The association between social characteristics, alcoholic beverage preferences, and binge drinking in a Serbian adult population

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Abstract

Aim: To determine the association of sociodemographic characteristics and type of alcoholic beverage consumed during binge drinking in Serbia. **Method:** We conducted a secondary analysis of data from the 2014 national survey on Serbian lifestyles focusing on substance abuse and gambling. The sample consisted of 5385 individuals. The respondents were divided into non-binge drinkers and binge drinkers, according to the quantity of alcohol consumed during one occasion. Binge drinkers reported consuming more than 60 g of pure alcohol (7.5 units of alcohol) during

one occasion at least once during the previous year. **Results:** The prevalence of binge drinking in the past year among 2676 female and 2709 male participants aged 18–64 years was 28.4%. The multivariate logistic regression model showed that binge drinkers were more likely to be male (95% CI 3.58–4.94), single (95% CI 1.01–1.53), to be former (95% CI 1.06–1.62) or current smokers (95% CI 1.57–2.19), and to consume more than one type of alcoholic beverage (95% CI 2.04–3.44). There was a negative association of binge drinking with age (95% CI 0.98–0.99), living outside Northern Serbia-Vojvodina region, and drinking only spirits (95% CI 0.39–0.93). **Conclusion:** Focusing on the positive association of sociodemographic factors and binge drinking could help policy makers create public health interventions against alcohol misuse. These interventions should be directed to males, smokers, and those who consume more than one type of alcoholic beverage.

The World Health Organization (WHO) estimates that 2.5 million deaths are caused annually by alcohol (7.6% of men's and 4% of women's total mortality) (WHO, 2011; WHO, 2014). Alcohol causes 5.1% of the global burden of disease measured by disability-adjusted life years (DALY) (WHO, 2014). Consuming alcohol is considered socially acceptable and desirable, especially in Western countries, and while there have been many legislative attempts to regulate extreme alcohol consumption, drinking is still a part of many celebrations (Berg et al., 2013). People's drinking patterns and behaviour vary cross-culturally (The Amsterdam Group, 2002). Drinking is associated with excess or with violent or antisocial behaviour in some cultures (e.g., the United Kingdom, Scandinavian countries, Australia), while the consumption of alcoholic beverages is integrated into daily life and activities without associated socially unacceptable behaviour in others (e.g., Mediterranean and South American countries) (The Amsterdam Group, 2002). Studies have shown a north-to-south gradient of these patterns in Europe (Bryant & Kim, 2012). Southern European countries have a high prevalence of everyday drinking with meals, while northern European countries have a higher prevalence of binge drinking (defined as drinking more than five standard drinks on one occasion (Wellman, Contreras, Dugas, O'Loughlin, & O'Loughlin, 2014) compared to central European and Mediterranean countries (Kuntsche et al., 2015).

High prevalence of binge drinking is found in Eastern European countries (36.6% in Lithuania, 39% in the Czech Republic). In some of these countries, episodes of continuous drunkenness lasting two or more days in combination with withdrawal from normal social life are relatively frequent (Roerecke & Rehm, 2014; WHO, 2014). Sociological and anthropological theories show us that drinking-related problems, including excessive drinking behaviours, are less common in countries which have positive social beliefs and expectancies about alcohol, while negative beliefs (in so-called "temperance" and "dry", Nordic cultures) are associated with a higher frequency of alcohol-related problems (The Amsterdam Group, 2002). Globalisation is erasing these differences between the countries (Babor et al., 2010).

The first scientific data about alcohol consumption in European countries were published in the 19th century and were related to average annual per capita consumption. For instance, Belgians consumed on average 6.9 litres of

pure alcohol per capita annually; in the Austro-Hungarian Empire the amount was 10.2 litres, and the Serbian consumption amounted to an astonishing 39 litres (Dimitrijevic, 2015a). This is about 325 litres of wine with a 12% alcohol content per capita or 97.5 litres of traditional plum schnapps with an alcohol content of 40%. Alcohol has traditionally been a part of social gatherings in Serbia, including celebrations and meetings with friends, but also occasions such as funerals and commemorations. Descriptions of wild celebrations in many cities show us the extent of heavy drinking in the 19th century (Dragisic-Labas, 2014). There was a belief that spicy food could not be quenched with water, but only with wine or spirits. Traditionally, wine or spirits were given even to small children in large quantities, because they were thought to improve children's health (Dimitrijevic, 2015a). Alcohol was seen in a positive light in folk poems dating back to the early Middle Ages, glorifying drunkenness (Dragisic-Labas, 2014). Alcohol is a part of Serbian traditional medicine, and it was widely believed that heavy drinkers were the strongest and healthiest members of the community, so much so that sobriety was considered dangerous and a health risk (Dragisic-Labas, 2014). In the early 20th century, competitions in heavy drinking were held in Eastern and Southern Serbia, and the winner, "The King of Tipplers", was the one who first fell under the table, not the one who drunk the most. In areas of Western Serbia, well-known for production of plums and spirits, there are numerous testimonies about "white deaths", of people dying of hypothermia due to heavy alcohol consumption after celebrations. In one district of Western Serbia, with 12 municipalities, the highest number of heavy drinking cases recorded by the authorities was 120 incidents daily (Dimitrijevic et al., 2015a). The homemade production of spirits was so widespread that only 10% of the yields were sold, with 90% used for spirits production in the household (Dimitrijevic, 2015a). Even today, business deals cannot be made without spirits. Migrations from rural to urban

areas were associated with hardship, and the solution for many was alcohol consumption. Although alcohol is widely used in Serbia, female drinkers are socially unaccepted; even moderate consumption is considered inappropriate. Women drink at home, as alcohol is seen as a "manly pleasure" (Dragisic-Labas, 2014). The Society for Sobriety was formed after the Second World War. Members of this society considered alcohol as an enemy of socialism, but it was during this period and especially during the 1990s war and subsequent economic transition that alcohol consumption exponentially increased compared to the period before 1990 (Dragisic-Labas, 2014). Alcohol is still a part of daily lives, and unlike in many countries, drinking is not limited to weekends.

Although Serbian society is traditionally highly tolerant of excessive drinking behaviours (Dimitrijevic, 2015b), there have been few studies on the characteristics of alcohol consumption in Serbia. In the early 2000s, data on alcohol consumption among the general population were obtained through three national surveys on population health. These studies were conducted in 2000, 2006, and 2013 (Institute of Public Health of Serbia, 2001, 2008, 2014) on representative samples of adults aged 15 years and older. Another study – the basis of our analysis – examined substance abuse and gambling in the Serbian adult population in the 2014 national survey on lifestyles in Serbia (Kilibarda, Mravcik, Sieroslawski, Gudelj Rakić, & Martens, 2014). Studies on alcohol consumption have also been conducted on adolescent populations (Golo, Cirić-Janković, Santrić-Milićević, & Simić, 2013; The ESPAD Group, 2015; Višnjić, Jović, & Grbeša, 2015). Data on alcohol consumption among school children have been acquired through the European School Survey Project on Alcohol and Other Drugs, conducted in 2008 and 2011 (The ESPAD Group, 2015). In the national survey on population health from 2013, the prevalence of individuals that reported binge drinking in the past month was 16% (Institute of Public Health of Serbia,

2014). Serbia has the highest prevalence of binge drinking in the countries of former Yugoslavia, where binge drinking prevalence varies from 6.2% in Bosnia and Herzegovina to 10.8% in Croatia (WHO, 2014). Among southeastern European countries, the highest prevalence of binge drinking is in Greece at 34.9% (WHO, 2014). In the national surveys on population health, the annual quantity of alcohol consumed per capita in Serbia has increased from 9.2 litres to 12.6 litres (Institute of Public Health of Serbia, 2001, 2008, 2014).

The prevalence of binge drinking and the characteristics of those who binge drink in Serbia have been studied mostly among adolescent and student populations. Around 32% of high school adolescents in Serbia have reported binge drinking (Golo et al., 2013; Višnjić et al., 2015). Motives for alcohol consumption among youth are different from those among adults. Adolescents drink to conform to peers (Kuntsche et al., 2015), while parents are often used as a model for drinking behaviour (Gilligan & Kypri, 2012).

Previous research shows that some demographic, economic, and lifestyle characteristics are associated with binge drinking, but there are a limited number of studies on types of alcohol consumed by those who binge drink (Bryant & Kim, 2012; Naimi, Brewer, Miller, Okoro, & Mehrotra, 2007; Okoro et al., 2004). Adult males tend to binge drink more than females (Naimi et al., 2007; Okoro et al., 2004); an opposite pattern could only be found in the adolescent population (The ESPAD Group, 2015). Binge drinking prevalence decreases with age (Kuntsche, Rehm, & Gmel, 2004; Okoro et al., 2004), but being unmarried and/ or a smoker are risk factors for binge drinking (Bryant & Kim, 2012). Higher levels of education have also been associated with binge drinking in some populations, but these findings are inconsistent in the literature (Bryant & Kim, 2012). Other factors are unemployment and poor socioeconomic status (Droomers, Schrijvers, Stronks, van de Mheen, & Mackenbach, 1999). Different types of family settings could

lead to differences in behavioural patterns, such as patterns of alcohol consumption (Thapa et al., 2016). As binge drinking is a public health issue and a risk factor for disease and death (Knai, Petticrew, Durand, Eastmure, & Mays, 2015), knowing the type of alcoholic beverages consumed could be highly important for the design of adequate policy interventions – such as price increases – directed to a specific type of beverage. Such interventions can lead to a substitution effect, but it is also known that binge drinkers usually prefer one type of beverage: for example, beer is the most commonly consumed alcoholic beverage by adult binge drinkers in the United States (Elder et al., 2010). Some interventions have been applied in England as a part of a public health responsibility deal. These include labelling unit alcohol content, warning labels on beverages, responsible drinking statements, tackling underage drinking, removing alcohol advertisements near schools, and the production of products with lower alcohol content (Knai et al., 2015). Alcohol advertisements are known to influence alcohol consumption, and the most advertised type of alcoholic beverage – beer – is the most frequently consumed (Naimi et al., 2007).

Characteristics of binge drinking adults have not been thoroughly examined in Serbia and neighbouring countries, so the aim of this study was to determine the association between sociodemographic characteristics, types of alcoholic beverages consumed, and binge drinking in the past year in the Serbian adult population.

Methods

Data source/sample

Our study is a secondary analysis of the data obtained from the national survey on lifestyles in Serbia during 2014 (Kilibarda et al., 2014). The sampling frame was the national household register. Sampling was carried out in accordance with probability proportion sampling (PSS) and weighted for sex, age, educational level, regions, and urban or rural areas (Kilibarda et al., 2014;

Skinner, 2016). A total of 11,144 households were visited, contact was made with 10,479 household members, and 8079 of these fulfilled the inclusion criteria. The final sample consisted of 5385 individuals aged 18–64 years with a response rate of 66.6%. Exclusion criteria were: individuals who were incarcerated or patients in hospitals or therapeutic communities, homeless individuals, individuals in homes for the elderly or homes for children, and individuals living in illegal settlements. Research was carried out through face-to-face interviews.

More details on the sampling, data collection, and instruments used can be found elsewhere (Kilibarda et al., 2014).

Procedure

The questionnaire used in the national survey on lifestyles in Serbia (Kilibarda et al., 2014) contained 158 questions, which included a set of questions on alcohol use (Smart Project, 2011). The questionnaire also contained the Kessler psychological distress scale K6 (Kessler et al., 2002), which is a six-item questionnaire intended to yield a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced in the most recent four-week period.

The research design and instrument were approved by the ethical committee of the Institute of Public Health of Serbia. The participants were given a description of the study process and aims in writing, and informed consent was obtained from them for the entire survey (Kilibarda et al., 2014).

Variables

A total of 14 variables were analysed: the participants' age, gender, region of residence, type of settlement, level of education, marital status, employment status, type of family, religion, monthly household income, self-perceived financial status, smoking status, type of alcoholic beverages consumed, and score on the psychological distress scale. The participants

were divided into three categories according to their score on the Kessler psychological distress scale. In the first category were participants scoring ≤7 points, which indicated no risk of psychological distress. The second category contained participants with scores between 8 and 12 points, which indicated moderate psychological distress. The high-risk category of psychological distress included participants with scores of ≥13.

Participants were asked if and how often they drank more than 60 grams of pure alcohol on one occasion. It was explained to the participants what the amount of 60 g means (1.5 litres of beer, 0.6 l of wine or 0.18 l of spirits) (Institute of Public Health of Serbia, 2014; Smart Project, 2011). Those who gave a non-zero response were labelled as binge drinkers, while the rest were labelled as non-binge drinkers.

Family type was defined as nuclear if the participant reported living in a family of parents and their children. Joint families included grandparents, parents, and children, and the families which included other relatives were marked as extended (Thapa et al., 2016).

Education was defined as primary if the participants had graduated only from primary school, which is obligatory in Serbia and lasts for eight years. Graduates from secondary schools, either high schools (lasting four years) or vocational schools (lasting three or four years), had secondary education, while college or university graduates were in a separate category.

Statistical analyses

Our descriptive analysis included absolute and relative numbers (percentages) of drinkers. Chi-square tests were used in order to assess differences between binge drinkers and non-binge drinkers regarding sociodemographic characteristics, smoking status, type of alcoholic beverages consumed, and score on the psychological distress scale. Bivariate logistic regression analysis was also applied to obtain odds ratios. Binge drinking was the outcome

variable. In order to identify a potential association of independent variables and binge drinking, all variables which were significant ($p < .05$) were entered into a multiple logistic regression model including odds ratios (OR) and 95% confidence intervals (CI) with binge drinking the as outcome variable. The IBM SPSS Statistics 19.0 package was used for these analyses.

Results

A total of 3866 participants (71.8%) reported consuming alcohol in the past year. The prevalence of binge drinking in the past year was 28.4% (1528 respondents out of a total of 5385). The prevalence of binge drinking among males was 44.5% and 12.4% among females.

The participants' sociodemographic characteristics, smoking status, and types of alcoholic beverages consumed were compared in the group of binge drinkers and in the group of non-binge drinkers (Table 1). Almost two thirds of the participants lived in urban areas (60.9%). There was a significant difference between binge drinkers and non-binge drinkers in sex, age, residential region, educational level, employment status, marital status, type of family, religious beliefs, smoking status, and type of alcoholic beverages consumed. Binge drinkers and non-binge drinkers were similar regarding their type of settlement, financial status, net monthly income, and psychological distress score. No significant differences could be found here.

The multivariate analysis (Table 2) showed a positive association between binge drinking and being male (OR 4.206, 95% CI 3.583–4.937), single (OR 1.296, 95% CI 1.099–1.529), a former smoker (OR 1.309, 95% CI, 1.059–1.617) or a current smoker (OR 1.853, 95% CI 1.569–2.190), and consuming more than one type of alcoholic beverage (OR 2.647, 95% CI 2.037–3.438) compared to drinking only beer. There was a negative association of binge drinking with age (OR 0.987, 95% CI 0.980–0.995), living outside Northern Serbia-Vojvodina region, and drinking only spirits (OR 0.606, 95% CI 0.393–0.935).

Discussion

The prevalence of binge drinking among the Serbian adult population was 28.4% in the past year. Studies that have applied the same methodology have shown that prevalence of binge drinking in Brazil was 27% in the past year (Wolle et al., 2011) and 31% in the United States in 2009 (Banta, Mukaire, & Haviland, 2014). The prevalence was lower for the US – 24.7% – in a study which used a shorter, one-month, time frame for binge drinking (National Institute on Alcohol Abuse and Alcoholism, 2015). The prevalence of binge drinking in the past week in Northern Ireland is similar to the prevalence in Serbia in the past year (Information PH Services S, 2008). Many studies have explored the prevalence of binge drinking in European countries in the past month. The rates vary from 3.8% in Andorra to 40.5% in Austria (Kuntsche et al., 2015; The ESPAD Group, 2015; WHO, 2014).

In our study, binge drinking in the previous year was associated with gender; age; marital status; living in Belgrade, Western, Central, Eastern or Southern Serbia; being a former or a current smoker; drinking only spirits; and consuming more than one type of alcoholic beverage. Some previous studies have shown that males binge drink more often than females (Bonin, McCreary, & Sadava, 2000; Dawson, Li, & Grant, 2008). Only in early adolescence is there a higher rate of substance use among females (Roerecke & Rehm, 2014). In our study males had 4.2 times higher odds of binge drinking. Studies have also shown that age is associated with binge drinking (Laranjeira, Pinsky, Zaleski, & Caetano, 2007; Muthén & Muthén, 2000; The ESPAD Group, 2015). The highest frequency of binge drinking has been found among younger population groups (Laranjeira et al., 2007; The ESPAD Group, 2015), which we also discovered in our study; the odds for binge drinking decrease with age. Our study confirmed the common finding that single persons have higher odds of binge drinking (Dawson et al., 2008). In our study, the odds for

Table I. Participants' social and lifestyle characteristics

Variables	Total N (%)	No binge drinking in the past 12 months N = 3858 N (%)	Binge drinking 12 months N = 1528 N (%)	OR (95% CI)	p-value
Gender					<.001
Males	2676 (49.7)	1485 (55.5)	1191 (44.5)	5.66 (4.93–6.49)	
Females	2709 (50.3)	2373 (87.6)	337 (12.4)	1.00 (reference category)	
Age (mean ± SD)	42.18 ± 13.43	43.35 ± 13.59	39.25 ± 13.28	0.98 (0.97–0.98)	<.001
Type of settlement					.511
Rural	2103 (39.1)	1496 (71.1)	607 (28.9)	1.04 (0.92–1.18)	
Urban	3281 (60.9)	2361 (72.0)	920 (28.0)	1.00 (reference category)	
Region of residence					
Vojvodina	1467 (27.2)	963 (65.6)	504 (34.4)	1.00 (reference category)	
Belgrade	1273 (23.6)	931 (73.1)	342 (26.9)	0.70 (0.58–0.83)	<.001
West Serbia	571 (10.6)	417 (73.0)	154 (27.0)	0.71 (0.57–0.88)	.001
Central Serbia	933 (17.3)	721 (77.3)	212 (22.7)	0.56 (0.47–0.68)	<.001
East Serbia	444 (8.2)	320 (72.1)	124 (27.9)	0.74 (0.59–0.94)	.012
South Serbia	697 (12.9)	505 (72.5)	192 (27.5)	0.73 (0.60–0.89)	.002
Marital status					<.001
Single	2239 (41.6)	1485 (66.3)	754 (33.7)	1.55 (1.38–1.75)	
Married/permanent relationship	3146 (58.4)	2372 (75.4)	774 (24.6)	1.00 (reference category)	
Level of education					
Primary	1419 (26.4)	1090 (76.8)	329 (23.2)	1.00 (reference category)	
Secondary	2942 (54.6)	2014 (68.5)	928 (31.5)	1.53 (1.32–1.77)	<.001
College and University	1024 (19.0)	753 (73.5)	271 (26.5)	1.19 (0.99–1.44)	.062
Employment status					
Unemployed	1684 (31.3)	1293 (76.8)	391 (23.2)	1.00 (reference category)	
Employed	2554 (47.4)	1685 (66.0)	869 (34.0)	1.71 (1.48–1.96)	<.001
Retired	699 (13.0)	598 (85.6)	101 (14.4)	0.56 (0.44–0.71)	<.001
Student	449 (8.3)	281 (62.6)	168 (37.4)	1.97 (1.58–2.47)	<.001
Type of family					
Nuclear	3892 (72.3)	2794 (71.8)	1098 (28.2)	1.00 (reference category)	
Joint	961 (17.8)	655 (68.2)	306 (31.8)	1.19 (1.02–1.39)	.025
Extended	532 (9.9)	408 (76.7)	124 (23.3)	0.77 (0.62–0.96)	.018

(continued)

Table I. (continued)

Variables	Total N (%)	No binge drinking in the past 12 months N = 3858 N (%)	Binge drinking 12 months N = 1528 N (%)	OR (95% CI)	p-value
Religion					.005
Not religious	455 (8.4)	300 (65.9)	155 (34.1)	1.34 (1.09–1.64)	
Religious	4930 (91.6)	3557 (72.1)	1373 (27.9)	1.00 (reference category)	
Monthly income per household (RSD)					
<20,000	995 (18.5)	730 (73.4)	265 (26.6)	1.0 (reference category)	
20,000–60,000	2805 (52.1)	2007 (71.5)	798 (28.5)	1.09 (0.93–1.29)	.276
60,000–100,000	1199 (22.3)	851 (70.9)	348 (29.1)	1.13 (0.93–1.36)	.216
>100,000	386 (7.2)	269 (69.7)	117 (30.3)	1.19 (0.92–1.54)	.184
Self-perceived financial status					
Very poor	584 (10.8)	426 (72.9)	158 (27.1)	1.00 (reference category)	
Poor	1571 (29.2)	1146 (72.9)	425 (27.1)	1.00 (0.81–1.24)	.975
Average	2661 (49.4)	1876 (70.5)	785 (29.5)	1.13 (0.97–1.38)	.229
Good	520 (9.7)	373 (71.7)	147 (28.3)	1.06 (0.82–1.39)	.647
Very Good	50 (0.9)	36 (72.0)	14 (28.0)	1.03 (0.54–1.96)	.932
Smoking					
Never	2252 (41.8)	1792 (79.6)	460 (20.4)	1.00 (reference category)	
Former smoker	993 (18.4)	714 (71.9)	279 (28.1)	1.53 (1.28–1.81)	<.001
Current smoker	2141 (39.8)	1352 (63.1)	789 (36.9)	2.27 (1.99–2.60)	<.001
Score on Psychological distress scale					
No risk	4309 (80.0)	3064 (71.1)	1245 (28.9)	1.00 (reference category)	
Moderate risk	766 (14.2)	560 (73.1)	206 (26.9)	0.91 (0.76–1.08)	.265
High risk	310 (5.8)	223 (71.9)	77 (28.1)	0.81 (0.62–1.05)	.117
Type of alcoholic beverage					
Only beer	364 (9.3)	265 (72.8)	99 (27.2)	1.00 (reference category)	
Only wine	384 (9.9)	328 (85.4)	56 (14.6)	0.46 (0.32–0.66)	<.001
Only spirits	268 (6.9)	228 (85.1)	40 (14.9)	0.47 (0.31–0.71)	<.001
More than one type	2849 (73.1)	1525 (53.5)	1324 (46.5)	2.32 (1.82–2.96)	<.001

Table 2. Multivariate logistic regression model with binge drinking as dependent variable.

| | Multivariate analysis | |
Independent variables	OR (95% CI)	p-value
Gender		
Female	1.00 (reference category)	
Male	4.21 (3.58–4.94)	<.001
Age	0.99 (0.98–0.99)	<.001
Region of residence		
Vojvodina	1.00 (reference category)	
Belgrade	0.64 (0.52–0.78)	<.001
West Serbia	0.70 (0.53–0.91)	.008
Central Serbia	0.48 (0.38–0.61)	<.001
East Serbia	0.63 (0.47–0.84)	.002
South Serbia	0.56 (0.44–0.71)	<.001
Relationship status		
Married/permanent relationship	1.00 (reference category)	
Single	1.30 (1.10–1.53)	.002
Level of education		
Primary	1.00 (reference category)	
Secondary	1.01 (0.83–1.22)	.928
College and University	0.84 (0.66–1.07)	.170
Employment status		
Unemployed	1.00 (reference category)	
Employed	1.08 (0.91–1.30)	.373
Retired	0.76 (0.55–1.04)	.089
Student	1.12 (0.83–1.52)	.448
Type of family		
Nuclear	1.00 (reference category)	
Joint	1.20 (0.99–1.46)	.059
Extended	0.97 (0.74–1.26)	.795
Religion		
Not religious	1.00 (reference category)	
Religious	1.04 (0.80–1.34)	.785
Smoking		
Never	1.00 (reference category)	
Former smoker	1.31 (1.06–1.62)	.013
Current smoker	1.85 (1.57–2.19)	<.001
Type of alchohol consumed		
Only beer	1.00 (reference category)	
Only wine	0.87 (0.59–1.29)	.488
Only spirits	0.61 (0.39–0.93)	.024
More than one type	2.65 (2.04–3.44)	<.001

binge drinking were 1.3 times higher for single participants.

We found no association between binge drinking and educational status, monthly income, self-perceived financial status, and employment, while previous research has shown divergent effects of these factors on binge drinking (Bonin et al., 2000; Claussen, 1999; Dawson et al., 2008; Frieden, 2011; Jenkins et al., 2015; Kuntsche et al., 2004; Mathiesen, Nome, Eisemann, & Richter, 2012; Schnohr et al., 2004; WHO, 2011, 2014). The

association between higher educational level and binge drinking has been studied multiple times (Frieden, 2011; Jenkins et al., 2015; Schnohr et al., 2004; WHO, 2011, 2014). An American study (Frieden, 2011) has found that a higher educational level is associated with binge drinking, but some other studies have found the opposite (Jenkins et al., 2015; Schnohr et al., 2004; WHO, 2014). In our study, multivariate analysis showed no association between binge drinking and educational status. Studies have also found an association between socioeconomic status and binge drinking (Bonin et al., 2000; Mathiesen et al., 2012; WHO, 2014). One of them reported increased binge drinking with higher socioeconomic status (Bonin et al., 2000), but others reported a positive association between material deprivation and binge drinking (Mathiesen et al., 2012; WHO, 2014). In our study, there was no significant association between a household's monthly income or self-perceived socioeconomic status with binge drinking in the past year. We found no association between binge drinking and employment status in the multivariate analysis, while according to existing literature employment status may have a divergent effect. According to some research, those in employment (Dawson et al., 2008) are likely to be at risk for binge drinking, while other research has found a higher risk for unemployed persons (Claussen, 1999; Kuntsche et al., 2004; WHO, 2014).

Being religious was not a significant factor for binge drinking in our study. Previous studies have focused mainly on differences in binge drinking prevalence between different religious affiliations (Holt, Miller, Naimi, Sui, 2006) but a study of US college students (Engs, Hanson, & Diebold, 1994) suggests that being religious is a protective factor against binge drinking.

A Norwegian study (Mathiesen et al., 2012) has found that heavy episodic drinkers have poorer mental health and are prone to different mental disorders. The relationship between anxiety/depression and alcohol misuse is well established in the literature (Cheng & Furnham, 2013; Swendsen et al., 1998). Even though alcohol could initially be used to reduce anxiety in some individuals, excessive alcohol consumption leads to anxiety, distress, and depression, which in turn can lead to higher levels of alcohol consumption, leaving the person trapped in a vicious circle. In addition, binge drinkers report more sick days (Wen et al., 2012). In our study there was no significant association between binge drinking and psychological distress.

It has been shown that smokers drink more heavily and more frequently than non-smokers (Falk, Yi, & Hiller-Sturmhöfel, 2008; Kahler et al., 2008; Twyman et al., 2016), and that the concurrent use of the two substances multiplies the negative health risks (Kahler et al., 2008). Smokers had almost two times higher odds for binge drinking in our study, which is in accordance with previously reported findings (Chiolero, Wietlisbach, Ruffieux, Paccaud, & Cornuz, 2006; Falk et al., 2008; Information PH Services S, 2008; Kahler et al., 2008). Current smokers had higher likelihood odds of binge drinking compared both to non-smokers (1.8 times higher) and former smokers (50% 1.3 times higher) in our study.

We also examined the association of type of alcoholic beverage consumed and binge drinking. Our study showed a strong association between binge drinking and consumption of more than one type of alcoholic beverage, compared to those who reported drinking only beer (2.65 times higher odds for binge drinking in the past 12 months). The total percentage of those who drank more than one type of alcohol among binge drinkers in our study was 86.7%. This is significantly more than reported by the US Behavioral Risk Factors Surveillance System, which found that 41.3% of binge drinkers consumed more than one type of alcoholic beverage (Naimi et al., 2007). In the American study, the highest percentage of binge drinkers was among those who drank only beer, 44.8%, while in our study only 6.5% of binge drinkers consumed only beer. Our results showed that drinking only spirits was strongly negatively

associated with binge drinking. It is fair to assume that the difference in types of alcohol consumed between these two studies is mainly due to cultural differences, and that the pattern found in Serbia could be similar to the mode in other European countries. Consumer preferences may be shaped by family or national traditions and cultures (if a country is, say, a big producer of wine, beer, or spirits), and enabled by regulatory frameworks (such as taxation, prohibition to sell to minors or to sell certain alcoholic quantities), and health promotion (for instance, via social media campaigns) (Knai et al., 2015). There is also a possibility that different types of alcoholic beverages could lead to different degrees of problem drinking (Bobak et al., 2004).

Our study is the first analysis to assess the association of sociodemographic characteristics and binge drinking in the adult population in Serbia. Previous research has focused only on adolescent populations and data on prevalence of binge drinking and its frequency. Ours is also the first study to examine the types of alcoholic beverages that binge drinkers consume in the Serbian population.

This study has several limitations, including the definition of binge drinking used and the 12-month time frame, which is a very strict cut-off. We used this definition in order to identify infrequent binge drinkers as well. In addition, it has been shown previously that there is a high correlation between past-year binge drinking and past two-week binge drinking: 77.9% of past-year binge drinkers reported binge drinking in the past two weeks (Cranford, McCabe, & Boyd, 2006). Another limitation is the cross-sectional design that does not allow the establishment of causal relationships among variables. In surveys carried out on general populations, the prevalence of binge drinkers might be underestimated due to recall bias. Underreporting is linked to alcohol consumption, and it grows more common with increased alcohol intake. Moreover, self-reported data on alcohol consumption covers only 30–70% of alcohol sales data (Hu et al., 2016). Also,

individuals who were institutionalised (in prison, hospital, etc.), homeless, or living in illegal settlements, were not included in the national survey on lifestyles. As a consequence, our findings do not apply to these individuals, and some settings may show a higher frequency of alcohol and substance use than the sample from a general population used in this study. Another limitation might be the participants' lack of willingness to share information with the researchers. A possible limitation could also be that some participants may have given socially desirable answers to some questions regarding substance abuse.

In conclusion, our study shows a positive association with sociodemographic factors and binge drinking in the past 12 months. Young single males who are current smokers and drink more than one type of alcoholic beverage are more likely to binge drink. This population also has scores indicative of moderate or high risk of psychological distress. Identification of these characteristics can help policy makers create specific preventive measures directed to this population with the aim of developing healthy coping strategies. Our study has the potential to assist policy makers to create targeted interventions aimed at reducing total alcohol consumption among young single males. This may also reduce binge drinking prevalence among this population group.

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