

# ALCOHOL DRINKING AMONG THE STUDENTS OF THE UNIVERSITY OF MARIBOR, SLOVENIA

## PITJE ALKOHOLA MED ŠTUDENTI UNIVERZE V MARIBORU, SLOVENIJA

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### ABSTRACT

#### Keywords:

university students,  
risky alcohol drinking,  
binge drinking

**Background.** Hazardous and harmful alcohol drinking is an important health, social and economic issue in Slovenia amongst all age groups. While drinking in Slovenia has been well researched amongst elementary and high school students, there is a lack of research on drinking amongst university students.

**Methods.** We conducted a cross-sectional study among first- and fourth-year students of the University of Maribor, Slovenia, attending the mandatory preventive health check between October 2009 and May 2010. During this health check, they filled in a non-anonymous lifestyle questionnaire. AUDIT-C questionnaire on alcohol use and questions on smoking and illicit drug use were also included.

**Results.** 3.130 students were included in the analysis, 1219 (38.9%) were males. There were 871 (27.8%) students that were screened as risky drinkers. The highest percentage of risky drinkers attended the Faculty for Wood Technology and the lowest the Faculty for Health Sciences. Students, recognized as healthier by the physicians, reported risky drinking significantly less often ( $p=0.015$ ). Students with higher BMI reported risky drinking significantly more often ( $p=0.012$ ). Variables, proved to be independently associated with the risky drinking in the multivariate analysis, were: bad health status ( $p=0.044$ ), male sex ( $p<0.001$ ), daily consumption of fried food ( $p=0.017$ ), smoking ( $p<0.001$ ), illicit drugs ( $p<0.001$ ), attending the Faculty for Civil Engineering ( $p=0.006$ ), not attending the Faculty for Health Sciences ( $p=0.002$ )

**Conclusions.** While the prevalence of risky drinking among students in this study is high, a structured preventive programme should be implemented for students, which will include also illicit drug use and smoking.

### IZVLEČEK

#### Ključne besede:

univerzitetni študenti,  
tvegano pitje alkohola,  
popivanje

**Uvod.** Tvegano in škodljivo pitje alkohola je pomembna zdravstvena, socialna in ekonomska tema v Sloveniji, ki se dotika vseh starostnih skupin prebivalstva. Pitje alkohola je dobro raziskano med osnovnošolci in srednješolsko mladino, malo pa je podatkov o pitju alkohola med študenti.

**Metode.** Izvedena je bila presečna raziskava med študenti prvih in četrth letnikov Univerze v Mariboru, ki so obiskali obvezni preventivni zdravniški pregled med oktobrom 2009 in majem 2010. V okviru tega pregleda so izpolnili tudi neanonimni vprašalnik o življenjskem slogu, ki je med drugim vključeval vprašalnik AUDIT-C za oceno pitja alkohola ter vprašanja glede kajenja in rabe prepovedanih drog.

**Rezultati.** V analizo je bilo vključenih 3130 študentov, od tega je bilo 1219 (38,9 %) moških. S presejalnim testom je bilo prepoznanih 871 (27,8 %) tveganih pivcev. Največji odstotek tveganih pivcev je bil med študenti višje lesarske šole, najnižji pa med študenti visoke zdravstvene šole. Med študenti, ki so jih zdravniki opredelili za bolj zdrave, je bilo statistično značilno manj tveganih pivcev ( $p=0,015$ ). Med študenti s povišanim indeksom telesne mase je bilo statistično značilno več tveganih pivcev ( $p=0,012$ ). Spremenljivke, ki so bile pri multivariantni analizi neodvisno povezane s tveganim pitjem, so bile slabo zdravstveno stanje ( $p=0,044$ ), moški spol ( $p<0,001$ ), vsakodnevno uživanje ocvrte hrane ( $p=0,017$ ), kajenje ( $p<0,001$ ), raba prepovedanih drog ( $p<0,001$ ), študij na Fakulteti za gradbeništvo ( $p=0,006$ ) in ne biti študent Visoke zdravstvene šole ( $p=0,002$ ).

**Zaključek.** Glede na ugotovljen velik odstotek tveganih pivcev bi bilo treba za študente uvesti strukturiran preventivni program za zmanjšanje pitja alkohola, ki bi vključeval tudi aktivnosti v zvezi s kajenjem in prepovedanimi drogami.

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## 1 INTRODUCTION

The WHO European region is the heaviest drinking region of the world, with 11 litres of pure alcohol/year/inhabitant of 15 years of age and over, which is 2.5 times more than the rest of the world (1). More than 60 diseases are directly related to alcohol drinking (2) and, in Europe, it is the second most important cause of premature death and morbidity (3). Alcohol drinking over low risk drinking limits (14 alcohol units/week or less for men and 7 units/week for women) puts women and people in younger age groups at higher mortality risks than men (4). Heavy episodic drinking (6 units or more per one occasion for men and 4 units or more per one occasion for women), even in non-hazardous drinkers, puts a person at health risks, and such binge drinking is the highest in young adults (5); additionally, it is even increasing among high school students (more among girls than boys) in some countries in Europe (6).

Slovenia is a wine producing country with 2 million inhabitants; drinking wine and home-made brandy has been a part of its culture for centuries. Slovenia has one of the highest alcohol consumption in Europe, but data are inconsistent: 11-18 litres of pure alcohol/year/inhabitant of 15-year-olds and over; 1-7 litres of that amount is unregistered (1, 7, 8), which is more than two times larger than is an average in Europe - 2.67 litres (9). Children start drinking alcohol already early in their childhood: Kolšek (10) reported that, in Slovenia, 73% of children (while Boben-Bardutzky et al. (11) reported only 52%) drank their first glass of alcohol before the age of 10 years. 5% of 10 yearsold (10) and 27% of 15 years old children (12) drink alcohol several times a week; 13% of 10 years old children have already been drunk, and 40% of them did not drink alcohol in the past year (10). Among 15 and 16 years old adolescents only 7% are lifetime teetotallers (the average in ESPAD countries is 13%, but there are differences between countries), and 21% of them have been drunk in the past month, while the average in ESPAD countries is 17% (6, 13). One quarter of deaths among young adults is directly related to alcohol (14). The frequency of alcohol drinking in Europe has been slightly decreasing in the last 10 years, but, in Slovenia, it is changing - decreasing and increasing, so, in the year 2010, it was the same as in the year 2000 (8, 15, 16), but, anyway, it has slightly decreased in the last 25 years (14). It is therefore not surprising that, according to the data from an anonymous questionnaire on the website of the national project 'Message from the bottle - [www.nalijem.si](http://www.nalijem.si)', 58% adult men and 49% adult women are drinking over low risk drinking limits, among those who answered the questionnaire (17). The research, conducted in 2012, in Slovenia, by Sorko and Boben, among a non-representative sample of adult population (18), has found 35.5% of harmful drinkers among adult

interviewees; more than 10% had three or four positive answers at 4-item CAGE questionnaire (19) and, among those who were interviewed, men were drinking higher amounts and more frequently.

While there were many studies done among university students in Europe (20-22), only a few local research projects have been conducted in Slovenia, but they have not used standardized questions about alcohol drinking (23-26), except for one that was conducted among the students of the University of Ljubljana (27).

The aim of this study was to determine the prevalence of risky drinking among the students of the second largest University in Slovenia - the University of Maribor, and possible associations of risky drinking with demographic and health characteristics of the students.

## 2 METHODS

### 2.1 Participants

A cross-sectional study has been conducted among first- and fourth-year students at the University of Maribor, in the study year 2009/2010. Between October 2009 and May 2010, 3.173 questionnaires were filled in. 1.232 (38.8%) students were males, 2.087 (65.8%) were first year students. 43 questionnaires were not completed and were excluded from the analysis.

### 2.2 Procedure

During the first and the fourth study year, all students have a mandatory health check at the Health Centre for students, and, at the beginning of this health check, they have to fill in a questionnaire (a written format), which, besides the personal data, includes also the questions about their life style and their alcohol drinking habits. At the end of the mandatory check-up, a well experienced physician, who performed it, rated the students' health on the scale from 10 to 50 (10 = healthy, 20 = healthy with risk factors, 30 = light health damage, 40 = medium health damage, 50 = heavy health damage), according to the findings at check-up and in terms of students' answers about their health problems. The gathered data from these health checks were analysed individually by the health care team, but for our research we received all data in one Excel file, excluding personal data.

### 2.3 Measures for Alcohol Drinking

A part of the lifestyle questionnaire for students was AUDIT-C questionnaire. We used the Slovenian adaptation of AUDIT-C questionnaire (28), which gives less false positive and false negative results, compared to the original questionnaire, because of the adapted answers to the second question and gender-specific changes in the text of the third question; consequently, a cut off

point for men is 6 points and for women 5 points. When a student was screened positive on AUDIT-C, he got a simple advice to reduce his drinking; a similar advice was given if screened positive for smoking, or any use of illegal drugs.

## 2.4 Statistical Analysis

The data was analysed with the SPSS 13.0 package (SPSS Inc., Chicago, IL). We calculated the descriptive data. In the bivariate analysis, we used the independent t-test and chi-square test. In the multivariate analysis, we used the logistic regression. The variables proved to be statistically significant in the bivariate analysis; they were entered into the multivariate analysis. We considered  $p < 0.05$  to be statistically significant.

## 3 RESULTS

Out of 3,130 students, there were 1,911 (61.1%) women (Table 1). Mean students' health, as rated by the physicians, was  $16.2 \pm 10.3$ . Mean BMI of the students was  $23.7 \pm 4.1$ .

According to AUDIT-C, 871 (27.8%), students were identified as risky drinkers. The highest percentage of risky drinkers attended the Faculty for Wood Technology and the lowest the Faculty for Health Sciences (Table 2).

**Table 2.** Risky drinking of alcohol according to different faculties\* - students of the University of Maribor, Slovenia, 2009-2010.

Faculty	N (%) of risky drinkers of alcohol
Tourism	36 (38.7)
Wood technology	17 (38.6)
Civil engineering	97 (37.7)
Electrical engineering	115 (34.8)
Mechanical engineering	47 (34.3)
Transport	36 (33.0)
Mathematics	43 (28.1)
Food science and technology	12 (27.3)
Chemistry	26 (26.5)
Philosophy	104 (26.5)
Agriculture	44 (25.7)
Law	39 (25.3)
Economic	164 (24.9)
Pedagogy	57 (24.1)
Business secretary	9 (16.4)
Health Sciences	13 (11.0)

\* faculties with N of respondents lower than 30 were excluded

**Table 1.** Demographic and health characteristics of the students of the University of Maribor, Slovenia, 2009-2010.

Characteristic	Number (%)
Sex	
Male	1219 (38.9)
Female	1911 (61.1)
Faculty	
Economic	659 (21.1)
Philosophy	392 (12.5)
Electrical engineering	330 (10.5)
Pedagogy	265 (8.5)
Civil engineering	257 (8.2)
Agriculture	171 (5.5)
Law	154 (4.9)
Mathematics	153 (4.9)
Mechanical engineering	137 (4.4)
Health sciences	118 (3.8)
Transport	109 (3.5)
Chemistry	98 (3.1)
Tourism	93 (3.0)
Business secretary	55 (1.8)
Food science and technology	44 (1.4)
Wood technology	44 (1.4)
Theology	29 (0.9)
Others (Security sciences, Medical, Organizational sciences)	22 (0.7)
Study year	
First	2.059 (65.8)
Fourth	1.071 (34.2)
The type of food consumed every day	
Fruit	3.096 (98.9)
Milk	3.056 (97.6)
Meat	3.044 (97.3)
Fried food	2.859 (91.3)
Fish	2.680 (85.6)
Smoking cigarettes regularly	690 (22.0)
Illegal drugs (ever used)	287 (9.2)
Any health problem detected at the routine check-up	1.862 (59.5)
Health status as determined by physicians	
Healthy	2.241 (71.6)
Healthy with risk factors	4 (0.1)
Light health damage	805 (25.7)
Medium health damage	4 (0.1)
Heavy health damage	76 (2.4)

Mean score of AUDIT-C was  $3.7 \pm 2.2$  (Table 3).

**Table 3.** Mean (and standard deviation) of AUDIT-C for selected variables.

Variable	AUDIT-C mean $\pm$ standard deviation
Sex	
Male	4.6 $\pm$ 2.3
Female	3.1 $\pm$ 1.9
Fried food every day	
Yes	3.8 $\pm$ 2.2
No	2.9 $\pm$ 2.1
Smoking	
Yes	4.4 $\pm$ 2.1
No	3.5 $\pm$ 2.2
Illegal drugs	
Yes	5.3 $\pm$ 2.2
No	3.5 $\pm$ 2.1
The Faculty of Electrical Engineering	
Yes	4.4 $\pm$ 2.3
No	3.6 $\pm$ 2.1
The Faculty of Civil Engineering	
Yes	4.4 $\pm$ 2.2
No	3.6 $\pm$ 2.2
The Faculty for Pedagogy	
Yes	3.1 $\pm$ 2.0
No	3.7 $\pm$ 2.2
The Faculty for Health Sciences	
Yes	2.5 $\pm$ 1.8
No	3.7 $\pm$ 2.2
The Faculty for Tourism	
Yes	4.1 $\pm$ 2.5
No	3.7 $\pm$ 2.2

Students, rated as having better health by the physicians, reported risky drinking significantly less often ( $15.5 \pm 9.7$  vs.  $16.4 \pm 10.5$ ,  $t=-2.340$ ,  $p=0.015$ ). Students with higher BMI reported risky drinking significantly more often ( $24.0 \pm 3.8$  vs.  $23.6 \pm 4.1$ ,  $t=2.508$ ,  $p=0.012$ ). There were also significant differences in risky drinking associated with sex, some eating habits, smoking, the use of illicit drugs and type of faculty (Table 4). On the other hand, there was no difference in risky drinking associated with the study year ( $p=0.354$ ) and sports activities of students ( $p=0.321$ ).

In the multivariate analysis, the following variables proved to be independently associated with the risky drinking: worse health status, male sex, daily consumption of fried food, and smoking, illegal drugs, attending the Faculty for Civil Engineering and not attending the Faculty for Health Sciences (Table 5).

**Table 4.** Bivariate associations of risky drinking with sex, lifestyle and the type of faculty (only the significant associations are shown), students of the University of Maribor, Slovenia, 2009-2010.

Variable	% of students with risky drinking	Chi-square	df	p
Men vs. women	35.8 vs. 22.8	62.666	1	< 0.001
Fried food every day: yes vs. no	28.6 vs. 19.9	9.222	1	0.002
Smoking: yes vs. no	40.0 vs. 24.4	65.301	1	< 0.001
Illegal drugs: yes vs. no	54.4 vs. 25.1	110.716	1	< 0.001
Attending				
The Faculty of Electrical Engineering: yes vs. no	34.8 vs. 27.0	9.054	1	0.003
The Faculty of Civil Engineering: yes vs. no	37.7 vs. 26.9	13.707	1	< 0.001
The Faculty for Pedagogy: yes vs. no	21.5 vs. 28.4	5.754	1	0.018
The Faculty for Health Sciences: yes vs. no	11.0 vs. 28.5	17.254	1	< 0.001
The Faculty for Tourism: yes vs. no	38.7 vs. 27.5	5.652	1	0.025

**Table 5.** Multivariate analysis\* for risky drinking of the students of the University of Maribor, Slovenia, 2009-2010.

Dependent variable	Independent variables	Odds ratio	95% lower and upper C. I. for odds ratio	p
Risky drinking	Worse health status as assessed by the physicians	0.992	0.983-1.000	0.044
	Male sex	1.36	1.230-1.469	< 0.001
	Fried food every day	1.486	1.072-2.059	0.017
	Smoking	1.952	1.615-2.360	< 0.001
	Illegal drugs	2.760	2.131-3.575	< 0.001
	Attending the Faculty for Electrical Engineering	1.216	0.930-1.588	0.152
	Attending the Faculty for Civil Engineering	1.493	1.121-1.988	0.006
	Not attending the Faculty for Pedagogy	1.077	0.723-1.332	0.923
	Not attending the Faculty for Health Sciences	1.623	1.303-1.796	0.002
	Attending the Faculty for Tourism	1.510	0.960-2.375	0.074
	Higher BMI	1.009	0.988-1.030	0.404

\* chi-square = 224.375, df = 11, p < 0.001, Nagelkerke R<sup>2</sup> = 0.100  
 BMI = body mass index

#### 4 DISCUSSION

The main findings of our study showed that more than one quarter of the students (27.8%) were screened as risky drinkers. Risky drinking was associated with male sex, bad health status, eating fried food every day, smoking, any use of illegal drugs and attending some faculties.

Leskovar & Fridl (25) in their study from 2007 found much more risky drinkers (46.3%) among students of the same University. There were also fewer teetotallers (5.6%) than in our study (7.8%). Such difference may be explained by the difference in the size of the sample (214 students in their sample and 3.130 in ours) and by different methodology. In their study, students filled in the questionnaire anonymously and on a voluntary basis, while in our study the questionnaire was not anonymous and it was an obligation to fill it in during the health check. In the same study year, Biščak-Hafner et al. (27) found 11.8% teetotallers and 23.1% risky drinkers among students of the University of Ljubljana, Slovenia. They found also 16.8% binge drinkers (at least monthly), while in our study, there were 20.3%. In their study, the same methodology was used as in our study, and it would be interesting to find out which factors were important for such a difference. The proportion of risky drinkers among young adults in other European countries differs a lot, but different methodologies makes comparisons rather difficult. In England, Heather et al. (29) found much more risky drinkers than were in our study: 61.0% students scored positive on AUDIT questionnaire (40.0% hazardous drinkers, 11.0% harmful drinkers and 10.0% with probable dependence), but, similar to our study, there were differences between the universities. Stock et al. (22) conducted a study in seven European countries

(Bulgaria, Denmark, Germany, Lithuania, Poland, Spain and Turkey) and found important differences among countries in problem drinking (at least one positive answer at CAGE questionnaire) - there were 24.0% of males and 13.0% of female students as problem drinkers (data for all countries). The data is not completely comparable to the results of AUDIT questionnaire that was used in our study, because the sensitivity and specificity of these two questionnaires to identify hazardous drinkers are not the same (30). Sebens et al. (21) also used CAGE questionnaire in five European countries (Bulgaria, Germany, Poland, Slovakia and UK) and found 11.8% to 22.1% problem drinkers among students, but they considered problem drinking at two or more positive responses to CAGE questionnaire. Gmel et al. (31) in Switzerland, among 19 years old men, found 7.2% teetotallers and 75.5% binge drinkers, but the studied population were all young males enrolling for mandatory army recruitment procedures, not only university students. Such big differences between countries can be partly explained by different methodology used in studies, by different overall alcohol consumption in countries and by cultural and historical differences (32).

Our study, as well as studies in many other countries, showed that more men are drinking alcohol and more men are binge drinkers than women (3, 5, 6, 20, 22, 24, 27, 29, 31). This result is not surprising as drinking alcohol historically was more or less men's domain, but in the last decades things are changing. Social roles of women (and also men's roles) are changing, women are more and more included equally in the society, many behaviours that were traditionally men's domain are taken over by women and, consequently, sex differences in alcohol drinking are becoming less evident (2, 6), which will probably cause



more alcohol-related health consequences for women in the next period.

Smoking and the use of illegal drugs are associated with higher alcohol consumption (3, 5, 6, 33, 34), which came as no surprise as a result also in our study, because it is known that different risky behaviours can be identified frequently in at-risk adolescents as a 'problem behaviour syndrome.' This association in youth can be explained from neurological and psychosocial perspectives (33, 35): In our study, we found that bad health status was associated with less alcohol drinking, which is similar to some other studies (5, 22), but depressive disorders may have the opposite result (21).

Our study showed also the association between alcohol drinking and eating fried food daily, which should be studied further to explain this relation, while there are not many studies on the relations between alcohol and different food intakes.

We found that alcohol drinking is associated with attending some faculties. A special interest was put on students of health sciences, where we found that they drank less compared to other students. International data on this topic are controversial. Thakore et al. (34) published a similar association, but Gerstenkom & Suwala (36) in Poland found 46.5% hazardous drinkers among students of medicine, which is quite different from students of health studies in our study, who drank even less than students of other faculties.

We found no association between sports activities and alcohol drinking, but the data from the literature is controversial (38-40), which may mean that some specific unidentified factors are related to the possible influence of sports activities on drinking habits.

Strengths of our study are the data which we collected of the students of all faculties of the second biggest university in Slovenia. We included the largest number of students of this University in the study so far - all students that came to the mandatory health check. The use of the specific and sensitive standardized international questionnaire gives good results and enables valid comparisons with the data of other similar studies. Used statistical methods showed important factors that were associated with alcohol drinking, the most interesting one, and not studied enough so far, was bad health status. Our study has also some limitations. Our data did not include students that had not come to the health check. We missed some students because of the time limit of the survey, whereas some students came for the check-up in the next study year and some students left the university during their first study year. Another problem of the study could be the use of the questionnaire which was not anonymous. This could have had an influence on the sincerity of students' answers - they might have declared

lower, more 'acceptable' numbers of drinks. As the whole questionnaire included only a limited number of questions, we probably missed out on some other factors that could be associated with alcohol drinking habits (e.g. religion, a social-economic status, place of living - at home or in campus, parents' drinking habits, etc.).

## 5 CONCLUSIONS

Although our results showed lower proportion of risky drinkers, comparing to the data from some other countries, we cannot be satisfied. The society as a whole, the government and also the University with its faculties should organize activities that would decrease students' drinking, if we know that 25% of deaths among young males and 10% among young females are related to alcohol (2), which would also have an influence on students' smoking habits and their use of illegal drugs. Besides general measures that significantly influence alcohol consumption (40) (e.g. higher taxes for alcohol beverages, reduced availability of alcohol, alcohol advertisement restrictions), regular screening and brief interventions should be implemented into primary health care, especially for adolescents and young adults, in addition to the popularization of, for the youth, a more acceptable web-based help for risky drinkers that includes the assessment of alcohol drinking habits, coupled with brief interventions which have been proven to be effective (41). It would be worth for politicians to consider to increase the minimum legal drinking age from 18 to the age 21, as it is in the United States, and as it is proven to be effective in reducing underage drinking and alcohol-related problems (42).

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## CONFLICTS OF INTEREST

The authors declare that no conflicts of interest exist.

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## ETHICAL APPROVAL

The Committee of Republic Slovenia for medical ethics approved the study on October, 27th, 2009; No. 71/10/09.

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