominante de consumo foi em *binge* (66,2% dos que relataram beber). Estudantes HD apresentaram risco 9,2 vezes maior de não estarem no período ideal do curso. **Conclusão:** Os universitários avaliados apresentaram maiores taxas de abuso de álcool. O beber em *binge* pode ter interferido no seu desempenho acadêmico. Consequências orgânicas, sociais e comportamentais foram também relatadas.

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**Palavras-chave:** Drogas, abuso de álcool, instituições acadêmicas.

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## Introduction

The transition to adulthood happens between 18-25 years old, approximately. Several experiences and discoveries take place in this period, including contact with alcohol<sup>1</sup>. In addition to the individual's personality itself, many variables influence drinking behavior: genetics; gender; ethnicity; college; religiosity; occupation; marital status; friends and family<sup>2,3</sup>.

Alcoholic beverages are widely available in the university environment, particularly at the parties<sup>2,3</sup>. Young college students are especially vulnerable to alcohol and this wide availability favors abusive use<sup>4</sup>. Despite of all risks, they are still not protected by laws against alcohol industry and therefore, it is known that they represent the main target population of advertising campaigns, which encourage

alcohol use as a way to belong to their group, freedom, and especially, entrance to adulthood, a sense of being free from the family control<sup>5</sup>.

Worldwide studies have addressed the behavior of college students regarding psychoactive substances. Most of them focused on the vulnerability of students and the need to encourage intervention and preventive measures about alcohol consumption<sup>1-8</sup>.

Despite methodological problems have been appointed by some authors, especially regarding the high variability of behavioral drinking in the youth<sup>9,10</sup>, it is well established that college students consume more alcohol than their age-matched, nonstudent peers<sup>6</sup>.

Drinking in young students is typically inconstant, varying with time of year and days of the week<sup>9</sup>. Actually, alcohol drinking behavior will fulfill criteria for dependence only in adulthood, when an established pattern of drinking is achieved. It is observed that most

young stop abusive drinking by the age of 25, and those who do not will probably be alcoholics<sup>11</sup>. However, heavy drinking increases the risk for alcohol-related injuries<sup>12</sup>. Binge drinking is associated to high risk of accidents, and is a major cause of death in young adults<sup>13</sup>.

There are not many studies addressing drinking behavior in college students, considering short and recent periods of time and as far as we know insufficient literature taking as outcome academic performance.

The present study aimed at evaluating the behavior of college students of a public university regarding the profile of alcohol consumption and its academic consequences.

## Methods

### Participants and study design

The cross-sectional study was carried out with the students enrolled at the Ouro Preto Federal University (UFOP) in a wide range of courses\*, in the second semester of 2007 (n = 4,912). Pregnant and breastfeeding women were not included in the study, since those conditions influence alcohol consumption<sup>14</sup>.

The sample size calculation considered a prevalence of ingestion of alcohol of 65%<sup>15</sup>, a confidence of 95%, and a statistical power of 80%, which resulted in a sample of 326 students. Considering possible losses for refusal, missing participant, or student not meeting the inclusion criteria, the final number was a probabilistic draw of 427 individuals. The sample was randomly drawn from a list that contained the total number of students enrolled.

After approval by the committee responsible for human experimentation (Ethics Committee of Ouro Preto Federal University, Brazil – CAAE – 0002.0.238.000-07), students were invited to participate. Upon accepting the invitation, they signed an informed consent form and received the questionnaires without space for identification. Two students, previously trained for the task, applied the questionnaires. After being completed, the questionnaires were sealed, and opened later by the researcher in charge.

### Study procedure

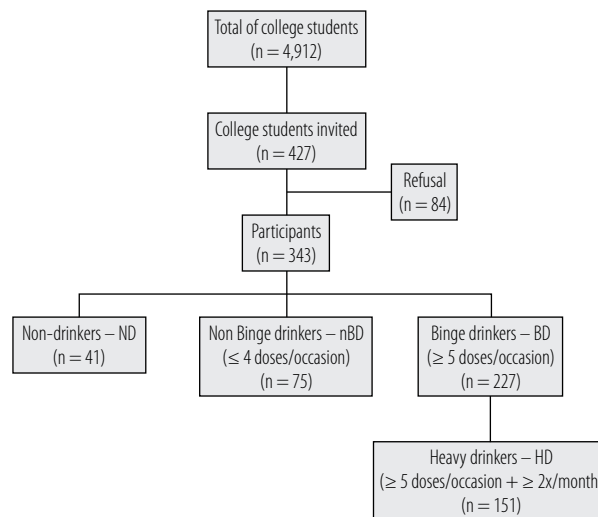
We used a questionnaire with 27 questions based on the model proposed by Prevention Research Center – Pacific Institute for Research<sup>16</sup> and World Health Organization<sup>17</sup>, with inclusion of questions regarding to pattern of alcohol intake, places where these beverages are consumed and specific questions regarding the consequences and drinking behavior of the students. Information for the inclusion criteria, as consumption of illicit drugs was also included. Sociodemographic data were also collected.

The consequences of alcohol consumption were investigated in relation to the month prior to the research. They were directed to academic performance and physical problems. Therefore, frequency of drunkenness, absence from classes; presence of gastrointestinal complaints and amnesia were inquired. Chronic academic consequences were evaluated by reports of low grades in disciplines, resulting in scholar failure, delayed graduation and therefore longer permanence in college.

Students were classified as following: “non-drinkers” (ND); “non-binge drinkers” (nBD), when alcohol consumption was lower than four doses per occasion, and “binge drinkers” (BD), when alcohol consumption was equal to or higher than five doses per occasion<sup>13,16,18</sup>. The category BD was also evaluated in relation to frequency, after which students who binge drank twice or more times a month were classified as “heavy drinkers” (HD)<sup>19</sup> (Figure 1). This classification

was based on patterns established by NIAAA (National Institute on Alcohol Abuse and Alcoholism). According to this classification, heavy drinking is a broad concept that encompasses binge drinking behavior and its frequency<sup>19</sup>. As students usually drink in binge, this classification seemed to be more appropriate than others available and frequently used in the literature.

One dose of alcoholic beverage is equivalent to 350 mL for beer; 120 mL for wine, and 50 mL for spirits (one dose = 10-12 g of alcohol)<sup>20</sup>.



**Figure 1.** Study profile and pattern of alcohol consumption by college students.

### Data analysis

Data were entered into Epidata (version 3.1)<sup>21</sup>. All statistical analysis were performed with STATA Statistical Software Package (version 10.0) (StataCorp LP, College Station, TX) and Epi-Info (version 6.04a)<sup>22</sup>. Statistical significance was accepted as  $P < 0.05$ .

Participants were classified by gender; age group; frequency of drunkenness, and drinking category (ND, nBD, BD and HD). Non-parametric tests were used when variables did not meet criteria for normality (Kolgomorov-Smirnov Test). Categorical variables were described through frequencies. Prevalence and 95% confidence intervals (95% CI) were calculated. Chi-square and Fisher's Exact tests were used to evaluate the difference in the distribution of categorical variables by gender. Chi-square for trend test was performed to evaluate risk of alcohol-related problems. *Odds ratio* between alcohol ingestion and academic failure was calculated. Kruskal Wallis Test followed by Man-Whitney U test evaluated differences between numbers of classes missed by age group.

## Results

Interviewers sorted 427 college students, with a refusal of 84 (19.7%). The final sample of 343 consisted of 60.6% male and 39.4% female students. Their mean age was  $22.0 \pm 2.5$  years (male) and  $21.7 \pm 2.2$  years (female). A considerable proportion of the students (18.1%) were not enrolled in the expected period of their graduation course, without differences between genders ( $p = 0.06$ ). Regarding living arrangements, most students lived in fraternities (77%). Most students reported having drunk one full dose of alcoholic beverage in life (95.2% male, 91.1% female;  $p = 0.13$ ).

Results of alcohol consumption in the previous month indicated: 11.9% of the college students reported no drinking (ND) and 88.1% declared ingesting alcohol (nBD = 21.9%; BD = 66.2%). There were 151 students classified as HD, which corresponds to 44.0% of the sample (Figure 1).

\* Computing Science; Environmental Engineering; Civil Engineering; Control and Automation Engineering; Mining Engineering; Production Engineering; Geological Engineering; Metallurgic Engineering; Physics; Industrial Chemistry; Information Systems; Biological Sciences; Pharmacy; Nutrition; Mathematics; Scenic Arts; Music; Languages; History; Law; Tourism.

Students in the ND, nBD, BD and HD groups were not different in relation to age ( $p = 0.40$ ) and religion ( $p = 0.50$ ). As presented in table 1, the highest percentage of students not enrolled in the expected period was observed in the BD and HD groups, with 32.9 and 33.3%, respectively ( $p = 0.02$ , compared to ND). No differences were detected between graduation courses.

Even though there were no statistical differences between the ND, nBD, BD and HD groups, approximately 40% of the students reported alcohol-related problems in their families (Table 1).

The college students showed preference for alcohol consumption in the company of other people ( $n = 250/72.9\%$ ). This finding was consistent with the venues chosen as their favorite for alcohol consumption, among which fraternities or friends' homes outnumbered the other places. The second place of highest consumption was the bar, followed by the student's own residence, the street and the student center/nightclub. Some students reported consuming alcohol at the university itself, with low prevalence (3.8%;  $n = 13$ ).

Male individuals in the BD and HD groups drink more than female ones, a finding that was not observed for individuals in the nBD group.

Beer presented the highest consumption in binge drinking in fraternity parties (69.4%) and bars (60.9%). Spirits were the second favorite of this kind of consumption in fraternity parties (25.2%). As regards gender, male students drank more beer and spirits in binge drinking ( $\geq 5$  drinks) than females in bars and fraternity parties.

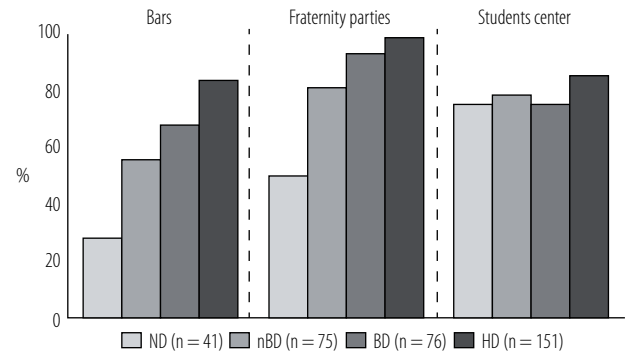
An expressive percentage of ND reported frequenting the main places of alcohol ingestion. Drinker's students (nBD, BD and HD) reported staying at their favorite places of alcohol consumption for longer than three hours at each occasion (Figure 2).

Most of the students (75.5%;  $n = 228$ ) who reported being drinkers (nBD, BD or HD) declared having been drunk at least once within the month prior to the study. Additionally, of 37 college students who reported drunkenness at least twice a week, 35 belonged to the HD group.

The proportion of individuals of both genders who reported being drunk three to four times within the month was higher in the age group 17-19 when compared to older students (20-24 and 25-31 years;  $p = 0.001$ ). A trend was observed towards an increase in the prevalence of organic, behavioral and academic consequences of excessive alcohol consumption in HD college students, as confirmed by the odds ratio (Table 2). Heavy drinkers presented about five times more risk of missing classes, stomach-ache and being drunk in class and about three times more risk of regretting how they drunk in the day before.

There was a gender difference only for the highest proportion of female students who reported stomach problems. It was higher among women (men: 54.5% and women: 71.4%;  $p = 0.003$ ).

Evaluating drinking categories (nBD, BD and HD) and enrollment in the ideal period of the graduation course, we observed a risk 2 times higher of the BD and HD not being enrolled in the ideal period (Table 3). It was also detected that HD students who missed periods also missed more classes (Table 3).



**Figure 2.** Frequency (%) of college student's non-drinkers (ND), non-binge drinkers (nBD), binge drinkers (BD) and heavy drinkers (HD) that remained in the bars, fraternity parties and students center for 3 hours or more.

**Bars:**  $p < 0.005$ : for ND x nBD ( $\chi^2 7.61$ ); ND x BD ( $\chi^2 15.34$ ); ND x HD ( $\chi^2 46.82$ ); nBD x HD ( $\chi^2 7.61$ ) and BD x HD ( $\chi^2 7.86$ ). **Fraternity parties:**  $p < 0.005$ : for ND x BD ( $\chi^2 30.71$ ); ND x HD ( $\chi^2 71.46$ ); nBD x HD ( $\chi^2 20.04$ ). **Students centers:**  $p > 0.05$ .

**Table 1.** Characteristics of college students non-drinkers (ND), non-binge drinkers (nBD), binge drinkers (BD) and heavy drinkers (HD), and their favorite place for consumption

	ND (n = 41)		nBD (n = 75)		BD (n = 76)		HD (n = 151)		$\chi^2$	P
	n	%	n	%	n	%	n	%		
<b>Gender</b>										
Male	26	63.4	36	48.0	58	76.3	88	58.2		
Female	15	36.6	39	52.0	18	23.7	63	4.7	13.30	0.004
<b>Enrolled in the ideal period of the course</b>										
Yes	31	75.6	64	85.3	51	67.1	100	66.7		
No	10	24.4	11	14.7	25	32.9	50	33.3	9.88	0.020
<b>Does anyone in your family have alcohol problems?</b>										
Yes	17	41.5	32	43.8	28	36.8	66	43.7		
No	24	58.5	41	56.2	48	63.2	85	56.3	1.12	0.773
<b>Where do you usually consume alcoholic beverages?<sup>a</sup></b>										
Where I live			37	49.3	61	80.3	124	82.1	86.77	0.0001
Home or fraternity of friends			49	65.3	64	84.2	136	90.7	128.53	0.0001
On the street			24	32.0	31	40.8	92	60.9	54.62	0.0001
In college			3	4.0	2	2.6	8	5.3	2.25	0.639
In sports events (soccer etc.)			1	1.3	6	7.9	30	19.9	25.52	0.0001
Hotel or motel			3	4.0	2	2.6	17	11.3	10.07	0.027*
Bar			44	58.7	62	81.6	128	84.8	100.02	0.0001*
In a student center (nightclub)			23	30.7	29	38.2	78	51.7	35.59	0.007*
In a restaurant			11	14.7	6	7.9	36	23.8	16.53	0.009*
At work			0	0	0	0	2	1.3	1.67	0.365 <sup>+</sup>
In an empty building or building under construction			0	0	0	0	2	1.3	1.67	0.365 <sup>+</sup>
In the car			0	0	0	0	4	2.6	2.94	0.132 <sup>+</sup>

**Table 2.** Risk for problems related to use of alcohol in the month prior to the study among non-drinkers (ND), non-binge drinkers (nBD), binge drinkers (BD) and heavy drinkers (HD) college students (n = 297)

Problems	No		Yes		Odds Ratio	CI 95%
	N (%)	CI 95%	N (%)	CI 95%		
Did you miss classes?						
nBD (n = 70)	59 (33.7)	26.6; 40.8	11 (9.0)	3.9; 14.2	1.00	
BD (n = 76)	50 (28.6)	21.8; 35.3	26 (21.3)	13.9; 28.7	2.79	1.27; 6.12
HD (n = 151)	66 (37.7)	30.5; 45.0	85 (69.7)	61.4; 77.9	6.91	3.53; 13.51
Did you feel sick to your stomach?						
nBD (n = 70)	44 (39.3)	30.1; 48.5	26 (14.0)	9.0; 19.1	1.00	
BD (n = 76)	32 (28.6)	20.1; 37.1	44 (23.8)	17.6; 30.0	2.33	1.20; 4.51
HD (n = 151)	36 (32.1)	23.4; 40.9	115 (62.2)	55.1; 69.2	5.40	3.00; 9.76
Were you drunk during class?						
nBD (n = 70)	67 (25.9)	20.5; 31.2	3 (7.9)	-1.1; 16.9	1.00	
BD (n = 76)	72 (27.8)	22.3; 33.3	4 (10.5)	0.3; 20.7	1.24	0.27; 5.77
HD (n = 151)	120 (46.3)	40.2; 52.4	31 (81.6)	68.7; 94.5	5.77	1.91; 17.43
Did you have amnesia?						
nBD (n = 70)	53 (33.3)	25.9; 40.7	17 (12.4)	6.8; 18.0	1.00	
BD (n = 76)	53 (33.3)	25.9; 40.7	23 (16.8)	10.4; 23.1	1.35	0.65; 2.82
HD (n = 150)	53 (33.3)	25.9; 40.7	97 (70.8)	63.1; 78.5	5.71	3.10; 10.53
Did you regret drinking a lot?						
nBD (n = 70)	57 (28.2)	22.0; 34.5	13 (13.7)	6.6; 20.7	1.00	
BD (n = 76)	60 (29.7)	23.3; 36.0	16 (16.8)	9.2; 24.5	1.17	0.52; 2.65
HD (n = 151)	85 (42.1)	35.2; 48.9	66 (69.5)	60.0; 78.9	3.40	1.75; 6.61

**Table 3.** Profile of missing classes and enrollment in the ideal period according to the college students drinking behavior

	Missed classes	Ideal period*				Odds Ratio**	CI 95%
		No		Yes			
		N (%)	CI 95%	N (%)	CI 95%		
nBD (n = 70)	No	6 (60.0)	27.4; 92.6	53 (88.3)	80.0; 96.7	1.00	
	Yes	4 (40.0)	7.4; 72.6	7 (11.7)	3.3; 20.0		
BD (n = 76)	No	18 (72.0)	53.7; 90.2	32 (62.8)	49.1; 76.4	2.69	1.17; 6.18
	Yes	7 (28.0)	9.7; 46.2	19 (37.2)	23.6; 50.9		
HD (n = 151)	No	16 (32.0)	18.8; 45.2	49 (49.0)	39.1; 58.9	2.45	1.12; 5.37
	Yes	34 (68.0)	54.8; 81.1	51 (51.0)	41.1; 60.9		

Non-binge drinkers (nBD), binge drinker (BD), heavy drinker (HD).

\* Ideal period: adequate period in relation to the beginning of the course; \*\* Adjusted odds ratio for missed classes.

As regards missing classes, 44.4% of the men (n = 83/187) and 33.6% of the women (n = 40/119) reported missing classes for being drunk in the past month, without differences between genders. Moreover, 13.4% of the men (n = 25/187) and 10.9% (n = 13/119) of the women reported being drunk while attending classes. Female students missed  $1.0 \pm 2.0$  classes (variation: 0-10) and male students missed  $1.9 \pm 3.6$  classes (variation: 0-35;  $z = -2.36$ ;  $p = 0.006$ ).

Evaluating the number of classes missed by age group, it was noticed the following values: 17-19 years,  $2.0 \pm 2.97$  (variation: 0-10); 20-24 years,  $1.6 \pm 3.31$  (variation: 0-35); and 25-31 years,  $0.6 \pm 1.58$  (variation: 0-8). Individuals in the age groups 17-19 ( $z = -2.96$ ;  $p = 0.003$ ) and 20-24 years ( $z = -2.44$ ;  $p = 0.015$ ) missed more classes than individuals in the older group. This age group drinks in binge more often than the others.

## Discussion

The main results of the present study indicated that alcohol could affect academic performance significantly. This is particularly important considering high prevalence of alcohol ingestion by college students and their more vulnerable age.

Brazilian studies with college students detected a prevalence of alcohol use between 65% to 92%<sup>23-29</sup>. Only four of those studies used a representative sample of all the graduation courses of the investi-

gated institution as it was done in the present study<sup>26-29</sup>. The mean prevalence of lifetime alcohol consumption in the present research was 93.1%, a result that is in line with those obtained by researchers in São Paulo (SP, Brazil), which detected a prevalence of lifetime use of 89.6 for women and 93.5% for men<sup>26</sup>.

The high consumption of alcohol in the college setting might be a result of several factors already described in the literature, such as social context; influence of friends; several parties where alcohol is widely available; mood improvement; reduction of stress, and the freedom of living alone or without one's family<sup>2,3,30,31</sup>.

Researchers suggest that young adults present an increased risk of alcohol abuse when they start living away from their parents. The behavior of inadequate alcohol consumption may lead to a delay in the student's development, a condition that might force them to stay longer at the university, therefore exposed to an environment that favors alcohol consumption, in a vicious cycle<sup>2,32</sup>.

A study carried out in Boston (USA) involving young college students between 21-24 years old found out that students presented mood alterations, deficit of attention and reaction time the day after an episode of binge drinking, even though their reading performance remained unaltered<sup>33</sup>.

The present study and those of other authors point to the fact that special attention should be given to the alcohol abuse among female college students<sup>20,26</sup>.

It is a known fact that women present a higher toxicity to alcohol due to the association of a higher amount of adipose tissue in relation to men and a reduced action of the gastric alcohol dehydrogenase (ADH), reducing the partial metabolism of ethanol. These factors favor higher blood alcohol content; intoxication and the development of alcoholic hepatic diseases as estheatosi, hepatitis and alcoholic cirrhosis, even when their consumption is similar to that of male individuals<sup>34,35</sup>. Additionally, the consumption of alcohol may increase the odds of breast cancer among women<sup>20,36</sup>.

The present study found that drunkenness twice or more times a week was higher among younger college students (17-24 years). This age group encompasses students who have just started college, and are classified as being highly vulnerable to the consumption of alcohol and other psychoactive substances<sup>2,3,6,8</sup>.

It is widely recognized that the risk of dependence and negative alcohol-related consequences increase as the frequency of episodic intoxication (binge drinking) grows higher<sup>37</sup>. The college students evaluated reported organic, academic and behavioral problems in the month prior to the research. Mainly those in the lowest age group and those in the HD group reported missing classes; being intoxicated during classes; amnesia, and regret for having drunk. Other authors reported that the perception of alcohol impact did not differ between genders as both mentioned the impact of missing classes as a negative consequence<sup>38</sup>.

Harm reduction interventions have been suggested in the literature. Interventions in students parties, including those that take place in fraternities, for example – alcohol-free parties or those that reward students who drink within the limit considered acceptable – have also been proposed by researchers, since the results obtained in isolated studies are positive<sup>39,40</sup>. In addition, the promotion of conscious consumption; drinks with a lower alcohol concentration; drinking water between doses; ingesting alcohol together with food; limiting the number of doses, and other measures that aim at promoting a responsible behavior of alcohol consumption, as indicated by Brazilian researchers<sup>41</sup>, may be included among the possible measures to be adopted by the institutions. Implementation at the universities of policies that increase the protective behavioral strategies can minimize negative alcohol-related consequences among college students<sup>42</sup>.

However the problem is managed, there are some important considerations that cannot be missed. Public universities are free in Brazil and it is financially supported with money provided by taxes. Government decisions have to be made every year to the proportion destined to education in the different levels, health, safety, and so on. It is a matter of concern that alcohol ingestion, besides the well-known problems, in health, familiar and traffic violence, also harms the expected results of so important social investments. Retention of students in the university for longer periods is prejudicial to the individual, who will not find social insertion, and also to society that did not recover the high investment in detriment of other activities. There is also another implication. Every year thousands of young students compete for the few available places, accordingly to their vocation. Many of them will never work in the chosen profession because of failure in the process.

Limitations of the present study must be noted, including randomization procedure that failed to produce equivalent groups at baseline for some variables (i.e. ethnic groups, gender and religion). Our data are cross-sectional so causal interpretations about the relationship between alcohol use and consequences are limited. The relatively homogenous nature of our sample of college students limits the possibility of generalization of results to students of universities in other regions of the country. The data were derived from self-report survey. Natural observation would be an ideal methodology to assess drinking behaviors and its consequences, and may be used in future studies. Future studies might also be designed to improve the quality of data collected in the present study, by using techniques which assess behaviors closer to their occurrence, for instance, a daily diary. Studies might also employ more objective measures of consequences, such as police records, college disciplinary files and maybe academic records. We believe that in spite of restrictions to the methodology of data collection, the present study will guide complementary investiga-

tion, in the near future. This study suggests important associations between variables. Methodological improvements in future studies should allow their authors to establish causality between these variables which was not possible with the present design.

## Conclusion

College students presented high rates of alcohol abuse. Binge drinking interfered in their academic performance. Organic, social and behavioral consequences were also reported. It is a matter of concern, in our view, that after a wide literature search, we did not find information about this deleterious effect of drinking behavior. Data from the present study points out to the need of additional studies on the subject. It is scaring that alcoholic beverages advertisements are still directed without restrictions to the young adult, in different countries.

## Acknowledgements

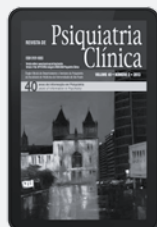
Quintaes KD and Fausto MA thanks Fapemig for the financial support (APQ-4869-4.08/07). Authors thanks to Camila R. Mont'Alverne for help with data collection.

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