

# Alcohol consumption in college students from the pharmacy faculty

## *Evaluación del consumo de riesgo de alcohol en estudiantes universitarios de la Facultad de Farmacia*

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### Resumen

Alcohol consumption is highly prevalent in university students. Early detection in future health professionals is important: their consumption might not only influence their own health but may determine how they deal with the implementation of preventive strategies in the future.

The aim of this paper is to detect the prevalence of risky alcohol consumption in first- and last-degree year students and to compare their drinking patterns.

Risky drinking in pharmacy students (n=434) was assessed and measured with the AUDIT questionnaire (Alcohol Use Disorders Identification Test). A comparative analysis between college students from the first and fifth years of the degree in pharmacy, and that of a group of professors was carried to see differences in their alcohol intake patterns.

Risky drinking was detected in 31.3% of students. The highest prevalence of risky drinkers, and the total score of the AUDIT test was found in students in their first academic year. Students in the first academic level taking morning classes had a two-fold risk of risky drinking (OR=1.9 (IC 95%1.1-3.1)) compared with students in the fifth level. The frequency of alcohol consumption increases with the academic level, whereas the number of alcohol beverages per drinking occasion falls.

Risky drinking is high during the first year of university. As alcohol consumption might decrease with age, it is important to design preventive strategies that will strengthen this tendency.

**Keywords:** AUDIT questionnaire, screening, alcohol, hazardous drinking, college students.

### Abstract

El consumo de alcohol es muy prevalente entre los estudiantes universitarios. La detección precoz en futuros profesionales sanitarios es muy importante puesto que puede incidir no solo en su salud, sino también en su enfoque en futuras acciones preventivas como profesionales de la salud.

Detectar la prevalencia del consumo de riesgo de alcohol en estudiantes de farmacia y en el profesorado y comparar el patrón de consumo entre estos grupos, y según el curso académico.

Se realiza un cribado del consumo de alcohol mediante el cuestionario AUDIT (Alcohol Use Disorders Identification Test) a estudiantes universitarios de farmacia (n=434) en el marco de un proyecto de innovación docente. Se realiza un análisis comparativo entre los estudiantes de primero y quinto curso, y el profesorado.

El 31,3% de los estudiantes fueron identificados como bebedores de riesgo. La mayor prevalencia de consumidores de riesgo y las mayores puntuaciones totales se observaron en los alumnos de primer curso. Los estudiantes de primero de turno de mañana presentaron un riesgo de 1,9 (IC 95%1,1-3,1) comparado con los de quinto. La frecuencia de consumo de alcohol se incrementa con el curso académico, mientras que el número de consumiciones por día de consumo se reduce.

Durante el primer año en la Facultad los estudiantes presentan una elevada prevalencia de consumo de riesgo. Puesto que con la edad se observa una tendencia decreciente en dichos consumos, es importante diseñar intervenciones preventivas que la favorezcan.

**Palabras clave:** AUDIT cuestionario, cribado, alcohol, consumo de riesgo, estudiantes universitarios.

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In recent years, the consumption of alcohol among young people has grown, especially in the form of binge drinking and visits to emergency rooms owing to alcoholic intoxication have become more frequent, especially among women (“Observatorio Español de la droga y las toxicomanías,” Spanish Drug Observatory, 2011). University students, especially, are a population at risk (Karam, Kypri, & Salamoun, 2007) and this is a good moment to introduce preventive strategies.

Approximately between 20% and 60% of the university population show risky consumption patterns (Arrieta, 2009; Montañó, Morales, Gómez, Maldonado, & Gantiva, 2011; Pengpid, Peltzer, van der Heever, & Skaal, 2013). The high consumption of alcoholic beverages among young people has been associated with high mortality and accident rates and unsafe behavior such as drink-driving or engaging in unprotected sexual relationships, as well as family problems (Barlés, Escario, Galbé, 2014; Arrieta, 2009; Hingson, Heeren, Winter, & Wechsler, 2005). Some of the risk factors related with excessive consumption of alcohol are: being male, impulsivity, having easy access to money, living alone or initiating consumption at an early age (Cortés, Giménez, Motos, & Cadaveira, 2014; Montañó et al., 2011; Mota et al., 2010; Restrepo, Agudelo, Giraldo, & Sánchez, 2011; Wicki, Kuntsche, & Gmel, 2010). There have been many studies that have addressed this problem in university students. The majority of these studies focus on sociological aspects (Bani et al., 2013; Wicki et al., 2010; Young and de Klerk, 2008) and associated risk factors (Vinader-Caerols, Monleón, and Parra, 2014; Ansari, Stock, and Mills, 2013; Caamaño-Isorna, Corral, Parada, and Cadaveira, 2008; DeMartini and Carey, 2012; Karam et al., 2007). There is, however, little information on the changes in consumption patterns depending on the academic year the students are in or of the differences between students and professors. There have been no follow-up studies over the length of the five-year degree program nor has there been any evaluation of the early intervention programs during the same. In addition, the data concerning the prevalence of risky consumption are somewhat heterogeneous owing to the different measurement tools used and the definitions employed by the different authors.

Awareness and prevention of alcohol consumption among the adult population is especially relevant. At the current time, there are tools for the screening of risky alcohol consumption which are easily applied and, as well, therapeutic interventions are available, both presential (brief presential intervention, Pengpid et al., 2013) or online (Khadjesari, Murray, Hewitt, Hartley, & Godfrey, 2011), which have proven to be efficacious in the reduction of risky consumption (Seigers & Carey, 2011; Toumbourou et al., 2007). Interventions aimed at future healthcare professionals are especially important given that they not only have repercussions on these people but also on the population in general. The university period, which is considered to be especially risky, is a good time for early intervention. In this sense, the Col-

laborative Working Group on Cross-sectional Clinical Studies of the Faculty of Pharmacy of the University of Barcelona (CCT-FARMA) decided to develop a cross-sectional clinical study on risky alcohol consumption over the five-year Pharmacy Degree course. The idea was to help students evaluate their own risks in terms of excessive alcohol consumption and provide them with the tools to recognize and identify risky behaviors in groups close to them which would allow them to carry out brief interventions in their future professional practice (Giménez et al., 2013; Rodamilans et al., 2012).

The objective of this study is to have an overall view of the alcohol consumption patterns of the students in the Faculty of Pharmacy at the University of Barcelona by means of determining the prevalence of risky consumption in first-year and fifth-year students prior to the development of the CCT-FARMA project. At the same time, the risk of participating professors in the Working Group is evaluated, with the aim of testing the levels of awareness of the same when addressing a clinical study of risky consumption.

As well as this, it aims to compare the differences in consumption patterns between the first-year and the fifth-year students, and the professors, after obtaining alcohol consumption data cross-sectionally at the moment in which the teaching project is initiated.

## Method

### *Design*

In the 2011-2012 academic year, the alcohol consumption patterns of the first-year and fifth-year students, and also those of the professors, were assessed cross-sectionally.

### *Study population*

Those selected to participate were individuals who were studying pharmacy at the University of Barcelona (UB). Data were collected from first-year students (morning timetable and afternoon timetable), fifth-year students and professors. Of the 434 students enrolled in the first year, 67.1% of them responded to anonymous questionnaires; of the 325 fifth-year students, 34.2% participated and of a total of 46 professors involved in the educational project, 84.8% responded.

### *Procedure*

In 2012 the CCT-FARMA innovative teaching project was begun, in which this cross-sectional study was introduced, starting with the first-year students. This clinical study is addressed from the different points of view provided by the subjects in the Pharmacy Degree (Rodamilans et al., 2012). In order to evaluate the efficacy of the CCT-FARMA, academic quantification mechanisms (knowledge, skills, integration and interpretation capacity) and health mechanisms, such as the evaluation of the risk of alcohol consumption (AUDIT test) were established. The survey was introduced unannounced; during class time, the students were asked

to respond voluntarily and anonymously to the Alcohol Use Disorders Identification Test (AUDIT). The professors responded to the test on the same day and at the same time.

The preliminary results presented form part of the new teaching project (CCT-FARMA), one of whose objectives is to evaluate, at the end of the Pharmacy Degree, and by means of the AUDIT test, whether the development of this clinical study has modified alcohol consumption compared to the initial evaluation carried out in 2012.

### Data collection tools

As a screening tool for risky alcohol consumption among the university population the full version of the Alcohol Use Disorders Identification Test (AUDIT) was used. This standardized tool, developed by the World Health Organization, consists of ten questions about the quantity, the frequency and the consequences of alcohol consumption. The test is validated in both Spanish and Catalan and its reliability level is also good (Cronbach Alpha= 0.89) (Contel Guillamón, Gual Solé, and Colom Farran, 1999) for university students (Fleming, Barry, and MacDonald, 1991). The screening test has shown that it has a good level of sensitivity and specificity, not only for detecting harmful and risky consumption but also for disorders brought on by alcohol consumption. Using 8 as a cut-off point, the test has a sensitivity and specificity of 90% and 61% (Barry and Fleming, 1993). According to the study carried out by Contel et al., (1991) in the male group, if we use 9 as a cut-off point, the sensitivity of AUDIT is 90% and its specificity is 81.5%. And in the female group (cut-off point 6) its sensitivity is 33.3% and its specificity is 91.6%.

### Statistical analysis

A descriptive analysis was carried out, of the sociodemographic data (gender and age) of the entire sample, and by groups studied (first-year, morning timetable students, first-year, afternoon timetable students, fifth-year students and faculty). The variables that correspond to each question on the

AUDIT were analyzed as quantitative and categorical variables. The distribution type of the AUDIT quantitative variable was verified by means of the Kolmogorov-Smirnov normality test. As it did not follow a normal distribution, non-parametric tests (Kruskal-Wallis) were used to compare the total AUDIT score according to the group evaluated, and in addition ANCOVA ranging was used to adjust for gender and age. In order to carry out the 2 to 2 analysis between each group, the non-parametric U-de Mann-Whitney test was used. In order to detect the risky consumption groups it was decided to categorize the overall AUDIT score into a binary variable using 9 or higher as the cut-off point for males and 6 or higher as that for females (Pérula de Torres et al., 2005; Rubio Valladolid, Bermejo Vicedo, Caballero Sánchez-Serrano, and Santo-Domingo Carrasco, 1998). In order to analyze the categorical variables the chi-square test was used and ANOVA was used for the quantitative variables. The multiple post-hoc comparisons were made by means of Bonferroni. It is considered statistically significant when  $p \leq 0.05$ . Pearson correlation analysis was carried out in order to determine the correlation between the age and the academic level ( $r=0.73$ ,  $p<0.001$ ). In order to analyze the relationship between the presence of risky consumption and the year the student was in, a logistical regression analysis was done, using gender and age as co-variables.

## Results

A total of 440 persons participated in the test. Complete data of gender and age of 434 persons were obtained. Of the total of responders, 286 were enrolled in the first year at university in the Faculty of Pharmacy (204 in the morning timetable and 82 in the afternoon timetable), 111 in the fifth year, and 37 were professors. Some 75.8% of the total sample taking part in the study were female, which corresponds to the normal distribution of students in this faculty. No significant differences in the distribution of genders according to the academic year were observed, and neither were any observed among the profes-

Table 1

Description of risky consumption in terms of the year of the degree the student is in

	FYMT (204)	FYAT (82)	Fifth-year (111)	Professors (37)	Total (434)	$\chi^2/F$	p-value
	n (%)	n (%)	n (%)	n (%)	N (%)		
<b>Gender (Female)</b>	148 (72,5)	62 (75,6)	93 (83,8)	26 (70,3)	329 (75,8)	5,7	0,13
<b>Age (mean (SD))</b>	18,5 (1,1) <sup>a, b</sup>	19,8 (4,0) <sup>c</sup>	24,2 (3,9) <sup>d</sup>	50,9 (7,3)	22,96 (9,5)	935,2	<0,001
<b>AUDIT Total (mean (SD))</b>	6,3 (5,3)	5,3 (3,9)	4,6 (4,1)	2,6 (1,3)	5,35 (4,7)		<0,001
<b>Risky consumption</b>	82 (40,2)	25 (30,5)	29 (26,1)	0	136 (31,3)	26,3	<0,001
<b>Males (%)</b>	26 (46,4)	5 (25,0)	6 (33,3)		37 (35,2)		
<b>Females (%)</b>	56 (37,8)	20 (32,3)	23 (24,7)		99 (30,1)	1,0	0,32

Note. FYMT: First-year, morning timetable; FYAT: First-year, afternoon timetable; a FYMT vs FYAT  $p=0,039$ ; b FYMT vs Fifth-year and vs Professors  $p<0,001$ ; c FYAT vs Fifth-year vs Professors  $p<0,001$ ; d Fifth-year vs Professors  $p<0,001$

sors. The average age of the whole sample was of 23.0 (DE 9.5), with the differences between the average ages of each group studied being statistically significant (Table 1).

**Relationship between alcohol consumption patterns and the year the student was in**

Some 31.3% of the students showed signs of risky consumption. The greater proportion of risky drinkers was observed among the first-year, morning-timetable students. 40.2% of the first-year, morning-timetable students showed risky consumption, followed by those in the afternoon timetable (30.5%) and the fifth-year students (26.1%). Among the professors, no risky consumers were detected (Table 1). After adjusting the results for the gender variable, it was observed that the first-year, morning-timetable students had an almost two-fold probability of risky consumption compared with the fifth-year students (OR=1.9 IC95% 1.1-3.1) (Table 2). If we adjust the data by age, the differences between the year of the degree the student is in lose statistical significance because as age increases, the risk of risky consumption diminishes (OR=0.84 IC95% 0.72-0.98) (Table 2).

Figures 1 and 2 show the frequency and amount of alcohol consumption of the different groups studied. The data show the presence of significant differences between the groups both in relation to the frequency of consumption ( $\chi^2= 33.2$ ;  $p<0,001$ ) as in the number of alcoholic drinks taken on a normal day ( $\chi^2= 68.4$ ;  $p<0,001$ ). In general, the most habitual frequency of alcohol consumption of the entire sample was of between two and four times a month (54.8%), followed by monthly consumption (22.4%). Only 6.2% had not drunk at

all over the last year. The professors were the group that drank with most frequency (43.2%: more than twice a week) followed by the fifth-year students (21.6%) and the first-year, morning-timetable students (11.3%) (Figure 1). The majority of first-year students (59.8% of the morning timetable and 63.4% of the afternoon timetable) and fifth-year students (45.0%) drank between two and four times a month (Figure 1).

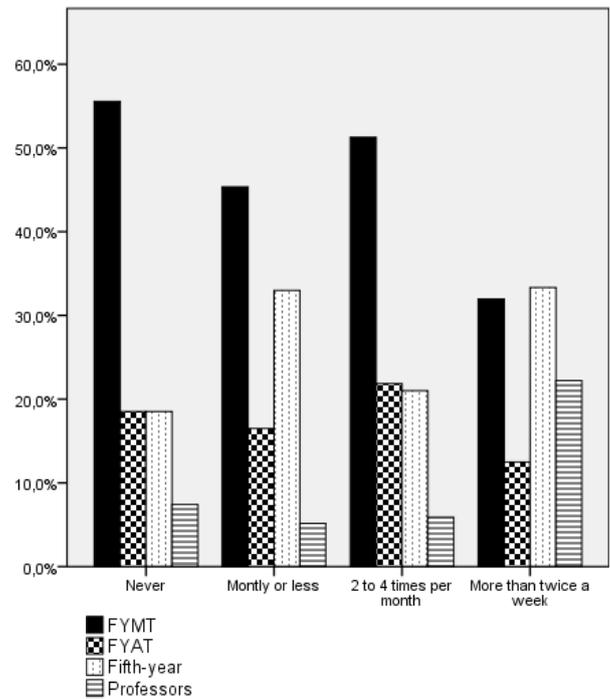


Figure 1. How often do you have a drink containing alcohol?

Table 2

*A. Relationship between the year the student is in and alcohol consumption risk after adjusting for gender*

	OR	95% I.C.	
		Min	Max
<b>FYMT vs FYAT</b>	1.5	0.9	2.6
<b>FYMT vs fifth-year</b>	1.9	1.1	3.1
<b>FYAT vs fifth-year</b>	1.2	0.6	2.3
<b>Gender</b>	1.3	0.8	2.0

Note. FYMT: First-year, morning timetable; FYAT: First-year, afternoon timetable

*B. Relationship between the year the student is in and alcohol consumption risk after adjusting for gender and age*

	OR	95% I.C.	
		Min	Max
<b>FYMT vs FYAT</b>	1.3	0.8	2.3
<b>FYMT vs fifth-year</b>	0.7	0.3	1.7
<b>FYAT vs fifth-year</b>	0.5	0.2	1.4
<b>Gender</b>	1.4	0.9	2.3
<b>Age</b>	0.8	0.7	0.98

Note.FYMT: First-year, morning timetable; FYAT: First-year, afternoon timetable

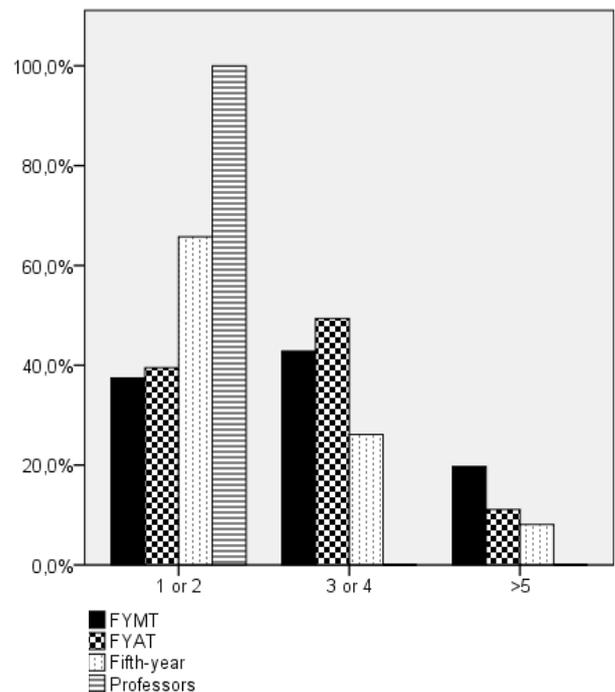


Figure 2. How many drinks containing alcohol do you have on a typical day when you are drinking

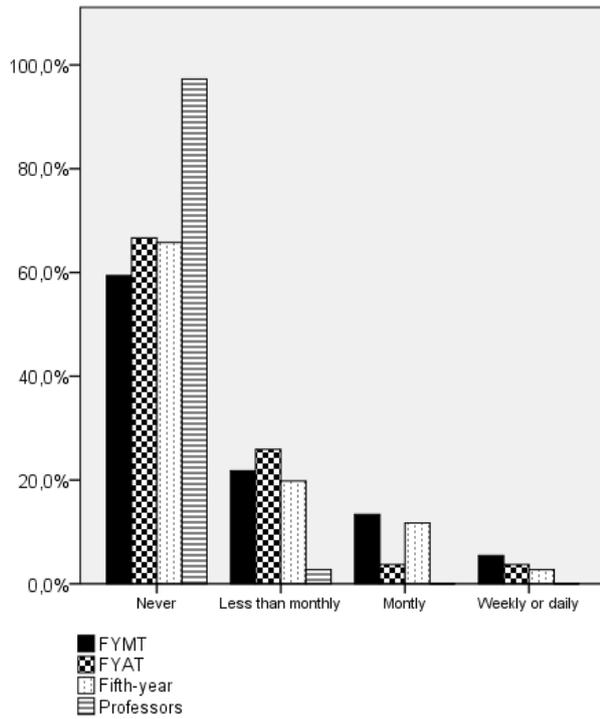
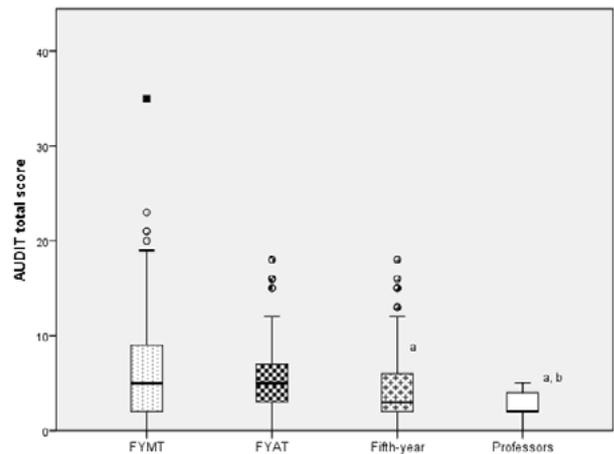


Figure 3. How often do you have 6 or more drinks on one occasion?

In the case of the professors, the amount drunk on each occasion on which consumption took place follows a tendency that is diametrically opposed to the frequency of the consumption. Thus, although they consume alcohol with greater frequency (42.3% more than twice a week) (Figure 1) the amount of alcohol consumed on each occasion is low (one or two drinks on each occasion) (Figure 2). In the case of the students, it can be observed how the amount of alcohol consumed decreases as each academic year passes. Thus, the majority of students who consume more than five drinks on each occasion are concentrated in the morning-timetable, first-year group (19.7%) followed by the afternoon-timetable students (11.1%) and the fifth-year students (8.1%) (Figure 2). In this sense, it can also be observed that the morning-timetable, first-year group were those who had six or more alcoholic drinks with greater frequency (Figure 3). The majority of students in this year, when they have more than six drinks on one occasion, do so monthly (35.2%) and 5.4% of them consume greater quantities weekly or more frequently.

**Comparison between the total AUDIT score and the year the student was in**

Statistically significant differences were observed on comparing the total score of the four groups studied ( $p < 0.001$ ) (Figure 4, Table 1). After adjusting for age and gender, the relationship between the total AUDIT score and the academic level lost statistical significance ( $F = 1,138$ ;  $p = 0.334$ ). The professors showed a total mean score that was significantly inferior to that of the first-year students (a mean difference



a: Significant differences with the first-year, morning timetable  
b: Significant differences with the first-year, afternoon timetable

Figure 4. Total AUDIT questionnaire score according to the year the student is in (including professors)

with the morning-timetable students of 3.7 points;  $p < 0.001$ ; mean difference with the afternoon-timetable students of 2.7 points,  $p < 0.001$ ). Statistically significant differences were also observed between responders from the morning-timetable, first-year group and the fifth-year students ( $p = 0.003$ ), with the obtained mean of the first-year students being greater (mean difference = 1.7 points).

**Discussion**

The first results from the evaluation study of the efficacy of the CCT-FARMA project that show screened results of risky consumption among the Faculty of Pharmacy population of the University of Barcelona (31.3%), indicate that an important percentage of the students could benefit from an intervention with the aim of reducing consumption among the students and thus raising awareness among future healthcare workers of the risks of consuming alcohol. To sum up, risky consumption and the total AUDIT score are reduced as students pass from one year of their degree to the next in such a way that the morning-timetable, first-year students show a greater level of risky consumption and average total AUDIT score compared with those of the last year. The consumption patterns between the students and the faculty member are polar opposites. The students have a greater tendency to consume high quantities of alcohol in an episodic manner while the professors drink smaller quantities with greater frequency.

The prevalence of risky drinking in the university sample (31.3%) is considerably higher than that described for the general population (10%), but is similar to that of other university populations in other countries (Ansari et al., 2013; Caamaño-Isorna et al., 2008; Pengpid et al., 2013; Reavley, Jorm, McCann, and Lubman, 2011; Young and de Klerk, 2008).

Although the percentage of males with risky consumption was slightly higher than that of females, these differences were not significant, unlike what has been observed in other studies (Ansari et al., 2013; DeMartini and Carey, 2012; Reavley et al., 2011). In this sense it is worth highlighting that unlike in other research, we took into account different cut-off points for males and females. According to Wicki M et al. (2010), though, these gender differences are maintained even when different hazardous consumption cut-off points are used for males and females.

The university student group that has most at-risk drinkers is that of the morning-timetable, first-year students (42%), followed by the afternoon-timetable students (30.5%) and the fifth-year students (26.1%). Although our results coincide with those of other authors (Ansari et al., 2013; Sebena, Orosova, Mikolajczyk, and van Dijk, 2011) there is a certain controversy regarding the relationship between age and risk of alcohol consumption. While some studies have observed an increase in risk at higher ages or later in the degree program, other studies do not observe any such relationship or, what is more frequent, that this relationship is negative (Sebena et al., 2011; Wicki et al., 2010). No significant differences are detected between the morning-timetable first-year students and those enrolled in the afternoon timetable, possibly because these students are of similar ages, although it is not known whether there are other differentiating factors that may intervene, such as, for example, whether there any differences in their reasons being enrolled in one timetable or the other. Our data suggests that the differences between students in one year of their degree and another are because of age differences. Unlike what appears to be the case in other countries, hazardous consumption among professors appears to be non-existent (Reavley et al., 2011). The results obtained from the AUDIT test at the beginning of this project (2012) show us that there is a reduction of risk between the first year of a degree program and the fifth. The time spent at the Faculty, therefore, would seem to be a good opportunity to strengthen this tendency towards a reduction of the risk that occurs between first-year and fifth-year students by means of interventions aimed at increasing awareness and sensitivity.

The consumption pattern of the pharmacy students is the opposite to that of the professors of the same faculty. Student consumption is more sporadic (they mainly consume between two and four times a month) and they consume greater quantities of alcohol per occasion (more than three drinks), while the professors consume between one and two alcoholic drinks with a frequency greater than twice a week (43.2%). This pattern coincides with that of other studies (Reavley et al., 2011; Slutske, 2005).

One of the principal problems of university students is alcohol consumption in the form of binge drinking (compulsive consumption), which has been widely described by various authors (Ansari et al., 2013; Jim McCambridge et al., 2013). Between 34.2 and 40.6% of pharmacy students had,

at some time in the year previous to the study consumed more than six alcoholic drinks on one single day, coinciding with the Spanish population data (EDADES 2011). In Spain, a drop in this type of consumption can be observed with age, with the highest prevalence of binge drinking being between the ages of 20 and 24 (EDADES 2011), coinciding with the university years. In some European studies, the percentage of excessive consumers (of five drinks or more) is around 60 to 70% (Ansari et al., 2013; Dantzer, Wardle, Fuller, Pampalone, and Steptoe, 2006). Students binge drink with greater frequency than professors, as occurs in other countries (Reavley et al., 2011). However, compared with the study carried out by Reavley et al., 2011 in which it is stated in objective terms that 21% of the teaching staff had more than six drinks a month or more, those in our sample did not indicate having more than six drinks with a frequency that was greater than monthly.

One of the principal limitations of this study, we should highlight, is that the data related to alcohol consumption are obtained from declared data, which although reliable in clinical populations, in general population could be skewed, despite the respondents answering anonymously. No socio-demographic data, which could act as a risk factor, were collected and nor were aspects of a sociocultural type taken into account, which could skew the results. In addition, it should be borne in mind that the results of this study were obtained from a sample of university students and staff and cannot, therefore, be extrapolated to other, non-university populations.

The developing of the clinical study of hazardous alcohol consumption from the perspective of the different subjects studied in the pharmacy degree means a teaching strategy with an integrative objective. To that end, the clinical study of hazardous alcohol consumption was designed via a fictitious character, Sam, who was clinically validated by the Addictive Behaviors Unit, and adjusted to real cases. Later, the participating subjects were coordinated. This character's pathology evolves over the five years of the Pharmacy Degree, and allows the students, in a certain way, to follow his life. To raise student awareness and to make them consider that hazardous alcohol consumption is not far removed from their environment, the evaluation of the students' own risky consumption is used.

Preventive campaigns aimed at this target population may be highly beneficial given the important social factor and the norms that this population go by (Wicki et al., 2010). Intervening in the at-risk university population could bring important benefits, not only in terms of their academic results, given that they are the students who are least motivated to perform well academically (Ansari et al., 2013), but also in terms of avoiding risky sexual behaviors and accidents. Given that brief interventions (including virtual ones) in this population are effective (Bewick et al., 2013; Jim McCambridge et al., 2013; Pengpid et al., 2013; Seigers & Carey, 2011),

it is important to be able to detect hazardous consumption early, with the aim of changing consumption patterns in a population that is so vulnerable to its effects. Without any doubt, new preventive developments must make extensive use of the new forms of communication (J McCambridge, Bendtsen, Bendtsen, & Nilsen, 2012).

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## Conflict of interests

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