

Time Trends: A Ten Years Comparison (2005/2006-2015/2016) of Alcohol Misuse During First Year in Medical School

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The purpose of the present study was to explore time-trends (2005/2006-2015/2016) of alcohol misuse in first year medical students and types of alcohol preferred by young adults in the same medical school. The study compared two cross-sectional cohorts of medical students (2005/2006: 365 females and 249 males; 2005/2016: 336 females and 123 males) from Timisoara, Romania, using the same questionnaire in both investigations. The analysis was conducted measuring gender and cohort effect on frequency of alcohol use patterns during the last month and the type of alcohol used preferred. Girls have increased with a small effect size both the number of days consuming at least one portion of alcohol and the number of days with binge drinking between evaluations, reducing the gap between boys and girls, seen in 2005/2006 evaluation. In multivariate models, though beer consumption has decreased (OR=0.6) between evaluations, wine (OR=3.6) and spirits (OR=1.6) consumption has increased. Beer and spirits are the type of alcohol used by young people for binge drinking. Interventions to reduce misuse of alcohol in general population or specific to university students need to be carefully tailored to the shifting patterns of alcohol consumption, which are gender specific.

Keywords: Alcohol misuse; Type of alcohol; Binge drinking; Intoxication; Medical students

The term misuse of alcohol is defined by frequent patterns of consume and high volume of consumption, both of which determine the impact of alcohol consumption on acute and chronic health problems. According to WHO, the European Region, especially the Eastern Europe has the highest proportion morbidity and premature death in the world due to misuse of alcohol. The trends of alcohol consumption per capita in the European Region have recorded a negative trend from 11.9 liters of pure alcohol in 2003-2005 to 10.9 liters of pure alcohol in 2008-2010. For Romania, in the same time frame the per capita alcohol consumption has increased from 12.8 to 14.4 L [1].

Following adolescence, the period of emerging young adulthood is characterized by gaining more independence and exploring various life possibilities [2]. For emerging young adults, especially the first year students, this period represents an abrupt transition to a more independent life with a change in role and setting [3,4]. Several studies have reported for this age an increase of several health risk behaviors, including alcohol abuse and subsequent alcohol-related problems, such as injuries, crimes [5-7], STDs, unplanned pregnancies, behavioral problems [8] and dependency, co-use of other drugs.

The purpose of the present study was to explore time-trends (2005/2006-2015/2016) of alcohol use and misuse in first year medical students and types of alcohol preferred by young adults.

Experimental part

Material and Methods

Subjects

This sample compared two cross-sectional cohorts from 2005/2006 and 2015/2016. Participants were selected from

the students attending the first year of Victor Babes University of Medicine and Pharmacy Timisoara, that included the following specializations: General Medicine, Dentistry, Nurses and Midwives. All participants were over 18 years of age at the time of the evaluation, with an age range of 18 - 25 years and median of 20 for the 2006 cohort and an age range of 18 - 26 years and median of 21 years for the 2016 cohort. In both occasions students were included in the cohort after expressing their free will to participate. The research was carried out in compliance with Helsinki Declaration.

Questionnaire

A 126-item questionnaire was developed in 2004 to investigate health-risk behaviors of young adults, as part of the grant *The evaluation of risk behavior dimension in high school students and young people from vocational schools and universities in Timis County* (CORT 2004), carried out between 2003-2006, CNCSIS code 1167, attained at Victor Babes University of Medicine and Pharmacy Timisoara. Some of the questionnaire items were modified from other instruments, including the Youth Risk Behavior Survey (YRBS) [9] and European School Survey Project on Alcohol and Other Drugs (ESPAD) [10]. In 2004 a pilot test was conducted to establish the validity and reliability of the instrument. This study received the University's Ethic Committee approval on both occasions.

The questionnaire was administered in both evaluations 2005/2006 and 2015/2016 in a regular classroom/laboratory/clinical setting and took students 60 min to complete. No filter questions were used. By doing this, comparable amounts of time are required to complete the

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questionnaire, regardless of risk behavior status and students cannot detect the risk behaviors of their colleagues simply by looking at the pattern of the responses. Only students present the day of the survey were eligible for participation.

Trained public health residents and undergraduate students conducted the survey. The data collectors read aloud scripts that explained the survey procedures. Anonymity was guaranteed and students were reassured that the information obtained would be used only for general assessment of the situation in the county.

The present paper used questions related to patterns of alcohol consumption during last 30 days: at least one portion and binge drinking, and types of alcohol preferred to consume.

Results and discussions

Consumes at least one portion of alcohol during last month

For men, 66.9% (166) in 2006 and 69.9% (86) in 2016 admit having at least one drink during last month. The percentages for women that consumed at least one portion of drink during last month are 38.5% (140) in 2006 and 52.0% (172) in 2016. In both evaluations, boys had consumed at least one portion of alcohol in significantly more days than the girls, with a medium effect size in 2005/2006: $U=28919$, $z=-8.17$, $p<0.001$, $r=0.33$, and a small effect size for 2015/2016 sample: $U=14701$, $z=-4.84$, $p<0.001$, $r=0.22$.

Between evaluations, boys did not significantly modify the proportion of days with at least one portion of alcohol,

but for girls, the number of days had increased between evaluations: $U=51783.5$, $z=-3.56$, $p<0.001$, $r=0.14$, with a small effect size (table 1).

Practices binge drinking during last month

Regarding binge drinking, for 2006, 35.1% (87) of men and 8.9% (36) of women admit they consumed at least in one occasion 5 or more portions of alcohol. For 2016 the percentages of students practicing binge drinking are 31% (50) for men and 16% (53) for women. In both evaluations, boys binge drank in significantly more days than the girls, with a medium effect size in 2005/2006: $U=33340.5$, $z=-7.85$, $p<0.001$, $r=0.32$, and a small to medium effect size for 2015/2016 sample: $U=14925$, $z=-5.86$, $p<0.001$, $r=0.27$.

Also for binge drinking in boys group no significant differences were found between evaluations regarding the number of days during last month when they drank more than 5 portions of alcohol in an occasions, $p=0.157$, but girls significantly increased the number of days with binge drinking $U=56565$, $z=-2.51$, $p=0.012$, $r=0.09$, with a small effect size (Table 2).

Type of preferred alcoholic beverage

In 2005/2006 evaluation 73.5% of men (183) and 52.9% (192) of women answered the question regarding the type of alcohol consumed. For the 2016 evaluation, the percentages of men declaring the type of alcohol preferred are 78.0% (96) for men and 64.5% (213) for women (table 3).

Consumes at least one portion of alcohol during last month	2006				2016			
	F		M		F		M	
	Column N %	Count						
Never	61.5%	224	33.1%	82	48.0%	159	30.1%	37
1-5 days	33.2%	121	47.2%	117	44.4%	147	47.2%	58
6 or more days	5.2%	19	19.8%	49	7.6%	25	22.8%	28
Subtotal	100.0%	364	100.0%	248	100.0%	331	100.0%	123

Table 1
DISTRIBUTION OF PARTICIPANTS ACCORDING TO CONSUME OF AT LEAST ONE PORTION OF ALCOHOL DURING LAST MONTH

Practices binge drinking during last month	2006				2016			
	F		M		F		M	
	Column N %	Count						
Never	90.1%	328	64.9%	161	84.0%	279	59.0%	72
1-5 days	9.9%	36	31.0%	77	14.2%	47	34.4%	42
6 or more days	0.0%	0	4.0%	10	1.8%	6	6.6%	8
Subtotal	100.0%	364	100.0%	248	100.0%	332	100.0%	122

Table 2
DISTRIBUTION OF PARTICIPANTS ACCORDING TO PRACTICING BINGE DRINKING DURING LAST MONTH

Type of favorite alcoholic beverage	2006				2016			
	F		M		F		M	
	Count	% per layer						
Beer	104	54.17	137	74.86	75	35.21	69	71.88
Wine	128	66.67	94	51.37	163	76.53	64	66.67
Spirits	14	7.29	40	21.86	57	26.76	43	44.79

Table 3
DISTRIBUTIONS OF PARTICIPANTS ACCORDING TO THE FAVORITE TYPE OF ALCOHOLIC BEVERAGE

In 2005/2006, higher proportions of men, compared to women consume beer $\chi^2(1) = 43.89, p < 0.001, OR = 3.09, IC95\% = (2.202; 4.336)$, and spirits $\chi^2(1) = 27.60, p < 0.001, OR = 4.80, IC95\% = (2.552; 9.041)$, but equal proportions consume wine, $p = 0.497$.

In 2015/2016 evaluation, the results are similar, higher proportions of men, compared to women consume beer $\chi^2(1) = 46.01, p < 0.001, OR = 4.344, IC95\% = (2.800; 6.742)$, and spirits $\chi^2(1) = 16.29, p < 0.001, OR = 2.57, IC95\% = (1.613; 4.110)$, but equal proportions consume wine, $p = 0.617$.

The proportion of beer consumers is constant between evaluations, for both men ($p = 0.908$) and women ($p = 0.072$). Instead, the proportion of wine consumers has increased for both men $\chi^2(1) = 6.55, p = 0.010, OR = 1.76, IC95\% = (1.140; 2.734)$ and women $\chi^2(1) = 13.95, p < 0.001, OR = 1.78, IC95\% = (1.315; 2.421)$.

Also, the spirits consumers proportion has increased for both men $\chi^2(1) = 16.61, p < 0.001, OR = 2.78, IC95\% = (1.684; 4.595)$ and women $\chi^2(1) = 33.69, p < 0.001, OR = 5.19, IC95\% = (2.832; 9.511)$.

Predictions

Direct logistic regression was performed in order to assess the impact of gender, group and pattern of alcohol consume during last month on the likelihood that the respondents would answer that they prefer to consume beer, wine or spirits.

Each of the models was applied separately for each type of preferred alcoholic drink. Each model contained 6 independent variables [gender (M/F), group (2005/2006 and for 2015/2016), frequency of alcohol consumption at least one portion (0 days, 1-5 days, over 6 days), frequency of binge drinking (0 days, 1-5 days, over 6 days) both during last month].

For beer the full model containing all predictors was statistically significant, $\chi^2(6, N = 1074) = 305.9, p < 0.001$, indicating that the model was able to distinguish between respondents who had beer as their favorite alcoholic drink or not. The model as a whole explained between 25.1% and 34.4% of the variance of having beer as their favorite alcoholic drink or not, and correctly classified 75.4% of cases. All six predictors made a unique contribution to the model. The strongest predictor of having beer as favorite alcoholic beverage was the daily consumption of at least one portion of alcohol in more than 5 days during last month, as compared who students who did not consume at least

one portion of alcohol during last month, which recorded a $OR = 7.6$. Students who drank in 1 to 5 days at least one portion of alcohol had 5 times more chances to like beer (table 4).

Students who practiced binge drinking in more than 6 days during last month, as compared to those who did not practice binge drinking at all, had an $OR = 5.1$ and students who practiced binge drinking in 1 to 5 days during last month had an $OR = 2.3$. Boys were 2.2 times more likely to preferred beer, as compared to girls. The sample 2015/2016 had an $OR = 0.604$ meaning that the sample in 2015/2016 consumed significantly less beer than the sample from 2005/2006. For wine the full model containing all predictors was statistically significant, $\chi^2(6, N = 1074) = 221.2, p < 0.001$, indicating that the model was able to distinguish between respondents who had wine as their favorite alcoholic drink or not. The model as a whole explained between 18.8% and 25.3% of the variance of having wine as their favorite alcoholic drink or not, and correctly classified 71.8% of cases. Only three predictors made a unique contribution to the model. The strongest predictor of having wine as favorite alcoholic beverage was the daily consumption of at least one portion of alcohol in 1 to 5 days during last month, as compared who students which did not drink alcohol at least one portion, which recorded a $OR = 7.8$. Students who drank in more than 6 days at least one portion of alcohol had 7.3 times more chances to like wine. The group of 2015/2016 was 1.6 times more likely to consume wine, compared to group investigated in 2005/2006. For gender, the $OR = 0.706$ indicating that women are more likely than men to prefer wine.

The frequency of binge drinking did not contribute to the model (table 5).

For spirits, the full model containing all predictors was statistically significant, $\chi^2(6, N = 1074) = 181.4, p < 0.001$, indicating that the model was able to distinguish between respondents who had wine as their favorite alcoholic drink or not. The model as a whole explained between 15.7% and 28.0% of the variance of having wine as their favorite alcoholic drink or not, and correctly classified 86.6% of cases. All 6 predictors made a unique contribution to the model. The strongest predictor of having spirits as favorite alcoholic beverage was the frequency of binge drinking of more than 6 days during last month, which recorded an $OR = 5.8$. The frequency of binge drinking of 1 to 5 days had an $OR = 3.77$.

Table 4
PREDICTORS OF HAVING BEER AS FAVORITE ALCOHOLIC BEVERAGE

Predictors of having beer as favorite alcoholic beverage ^a	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Sex (M vs. F)	.794	.158	25.320	1	.000	2.211	1.623	3.012
Group (2015/2016 vs. 2005/2006)	-.508	.157	10.520	1	.001	.602	.443	.818
No of days with at least 1 portion of alcohol			94.007	2	.000			
1-5 days vs. 0 days	1.612	.177	83.367	1	.000	5.013	3.546	7.085
Over 6 days vs. 0 days	2.023	.284	50.905	1	.000	7.563	4.338	13.184
No of Days with binge drinking			20.585	2	.000			
1-5 days vs. 0 days	.823	.198	17.328	1	.000	2.276	1.545	3.353
Over 6 days vs. 0 days	1.633	.675	5.855	1	.016	5.118	1.364	19.208
Constant	-1.894	.152	154.449	1	.000	.150		

a. Variables entered on step 1: sex, group, No of days with at least 1 portion of alcohol, No of Days with binge drinking.

Table 5
PREDICTORS OF HAVING WINE AS FAVORITE ALCOHOLIC BEVERAGE

Predictors of having wine as favorite alcoholic beverage ^a	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Sex (M vs. F)	-.348	.157	4.920	1	.027	.706	.519	.960
Group (2015/2016 vs. 2005/2006)	.504	.142	12.586	1	.000	1.656	1.253	2.188
No of days with at least 1 portion of alcohol			156.925	2	.000			
1-5 days vs. 0 days	2.049	.165	153.836	1	.000	7.756	5.611	10.721
Over 6 days vs. 0 days	1.988	.265	56.201	1	.000	7.304	4.343	12.283
No of Days with binge drinking			1.620	2	.445			
1-5 days vs. 0 days	-.244	.192	1.619	1	.203	.783	.538	1.141
Over 6 days vs. 0 days	-.166	.480	.119	1	.730	.847	.330	2.173
Constant	-1.512	.136	123.478	1	.000	.221		

a. Variables entered on step 1: sex, group, No of days with at least 1 portion of alcohol, No of Days with binge drinking.

Table 6
PREDICTORS OF HAVING SPIRITS AS FAVORITE ALCOHOLIC BEVERAGE

Predictors of having spirits as favorite alcoholic beverage ^a	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Sex (M vs. F)	.639	.211	9.136	1	.003	1.895	1.252	2.868
Group (2015/2016 vs. 2005/2006)	1.272	.209	37.175	1	.000	3.569	2.371	5.373
No of days with at least 1 portion of alcohol			13.928	2	.001			
1-5 days vs. 0 days	.885	.272	10.580	1	.001	2.424	1.422	4.132
Over 6 days vs. 0 days	1.252	.357	12.283	1	.000	3.497	1.736	7.044
No of Days with binge drinking			34.810	2	.000			
1-5 days vs. 0 days	1.329	.235	32.033	1	.000	3.775	2.383	5.981
Over 6 days vs. 0 days	1.754	.514	11.666	1	.001	5.778	2.112	15.809
Constant	-3.848	.270	202.400	1	.000	.021		

a. Variables entered on step 1: sex, group, No of days with at least 1 portion of alcohol, No of Days with binge

Students enrolled in 2015/2016 were 3.6 more likely than the students evaluated in 2005/2006 and men were 1.9 times than women to drink spirits.

Students who drank in more than 6 days at least one portion of alcohol had 3.5 times more chances to like spirits. Daily consumption of at least one portion of alcohol in 1 to 5 days during last month, as compared who students which did not have any day during last month when they consumed one portion of alcohol, recorded an OR=2.4 (table 6).

The prevalence of use of alcohol, defined as the consume at a least a portion of alcohol during last month for 2005/2006 sample of 66.9% for men and 38.5% for women and for 2015/2016 sample of 69.9% for men and 52.0% for women. This study has found that, in men, 35% in 2005/2006 and 41% in 2015/2016 practiced binge drinking, while in women 9.9% in 2005/2006 and 16% in 2015/2016 had this pattern of consumption. In men, the number of days during last month with at least one portion of alcohol and the number of days with binge drinking was kept relatively constant between evaluations, but women have increased both the number of days in which consumed at least a portion of alcohol and in which binge drank, with a small effect size, reducing the gap between men and women. WHO recommend at most 20 g of alcohol per day for man and 10 g of alcohol for women, but not in all days, and in the absence of binge drinking [1]. Most beneficial health effect

related to coronary artery disease [11], cardiovascular and overall mortality [12] were seen in elderly moderate drinkers. For internalizing disorders such as depression or anxiety, in young people [13], or for breast cancer in women [14] no beneficial effects were observed even in low doses of alcohol. Instead heavy drinking was associated in several cohorts with increase mortality and morbidity, and according to WHO the percentage of alcohol-attributable deaths among men amount to 7.6 % of all global deaths compared to 4.0 % of all deaths among women [1]. In both evaluations, for men beer remains top favorite alcoholic drink, followed by wine, and then spirits, while for women wine is top favorite alcoholic drink, followed by beer and spirits. The proportions of each type of alcohol have changed as follows: while beer consumption maintained constant for both genders, wine and spirits have increased their quotation as favorite in 2015/2016 evaluation. The prediction model for beer indicated that the consumer was male, which consumed it in at least as portion throughout the last month, but also used it for binge drinking, with a predilection of belonging to 2005/2006 evaluation. In prediction model for wine significant contributors were feminine gender, and 2015/2016 evaluation, and moderate consumption. Binge drinking patterns did not contribute significantly to prediction of wine

as favorite drink. For spirits, the user profile is of masculine gender, with membership in 2015/2016 evaluation, binge drinker, but also moderate consumer.

So the pattern of consumption related to type of alcohol has shifted: in 2005/2006 beer was used for binge drinking, while in 2015/2016 the odds ratio for spirits have increased. Most probably spirits are consumed hidden in fixed drinks such as *alcopop* or mixed with energy drinks, which contain high amounts of sugar and hide the strong taste of this type of alcoholic drink.

A recent review [15] of 62 studies has shown that young people who consumed mixes of alcohol-energy drinks have drank more alcohol and experienced more alcohol-related harm than other users.

Beneficial effect of wine and beer is due to non-alcoholic compounds, mainly polyphenols, found in higher quantities in wine, compared to beer. In a review, Arranz et al [16] have pointed out that regular and moderate wine and beer consumption is associated with decreased incidence of cardiovascular disease (CVD), hypertension, diabetes, and certain types of cancer, including colon, basal cell, ovarian, and prostate carcinoma, the effect being lower for beer. Recent study [17] showed a beneficial effect in moderate beer consumption for major chronic conditions and some benefit against cardiovascular disease. Other authors [18] have shown a reduction of the endothelial dysfunction associated with cardiovascular risk factors by non-alcoholic beer components.

On the other hand, spirits have the lowest amount of polyphenols of all alcoholic beverages.

Conclusions

The present study gives a unique overview of the changing trends in type and patterns of use and misuse of alcohol in medical students from western Romania, over one decade. The prevalence of use of alcohol, defined as the consume at a least a portion of alcohol during last month for 2005/2006 sample of 66.9% for men and 38.5% for women and for 2015/2016 sample of 69.9% for men and 52.0% for women. This study has found that, in men, 35% in 2005/2006 and 41% in 2015/2016 practiced binge drinking, while in women 9.9% in 2005/2006 and 16% in 2015/2016 had this pattern of consumption. In men, the number of days during last month with at least one portion of alcohol and the number of days with binge drinking was kept relatively constant between evaluations, but women have increased both the number of days in which consumed at least a portion of alcohol and in which binge drank, with a small effect size, reducing the gap between men and women.

In both evaluations, for men beer remains top favorite alcoholic drink, followed by wine, and then spirits, while for women wine is top favorite alcoholic drink, followed by beer and spirits. The proportions of each type of alcohol have changed as follows: while beer consumption maintained constant for both genders, wine and spirits have increased their quotation as favorite in 2015/2016 evaluation.

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