Incidence of Binge Drinking in a Cohort of University Students of the South-East Region of Brazil, 2010-2011

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Abstract: *Objectives*: The aim of the present study was to evaluate the prevalence and incidence of binge and at-risk alcohol consumption among new-entrant students in a public university in the South-East Region of Brazil.

Methods: Longitudinal study undertaken with a random sample of undergraduates (N=1,168) in the first semesters of 2010 (n=256) and 2011 (n=183). In order to evaluate drinking patterns, participants were classified as abstainers, light, moderate, binge or heavy binge drinkers. The *Alcohol Use Disorders Identification Test (AUDIT)* questionnaire score was used to define the risk categories for consumption: low risk, risk, harmful use and probable dependence. Statistical analysis was undertaken using *Stata software*, version 11.0.

Results: Amongst the 256 students evaluated, 51.6% were women and 64.5% were aged ≥19 years. The prevalence of consumption of alcoholic beverages was 75.8%. The average age of onset of alcohol consumption was 15.7±1.9 years. The incidence of binge + heavy drinkers was 2.6/100 persons per year, with vulnerability shown in individuals of male sex and of age 19 years or more. The incidence of risk level drinkers was 2.0/100 persons per year and greater for individuals of male sex and younger than 19 years.

Conclusion: The students of this institution are at high risk for problems associated with alcohol use.

Keywords: Alcoholic Beverages, Longitudinal Data, Prevalence, Incidence, University Students.

INTRODUCTION

Alcohol is a psychoactive substance whose use is legal commercially and acceptable socially [1]. The consumption of alcohol is associated with a variety of acute and chronic consequences, be they individual or collective, which range from lesions due to traffic accidents to chronic diseases such as cancer and cardiovascular disease [2].

In Brazil, the consumption of alcohol and other drugs is more frequent in the university population compared to the general population [3]. For a significant portion of students, the national data suggest that the onset of exposure to alcohol is prior to entry to higher education [3]. In the latest National Survey that investigated the consumption of psychotropic drugs amongst students in primary and secondary education, 60.5% of students reported having already used alcohol at some point in life and, of these, 63% declared having started to consume alcoholic beverages before age 15 [4].

In Brazil, there are few studies that investigate the consumption of alcohol amongst recent-entry students in higher education institutions [5,6]. In light of the national scenario of alcohol consumption in primary and secondary education, it is important to identify and monitor the pattern of consumption of alcoholic beverages amongst students of higher education institutions so that actions to prevent and intervene in the abusive consumption of alcohol can be planned adequately.

The objective of the present study was to evaluate the prevalence and incidence of binge and at-risk use of alcohol by recent-entry students in a public university of the South-East Region of Brazil.

METHODS

This longitudinal study had an average duration of 1 year and was undertaken in 2 campuses of a federal university of the South-East Region of Brazil. This study was approved by the Ethics in Research with Human Beings committee of UFOP (CAAE – 0003.0.238.000-09). Participants in the study were all the selected students who agreed to, and signed, a free and informed term of consent.

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The population of this study was composed of 1,168 recent-entry students in the undergraduate courses of this university. A prevalence of alcohol use of 73.5% [7], variance of 5%, and confidence level of 95% were used for the sample size calculation, resulting in a minimum sample of 239 students. The selection of the simple random sample was made using the official list of students that enrolled at the institution in March 2010.

After the selection of the sample, the educational institution made the list of subjects and lesson timetables of each selected student available, allowing their location during the data collection stage.

Volunteers previously trained in the application of questionnaires undertook the collection of data. In the first data collection, undertaken in the March to July 2010 period, 256 students participated and in the follow-up stage, March to July 2011, 183 students participated. Reasons for loss to follow-up (28.5%) were refusal to continue in the study, absenteeism, temporary suspension of education, academic mobility and absence on health grounds. In order to evaluate trends in losses to follow-up, the variables of gender and age range were compared for those students who remained in the study and those lost to follow-up and no differences were observed. Of the 183 students that continued in the study, only 177 answered all of the *AUDIT* questions.

During the interview, information about gender, birth date, and whether the individual consumed alcohol was obtained. Those who declared consumption of alcoholic beverages were asked to inform the age at which they first drank, whom they were with on the occasion of their first exposure to alcohol and to answer the *Alcohol Use Disorders Identification Test* (*AUDIT*) questionnaire [8]. The *AUDIT* questionnaire score was used to define risk categories of alcohol consumption: low risk (0 to 7 points), risk (8 to 15 points), harmful consumption (16 to 19 points) and probable alcoholic dependence (≥20 points) [8]. Information on the length of time (years) of the individual's alcohol consumption was determined as the age at which the individual drank for the first time to their current age. This time was categorized in quartiles (≤25, >25 to 75, and >75) for the presentation of results. The age at which the individual first drank was categorized as <18 years or ≥18 years, based upon Brazilian legislation. The pattern of alcohol consumption was determined from the responses to *AUDIT* questions 1 and 2 and was classified as: light drinkers (consumption ≤ 2 units and frequency ≤1 occasion/month), moderate drinkers (consumption >2 and<5 units and frequency 1 to 4 occasions/month), binge drinkers (consumption ≥5 units per occasion and frequency ≤1 occasion/month) and heavy binge drinkers (consumption ≥5 units per occasion and frequency ≥2 occasions/month) [3,8,9].

The database was constructed with dual input to *Epidata software*, version 3.1. The statistical analysis was undertaken with *Stata software*, version 11.0, adopting a significance level of less than 5%.

Prevalence of alcohol consumption was estimated using information from the first data collection. For incidence calculations, prevalent cases were excluded from analysis. The incidence of binge drinkers, heavy binge drinkers and total binge drinkers (consumption ≥5 units per occasion) was calculated. The follow-up period was defined as the time between the start date of the study and the date of the last data collection or loss. Individuals with only one evaluation were censored on the second visit, adding to the average expected time between the two stages of the study (0.25 years).

In order to compare the basic information according to gender and age range, the Chi-Squared test was used. In order to compare any alteration in patterns of consumption of alcoholic beverages between students who participated in the two stages of the study and who answered the *AUDIT* questionnaire, Cochran's Q test was used.

RESULTS

Of the 256 students who participated in the foundation stage of the study, 51.6% (n=132) were women and 64.5% were aged ≥19 years. Amongst the students who declared consumption (n=194), 86.6% initiated the consumption of alcoholic beverages with friends, 85.6% started to drink under the age of 18 and 73.2% had consumed alcoholic beverages for more than 2.6 years (Table **1**). The median time of consumption of alcoholic beverages was 4.1 years (P25-P75: 2.6- 6.2 years). The average age of initial consumption of alcohol was 15.7±1.9 years, with no significant difference observed between genders (p=0.39). No significant difference was found when comparing information on whom first drinks were taken with, age at onset of drinking, and time of consumption of alcohol by gender. Consumption was more frequent in individuals of male gender (81.4% *vs* 70.4%) and older individuals (81.3% *vs* 72.7%).

The prevalence of consumption of alcoholic beverages was 75.8%. The prevalences of binge consumption, heavy binge drinking and at-risk consumption were 30.7%, 17.2% and 41.4%, respectively.

The incidences of binge drinkers, heavy binge drinkers and of the association binge + heavy binge drinkers were 1.0/100 persons per year, 1.6/100 persons per year and 2.6/100 persons per year (Table **2**). The incidences of heavy binge drinkers and of the association binge + heavy binge drinkers were higher amongst individuals of male sex and of the age range younger than 19 years. Binge drinkers, in turn, show the same incidence rates for both genders and age ranges.

Table **3** shows the incidence rates of drinkers of at-risk alcohol consumption, harmful use, and probable alcohol dependence, based on the total score of the

Table 1: Basic Information about the Consumption of Alcoholic Beverages of Recent-Entry University Students of a Public Institution in the South-East Region of Brazil, 2010

Information about Alcohol Consumption	Total	
	n	%
Do you consume alcoholic beverages? (n=256)		
Yes	194	75.8
No	62	24.2
With whom did you drink the first time? (n=194)		
Family	23	11.8
Friends	168	86.6
Did not answer	3	1.6
At what age did you start to drink? (n=194)		
<18	166	85.6
≥18	25	12.9
Did not answer	3	1.5
Time of consumption of alcoholic beverages (n=194)		
≤2.6 years	49	25.3
>2.6-6.2 years	93	47.9
>6.2 years	49	25.3
Did not answer	3	1.5
Pattern of alcohol consumption (n=256)		
Abstainers	4	1.5
Light drinkers	51	19.9
Moderate drinkers	14	5.5
Binge drinkers	78	30.5
Heavy drinkers	44	17.2
Did not answer	3	1.2
Non-drinkers	62	24.2
AUDIT Questionnaire (n=256)		
Low risk	61	23.8
Risk	106	41.4
Harmful	15	5.9
Probable dependence	8	3.1
Non-drinkers	62	24.2
Did not answer	4	1.6

Table 2: Incidence of a Pattern of Binge and Heavy Binge Consumption of Alcoholic Beverages Amongst University Students in a Public Institution in the South-East Region of Brazil

Alcohol ingestion pattern	Person-time	Events	Rate (100 persons/year)	CI 95%
Binge + Heavy Drinkers				
Total	1604.10	41	2.55	1.88; 3.47
Gender				
Male	732.49	21	2.86	1.87; 4.39
Female	871.61	20	2.29	1.48; 3.55
Age range				
< 19 years	101.0	4	3.96	1.48; 10.55
≥ 19 years	1503.1	37	2.46	1.78; 3.40
Binge Drinkers				
Total	1846.36	30	1.62	1.14; 2.32
Gender				
Male	828.13	13	1.57	0.91; 2.70
Female	1018.23	17	1.67	0.10; 2.68
Age range				
< 19 years	136.72	2	1.46	0.03; 5.85
≥ 19 years	1706.64	8	1.63	1.13; 2.37
Heavy Drinkers				
Total	2010.23	17	0.84	0.05; 1.36
Gender				
Male	1014.43	11	1.08	0.60; 1.96
Female	995.80	6	0.60	0.27; 1.34
Age range				
< 19 years	101.02	2	1.98	0.49; 7.90
≥ 19 years	1909.21	15	0.78	0.47; 1.30

CI: Confidence Interval 95%.

AUDIT questionnaire. The incidence rates of these events were 2.0/100 persons per year, 0.3/100 persons per year and 0.2/100 persons per year, respectively. Men and individuals younger than 19 years presented the highest incidence rates for at-risk consumption. For harmful alcohol consumption, women and individuals of 19 years or more presented the highest incidence rates. On evaluating the consumption in probable dependence, the same rates of incidence were observed in both genders and rates were higher in individuals of 19 years or more.

Table **4** shows the classification of student drinkers by gender, according to *AUDIT* questionnaire score. Amongst the students who declared they drank, the largest percentage of students was encountered in the at-risk category in both stages of the study. The change in classification was significant only for individuals of male sex (p=0.04).

DISCUSSION

The average age of onset of use of alcoholic beverages observed in this study (15.7 years) is similar to that encountered in the National Survey I on the Use of Alcohol, Tobacco and Other Drugs Amongst University Students (15.3 years), and in studies undertaken with Brazilian students in secondary education [1,3,10,11]. The early age of experimentation with this substance and the time interval over which these individuals consume alcoholic beverages (73.2% had consumed alcohol for more than 2.6 years) indicate that the alcoholic habit precedes university entry. This information is corroborated by other studies which suggest that the earlier the use of such a substance, the greater the harm to the individual in the future [12,13,14].

Among the various factors that may be related to the early age of onset and habit of consuming alcohol,

Table 3: Incidence of Alcohol Drinkers of at-Risk Consumption, Harmful Use and Probable Dependence Amongst University Students of a Public Institution of the South-East Region of Brazil

AUDIT Classification	Person-time	Events	Rate (100 persons/year)	CI 95%
Risk				
Total	1687.67	33	1.95	1.39; 2.75
Gender				
Male	801.67	17	2.12	1.31; 3.41
Female	886.10	16	1.81	1.10; 3.29
Age range				
< 19 years	124.85	4	3.20	1.20; 8.54
≥ 19 years	1562.81	29	1.85	1.29; 2.67
Harmful				
Total	2180.10	7	0.32	0.15; 0.67
Gender				
Male	1060.06	3	0.28	0.09; 0.87
Female	1120.03	4	0.35	0.13; 0.95
Age range				
< 19 years	126.16	0	0	0
≥ 19 years	2053.93	7	0.34	0.16; 0.71
Probable Dependence				
Total	2213.08	4	0.18	0.07; 0.48
Gender				
Male	1070.65	2	0.19	0.05; 0.75
Female	1142.43	2	0.17	0.04; 0.70
Age range				
< 19 years	123.44	1	0.81	0.11; 0.58
≥ 19 years	2089.64	3	1.43	0.46; 4.45

CI: Confidence Interval 95%.

Table 4: Alterations in the AUDIT Classification of University Students of a Public Institution of the South-East Region of Brazil, 2010/2011, by Gender (N=177)

AUDIT Classification	Start of study		End of study		*p**	Men				*p**	Women				*p**
						Start		End			Start		End		
	n	%	n	%		n	%	n	%		n	%	n	%	
Low risk	36	20.34	48	27.12	*0.168*	17	17.17	30	30.3	*0.037*	19	24.36	18	23.08	*0.841*
Risk	83	46.89	69	38.98		50	50.51	35	35.35		33	42.31	34	43.59	
Harmful	10	5.65	16	9.04		7	7.07	10	10.1		3	3.85	6	7.69	
Dependence	6	3.39	6	3.39		4	4.04	2	2.02		2	2.56	4	5.13	
Non-drinkers	42	23.73	38	21.47		21	21.21	22	22.22		21	26.92	16	20.51	

*Cochran's Q.

is the absence of surveillance and penalization for infractions of Law n. 8069/90, in which the prohibition of sale of alcohol to those younger than 18 years is stated [15].

The prevalence of consumption of alcoholic beverages amongst students in this study was rather high and similar to that found by Nunes *et al.* who observed a prevalence of consumption of 71.5% among university students in the health field [16]. On the other hand, a transverse study conducted at the same institution which evaluated a sample of students properly matriculated in the second semester of 2007 found a lower prevalence of alcohol consumption in relation to that observed in this study [17].

The high incidence of university binge drinkers + heavy binge drinkers found in this study suggests that a significant portion of students at this university may present an augmented risk for problems related to the excessive consumption of alcohol such as academic and negative organic consequences cited in the study by Aguiar-Nemer *et al.* [17].

The higher incidence of heavy binge drinkers of male sex may be explained by socio-cultural and biological factors such as the greater exposure/access of these individuals to festive environments, and this suggests a greater vulnerability of men to risk-taking behaviours [18,19].

Concordant with the international study undertaken by Vergara, 2008, a higher incidence of at-risk use of alcohol was observed in this cohort [20]. According to the applied tool (*AUDIT*), this fact suggests that although these individuals do not exhibit current problems, they may, in the future, present health problems and suffer/cause injury, violence, legal or social problems and/or produce low performance in their studies due to acute intoxication episodes. This scenario may be reversed by proposing the establishment of abstinence targets or the compliance of drinking patterns with limits considered low risk [8,21].

The main limitation of this study is recall bias, a common fact when it is necessary that the subject remember the frequency and quantity of consumption of beverages, which hinders understanding of their usual consumption, although resources were used so that this consumption might be recalled, as indicated by Willet, 1998 [22].

It is worth highlighting that the comparison between the incidence and alterations in the pattern of alcohol consumption of the university students of this study with other students is difficult due to the scarcity of longitudinal epidemiological studies.

CONCLUSION

The results of this study indicate that the recent-entry students of this university are at high risk for problems associated with the use of alcohol and it is necessary to develop preventive programmes for this target population specifically.

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