

CROSS-SECTIONAL STUDY

Difference in alcohol consumption in central and eastern Slovakia during a coronavirus pandemic (COVID-19)

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ABSTRACT

INTRODUCTION: The COVID-19 pandemic has caused several negative changes. Increased alcohol consumption has been reported in some studies. This study aimed to compare the level of alcohol consumption among college students in the central and eastern regions of Slovakia.

MATERIALS AND METHODS: This cross-sectional study was conducted during the COVID-19 pandemic. Three Slovak universities were included in the study. The Alcohol Use Disorders Identification Test (AUDIT) was used to determine alcohol consumption.

RESULTS: The total number of college students was 3,647. The overall AUDIT score was significantly higher in the eastern region ($p < 0.001$). Alcohol was not consumed more frequently between regions in men and women ($p > 0.05$). During a typical drinking day, more alcohol was consumed in the eastern region compared to the central region of Slovakia in men ($p < 0.028$). Excess drinking by men has been reported in the eastern region compared to the central region ($p < 0.048$). There was no significant difference between addiction groups in the symptoms ($p > 0.05$). Inability to remember what happened on a night of drinking was a significant difference in eastern men ($p = 0.047$).

CONCLUSION: Alcohol consumption is a significant problem in Slovakia. The number of students with a high AUDIT score from the eastern region is higher than the number of students with a high AUDIT score from the central region. More significant differences were found between men compared to women from eastern and central Slovakia (Tab. 5, Fig. 2, Ref. 34). Text in PDF www.elis.sk

KEY WORDS: alcohol consumption, AUDIT, pandemic, COVID-19, Slovakia.

Introduction

The coronavirus 2019 (COVID-19), brought on by SARS-CoV-2, was first reported in late 2019 in Wuhan, China (1, 2). The incubation period and the highly contagious nature of the SARS-CoV-2 virus, as well as the extensive global network with large travel activities around the world, led to the rapid spread of the COVID-19 pandemic (3, 6). In humans, coronaviruses cause respiratory infections that range from the common cold to severe conditions (4, 5).

Several governments introduced various restrictions on social life and contacts, resulting in quarantine, to slow the spread of the

COVID-19 pandemic (7, 8). These restrictions included the closure of schools, kindergartens, and other facilities such as restaurants, cafes, and hairdressers, travel bans and border closures, the abolition of sporting and cultural events, even guidelines for social contacts (9,10). Several restrictions caused millions of people to be isolated for long periods of time, increasing feelings of anxiety and depression in the general population (11–13).

The pandemic involved several stressors (14), which led to higher alcohol consumption (15). Alcohol consumption has been part of the cultural traditions of most societies since the beginning of civilization (16). Alcohol consumption has become a public

Tab. 1. Baseline statistics of the participants.

		Central region	Eastern region
Gender	Men	297 (25.5%)	1673 (67.4%)
	Women	867 (74.5%)	810 (32.6%)
Age		23.5 (± 6.2)	21.7 (± 3.9)
Study form	Full time	956 (82.1%)	2376 (95.7%)
	External	208 (17.9%)	107 (4.3%)
Year of study	1	387	794
	2	282	574
	3	226	449
	4	148	336
	5	106	292
	6	15	38

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health problem since the 18th and 19th centuries, when industrial workers became (17). Alcohol is the most widespread addiction in all geographical regions and in all sections of the population (18). Alcohol consumption is associated with many physical diseases and mental disorders (19–22), which can make an individual vulnerable to COVID-19. Alcohol affects the immune system and therefore increases the risk of certain diseases. Alcohol has long- and short-term effects on all organs of the body, so there is no “safe” limit of consumption (23).

Alcohol consumption in the Slovak Republic is a common daily habit (24). However, in some regions of Slovakia, alcohol consumption is probably higher than in other regions, so we decided to compare the level of alcohol consumption among college students in the central and eastern regions of Slovakia.

Materials and methods

This cross-sectional study was conducted between December 2021 and January 2022, during the third wave of the COVID-19 pandemic and lockdown. Three Slovak universities were included in the study. Two universities are in central Slovakia: Matej Bel University in Banská Bystrica and Slovak Medical University in Bratislava, Faculty of Health in Banská Bystrica, and one is in eastern Slovakia: Technical University in Košice.

College students were included in the study. Students with visual impairment were not included in the study. After obtaining informed consent from all participants, the students completed structured questionnaires. The questionnaires were distributed through online school systems.

Tab. 2. Frequencies of AUDIT score categories by region and gender.

Region	Gender	AUDIT score category			ALL
		Low	Medium	High	
Central		896	230	38	1164
	Men	198	84	15	297
	Women	698	146	23	867
East		1680	663	140	2483
	Men	1060	499	114	1673
	Women	620	164	26	810
All		2567	893	178	3647
	Men	1258	583	129	1970
	Women	1318	310	49	1677

Tab. 3. Absolute risk of AUDIT score categories by region and gender.

Region	Gender	AUDIT score category		
		Low	Medium	High
Central		77.0%	19.8%	3.3%
	Men	66.7%	28.3%	5.1%
	Women	80.5%	16.8%	2.7%
East		67.7%	26.7%	5.6%
	Men	63.4%	29.8%	6.8%
	Women	76.5%	20.2%	3.2%
All		70.4%	24.5%	4.9%
	Men	63.9%	29.6%	6.5%
	Women	78.6%	15.5%	2.9%

Tab. 4. Comparison of two regions of Slovakia in terms of AUDIT final score by gender.

AUDIT final score		Mean (\pm SD)	Mean Difference	t *	p*
All students	Central	5.33 (\pm 4.72)	1.082	5.99	< 0.001
	East	6.41 (\pm 5.24)			
Women	Central	4.88 (\pm 4.48)	0.336	1.53	0.126
	East	5.22 (\pm 4.53)			
Men	Central	6.61 (\pm 5.15)	0.370	1.10	0.272
	East	6.98 (\pm 5.46)			

*According to the two-sample independent t-test

Students were asked about alcohol consumption. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The ethics committee of Matej Bel University approved the study (No. 2200/2021).

Alcohol Use Disorders Identification Test (AUDIT)

The Alcohol Use Disorders Identification Test (AUDIT) was used to determine alcohol consumption. AUDIT is used as one of the tools to detect alcohol consumption and related risk behaviours in primary care settings (25). AUDIT is a 10-item clinical screening tool with a score ranging from 0 to 40 (26, 27). The AUDIT score is divided into low (scores between 0 and 7), medium (scores between 8 and 15), high (scores between 16 and 19), and very high (scores 20 and above). AUDIT was presented as a retrospective measurement. The Slovak standardized version was used.

Participants

The study involved 3647 college students from three universities in Slovakia. The sample in central Slovakia consisted of 1164 college students (men 25.5 %, women 74.5 %), and the eastern Slovakia group consisted of 2483 college students (men 67.4 %, women 32.6 %). The characteristics of the sample can be seen in Table 1. Information about the study was provided through the university’s online communication systems. All participants agreed to participate in the study and informed consent was obtained. The questionnaire was compiled using Google online forms.

Statistical analysis

Data were collected in an Excel spreadsheet and managed with IBM SPSS software. An independent sample t-test was used to compare the average AUDIT score of individual questionnaire items between the central and eastern regions of Slovakia. A two-proportion Z-test was used to test the equality of proportion of students with a high AUDIT score between central and the eastern Slovakia. The absolute risk calculation was used to express the differences in three categories of AUDIT scores between central and east regions (absolute risk = the number of students in a particular AUDIT score category divided by the number of students in the entire group).

Tab. 5. Comparison of two regions of Slovakia in terms of AUDIT score for each item of the questionnaire.

Domains	Item of the AUDIT	Gender	Region	Mean (\pm SD)	t *	p*	
Hazardous alcohol use	How often do you have a drink containing alcohol?	Women	Central	1.77 (\pm 0.97)	-1.413	0.158	
			East	1.84 (\pm 1.03)			
		Men	Central	1.93 (\pm 1.14)		1.230	0.219
			East	2.02 (\pm 1.15)			
	How many drinks containing alcohol do you have on a typical day when you are drinking?	Women	Central	0.75 (\pm 0.80)	-1.478	0.140	
			East	0.80 (\pm 0.85)			
		Men	Central	1.13 (\pm 0.90)		2.206	0.028**
			East	1.26 (\pm 0.98)			
	How often do you have six or more drinks on one occasion?	Women	Central	0.70 (\pm 0.91)	-1.212	0.226	
East			0.76 (\pm 1.01)				
Men		Central	1.28 (\pm 1.36)	1.972		0.048**	
		East	1.43 (\pm 1.37)				
Dependence symptoms	How often during the last year have you found that you were not able to stop drinking once you had started?	Women	Central	0.18 (\pm 0.57)	-0.970	0.332	
			East	0.20 (\pm 0.63)			
		Men	Central	0.22 (\pm 0.68)		0.455	0.649
			East	0.24 (\pm 0.70)			
	How often during the last year have you failed to do what was normally expected from you because of drinking?	Women	Central	0.21 (\pm 0.53)	-1.380	0.168	
			East	0.25 (\pm 0.60)			
		Men	Central	0.28 (\pm 0.64)		0.459	0.646
			East	0.30 (\pm 0.68)			
	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Women	Central	0.05 (\pm 0.32)	0.024	0.981	
East			0.05 (\pm 0.33)				
Men		Central	0.12 (\pm 0.49)	0.238		0.812	
		East	0.11 (\pm 0.48)				
Harmful alcohol use	How often during the last year have you had a feeling of guilt or remorse after drinking?	Women	Central	0.35 (\pm 0.65)	-1.326	0.185	
			East	0.39 (\pm 0.74)			
		Men	Central	0.37 (\pm 0.70)		0.182	0.855
			East	0.37 (\pm 0.69)			
	How often during the last year have you been unable to remember what happened the night before because you had been drinking?	Women	Central	0.31 (\pm 0.62)	-0.336	0.737	
			East	0.32 (\pm 0.65)			
		Men	Central	0.37 (\pm 0.68)		1.989	0.047**
			East	0.46 (\pm 0.75)			
	Have you or someone else been injured as a result of your drinking?	Women	Central	0.45 (\pm 1.07)	-0.730	0.466	
			East	0.49 (\pm 1.12)			
		Men	Central	0.67 (\pm 1.21)		1.369	0.172
			East	0.56 (\pm 1.16)			
Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down?	Women	Central	0.13 (\pm 0.65)	0.327	0.744		
		East	0.12 (\pm 0.64)				
	Men	Central	0.24 (\pm 0.88)		0.047	0.962	
		East	0.25 (\pm 0.89)				

*According to the two-sample independent t-test, **statistically significant at the level 0.05

Results

The total number of college students who completed the AUDIT questionnaire was 3,647. The sample consisted of 1,677 women (46 %) and 1,960 men (54 %).

In the central region, a low AUDIT score was found among 896 students (198 men, 698 women), a medium score was found for 230 students (84 men, 146 women), and a high score was found for 38 students (15 men, 243 women). In the eastern region, a low AUDIT score was found for 1,680 students (1060 men, 620 women), a medium score was found for 663 students (499 men, 164 women), and a high score was found for 140 students (114 men, 26 women). The frequencies of the AUDIT score are in Table 2. The absolute risk of AUDIT score categories by region and gender is in Table 3.

The final AUDIT score was significantly higher in the eastern region ($p < 0.001$). No statistically significant difference was found between women ($p = 0.126$) and men ($p = 0.272$). Final AUDIT score results are in Table 4.

Alcohol was not consumed more frequently between regions in men and woman ($p > 0.05$). During a typical drinking day, more alcohol was consumed in the eastern region compared to the central region of Slovakia in men ($p < 0.028$). Excess drinking by men has been reported in the eastern region compared to the central region ($p < 0.048$). There was no significant difference between the groups in the symptoms of addiction ($p > 0.05$). Inability to remember what happened on a night of drinking was a significant difference in eastern men ($p = 0.047$). The comparison between men and women is in Table 5.

The number of students who have a high AUDIT score from the eastern region is statistically significantly higher than the number of students with a high AUDIT score from the central region ($Z = 3.101$; $p < 0.001$) (Fig. 1). There are no statistically significant differences between women ($Z = 1.128$; $p = 0.128$) or men ($Z = 0.677$; $p = 0.249$) within regions for students with a high AUDIT score (Fig. 2).

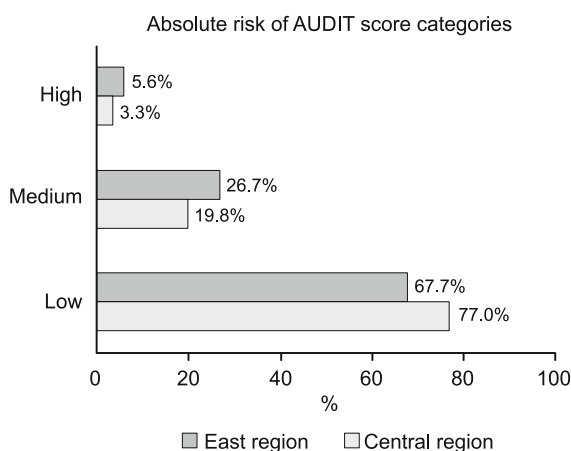


Fig. 1. Absolute risk of the low, medium, and high AUDIT score – Comparison of central and eastern region.

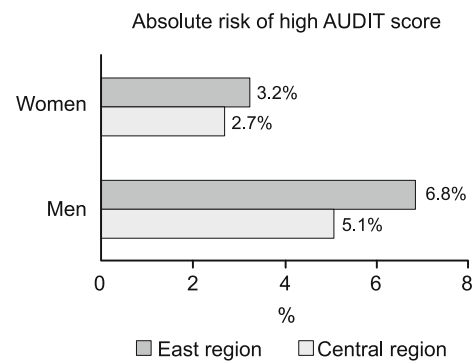


Fig. 2. Absolute risk of high AUDIT score – Comparison of the central and eastern regions by gender (women: $Z = 1.128$, $p = 0.128$; men: $Z = 0.677$; $p = 0.249$).

Discussion

In our study, differences in alcohol consumption according to the AUDIT questionnaire between central and eastern Slovakia were significant. Some regions with favourable geosocial conditions are known for the traditional production and consumption of wine, and others for the legal and illegal production of alcohol. Another explanation is the cultural difference in individual parts of Slovakia and the greater inclination toward alcohol consumption in some regions. This may be associated with different perceptions of harmful drinking and different levels of alcoholism in the societies of different regions. In the eastern region of Slovakia, there is more wine consumption than in the central region. Another possibility is the difference in the psychological impact of social isolation during the lockdown in different societies. Residents of the rural community could suffer less during lockdown than those in more urban areas, leading to compensatory increased alcohol consumption. Alcohol consumption is a significant problem in Slovakia. Slovakia is one of the countries with the highest prevalence of liver cirrhosis (28).

Initially, social distancing, along with increased population testing, were the only effective measures to control the pandemic, but with several long-term consequences (29). The purpose was to slow the pace of new cases and reduce the peak of cases in the community, as well as the burden on health systems. As in most countries around the world, the Slovak government introduced various restrictions on social life and contacts, resulting in quarantine to slow the spread of the COVID-19 pandemic.

The impact of COVID-19 on psychiatric symptoms and disorders, substance use, and addiction is currently being investigated. Although empirical evidence is still minimal, most studies to date suggest a poorer well-being in the general population due to the COVID-19 emergency. In the current context, excessive alcohol consumption weakens the immune system, making it more susceptible to SARS-CoV-2 infection (18, 30).

Barbosa et al (17) evaluated alcohol consumption during the pandemic in the United States. There was a higher incidence of

binge drinking (+ 21 %, $p = 0.001$). Differences were found for all sociodemographic subgroups assessed. Alcohol consumption was also evaluated in a study by Koopmann et al (31). In total, 3,245 people participated in the survey; 35.5 % reported an increase in drinking during lockdown. Steffen et al (32) also evaluated alcohol consumption during the pandemic in 2,067 participants. Changes in alcohol consumption were significantly different between young and mature adults ($p < 0.001$). Among young adults, 42 % reported unchanged drinking behaviour compared to 76 % of mature adults; 44 % of young adults reported drinking less compared to only 7 % of mature adults. Interestingly, in the entire cohort, the change in alcohol intake was more pronounced among moderate drinkers. In addition to location, other factors affect alcohol consumption. The level of alcohol consumption during the first lockdown was evaluated in a study by Irizar et al (33). Alcohol consumption was affected by personal coping motives, anxiety, drinking at home alone, and drinking at home with others. Weerakoon et al (34) evaluated the link between alcohol consumption and the pandemic and found that 34 % of the cohort reported excessive drinking during the COVID-19 pandemic. During the pandemic, more alcohol drinkers (60 %) increased their alcohol consumption (28 %). Higher alcohol consumption was associated with longer home time.

This study has several limitations and is associated with different types of bias. It is a cross-sectional online survey, and the results cannot be re-evaluated or underestimated. Our sample consisted of university students from eastern and central Slovakia. The data and conclusions drawn are based on the level of alcohol consumption that they reported themselves, so a control factor was missing, and it was impossible to confirm the correctness of the answer unambiguously. Furthermore, it is possible that several students were outside their university during the pandemic; on the other hand, higher cultural habits could also be transferred to their place of residence.

Conclusion

Alcohol consumption is a significant problem in Slovakia. The number of students who have a high AUDIT score and are from the eastern region is higher than the number of students with a high AUDIT score from the central region. More significant differences were found between men compared to women from the area of eastern and central Slovakia.

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