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Psychoactive substance use among medical students: a preliminary study

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SUMMARY - Objective: the authors report on the preliminary data on psychoactive substance use among first-year medical students of the University of L'Aquila. Methods: 153 students were asked to fill in questionnaires on their living conditions, on alcohol intake habits in the previous week, and the Minnesota Multiphasic Personality Inventory. Results: 27% of the students reported that they never drank alcohol and the proportion of females was significantly higher than that of males. The consumption of alcohol was common, but most students state that they drank only during social events and were therefore considered to be social drinkers. 73% had drunk alcohol in their lives, but only 45% had drunk alcohol in the previous week. Generally the students were satisfied with their living conditions; students who drank showed more satisfaction with their sexual relationship than abstainers. About 20% of students smoked cigarettes and only 3% took self-prescribed benzodiazepines. The MMPI profiles were in the normal range and did not clinically discriminate specific patterns among psychoactive substance consumers. Conclusions: Italian male smokers with full and satisfying sexual relationships were predictors of alcohol intake in the sample which was biased towards high social class and high educational level compared to the general population of young adults. Student follow-ups at 3 and 6 years are planned to investigate the association between alcohol use, psychological variables and academic drop-out and performances.

INTRODUCTION

In English-speaking countries, several studies have been conducted on psychoactive substance use among university students, especially among those attending the Faculty of Medicine[1-4]. The interest in this topic derives from the considerations that medical students have high levels of stress during their course of study[5-8,2] and their personal lifestyle could influence their role as future health professionals and educators in their communities[9-11].

Different studies investigated the relationship between substance use and personal and academic stress in medical students, considered as a population at risk[12-14].

All studies documented the frequent and heavy use of alcohol among medical students[15] and a low consumption of other psychoactive substances.

Heavier drinking students were more likely to be male, single and non religious[16], to have heavy drinking parents[17], to have larger social networks but in contact with fewer relatives, and more impervious to peer or other social influences[18,19].

The Italian survey carried out by the Permanent Observatory on Youth and Alcohol together with Doxa[20] reported data on alcohol consumption in a sample of a general young population aged from 18 to 24 years; 26% of the sample had not drunk any kind of alcohol in the previous three months, while 51% reported regular alcohol consumption (more than once a week) and 23% were occasional consumers during the same period.

The main aim of this work was to report on first-year students' lifestyle, psychological conditions and substance intake, especially drinking habits.

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Students will be followed-up during their medical training to assess the evolution of substance use and the relationship between this and academic performance.

METHODS

Sample

The study was performed by the university centre for student psychological counselling, Servizio di Ascolto e Consultazione per Studenti (SACS), in March 1992 and March 1993. One-hundred and twenty students (90 Italians and 30 foreigners) are admitted to the Faculty of Medicine of the University of L'Aquila every year. The fist-year medical students were given the questionnaires to be filled in during a General Psychology lecture. 153 students in the two years of study (63% of all registered in 1991-92 and 1992-93 at the Faculty) filled in the questionnaires. Of them, 64 students (42% of total enrolled students) were registered in 1992 and 89 (58% of total enrolment) in 1993.

Measures

The students filled in an information form developed by our group. This was not anonymous due to the follow-up study design.
The information asked included:
– demographic and social data of the student;
– demographic and social data of his/her family: family composition, relatives' educational level and the head of the family's profession;
– student curriculum data: kind of secondary school certificate, previous university courses, doubts on study choice, studying habits;
– psycho-social data on university life: accomodation, use of public transport for students living outside the town, financial conditions and possible occupations, social relationships, relationship with partner, sexual life and leisure activities. Every section included one item on student subjective satisfaction; a specific section concerned foreign students and their problems;
– consumption of alcohol, tobacco and prescription drugs.
In the questionnaire, eight common psychoactive drugs were listed (benzodiazepines, amphetamines, etc.) with their trade names to allow a simple identification by students. The compounds investigated were bromazepan, diazepam, chlordiazepoxide, lorazepam, alprazolam, triazolam, phenphluramine, dextroamphetamine. Use of illegal substances was not investigated, since it was not possible to ensure anonymity.
Alcohol consumption was investigated:
a) asking the students if they had ever drunk and, if so, what was their pattern of current use (daily or almost, 2-4 times a week, once a week, only at social events, less than once a month, never);
b) asking the students to fill in the Self-administered Quantitative Questionnaire (SQQ), a short graphical form that investigates quantity and frequency of the consumption of five alcoholic beverages (wine, beer, bitters, spirits and aperitifs) during the previous week. For each beverage, the respondent was asked to select among four-six pictures the maximum amount consumed in a day: e.g., for wine consumption, the pictures were: one glass, two glasses, one half-litre bottle, two one-litre bottles and three one-litre bottles. The respondent was also asked to record the number of days on which each beverage was assumed. The consumption was later converted into g/alcohol/day, for instance a glass of wine was considered 12 g of alcohol. Maximum weekly alcohol consumption was calculated multiplying the maximum amount consumed in a day by the number of days of consumption.
This very simple questionnaire was shown to be valid in discriminating among light drinkers, heavy drinkers and alcoholics[21].
The students were also administered the Minnesota Multiphasic Personality Inventory, MMPI[22], one of the most widely used personality questionnaires.
The questionnaire provides scores on the following ten clinical scales: 1) Hs (Hypochondriasis); 2) D (Depression); 3) Hy (Conversion hysteria); 4) Pd (Psychopathic deviate); 5) Mf (Masculinity-femininity); 6) Pa (Paranoia); 7) Pt (Psychasthenia); 8) Sc (Schizophrenia); 9) Ma (Hypomania); 10) Si (Social introversion). The scales represent linear measures of personality traits of individuals and together define a personality profile.

Statistics

Data analysis was performed with the Statistical Package for the Social Sciences for Windows, advanced statistics[23] on a 486 IBM-compatible personal computer.
The Chi-square test was used for categorical variables to identify significant psychosocial differences between males and females, drinkers and abstainers, smokers and non-smokers.

In order to discover which variables might be predictors of alcohol intake, three sets of logistic regression analyses (stepwise and forced entry models) were carried out. The analyses were conducted using three different patterns of alcohol assumption as dichotomous dependent variables. The considered dependent variables will be specified in the results section. In each analysis the same list of possible predictors was used; the predictors were considered as a whole and in two different clusters: the socio-demographic (age, sex, nationality, father's educational level) and the psychosocial (smoking habits, satisfaction with social relationships, with affective relationships, with sexual relationships, having full sexual relationship) in order to best explore their predictive value. The value of significance of an independent variable to enter in the model was 0.5.
Analysis of variance for non-parametric data (Kruskall-Wallis 1-way ANOVA) was used to examine the differences in MMPI mean score values students' different drinking patterns.

RESULTS

Age, sex, social and geographic origin of the students

The mean age of the 153 students included in the study was 20.1 years (SD 1.6). 58% of the sample was represented by females (n. = 89) and 42% (n. = 64) by males. There were 118 Italian students (77%) and 35 (23%) foreigners.
The sex ratio was statistically different between Italian and foreign students ($\chi^2 = 16.34$; 1 df, $p < 0.001$); there were 77% females among Italians and 28% among foreigners. 93% of the Italian students were Catholic and only 7% reported not following any religious practice. 88% of the foreigners were orthodox, 6% were Catholic and the remaining 6% followed other religions.
The males more often came from towns and metropolitan areas, the females from rural areas ($\chi^2=17.07$; 2 df, $p < 0.001$). The students who were not resident in L'Aquila (n. = 128, 84%) and not born there were in the majority; only 10% (n. = 16) came from the town and a small percentage (n. = 9, 6%) from nearby suburban areas.

Demographic and social characteristics of the relatives of our student sample

The father and mother's educational level was relatively high: 41.8% of the fathers (n. = 64) and 24% of the mothers (n. = 38) had a university degree. 45% of mothers had a high school qualification. More than 30% of the fathers were professionals and belonged to a medium-high social class (teachers, office-workers, managers). It's interesting to note that 14% of fathers were already retired.

Psychosocial variables

50% of the students lived in a rented flat with other students, 15% lived in religious colleges. None of the students lived in the university students' hostel. Three quarters of the non-native L'Aquila students stated that they were satisfied with their accomodation. Almost all students were satisfied with their social relationships (90%) and most with their leisure activities (78%) and with their partners (71%), while only 33% reported a satisfactory sexual life.

Psychoactive substance use habits

Forty-two students (27.5%) reported that they never drank alcohol.
The proportion of students who had never drunk alcohol was statistically different between males (10.9%) and females (39.9%) (Table 1). Almost twice as many male students had never drunk spirits as had never drunk beer or wine. The proportion of

TABLE 1

Students who never drank by type of beverages and sex

	Males (n. 64)		Females (n. 89)		χ^2 (1 df)	p
	N.	%	N.	%		
Students who never drank any kind of alcoholic beverage	7	10.9	35	39.3	15.06	< .001
Students who never drank wine	16	10.5	54	35.3	19.08	< .001
Students who never drank beer	14	9.1	47	30.7	14.85	< .001
Students who never drank spirits	29	19.0	66	43.1	13.15	< .001

TABLE 2

Amount of alcohol consumption in g in the previous week

g	Wine		Beer		Bitters, spirits and aperitifs		Total consumption	
	N.	%	N.	%	N.	%	N.	%
0	116	75.8	111	72.5	123	80.4	85	55.6
<= 12	10	6.5	23	15.1	12	7.9	28	18.3
<= 24	10	6.5	11	7.2	5	3.3	8	5.3
<= 36	2	1.3	5	3.3	4	2.7	8	5.3
<= 48	7	4.6			3	2	4	2.6
<= 72	2	1.3			4	2.7	5	3.4
<= 84	2	1.3			1	0.7	2	1.4
<= 96	3	2	1	0.7				
<= 144			1	0.7			10	6.6
<= 192							1	0.7
<= 222							1	0.7
<= 240					1	0.7		
<= 432			1	0.7				
<= 672	1	0.7						
<=1344							1	0.7

TABLE 3

Logistic regression models for dependent variable: never drinkers vs. drinkers

Step	All variables	Forced entry model			Variable entered on step number	Stepwise model	
		B	SE	O.R.		χ^2 (1 df)	p
1	Age	–0.04	0.14	0.96			
2	Gender: male	0.73	0.56	2.08			
3	Italian nationality	–1.16	0.72	0.31			
4	High educational level of father	0.61	0.48	1.85			
5	Smoking	1.20	0.68	3.33	2	5.79	.01
6	Satisfaction with social relationships	–0.79	0.84	0.45			
7	Satisfaction with affective relationships	–0.03	0.44	0.96			
8	Satisfaction with sexual relationships	0.51	0.78	1.67			
9	Having full sexual relationships	1.06	0.65	2.88	1	25.63	.0000
	Socio-demographic variables						
1	Age	–0.04	0.14	0.95			
2	Gender: male	1.54	0.48	4.68	1	15.94	.0001
3	Italian nationality	–1.31	0.67	0.26	3	4.53	.03
4	High educational level of father	0.90	0.44	2.46	2	4.04	.04
	Psychosocial variables						
1	Smoking	1.44	0.66	4.22	2	5.95	.01
2	Satisfaction with social relationships	–0.81	0.84	0.44			
3	Satisfaction with affective relationships	–0.21	0.43	0.81			
4	Satisfaction with sexual relationships	0.35	0.74	1.42			
5	Having full sexual relationships	1.67	0.59	5.35	1	26.04	.0000

all drinkers was statistically lower in females for all kinds of alcohol beverage.
A strong and statistically significant association was found with sexual life. As many as 83% of students who had never drunk and only 33% of drinkers did not have full sexual relationships ($\chi^2 = 25.12$, 1 df, $p > 0.001$); the latter also expressed more satisfaction with sexual life (44% vs 12%) ($\chi^2 = 13.86$, 1 fd, $p < 0.001$).

Previous week alcohol assumption assessed by SSQ

Among the 37 (24%) wine drinkers the mean maximum weekly g/alcohol consumption was 54 g of alcohol, median 24 (quartile: first = 12; third = 48); among the 42 (27%) beer drinkers the mean was 30, the median 12 (quartile: first = 6; third = 24). Among the 20% bitter, spirits, and aperitif drinkers the weekly g/alcohol mean was 34, the median was 21 (quartile: first = 10.5; third = 48).
Average total weekly alcohol consumption in the 68 (44%) students who had drunk alcohol in the previous week defined as current drinkers, was 64 g, median 24, first quartile 7.5, third quartile 64.5.
The distribution of intakes is reported in Table 2. Among drinkers in the previous week there were 24 «heavy» drinkers (more than 36 g of alcohol a week) and 44 «light» drinkers (less than 36 g of alcohol a week).

Predictors of alcohol consumption

Logistic regression analyses were performed considering three different patterns of alcohol consumption. In the first set we entered as dichotomous variable drinking students versus students who had never drunk (Table 3). If we consider all nine possible predictors, only having full sexual relationships and smoking entered the stepwise model, as in the analysis performed only on the psychosocial cluster; using the socio-demographic variables the odds of being a drinker were increased by being male, belonging to a higher social class, and being Italian.
In the second set we focused on drinking students and we considered students who had drunk in the previous week versus students who had not (current drinkers vs. past and occasional drinkers) (Table 4). Within the set of the all considered variables, being

TABLE 4

Logistic regression models for dependent variable: past and occasional drinkers vs. current drinkers

Step	All variables	Forced entry model			Variable entered on step number	Stepwise model	
		B	SE	O.R.		χ^2 (1 df)	p
1	Age	0.10	0.17	1.11			
2	Gender: male	1.12	0.49	3.07	1	9.66	.001
3	Italian nationality	–0.04	0.52	0.95			
4	High educational level of father	0.20	0.52	1.22			
5	Smoking	1.13	0.52	3.09	2	6.01	.014
6	Satisfaction with social relationships	0.33	0.67	1.39			
7	Satisfaction with affective relationships	0.28	0.49	1.33			
8	Satisfaction with sexual relationships	–0.07	0.60	0.92			
9	Having full sexual relationships	0.35	0.61	1.42			
	Socio-demographic variables						
1	Age	0.11	0.18	1.12			
2	Gender: male	1.24	0.43	3.45	1	9.66	.001
3	Italian nationality	–0.13	0.48	0.87			
4	High educational level of father	0.35	0.50	1.41			
	Psychosocial variables						
1	Smoking	1.08	0.50	2.97	1	6.42	.01
2	Satisfaction with social relationships	0.21	0.64	1.23			
3	Satisfaction with affective relationships	0.37	0.46	1.46			
4	Satisfaction with sexual relationships	–0.05	0.57	0.94			
5	Having full sexual relationships	0.85	0.54	2.34	2	4.76	.02

TABLE 5

Logistic regression models for dependent variable: «heavy» drinkers vs. «light» drinkers (students drinking more or less than 36 g of alcohol in the previous week)

Step	All variables	Forced entry model			Variable entered on step number	Stepwise model	
		B	SE	O.R.		χ^2 (1 df)	p
1	Age	–0.28	0.36	0.75			
2	Gender: male	–0.19	0.68	0.98			
3	Italian nationality	1.10	0.68	3.01			
4	High educational level of father	–0.39	0.73	0.67			
5	Smoking	0.92	0.62	2.52			
6	Satisfaction with social relationships	0.09	0.98	1.10			
7	Satisfaction with affective relationships	–0.22	0.75	0.80			
8	Satisfaction with sexual relationships	0.25	0.76	1.28			
9	Having full sexual relationships	1.73	1.04	5.65	1	5.84	.015
	Socio-demographic variables						
1	Age	–0.14	0.27	0.84			
2	Gender: male	0.55	0.56	1.74			
3	Italian nationality	0.85	0.60	2.34			
4	High educational level of father	–0.10	0.67	0.90			
	Psychosocial variables						
1	Smoking	0.86	0.59	2.38			
2	Satisfaction with social relationships	–0.02	0.96	0.97			
3	Satisfaction with affective relationships	0.03	0.66	1.03			
4	Satisfaction with sexual relationships	0.36	0.73	1.43	1	5.70	.01
5	Having full sexual relationships	1.42	0.96	4.17			

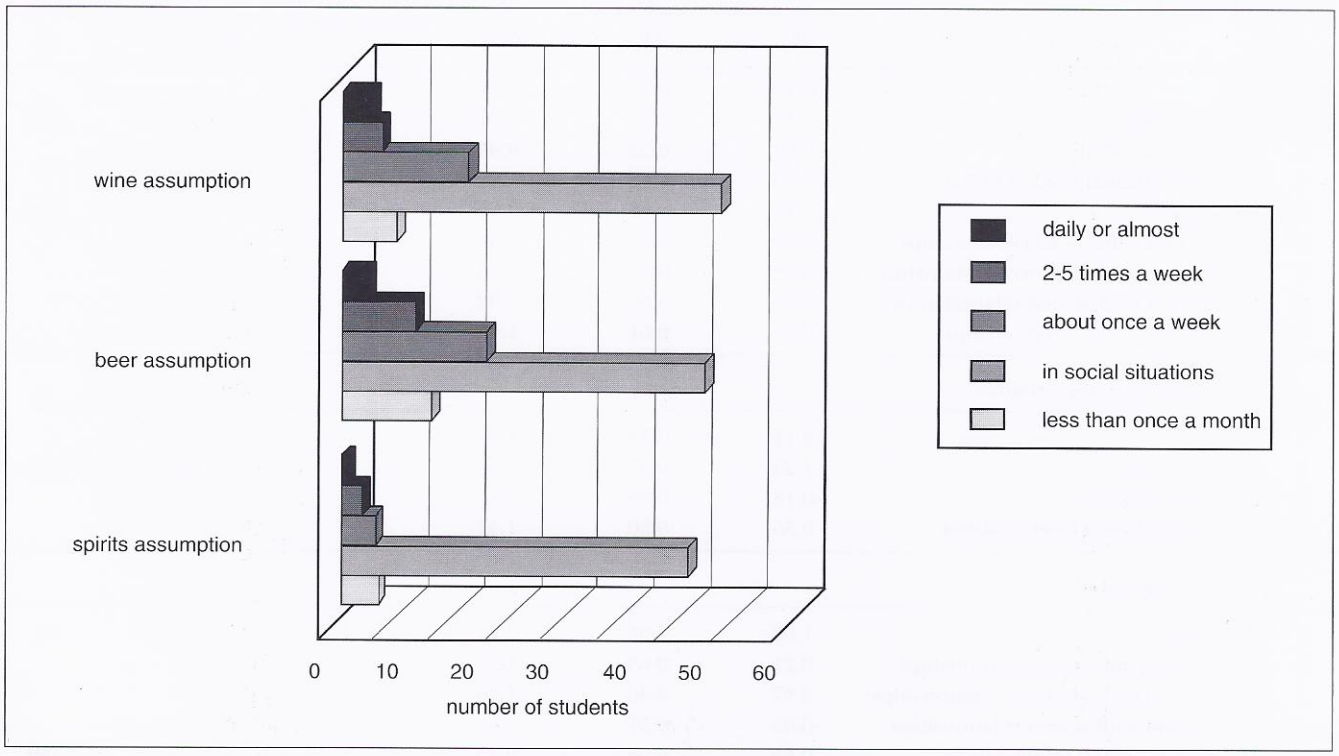

FIGURE 1 Pattern of alcohol assumption by drinking students (number of students).

male and smoking were the only predictors. Within the demographic variables only being male was a significant predictor; by psychosocial variables, smoking and having full sexual relationships were associated with a higher risk for drinking.
The last set was performed using as dependent variable drinking more or less than 36 g of alcohol in the previous week («heavy» drinkers vs «light» drinkers) (Table 5). «Heavy» drinkers were more likely to have full sexual relationships within all the considered predictors and to be more sexually satisfied, if considering only the psychosocial variables.
Most drinking students drank only occasionally and mainly in social situations (Figure 1). The proportion of daily drinkers was very low for every kind of beverage and reached 5% only for wine.

TABLE 6

Cigarette smoking

	N.	%
Never smokers	110	72
Ex-smokers	7	4.5
1 - 2 cigarettes a week	5	3.3
1 - 9 cigarettes/day	7	4.5
10 - 15 cigarettes/day	10	6.5
16 - 20 cigarettes/day	11	7.2
More than 20 cigarettes/day	3	2.0

Cigarette smoking

110 students (72%) reported that they had never smoked, 7 students claimed to have given up smoking, so that at the time of the study 117 students (76%) did not smoke cigarettes (Table 6).
Among the smoking students, only 24 students (about 16% of the total) reported smoking more than 10 cigarettes a day.
In cigarette smoking, no statistically significant differences for sex and nationality were found. As foreseen, there was a positive association between smoking and alcohol consumption. About 8% of never drinkers and 92% of drinkers were smokers ($\chi^2 = 8.6$; 1 df, $p = 0.003$).

Drug consumption

Only 5 students (3.3%; 3 females and 2 males) gave a positive answer to the items about taking «tranquillizers or stimulants». All 5 students took benzodiazepines (2 subjects took lorazepam, 2 bromazepam, 1 diazepam) and reported their consumption as occasional (less than once a month).

Psychological correlates

Validity scales (L, F, K) of MMPI showed good reliability. The mean and median scores of all clinical scales were all in the normal range. Scores were

TABLE 7

Alcohol and MMPI: MMPI mean scores in never drinkers, past drinkers, current drinkers

	Never drinkers (n. = 42)		Past drinkers (n. = 43)		Current drinkers (n. = 68)	
	Mean	Median	Mean	Median	Mean	Median
Scale **L**	44.5	41	45.6	46	43.5	43
Scale **F**	49.3	46	52.8	53	50.7	46
Scale **K**	49.4	50	48.7	48	50.1	50
Scale **HS**	55.0	53	56.5	56	56.5	56
Scale **D**	57.6	57	59.0	57	54.9	54
Scale **HY**	54.7	55	56.0	56	57.1	56
Scale **PD***	47.5	46	53.0	52	51.5	52
Scale **MF***	47.2	45	47.9	50	53.2	54
Scale **PA***	47.8	46	52.2	53	50.8	48
Scale **PT**	51.4	49	57.4	56	53.8	54
Scale **SC***	48.8	46	55.3	56	52.8	50
Scale **MA**	47.9	49	50.6	52	53.0	52
Scale **SI***	52.4	52	54.3	54	49.4	50

*(Kruskall - Wallis 1-way ANOVA Test $p < 0.05$).

compared between never drinkers, current drinkers (who had drank in the previous week) and past/occasional drinkers (who had not drank in the previous week) (Table 7).
Kruskall-Wallis 1 way-ANOVA test reached statistical differences ($p < 0.05$) on the following scales: Pd (Psychopathic deviate), Mf (Masculinity-femininity), Pa (Paranoia), Sc (Schizophrenia), Si (Social introversion) but the differences were small and almost never in a consistent order from never drinkers, past/occasional drinkers, current drinkers.
No statistically significant differences on MMPI scores between non-smokers and smokers were found.

DISCUSSION

Some studies have identified first year medical students as heavy drinkers who should be a priority target for health education[24,25].
In our Italian sample, the consumption of alcohol was common, but most students stated that they drank only during social events (about 50%). 73% had drunk alcohol in their lives, but only 45% had drunk alcohol in the previous week. Only 3 students (2% of the total sample) had drunk more than the recommended 3 units of alcohol a day. First year medical students drink much less than the national sample of youth described by Rossi[20]. Our sample of course is biased towards high social class and high educational level.
Despite literature data referring as a predictor of alcohol assumption more isolation from the peer group[18], our drinking students were more likely to belong to higher social classes, to have good relationships with friends, able to approach a partner, and have a full sexual life. Never drinkers had had fewer sexual experiences and were less satisfied with their sexual life, but there was no difference in satisfaction with social relationships. The «heavier» drinking students were more likely to be subjectively satisfied with their sexual relationships. Alcohol intake seems to identify well-off students, behaving as «stereotyped adults» in respect to a lower sexual inhibition, being male and smoking cigarettes.
In our study drinking is associated with male gender and also with smoking, as has been shown repeatedly in previous studies[26,27]; in regard to smoking, for instance, in a recent Danish population study the authors found that abstainers were statistically more frequent among individuals who never smoke and an increasing tobacco consumption was associated with an increasing alcohol consumption[28].
Studies on Italian high school student samples confirmed these results[29,30,31].
In our sample males drank more but did not smoke more than females. 20% of students smoked cigarettes (14% more than 10 a day) and only 3% took self-prescribed benzodiazepines.
Student psychological profiles, assessed by MMPI, were in the normal range and they did not clinically discriminate between different drinking and smoking habits.
Our results on alcohol consumption agree with the paper by McAuliffe *et al.*[3], who showed that medical students are not heavy but social drinkers, and are not especially vulnerable to alcoholism; but it must be emphasized that our sample was made up of first year medical students and an increasing consumption in the last years of medical school has often been reported[11,32,33].
Because our study design includes follow-up of the sample in the next 6 years, it will be possible to assess changes in alcohol and substance use. It will also be possible to investigate the association between alcohol use, psychological variables and academic drop-out and performances.

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