Alcohol Drinking in Higher Education Students from Coimbra and the Impact of Academic Festivities

Consumo de Álcool nos Estudantes do Ensino Superior de Coimbra e o Impacto das Festas Académicas

ARTIGO ORIGINAL

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ABSTRACT

Introduction: The international and national literature as well as studies carried out in universities in Portugal show there is excessive alcohol consumption and binge drinking. However, no relation with alcohol consumption and college parties has yet been established. The aim of this study was to assess the association between alcohol consumption and binge drinking with college parties, and also to understand specific patterns of alcohol consumption by gender and years of university attendance.

Material and Methods: A survey comprised of the Alcohol Use Disorders Identification Test – Consumption (AUDIT-C) and the question "What is your most consumed drink?" referring to months without and with college parties, was disseminated in the University of Coimbra Facebook® page to students of the University of Coimbra and of the Polytechnic Institute of Coimbra seventeen years old and over.

Results: The AUDIT-C score in college party months is higher than in months without such parties with strong, positive and significant correlation (ρ = 0.711; ρ < 0.001). In months without college parties, 41.8% of females and 24.0% of males have a positive AUDIT-C. In months with college parties, 73.8% of females and 56.3% of males have a positive AUDIT-C. In months with college parties, females have higher risk of excessive consumption (ρ < 0.001) and drink a higher amount of spirits / shots. There is a significant difference in the most consumed drinks between genders (ρ < 0.001).

Conclusion: College parties allow for more opportunities of pre-existing binge drinking. The way young people face alcohol consumption is a major problem to be addressed.

Keywords: Alcohol Drinks; Alcoholic Intoxication; Binge Drinking; Ceremonial Behavior; Graduate Education

RESUMO

Introdução: Na literatura internacional, nacional e em estudos no ensino superior em Portugal os jovens apresentam consumos alcoólicos excessivos e *binge drinking*. Contudo, não se encontra estabelecida qualquer relação entre o consumo e as festas académicas. O objectivo deste estudo foi compreender a associação entre consumo de bebidas alcoólicas e festas académicas, estabelecendo uma relação entre estes momentos e um padrão específico de consumo, bem como perceber a ocorrência de padrões específicos de consumo de acordo com o sexo e os anos de frequência escolar.

Material e Métodos: Foi elaborado um questionário, constituído pelo *Alcohol Use Disorders Identification Test – Consumption* (AUDIT-C) e apresentando a questão "Qual a bebida mais consumida?" num mês com festas académicas e num mês sem que se realizassem. O questionário dirigido a alunos da Universidade de Coimbra e do Instituto Politécnico de Coimbra, foi divulgado na página de Facebook® da Universidade de Coimbra.

Resultados: Na amostra de estudantes do ensino superior de Coimbra, com idade igual ou superior a dezassete anos (n = 503), o AUDIT-C em mês com festas académicas é superior ao mês sem festas, verificando-se correlação positiva forte e significativa (ρ = 0,711; ρ < 0,001). Em mês sem festas académicas, 41,8% do sexo feminino e 24,0% do sexo masculino apresentam AUDIT-C positivo. Em mês com festas académicas 73,8% do sexo feminino e 56,3% do sexo masculino apresentam AUDIT-C positivo. O sexo feminino apresenta maior risco de consumo excessivo (ρ < 0,001) e bebe mais bebidas espirituosas / *shots*. Há diferença significativa entre sexos quanto à bebida mais consumida (ρ < 0,001).

Conclusão: As festas académicas fomentam as ocasiões de *binge drinking* pré-existentes, residindo o problema na forma como os jovens abordam o consumo de álcool.

Palavras-chave: Bebedeira; Bebidas Alcoólicas; Comportamento Ritualístico; Educação de Pós-Graduação; Intoxicação Alcoólica

INTRODUCTION

Alcohol is legally, socially, and culturally accepted, inducing dependence and with a negative impact on health when consumed in excess. Knowing how to drink moderately is a key factor for coexistence and even social integration.[1] The pattern of episodic excessive consumption, called binge drinking, corresponds to the consumption within two hours of six or more standard drinks in men and five standard drinks in women, on a single occasion.[2]

In 2016, 32.5% of the world population consumed alcoholic beverages and this behaviour was mostly found in males, while females drank less and showed less frequent binge drinking episodes.[3,4]

Excessive alcohol use was considered as the seventh leading risk factor of premature death and disability, corresponding to the leading risk factor among the young population and affecting health, depending on the type and

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volume of intake, with long-term adverse effects.

Acute intoxication is related to injuries and psychophysiological disorders, and dependence can lead to self-injurious behaviour and violence.[3]

Alcohol consumption is considered as directly responsible for 13.5% of deaths of people aged 20 - 39. The greatest impact at these ages leads to a decrease in average life expectancy, as it is related to injuries that are related to the cause of death.[4]

An increase in the consumption of beer (40%) and wine (29.8%) has been found in Europe, with a decrease in the consumption of spirits (27.2%).[4]

The pattern found in people aged 15-19 is in line with what is found in the overall population, and young people aged 20-24 are even more frequent drinkers than the overall population, which may correspond to a peak consumption prevalence at these ages. An episodic binge drinking is prevalent among those aged 15 - 19 (≥ 20%), reaching a peak among those aged 20 - 24.[4] Episodic binge drinking is also higher in these age groups among those who drink, meaning that binge drinking is mostly found in consumers.[4]

A higher alcohol consumption has been found in Portugal when compared to the European average.[4] An increase in dependence and in the risk of heavy drinking has been found in the 15-24 age group. In 2016, alcohol was consumed by 83.7% of young people, with no gender differences and binge drinking found in 49.6% (a 12.4% difference between males and females) and alcohol intoxication found in 31.4% (9.5% difference between males and females).[5] In recent years, there has been a change in the consumption pattern between genders, with a trend towards an increasing consumption in females.[6]

Data that are currently used in Portugal for the assessment of consumption per age, gender and higher education (HE) institutions are suboptimal, and research is of great relevance since heavy drinking is one of the factors with the greatest impact on the development of students who face new academic, social and developmental demands.[3,7-9] The need for adaptation and personal growth is often related to seeking and experimentation, leading to the adoption of dysfunctional behaviours and unhealthy lifestyles, compromising health and the academic success of young adults.[8]

Alcohol consumption has become fashionable and is very commonly found among young people towards their integration activities in HE, associated with party nights with friends,[9] in which young people seek the effects of alcohol intoxication.[10] Portuguese studies carried out in HE institutions suggested the presence of heavy drinking and a pattern of binge drinking.[1,10-13] However, no relationship has yet been established between alcohol consumption in months with planned college party activities *vs.* in any other months.

There are different moments of integration of new students in Coimbra, especially including the main academic festivals as *Festa das Latas* and *Queima das Fitas*, and the knowledge of their real impact on the consumption patterns of young students will certainly provide relevant information.

"Parties without alcohol are boring", while "parties with no alcohol could not be organized" and "drinking is one of the most enjoyable ways to party" are considered by many students.[10] The encouragement of consumption by peers is also a reality, especially among males.[10] Therefore, it is considered that college parties involve the adequate environment for heavy drinking, corresponding to a risk for young people.[14]

A significant receptiveness to respond to the questions of the Alcohol Use Disorders Identification Test - Consumption (AUDIT-C) has been found in different studies, regardless of the amount of alcohol consumed, allowing the identification of the types of consumption.[15] A screening is crucial, as a reduction in consumption has been found in heavy drinkers upon their identification and having attended short interventions or treatment plans.

The action plan is the more effective the earlier any binge drinking has been identified.[15]

Considering the impact of the news of heavy drinking during college parties, this study was aimed at assessing the association between different planned college parties - for the integration of new students - and the average levels of alcohol drinking, assessing any relationship between these moments and the specific average pattern of consumption outside this context. It was also aimed at assessing whether alcohol consumption is a cross-sectional or occasional event, as well as assessing the impact of college parties. Knowing how the impact of the length of undergraduate studies on alcohol consumption, which is the most consumed drink and whether this varies with college parties were the secondary endpoints of the study.

MATERIAL AND METHODS

This was a cross-sectional observational study approved by the Ethics Committee of the Faculty of Medicine of the University of Coimbra (UC), with a convenience population including students attending the HE institutions in Coimbra, aged 17 years and above.

A three-part questionnaire was designed for the study and was applied through Google Forms technology, planned to be fully completed at a single time.

A face-to-face pre-test was applied to thirty-two volunteers to assessing a completion time and any constraints regarding understandability and pleasantness. The sample size was determined for a population of 35,272 students, a 95% confidence interval and a 5% margin of error.

Subsequently, the questionnaire was disclosed in the UC Facebook® page between 25 October and 20 November 2018, with two electronic reminders. Participants were informed about the anonymous, confidential, and voluntary nature of the questionnaire to ensure its accuracy. Therefore, an initial informed consent was presented for mandatory completion by all potential participants in the study. The last three digits of each participant's citizen's card and the first

and last letters of the surname were required for practical reasons and to remove duplicate responses.

The questionnaire was based on the Portuguese version of the Alcohol Use Disorders Identification Test - Consumption (AUDIT-C) survey [Appendix 1 (see Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/12366/6298)], a reduced version of the AUDIT questionnaire, the Portuguese version having been validated by Jorge Roque da Cunha in 2002.[16] Individuals at risk of binge drinking are assessed by the AUDIT-C survey,[2] by using three questions: "How often do you consume alcoholic beverages?", "When you drink, how many alcoholic beverages do you consume on a normal day?" and "How often do you consume 6 drinks or more on a single occasion?" Each question included five responses which were assigned a score ranging 0 to 4. Excessive alcohol consumption was considered for a sum of scores ≥ 5 (male) and ≥ 4 (female). The total score ranges from 0 to 12.

The first part of the questionnaire included the question "Are you a higher education student in Coimbra?" and an initial epidemiological survey [Appendix 1 (see Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/12366/6298)] including the participant's age, gender, and year of entry into HE.

The second part of the questionnaire, referring to a month with no planned college parties (MSFA), included the AUDIT-C survey and the question What drink do you consume the most?" [Appendix 1 (see Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/12366/6298)].

The third part of the questionnaire, referring to a month with planned college parties (MCFA), included the AUDIT-C survey, the question "What drink do you consume the most?" [with three options: beer, wine and others (shots, spirits...)] [Appendix 1 (see Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/12366/6298)] and the question "Do you think you have the same approximate pattern of consumption as in the rest of the time?"

Subsequently, the questionnaires of respondents who were not HE students were excluded from the study. Responses were divided into two groups, according to the length of undergraduate studies (≤ 3 and > 3 years), considering the duration of most undergraduate degrees, followed by the optional Integrated Master's degree.

IBM SPSS Statistics software, version 24 was used for statistical analysis.

Qualitative and quantitative variables were described by absolute and relative frequencies. Chi-square (χ^2) test of independence was used for the assessment of the association between nominal qualitative variables, while Mann-Whitney's U-test, as well as Spearman's correlation were used for the relationship between non-nominal ordinal variables of two groups, as no normal distribution of numeric variables was found. A 0.01 significance level was considered. Growth dynamics (Δ) were also obtained.

RESULTS

Demographic characteristics of the sample

A three-minute completion time was defined in the pre-test and no constraints in perception or displeasure with the questionnaire were found.

In total, 518 responses were obtained, 503 (97.1%) of which were considered valid for the study (all required fields were completed and respondents have confirmed that they were students attending Coimbra HE institutions). A 381-sample size was obtained.

A respondents' mean age of 21.8 ± 3.1 years (95% CI, between 21.5 and 22.0 years), ranging from 17 to 43 years has been found; 148 (29.4%) male respondents have been found, 3.2 ± 2.1 years of mean length of undergraduate studies and 239 (46.1%) respondents had attended HE for less than four years.

Respondents' age ($p < 0.001$) and length of undergraduate studies in Coimbra ($p < 0.001$) did not show a normal distribution, as per the one-sample Kolmogorov-Smirnov (KS) test.

No significant age differences were found between genders (♂ 22.1 ± 3.3 and ♀ 21.6 ± 3.0, p = 0.053), nor in the length of undergraduate studies in Coimbra (♂ 3.5 ± 2.4 and ♀ 3.1 ± 2.0, p = 0.195), as per Mann-Whitney's U-test.

Comparison of consumption patterns between MSFA and MCFA

AUDIT-C variables in MSFA and MCFA did not show a normal distribution (KS, $p < 0.001$).

Higher consumptions were found in months with planned college parties (AUDIT-C score in MCFA of 5.9 ± 3.4) when compared to months without college parties (AUDIT-C score in MSFA of 3.2 ± 2.3) (Table 1). There is a strong and significant positive correlation between both values (ρ = 0.711; $p < 0.001$), showing that those who already had higher consumption in months without parties will have higher consumption in months with college parties.

As described in Table 2, 65.8% have described a different pattern of consumption in MSFA *vs.* MCFA, with no difference between genders ($p = 0.248$), even though significant differences were found between MSFA (positive AUDIT-C scores from 41.8% of female and 24.0% of male respondents) *vs.* MCFA (73.8% of female and 56.3% of male respondents) ($p < 0.001$), showing a higher percentage of positive AUDIT-C scores in both MSFA and MCFA in female respondents.

Significant differences were only found in MSFA ($p = 0.002$), with higher scores in students with ≤3 years of undergraduate studies, as shown in Table 3.

A significantly higher AUDIT-C score was found in the group of respondents with ≤3 years of studies in MSFA ($p = 0.002$), which was not found in MCFA ($p = 0.013$). Growth dynamics (Δ) of AUDIT-C of + 0.77 and + 1.35 were obtained between MSFA and MCFA for female and male respondents, respectively.

A weak and non-significant negative correlation (ρ = -0.082; $p = 0.072$) has been found between respondents'

Table 1 – AUDIT-C score in months without and with planned college parties

	n	Mean ± SD	95% CI	*ρ; p*(*)
AUDIT-C score in MSFA	489**	3.2 ± 2.3	3.0 a 3.4	0.711; < 0.001
AUDIT-C score in MCFA	489**	5.9 ± 3.4	5.7 a 6.2	

(*) Spearman's correlation;
** Author's note: 14 omitted cases (2.8%).
MSFA: months without planned college parties; MCFA: months with planned college parties

Table 2 – Pattern of consumption and AUDIT-C score in MSFA and MCFA, per gender

		Female n (%)	Male n (%)	Total n (%)	*p*
Same pattern in MSFA *vs.* MCFA?	Yes	127 (35.8)	45 (30.4)	172 (34.2)	0.248(*)
	No	228 (64.2)	103 (69.6)	331 (65.8)	
MSFA	Negative AUDIT-C	202 (58.2)	108 (76.0)	310 (63.4)	< 0.001(**)
	Positive AUDIT-C	145 (41.8)	34 (24.0)	179 (36.6)	
MCFA	Negative AUDIT-C	91 (26.2)	62 (43.7)	153 (31.3)	< 0.001(**)
	Positive AUDIT-C	256 (73.8)	80 (56.3)	336 (68.7)	

(*) Mann-Whitney's U-test; (**) χ^2
** Author's note: 14 omitted cases (2.8%).
MSFA: months without planned college parties; MCFA: months with planned college parties

Table 3 – AUDIT-C score per length of undergraduate studies

	Length of undergraduate studies		*p* (*)	Gender		*p*(*)
	≤ 3 years	> 3		Female	Male	
AUDIT-C score in MSFA	3.5 ± 2.3	2.8 ± 2.3	0.002	3.2 ± 2.4	3.1 ± 2.3	0.680
AUDIT-C score in MCFA	6.2 ± 3.4	5.4 ± 3.3	0.013	6.0 ± 3.4	5.6 ± 3.2	0.216

(*) χ^2
MSFA: months without planned college parties; MCFA: months with planned college parties

age and AUDIT-C score in MSFA in addition to a weak but significant negative correlation with the length of undergraduate studies (r_s = -0.130; p = 0.004), while a weak negative and non-significant correlation has been found between respondents' age and AUDIT-C score (ρ = -0.057; p = 0.205) and weak negative and non-significant correlation between AUDIT-C score and length of undergraduate studies (ρ = -0.104; p = 0.021) in MCFA.

Significant differences between genders have been found in MSFA and in MCFA regarding the frequency of consumption (AUDIT-C question 1) (p < 0.001), quantity (AUDIT-C question 2) (p < 0.001) and frequency of heavy drinking (AUDIT-C question 3) (p < 0.001), which was higher in male respondents (Table 4).

As shown in Table 5, beer was the most consumed type of drink by 55.9% of the respondents in MSFA, others (shots, spirits) by 27.8% and wine by 16.3%, with no significant differences found between groups of length of undergraduate studies regarding the most consumed type of drink (p = 0.119). However, significantly different results were obtained between genders in the question regarding the mostly consumed type of drink (p < 0.001).

Beer was consumed by 52.5% of the respondents in MCFA, others (shots, spirits) by 32% and wine by 15.5%. No differences were found between the groups of length of undergraduate studies regarding the most consumed type of drink (p = 0.029), with a different behaviour between genders (p < 0.001) - Table 5.

A Δ of + 0.15 for spirits/shots, -0.04 and -0.02 for wine and beer, respectively were obtained between MSFA and MCFA.

DISCUSSION

The research methodology was welcomed by students attending the University of Coimbra and the Polytechnic Institute of Coimbra, allowing for quicker responses from a wider universe of respondents and a significant volume of responses to questions on alcohol consumption.

The results were obtained from the completion of a Google forms questionnaire disclosed in the Facebook® page of the UC. A representative group of respondents was obtained, even though the questionnaire completion was voluntary.

The AUDIT-C survey should be made available to the whole student population, in collaboration with the HE institutions, aimed at a better characterisation and monitoring of the population, following the survey guidelines (whenever ≥ 5 units in men and ≥ 4 in women, questions 4 to 10 of the AUDIT were added, to define the consumption and any further strategy).

Mostly female respondents were obtained, in line with a study previously conducted at the UC,[11,17] and in line with the Coimbra student population (56.5% female students).[18]

In contrast to the 2016 national data from the HBSC/JunP Project,[19] 65.8% of respondents have described a higher consumption in MCFA, which is shown by an almost

Table 4 – Responses to the items of AUDIT-C survey per gender and regarding MSFA *vs*. MCFA

		Female n (%)	Male n (%)	Total	*p* (*)
Item 1: AUDIT-C score in MSFA	Never	49 (13.8)	4 (2.7)	53 (10.5)	< 0.001
	Once a month or less	149 (42.0)	32 (21.6)	181 (36.0)	
	2 - 4 times a month	131 (36.9)	67 (45.3)	198 (39.4)	
	2 - 3 times a week	22 (6.2)	38 (25.7)	60 (11.9)	
	> 4 times a week	4 (1.1)	7 (4.7)	11 (2.2)	
Item 2: AUDIT-C score in MSFA	1 or 2	231 (65.1)	70 (47.3)	301 (59.8)	< 0.001
	3 or 4	62 (17.5)	36 (24.3)	98 (19.5)	
	5 or 6	44 (12.4)	20 (13.5)	64 (12.7)	
	7 or 9	12 (3.4)	9 (6.1)	21 (4.2)	
	≥ 10	6 (1.7)	13 (8.8)	19 (3.8)	
Item 3: AUDIT-C score in MSFA	Never	147 (41.4)	30 (20.3)	177 (35.2)	< 0.001
	Once a month or less	162 (45.6)	66 (44.6)	228 (45.3)	
	2 - 4 times a month	39 (11.0)	42 (28.4)	81 (16.1)	
	2 - 3 times a week	3 (0.8)	7 (4.7)	10 (2.0)	
	> 4 times a week	4 (1.1)	3 (2.0)	7 (1.4)	
Item 1: AUDIT-C score in MCFA	Never	15 (4.2)	3 (2.0)	18 (3.6)	< 0.001
	Once a month or less	71 (20.0)	7 (4.7)	161 (32.0)	
	2 - 4 times a month	117 (33.0)	44 (29.7)	161 (32.0)	
	2 - 3 times a week	91 (25.6)	43 (29.1)	134 (26.6)	
	> 4 times a week	61 (17.2)	51 (34.5)	112 (22.3)	
Item 2: AUDIT-C score in MCFA	1 or 2	15 (4.2)	3 (2.0)	18 (3.6)	< 0.001
	3 or 4	71 (20.0)	7 (4.7)	78 (15.5)	
	5 or 6	117 (33.0)	44 (29.7)	161 (32.0)	
	7 or 9	91 (25.6)	43 (29.1)	134 (26.6)	
	≥ 10	61 (17.2)	51 (34.5)	112 (22.3)	
Item 3: AUDIT-C score in MCFA	Never	97 (27.3)	17 (11.5)	114 (22.7)	< 0.001
	Once a month or less	101 (28.5)	28 (18.9)	129 (25.6)	
	2 - 4 times a month	89 (25.1)	41 (27.7)	130 (25.8)	
	2 - 3 times a week	41 (11.5)	27 (18.2)	68 (13.5)	
	> 4 times a week	227 (7.6)	35 (23.6)	62 (12.3)	

(*) Mann-Whitney's U-test
MSFA: months without planned college parties; MCFA: months with planned college parties
Author's note:
Item 1: "*Com que frequência consome bebidas que contêm álcool?*" ("How frequently do you drink alcohol?");
Item 2: "*Quando bebe, quantas bebidas contendo álcool consome num dia normal?*" ("When you drink, what is your normal daily intake?");
Item 3: "*Com que frequência consome 6 bebidas ou mais numa única ocasião?*" (How frequently do you drink six or more drinks on a single occasion?").

three-times increase in mean AUDIT-C score (3.2 ± 2.3 in MSFA and 5.9 ± 3.4 in MCFA) and by an increased rate of positive AUDIT-C scores (36.6% in MSFA and 68.7% in MCFA), corresponding to heavier drinking associated with planned college parties.

The average AUDIT-C score in MSFA was at the threshold of heavy drinking, with 36.6% of respondents obtaining a positive AUDIT-C score. This result is worth mentioning and should be considered in further studies on a regular basis. The mean AUDIT-C score in MCFA corresponds to heavy drinking in both genders (≥ 5 in men, ≥ 4 in women), almost doubling the number of respondents with positive AUDIT-C score (68.7%). In addition, the strong positive correlation between AUDIT-C scores in MSFA and MCFA (ρ = 0.711, p < 0.001) showed that the higher the consumption in MSFA, the higher the consumption in MCFA.

No correlation has been found between the respondent's age and alcohol consumption, and our results were in line with other surveys conducted with HE students from Coimbra, Leiria and Aveiro.[1]

Alcohol consumption seems to decrease with the length of undergraduate studies, both in MSFA (ρ = -0.130, p = 0.004) and MCFA (ρ = -0.104, p = 0.021). This result has been confirmed by studies from the University of Aveiro and can be explained by the fact that students have a greater need for integration and loss of social inhibition within the

Table 5 – Most consumed drink in MSFA and in MCFA, per length of undergraduate studies and per gender

			Most consumed drink			
			Beer n (%)	**Wine** n (%)	**Others** (shots, spirits...) n (%)	***p*** (*)
MSFA	Length of undergraduate studies	≤ 3 years	132 (55.2)	30 (12.6)	77 (32.2)	0.119
		≥ 4 years	136 (59.6)	41 (18.0)	51 (22.4)	
		Total	268 (57.4)	71 (15.2)	128 (27.4)	
	Gender	Female	162 (45.6)	63 (17.7)	130 (36.6)	< 0.001
		Male	119 (80.4)	19 (12.8)	10 (6.8)	
		Total	281 (55.9)	82 (16.3)	140 (27.8)	
MCFA	Length of undergraduate studies	≤ 3 years	120 (50.2)	34 (14.2)	85 (35.6)	0.029
		≥ 4 years	136 (59.6)	31 (13.6)	61 (26.8)	
		Total	256 (54.8)	65 (13.9)	146 (31.3)	
	Gender	Female	151 (42.5)	63 (17.7)	141 (39.7)	< 0.001
		Male	113 (76.4)	15 (10.1)	20 (13.5)	
		Total	264 (52.5)	78 (15.5)	161 (32.0)	

(*) Mann-Whitney's U-test
Author's note: 32 omitted cases (7.2%).
MSFA: months without planned college parties; MCFA: months with planned college parties

first years.[13] However, an increased consumption in MCFA is similar in both groups based on the length of undergraduate studies (≤ 3 years, AUDIT-C score ranging from 3.5 ± 2.3 to 6.2 ± 3.4; > 3 years, AUDIT-C score ranging from 2.8 ± 2.3 to 5.4 ± 3.3).

No significant differences between genders regarding the mean AUDIT-C score have been found. This fact may be suggestive of a higher risk of binge drinking in female respondents, considering the lower AUDIT-C cut-off point in females (≥ 4 in females, ≥ 5 in males). In fact, within MSFA, 41.8% of female and 24% of male respondents showed positive AUDIT-C scores ($p < 0.001$). In MCFA, the scores have significantly increased to 73.8% in female and 56.3% in male respondents ($p < 0.001$). Therefore, a higher rate of positive AUDIT-C scores has been found in female respondents, showing a higher risk of heavy drinking among HE students.

Nevertheless, whenever each question was considered in isolation, male respondents have shown a trend as believing themselves in higher consumption, showing consumption levels over the recommended intake and more frequent binge drinking, in line with another study conducted in HE in Coimbra.[11]

Different results have been obtained in our study, when compared to studies carried out in other countries,[20,21] as well as in HE in Portugal, such as in Aveiro, where male respondents have shown higher intakes.[1,7,9,13] These may be due to sample size, distribution and a possible change in consumption habits since these studies were carried out.[1,7,9,13] However, a similar pattern of consumption between both genders has been found in the survey of young participants in the National Defence Day. The results of this study are in line with more recent studies.[5]

A 13.8% rate of abstainers in female and 2.7% in male respondents have been found in MSFA, below the national data,[5] although in line with the people aged 18 and participants in the National Defence Day.[4] These results may be related to the age range of this study, which may be reaching peak drinking prevalence.[4] In MCFA, these rates were reduced to 4.2% and 2%, respectively.

A consumption over the recommended maximum daily intake (one standard drink for women and two for men) was described by 35% of female and 52.7% male respondents on a normal day in MSFA,[2] in line with other studies in higher education students in Coimbra.[22] Ten or more drinks were consumed by 1.7% of female and 8.8% of male respondents on a normal day in MSFA; in contrast, a consumption above the recommended maximum daily intake was described by 95.8% of female and 98% of male respondents in MCFA, while 10 or more drinks were consumed by 7.6% of female and 23.6& of male respondents on a normal day in MCFA.

Binge drinking was described by 58.6% of female and 79.7% of male respondents in MSFA, from which 12.9% and 35.1% have described it 2-4 times a month and 1.1% and 2.0% 4 times a week and above, respectively, corresponding to worrying values and above those found in national and international literature.[4,5,22]

Binge drinking was significantly increased in MCFA to 72.7% in female and to 88.5% in male respondents, corresponding to 44.2% and 69.5% with higher consumption between two to four times a month, and 7.6% and 23.6% with higher consumption between four or more times a week, respectively. This pattern is considered high-risk due to the greater likelihood of developing acute injuries and long-term outcomes, even when the average daily intake does not exceed the recommended values.[2]

These data showed a significant increase in the risk of heavy drinking in MCFA, supporting a reality of widespread excessive alcohol use reported by the media during planned college parties. The reasons and their potential outcomes should be studied.

Beer was the most consumed drink in MSFA by 55.9% of respondents, other drinks (shots, spirits) by 27.8% and wine by 16.3%, while these were the most consumed drinks by 52.5%, 32% and 15.5% in MCFA, respectively, showing a strong and significantly positive correlation ($\rho = 0.756$, $p < 0.001$).

Significant differences were found between genders regarding the most consumed type of drink. Spirits/ shots were mostly described by males in MCFA, to the detriment of wine or beer, although the latter remains as the preferential type of drink. The most consumed type of drink has remained unchanged in female respondents, with a mild increase in the preferential consumption of spirits / shots, to the detriment of beer. Strong alcoholic drinks are preferred by female respondents in MSFA, when compared to male respondents, which has been found in students attending the Leiria Secondary School.[9]

Significant differences were found between groups with different lengths of undergraduate studies regarding the most consumed type of drink in MCFA. Spirits and wine are the most consumed by the group with less years of undergraduate studies, to the detriment of beer.

These results were significantly different from those found in the national literature, showing wine as the most consumed type of alcohol, followed by beer and spirits.[5,22] However, the results are in line with other studies carried out in HE students,[1] showing a preferential consume of non-spirit drinks among students, even considering beer as the 'students' drink. It is worth mentioning the significantly higher preferential consumption of spirits among students in Coimbra, when compared to other studies.[1,4,5,11,12]

The reasons for preferential consumption of a specific type of alcohol remains unclear and should be analysed together with the higher consumption throughout the first years of undergraduate studies.

A difficult comparison of results was a limitation of the study, as different 'screening' tools are used to assess the alcohol consumption patterns, which is aggravated by the scarcity of studies on this subject. Therefore, a further extension of the analysis of drinking patterns to other institutions, up to secondary school, will certainly allow a better understanding of whether the impact of college parties is exclusive to HE students or if it is already based on previous habits. Apart from college parties and the uninhibited atmosphere, there may be specific characteristics of each student that should be assessed.

The identification of heavy drinking pattern is aimed at the prevention of associated pathologies. Therefore, in future research, the full AUDIT survey should be made available to those who have obtained a positive AUDIT-C score, involving an orientation. A behavioural change is required to fight against this issue. Knowing that 65.8% of the respondents acknowledge having a different consumption pattern at college parties (contemplation stage?), the next step would be to understand if they would be willing to move on to the next stage (preparation?).

CONCLUSION

A significant level of alcohol use has been found in a group of higher education students in Coimbra, with at-risk drinking described by 36.6% of the respondents and a consumption above the maximum recommended daily intake described by 40.2% in months with no planned college parties.

A higher risk of heavy drinking has been found in female respondents, according to the AUDIT-C survey.

The risk of heavy drinking was increased by planned college parties.

A different type of alcohol was consumed in months with no planned college parties, when compared to those with these parties, with an increased consumption of spirits/ shots by all genders.

The use of alcohol was reduced as the length of undergraduate studies increased. However, the impact of college parties remained unchanged and was not associated with the length of undergraduate studies. A higher consumption of spirits was found in the group with shorter length of undergraduate studies.

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AUTHOR CONTRIBUTION

ACT: Conception, field work, data analysis, writing of the manuscript.

LMS: Conception, statistical analysis, critical review.

HUMAN AND ANIMAL PROTECTION

The authors declare that this project complied with the regulations that were established by the Ethics and Clinical Research Committee, according to the 2013 update of the Helsinki Declaration of the World Medical Association.

DATA CONFIDENTIALITY

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in writing this manuscript.

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