

## PREVALENCE OF ALCOHOL CONSUMPTION IN ISCHEMIC STROKE PATIENTS

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Risk factors for ischemic brain disease can be classified into modifiable and non-modifiable. Among others, modifiable risk factors include the alcohol consumption. Our aim was to determine the prevalence of alcohol consumption in ischemic stroke patients aged 15-45 and 46-75 years, and to compare the two age groups with regard to this risk factor.

The study sample comprised a total of 120 male and female ischemic stroke patients, and were divided into two groups - one with 60 patients aged 15-45 years and the other with 60 patients aged 46-75 years, treated at the Clinic for Neurology of the Clinical Centre of Vojvodina, Novi Sad in the period 2005-2008. All the patients fulfilled the clinical and radiological criteria for the diagnosis of ischemic stroke.

The risk factor studied was alcohol consumption (over 60g/days).

In the younger study group, alcohol consumption was found in 16,9% of the subjects. In the older study group, alcohol consumption was present in 26,7% of the subjects. In both groups (120 patients), alcohol consumption was found in 21,7% of patients.

The results of our study indicate that alcohol consumption as a risk factor for ischemic stroke was prevalent in the older ischemic stroke patients; however, the difference was not statistically significant. *Acta Medica Medianae 2012;51(2):5-10.*

**Key words:** alcohol, ischemic stroke, stroke

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### Introduction

Risk factors often precede the development of the disease for many years, contributing to the progression of the pathological process in blood vessels (1). The disease may be attributable to a single or a combination of multiple risk factors. The risk factors are classified into modifiable and non-modifiable ones. Alcohol abuse is considered as one of potentially important modifiable risk factors (2).

Acute stroke is one of the most important neurological diseases. It is the cause of death of more than 5.5 million people per year, which makes 10% of the overall mortality worldwide, and cerebrovascular diseases are the third most common cause of death in many countries (3). Acute ischemic stroke is a more common form of the disease, occurring in some 75-80% of patients (2).

Alcohol consumption and its impact on development of ischemic stroke have been widely addressed in numerous researches. The Framingham Heart Study revealed that excessive or even

moderate drinking is associated with an increased relative risk of stroke, whereas consumption of small quantities of alcohol poses a reduced relative risk of stroke, as compared to the people who do not drink at all (4).

A group of researchers from Finland investigated the relation between acute alcohol intoxication and chronic alcoholism and stroke (5). The authors established that, compared with the general population, the risk of ischemic CVI in chronic alcoholics was twofold and even fivefold higher in male and female patients, respectively (5).

Related research of other authors revealed that alcohol consumption poses an increased risk and could predispose to stroke (6). Besides, some authors consider alcohol a toxin that negatively affects every particular organ, either directly or indirectly (7), including the central nervous system. Deteriorating effects of alcohol are more pronounced in women, and even a relatively small amount of alcohol may cause severe complications (8).

As early as 1725, alcohol was considered a possible risk factor for stroke, and in 1984, it was categorized as "incompletely confirmed" risk factor for stroke (9). This supports the fact that no medical consensus has been reached yet on the relationship between alcohol and stroke and further research of this issue is expected. The

authors of the National guidelines for ischemic stroke are of the opinion that alcoholics across all age groups are at increased risk of having a stroke (2).

The aim of our research was to determine proportional representation of alcohol abuse in two age groups of patients (15-45 and 45-75 years) from the territory of Vojvodina, who suffered ischemic stroke, and to establish potential differences between these two groups.

## Methods

The study sample comprised 120 male and female ischemic stroke patients treated at the Clinic for Neurology of the Clinical Center of Vojvodina in Novi Sad, Serbia, in the period from October 14, 2005 to March 21, 2008. Study subjects were divided into two age groups - 60 patients aged 15-45 years and 60 patients aged 46-75 years. All study subjects met the clinical and radiological criteria for the diagnosis of ischemic stroke. Due to the low incidence of stroke in young patients and therefore a small numbers of young stroke patients enrolled prospectively, the study was partly retrospective, by a retrospective review of medical records (data was collected from medical histories).

Information about the patients who were enrolled prospectively was obtained from the patients themselves or their relatives.

The studied risk factor for ischemic stroke was alcohol abuse. We studied the consumption of all types of alcoholic beverages: whiskey, brandy, wine, beer and other alcoholic drinks. Heavy consumers were considered those patients who were taking over 60g/day. One alcoholic drink has 10g in Australia and Europe, or milliliter of alcoholic beverages containing 0.785g (10); a bottle of wine contains about 70g (11).

Data were analyzed using standard statistical methods. All analyses were performed using the software package SPSS 15.0 for Windows. The differences in frequencies were tested with the  $\chi^2$  test. The level of statistical significance adopted for all analyses was 0.05.

## Results

The investigation encompassed 120 patients with ischemic stroke, aged 15-45 (60 patients) and 46-75 (60 patients) years. The patients were from the territory of Vojvodina Province and were hospitalized at the Institute for Neurology in Novi Sad.

In the age group of 15 to 45 years old, males were presented with 48.3%, while females were presented with 51.7%; in the age group from 46 to 75 years, there were 53.3% of males and 46.7% of females (Table 1). Age groups were significantly different between the variables of occupation and were divided into five groups (Table 2).

All respondents to the place of residence were divided into three groups (Table 3).

Table 1. Sex structure in two age groups of ischemic stroke patients

Age group		Sex		Total
		male	female	
15-45 yrs	N	29	31	60
	%	48,3%	51,7%	100,0%
46-75 yrs	N	32	28	60
	%	53,3%	46,7%	100,0%
Total	N	61	59	120
	%	50,8%	49,2%	100,0%

$\chi^2$  is not statistically significant  
 $\chi^2 = .133$  df(1) p=0,715

Table 2. Occupations in two age groups of ischemic stroke patients

Age group		Occupation					Total
		housewife	worker	H.school and Univer. Educ.	farmer	student	
15-45 yrs	N	10	31	17	0	2	60
	%	16,7%	51,7%	28,3%	,0%	3,3%	100,0%
46-75 yrs	N	13	8	38	1	0	60
	%	21,7%	13,3%	63,3%	1,7%	,0%	100,0%
Total	N	23	39	55	1	2	120
	%	19,2%	32,5%	45,8%	,8%	1,7%	100,0%

$\chi^2$  is statistically significant.  $\chi^2 = .24,974$  df(4) p=0,000

Table 3. Place of residence in two age groups of ischemic stroke patients

Age group		Place of residence			Total
		village	small town	big city	
15-45 yrs	N	20	15	25	60
	%	33,3%	25,0%	41,7%	100,0%
46-75 yrs	N	22	15	23	60
	%	36,7%	25,0%	38,3%	100,0%
Total	N	42	30	48	120
	%	35,0%	25,0%	40,0%	100,0%

$\chi^2$  is not statistically significant.  $\chi^2 = 0,179$  df(2) p=0,915

Table 4. Prevalence of alcohol consumption in two age groups of ischemic stroke patients

Age groups		Alcohol consumption		Total
		no	yes	
15-45 yrs	N	50	10	60
	%	83,3%	16,7%	100,0%
46-75 yrs	N	44	16	60
	%	73,3%	26,7%	100,0%
Total	N	94	26	120
	%	78,3%	21,7%	100,0%

$\chi^2$  is not statistically significant.  $\chi^2 = 1,227$   $df(1)$   $p=0,268$

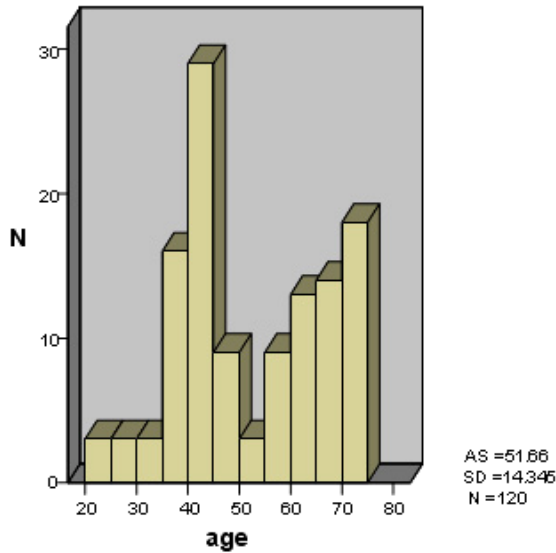


Figure 1. Display of the distribution of age in the whole sample

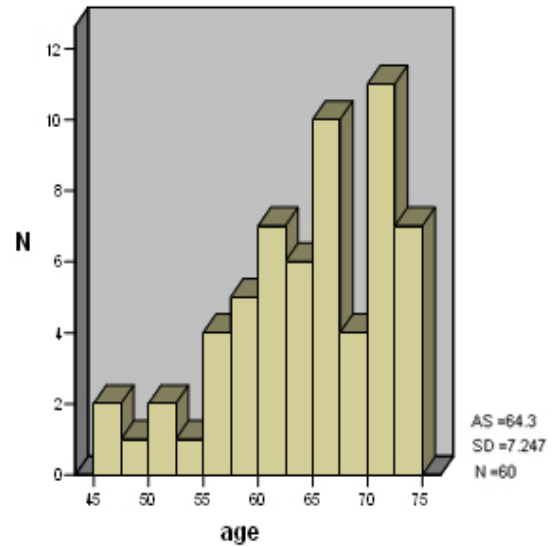


Figure 3. Display of the distribution of age in ischemic stroke patients aged 46-75 yrs

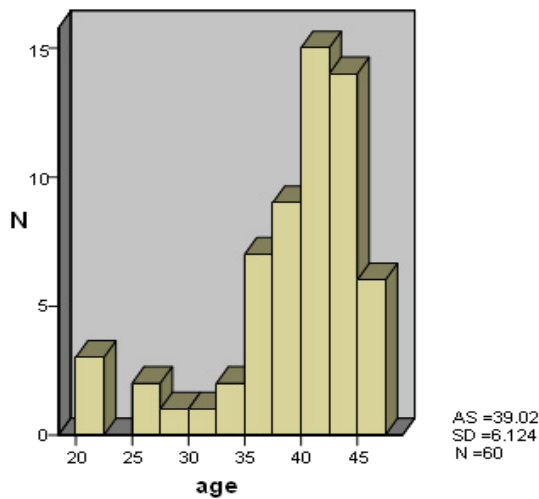


Figure 2. Display of the distribution of age in ischemic stroke patients aged 15-45 yrs

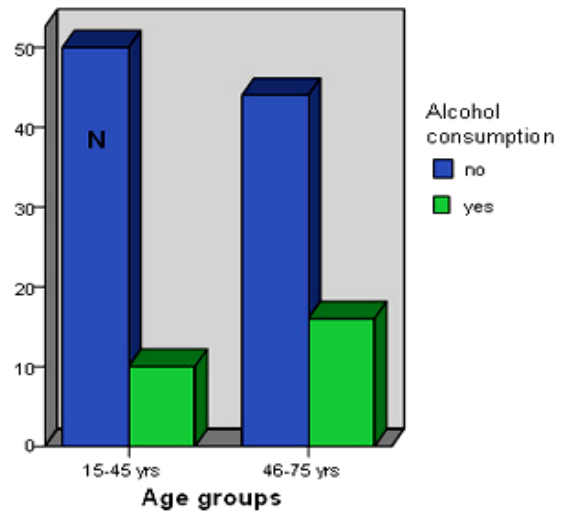


Figure 4. Prevalence of alcohol consumption in two age groups of ischemic stroke patients

The age structure of the sample indicates that the majority of examinees were elderly subjects. Arithmetic mean was 51.66 years, with a standard error of 1.310. The median age was 46, mod 44, and the standard deviation was 14.345 (Figure 1).

In the group of respondents aged from 15 to 45 years, the arithmetic mean was 39.02 years with a standard error of 0.791. The median was

40.00 and the standard deviation was 6.124 (Figure 2).

In the group of respondents aged from 46 to 75 years, arithmetic mean was 64.30 years with a standard error of 0.936. The median was 65.50 and the standard deviation was 7.247 (Figure 3).

Alcohol abuse was established in 16.7% of patients from the younger group, whereas this

risk factor was present in 26.7% of patients from the older group (Table 4, Figure 4). The overall rate of alcohol abuse within the entire patient population (120 patients) was 21.7% (Table 4).

Higher incidence of alcohol abuse was established in the group of older patients; however, the difference between the two investigated groups was not statistically significant (Table 4, Figure 4).

## Discussion

Effect of alcohol abuse as a risk factor for ischemic stroke was extensively investigated worldwide.

In the present study, in the age group 15-45 years, there were 48.3% of male subjects, and the average age of the group was  $39.02 \pm 6.124$  years. In the age group 46-75 years, there were 53.3% of male subjects and the average age of the group was  $64.30 \pm 7.247$  years. In the younger group, women were more numerous, which is in line with an Italian study where women made a majority (61%) among the patients less than 35 years of age (12). In the older group, men were more numerous, which corresponds to a German study in which out of a total of 852 ischemic stroke patients with the average age of  $67 \pm 12.4$  years 57% were men (13).

Our research revealed an alcohol abuse rate of 16.7% of patients in the younger group, and 26.7% in the older group of patients. The overall rate of alcohol abuse within the entire patient population (120 patients) was 21.7%.

A previous research conducted in Novi Sad in the period January 2001 – September 2004, which encompassed 100 patients aged 15-45, revealed an alcohol abuse rate of 19% (14) which is in accordance with our results obtained in the group of younger patients.

Some authors consider that the effects of alcohol abuse as a risk factor for ischemic stroke are controversial and likely dose-dependent (15). Excessive quantities of alcohol negatively affect the human body in many ways and may promote progression of ischemic stroke. Physiopathological mechanisms involved in the effects of alcohol on development of ischemic stroke include heart arrhythmia, cardiac wall mobility disorders, arterial hypertension, increased thrombocyte aggregation, activation of the coagulation cascade and impaired blood flow to the brain (16).

Regular alcohol consumption is frequently related to increased incidence of stroke. The most likely explanation for this is the fact that heavy drinkers have increased systolic and diastolic blood pressure as compared to the persons who drink alcohol only occasionally or not at all (17). It is well established that arterial hypertension promotes and accelerates athero-

sclerosis, affecting even large arteries in the brain.

Epidemiological data suggest that daily intake of small amounts of alcohol, i.e. up to 30 g of ethanol (up to three glasses of wine), has a protective effect against ischemic stroke and coronary disease. One theory suggests that tannins, the substances found in red wine, have a long-term and positive effect (18).

Thus, it can be concluded that positive or negative effects of alcohol on human body are highly dose-dependant.

A research conducted by the group of authors from Finland was based on a hypothesis on dose-dependent effects of alcohol, i.e. that heavy drinking increases the risk of stroke, whilst moderate alcohol consumption is associated with lower risk of ischemic stroke. This prospective study encompassed 15,965 Finns of both sexes, aged 25 to 64 years, which previously did not experience stroke (18). The population has been monitored throughout a ten-year period, and 249 stroke episodes were recorded, 179 of which were ischemic strokes (18). The patients were distributed into two groups. The first group consisted of 3,558 (22%) patients who consumed large amounts of alcohol at once, i.e. who got drunk. The second group encompassed 12,407 (77%) patients who did not drink large quantities of alcohol at once. The patients from the first group were younger and consumed significantly larger amounts of alcohol. In this group, higher body mass index, higher incidence of hypertension, significantly heavier smoking and lower education level were established as compared to the second group. The risk of stroke was 1.85, whereas the risk of ischemic stroke reached 1.99 (18). This study confirmed that drinking habit is an independent risk factor for all stroke types, as well as for the ischemic stroke. At the level of the entire group investigated, alcohol abuse was observed in 21.7% patients in our study, which closely correlates with the research of Finnish authors.

Comparison of the differences in occurrence of risk factors between younger and older groups revealed the difference in proportional representation; however, it was not statistically significant.

## Conclusion

The results of our research revealed higher incidence of ischemic stroke associated with alcohol abuse in older patients; however, the difference was not statistically significant.

Alcohol abuse as a risk factor for ischemic stroke is a disease that can be treated by psychiatric methods, and breaking this bad habit will decrease the risk for the development of ischemic stroke.

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## UČESTALOST ZLOUPOTREBE ALKOHOJNIH PIĆA KOD BOLESNIKA SA ISHEMIJSKIM MOŽDANIM UDAROM

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Faktori rizika za nastanak ishemijske bolesti mozga mogu se podjeliti na faktore na koje se može uticati i na faktore na koje se ne može uticati. Između ostalih, zloupotreba alkoholnih pića je jedan od faktora rizika na koji se može uticati. Cilj istraživanja bio je da se ustanovi procentualna zastupljenost zloupotrebe alkoholnih pića kod bolesnika sa ishemijskim moždanim udarom uzrasta od 15 do 45 godina i uzrasta od 45 do 75 godina, da se međusobno uporede ove dvije grupe, u pogledu ovog faktora rizika.

Uzorak istraživanja predstavljalo je 120 bolesnika oba pola sa ishemijskim moždanim udarom, a koji su bili razvrstani u dvije grupe od po 60 pacijenata i to mlađeg uzrasta od 15 do 45 godina i starijeg uzrasta od 46 do 75 godina koji su liječeni na Institutu za neurologiju Vojvodine u Novom Sadu u periodu od 2005. do 2008. Bolesnici su ispunjavali kliničke i radiološke kriterijume za dijagnozu ishemijskog moždanog udara.

Ispitivani faktor rizika za ishemijski moždani udar bio je zloupotreba alkoholnih pića (preko 60g/dan).

Učestalost zloupotrebe alkoholnih pića kao faktora rizika u mlađoj grupi bila je kod 16,9% bolesnika. Kod starije grupe ispitanika procentualna zastupljenost zloupotrebe alkoholnih pića kao faktora rizika bila je kod 26,7% bolesnika. Kad je u pitanju cijela grupa, zloupotreba alkoholnih pića bila je prisutna kod 21,7% bolesnika.

Rezultati istraživanja pokazuju da je zloupotreba alkoholnih pića kao faktor rizika za nastanak ishemijskog moždanog udara procentualno zastupljeniji kod starijih bolesnika, ali nije utvrđena statistički značajna razlika. *Acta Medica Medianae 2012; 51(2):5-10.*

**Ključne reči:** alkoholna pića, ishemijski moždani udar, moždani udar