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The prevalence of traditional risk factors for cardiovascular disease in the Omsk region: data of the ESSE-RF2 study

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Aim. To study the prevalence of some traditional risk factors for cardiovascular disease (CVD) in the Omsk region.

Material and methods. The prevalence of traditional risk factors for CVD in a representative sample of the Omsk region population aged 25-64 years (n=1648) was estimated as a part of the ESSE-RF2 study in 2017.

Results. It was established that the mean age of CVD detection in the Omsk region is 46,3 years, the prevalence of overweight is 35,0%, obesity — 30,3%. Abdominal obesity was detected in 56,8% of subjects. Smoking was reveled in 21,2% of the population, former smoking — 20,0%. Alcohol consumption more than 2 times a month was observed in one third of respondents (30,5%). In the group of healthy people, compared with CVD patients, the percentage of smokers and alcohol consumers was detected significantly more often: smoking — 25,2±1,26% vs 17,1±0,86% and 32,9±1,6% vs 28,1±1,4%, respectively. Perhaps it was the diseases the reason for smoking cessation and alcohol abstinence among people with CVD. It should be noted that among 70% of alcohol consumers, both with/without CVD, strong drinks were the preferred type of alcohol.

Hypertension (HTN) was observed in 47,9% of subjects, and in 43,1% the diagnosis was verified. In 4,8% of HTN individuals, blood pressure increase was detected for the first time in this study.

The prevalence of diabetes of both types in the Omsk region was 6,7%, and in group A (with CVD) it was much higher than in group B (without CVD): 10,7% vs 2,8%. Type 2 diabetes prevailed in people with CVD (p=0,000005). This was not characteristic of type 1 diabetes.

Conclusion. The most common risk factors for CVD in the Omsk region population were HTN (47,9%), abdominal obesity (56,8%), a positive family history of early CVD (62,0%), alcohol consumption over the past 12 months (71,7%) and strong alcohol drinking (72,0%). However, a significant portion of the subjects (41,3%) consumed alcohol no more than 1 time per month.

Key words: risk factors, cardiovascular diseases, smoking, alcohol consumption, abdominal obesity, hypertension.

Relationships and Activities. The study was funded by the federal budget. Omsk State Medical University participated in an open competition for conducting this study in the Omsk region, which resulted in the conclusion of a civil contract № 2/4/17000062 of May 24, 2017.

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In recent years, in high-income countries, age-standardized death rates from cardiovascular disease (CVD) have decreased sharply. Among the factors contributing to such a reduction in mortality was a decrease in smoking prevalence, blood pressure (BP) normalization, and improved healthcare [1, 2].

A high-risk strategy is the main approach of primary prevention of CVD, which include identifying patients with a high risk of CVD [3]. This approach is particularly relevant in Russia, where the prevalence and mortality from CVD is significantly higher than in most countries of Europe and USA [3]. It can be assumed that in different Russian regions, due to economic, climatic and geographical differences and behavioral patterns of the population, traditional CVD risk factors (RF) may have different distribution and, as a result, significance in disease prevention.

The aim was to study the prevalence of some traditional risk factors for CVD in the Omsk region.

Material and methods

In 2017, as part of a multicenter observational study ESSE-RF2, a screening study of the Omsk region population with single protocol for all participating centers was conducted [4].

According to the Protocol requirements [4], a representative sample of the population of Omsk and Omsk Oblast (n=2000) was formed by cluster sampling. Following healthcare facilities took part in the study: A. N. Kabanov City Clinical Hospital № 1; City Polyclinic № 10; City Clinical Hospital № 3; City Polyclinic № 4; City Polyclinic № 11.

Then, 20 locality health centers of mentioned healthcare facilities were randomly selected for participation in the study: 15 — urban (5 from each district) and 5 from the rural facility — Omsk Central District Hospital. Then households included in the sample was randomized (n=1000). Men and women permanently residing in selected households aged 25-64 years were invited to the survey. The quantitative composition of participants was controlled according to the eight age-sex strata (men and women — 25-34 years, 35-44 years, 45-54 years, 55-64 years). Characteristics of the invitation, the response rates, the reasons and structure of denials were reflected in our previous articles [5, 6].

Of the created representative sample, 1648 people were examined. The response rate was 84,0% [5].

We evaluated the prevalence of the following traditional RF for CVD [3]:

1) Male gender;

2) Positive family history of early CVD: fatal or nonfatal CVD (myocardial infarction, stroke), and/or documented hypertension (HTN) in first-degree relatives up to 55 years old in men and up to 65 years old in women;

3) Overweight (body mass index (BMI) ⩾25 kg/m^2) and obesity (BMI ⩾30 kg/m^2);

4) Abdominal obesity (AO) was considered as an increase in waist circumference ⩾94 cm in men and ⩾80 cm in women;

5) Smoking. Smokers were those who smoked at least one cigarette per day or quit smoking <1 year ago;

6) Alcohol. Three criteria were evaluated: “alcohol intake over the past 12 months”; “frequency of alcohol consumption per month” (“>2 times”); “prevailing type of alcohol” (“strong”);

7) HTN. Hypertensive subjects were those who answered in the affirmative the question: “Have you ever been told by a doctor or other medical professional that you have high BP?”.* Increased office BP ⩾140 and/or ⩾90 mm Hg was considered as a possible HTN;

8) Type 2 diabetes (T2D). Subjects with diabetes were those who answered in the affirmative the question: “Have you ever been told by a doctor that you have/had diabetes?”.

Sex, age, family history of CVD, the presence of HTN and T2D, smoking status, frequency, type and intensity of alcohol consumption were evaluated according to standardized questionnaires of the study.

Since the ESSE-RF study in the Omsk region was conducted on the basis of outpatient healthcare facilities, the survey was performed by the primary care physician. Thus, all verified cases of elevated BP were considered as a history of HTN.

Resting BP was measured before the survey, in the sitting position with the right arm supported on the table at the heart level using automatic BP monitor. Systolic BP (SBP)/diastolic BP (DBP) considered the average of two measurements taken at interval of 5 min.

Obesity was determined by measuring height and weight, followed by BMI calculation.

To assess the significance of non-modifiable RF for CVD such as sex, age, positive family history of early CVD, the sample was divided into

* All affirmative answers to the question about whether the respondent had high BP before the examination were verified by the primary care physician.

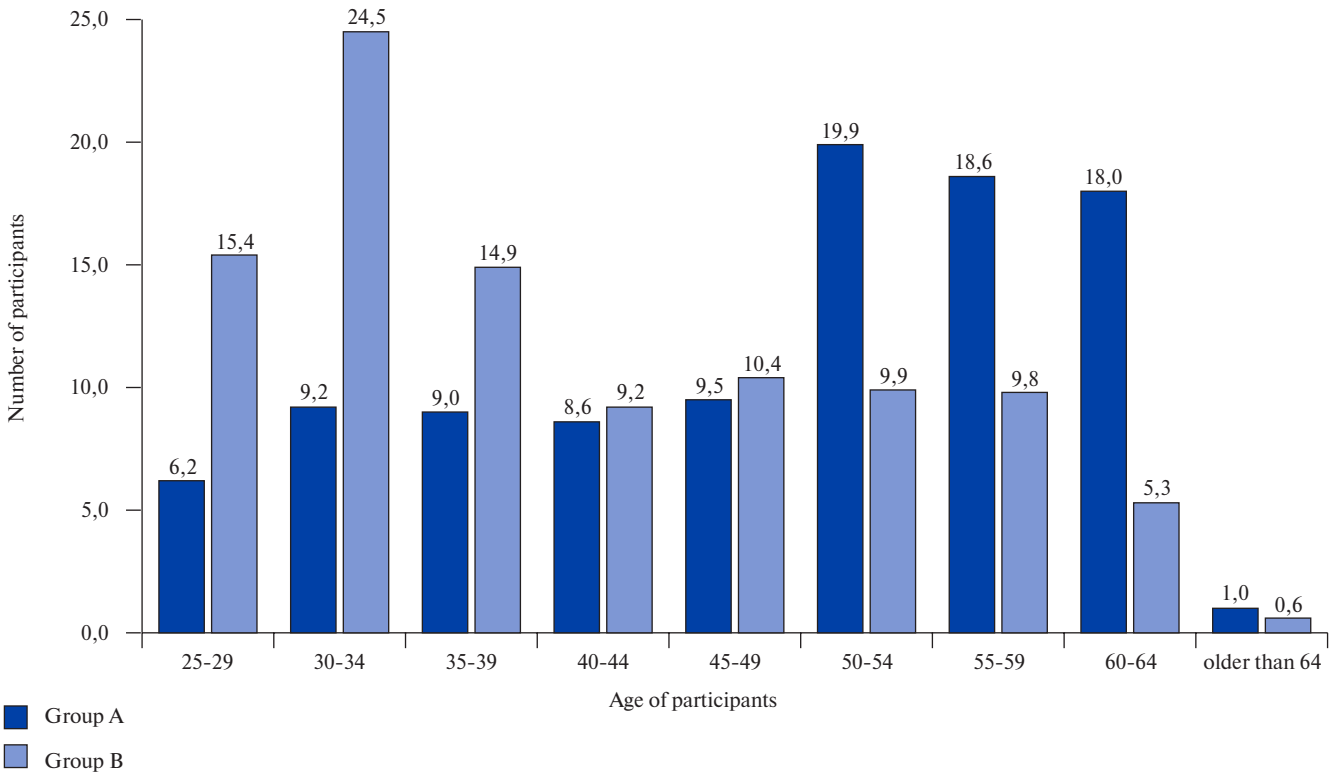

Figure 1. Age-specific distribution of participants (%).

two groups: group A (n=811) — subjects with cardiovascular disease (HTN, myocardial infarction, stroke, heart failure, coronary artery disease, cardiac arrhythmias) and group B (n=837) — subjects without CVD.

We used observational epidemiological (case-control, cross-cectional) and statistical research methods. The significance of the factors was assessed by odds ratio (OR) with 95% confidence interval (CI). For data processing, the spreadsheet program MS Excel and the open source OpenEpi (http://www.openepi.com/Menu/OE_Menu.htm) were used. To describe the prevalence of RF in groups, the mode (Mo) and median (Me) values were used. In each study group, the prevalence of RF was calculated for all patients and separately for men and women. Differences were considered significant at $P<0,05$.

This study was performed in accordance with the Helsinki Declaration and Good Clinical Practice standards. The ESSE-RF2 study was approved by the Independent Ethical Committee of National Medical Research Center for Preventive Medicine. The medical ethics committees of all participating centers approved this study. All patients signed informed consent.

Results and discussion

Age-specific distribution of the participants is shown in Figure 1. As shown in the Figure, among the subjects <50 years old, there are more patients without CVD (group B) compared to group A. Then there is an almost twofold increase in the number of patients with CVD (group A) compared to group B. In group A there were 44,4% of men (n=360) and 55,6% of women (n=451); in group B there was a comparable sex composition: 45,6% (n=382) and 54,4% (n=455), respectively. The predominance of women in both groups (906 women vs 742 men) is apparently associated with a more responsible attitude to their own health. A similar sex ratio was obtained by us for the urban and rural population of the same region in previous studies [5, 6].

The mean age of participants with CVD (group A) was 48,7 years (95% CI 46,3÷51,1) and group B (without CVD) — 41,0 years (95% CI 39,0÷43,1). Significant differences between these groups by age are explained by a known more common development of CVD at an older age: the earliest age in a subject with CVD was 46,3 years (men — 45,8 years; women — 46,6 years). The mean age in

Table 1

Prevalence and significance of RF for CVD in the population of the Omsk region

№	Risk factor	Overall in region, n=1648		Subjects with CVD (Group A), n=811		Subjects without CVD (Group B), n=837		OR (95% CI) between 5 and 7	P Significance of differences between 5 and 7
		абс	%	абс	%	абс.	%		
1	Men >45 years old	432	26,2	255	31,4	177	21,0	1,710 (1,369÷2,136)	0,000002
2	Women >55 years old	241	14,7	182	22,4	59	7,0	3,815 (2,793÷5,212)	<0,0000001
3	Positive family history of early CVD	1022	62,0	558	68,8	464	54,8	1.254 (1,162÷1,355)	<0,0000001
4	Overweight (25⩽BMI<30)	576	35,0	299	37,0	277	33,0	1,126 (0,986÷1,285)	0,0779
5	Obesity (BMI ⩾30)	500	30,3	332	41,0	168	20,0	2,061 (1,759÷2,416)	<0.0000001
6	Abdominal obesity WC ⩾94 cm in men, ⩾80 cm in women	936	56,8	589	72,6	347	41,5	1,771 (1,616÷1,940)	<0,0000001
7	Current smoking	350	21,2	139	17,1	211	25,2	0,687 (0,567÷0,832)	0,0001006
8	Former smoking	329	20,0	183	22,6	146	17,5	1,308 (1,076÷1,589)	0,006786
9	Hypertension	711	43,0	711	87,7	0	0	-	-
10	First smoking experience at the age <18 years	168	10,2	87	10,7	81	9,7	1,122 (0,815÷1,543)	0,481
11	Alcohol consumption over last 12 months	1182	71,7	588	72,5	594	71,0	1,079 (0,870÷1,337)	0,489
12	Frequency of alcohol intake per month: >2 times	503	30,5	228	28,1	275	32,9	0,799 (0,648÷0,986)	0,037
13	Prevailed type of alcohol — strong	1186	72,0	597	73,6	589	70,4	1,175 (0,947÷1,457)	0,143
14	Both types of diabetes	110	6,7	87	10,7	23	2,8	3,946 (2,518÷6,184)	<0,0000001
15	Type 2 diabetes	89	5,4	78	9,6	11	1,3	1,875 (1,216÷2,890)	0,000005
16	Type 1 diabetes	21	1,3	9	1,1	12	1,4	0,782 (0,332÷1,847)	0,574

Abbreviations: CI — confidence interval, BMI — body mass index, WC — waist circumference, O**K** — odds ratio, CVD — cardiovascular disease.

groups A and B did not differ between men and women: group A — 48,2 (95% CI 45,8÷50,6) vs 49,1 (95% CI 46,6÷51,6) years, in group B — 41,3 (95% CI 39,2÷43,4) vs 40,0 (95% CI 38,0÷42,0) years, respectively. Thus, the development of CVD in the Omsk region can be expected from 48 years for men and 49 years for women. However, according to the National guidelines, age as RF is considered to be 55 years for men and 65 years for women [3]. This fact requires further study.

A positive family history of early CVD in first-degree relatives (<55 years for men and <65 years for women) was detected in 62,0% of respondents (Table 1). In group A, this indicator was significantly higher than in group B — 68,8% vs 54,8%, p<0,0000001. This indicates a high proportion of people with a positive family history of early CVD (>60%) and the need for additional early preventive measures.

A more detailed analysis showed that 16,0% (n=130) of group A subjects had a positive family history of myocardial infarction, 57,3% — stroke (n=465), 17,3% — HTN (n=140). In group B, a similar distribution was as follows: 9,4% (n=79), 44,2% (n=370) and 16,7% (n=140), respectively. This may indicate the need for a careful attitude of respondents without CVD and with positive family history of

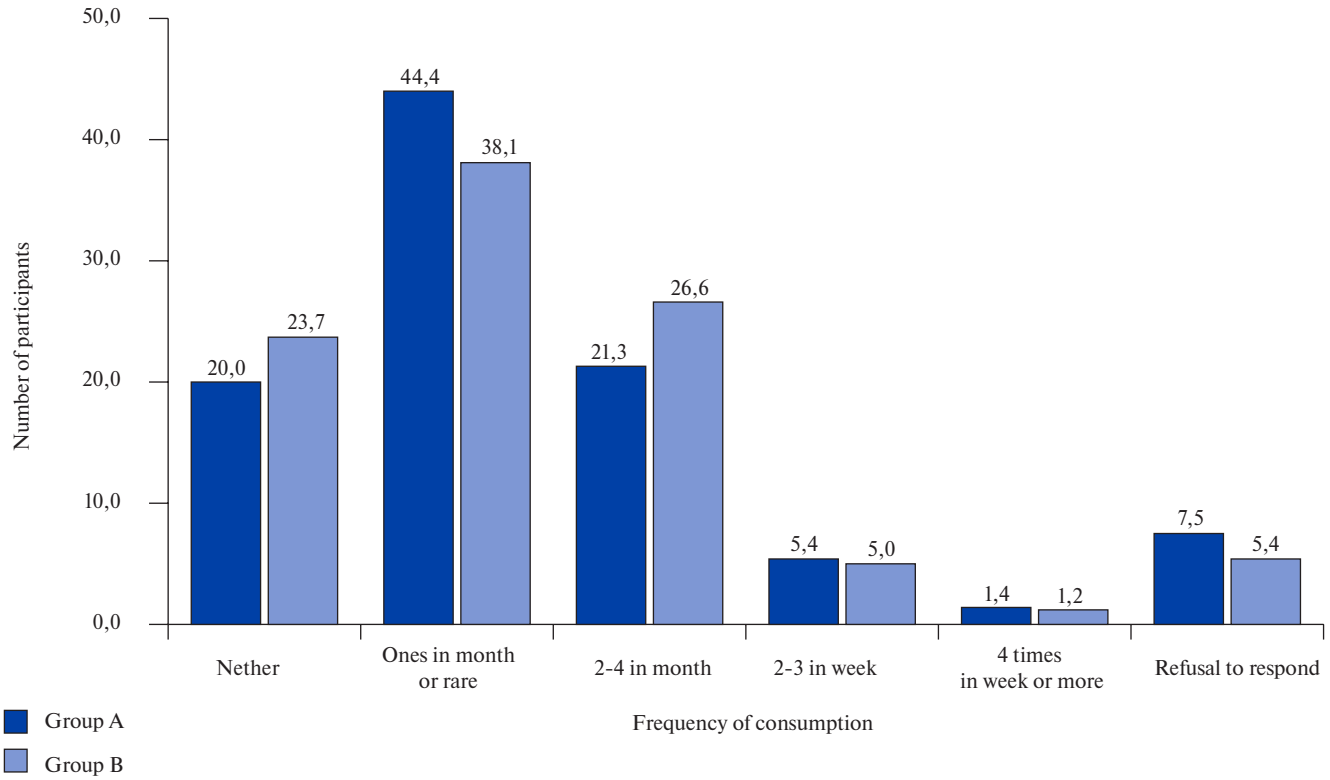

Figure 2. Frequency of alcohol consumption (%).

CVD to their own health and an early change in lifestyle.

The proportion of respondents with overweight and obesity (BMI ⩾25) was 65,3% (n=1076), of which overweight — 35,0% (n=576), obesity — 30,3% (n=500) (Table 1). The same prevalence of obesity in Russian population was obtained in the ESSE-RF study: 29,7% [7] and 33,4% [8].

Among people with CVD, the prevalence of overweight did not differ significantly from people without CVD: 37,0% vs 33,0%, but obesity (BMI ⩾30) was 2 times more common in group A than in group B (41,0% vs 20,0%) (Table 1).

However, BMI does not reflect the differences between muscle and adipose tissue, as well as the distribution of the latter. Waist circumference (WC) is a more valuable predictor of both CVD and diabetes. AO amounted to 56,8% in the Omsk region (Table 1), which is comparable to the national data — 55% [8]. As in other regions of Russia [8], Omsk women are significantly more likely to suffer from AO compared with men: 63,4% (n=574) and 48,8% (n=362), respectively. It is noteworthy that the prevalence of AO significantly exceeds the prevalence of obesity in BMI both in the population and in both study groups (Table 1). This fact indicates the importance of measuring WC as an indicator defining such an important and widely spread RF as AO. In both groups A and B, AO prevailed among women compared with men: in group A — 44,7% (n=359) vs 29,3% (n=238), in group B — 26,5% (n=221) vs 15,1% (n=126), respectively. Thus, in the Omsk region, AO among CVD patients compared with people without CVD is significantly more common: men — OR 1,97 (95% CI 1,62-2,39, p<0,0000001), women — OR 1,70 (95% CI 1,48-1,94, p<0,0000001).

Smoking was detected in 21,2% (n=350) of the Omsk region population (Table 1). Compared with the data of the ESSE-RF study in 2013-2014 (27,7%) and the Russian Federal State Statistics Service in 2011 (25,7%), the value obtained in this study is quite "favorable" and is closer to the low prevalence compared to other Russian regions [9]. According to the ESSE-RF study, only three regions have lower prevalence of smoking: the Republic of North Ossetia-Alania, the Tyumen and Samara Oblasts (18,7%, 20,0% and 20,7%, respectively). In the other eight regions of Russia participating in the

ESSE-RF study, this parameter is higher and even reaches 32,1% (Tomsk region) and 34,6% (Kemerovo region) [9].

It is noteworthy that 20,0% (n=329) of the population were former smokers, and this number is comparable to the number of current smokers, which is an encouraging fact (Table 1).

Among smokers and former smokers, more than 95% of participants smoked every day in both groups (group A — 95,6%, group B — 96,7%). First smoking experience at the age <18 years in group A was in 26,6%, in group B — in 22,7% of respondents. This fact confirms the known data that the earlier a person begins to smoke, the more likely it can affect the development of CVD.

There were lower number of current smokers in group A than in group B (17,1% vs 25,2%, respectively, p=0,0001). It is obvious that a sick person rather breaks bad habits than an individual without diseases. This is also indicated by the fact that the proportion of former smokers among CVD patients is significantly higher than in the group without CVD (22,6% vs 17,5%, respectively; p=0,006). It is encouraging that the proportion of never smokers not depend on the presence/absence of CVD. In the Omsk region, the prevalence of this indicator in groups A and B were close: 60,3% (n=489) and 57,3% (n=480), respectively.

Over the past 12 months, alcohol consumption was detected in 71,7% of respondents in the Omsk region (Table 1). A significant part of participants consume alcohol mainly 1 time/month and less often — 41,3% (group A — 44,4% and group B — 38,1%) (Figure 2). A third (30,5%) of respondents consumes alcohol more than 2 times/month. People with CVD (group A) were significantly less likely to consume alcohol compared to group B (28,1% vs 32,9%, p<0,037), which can probably be explained, as in smokers, by a greater motivation for patients to break bad habits compared to healthy people (Table 1). It should be noted that in both groups strong drinks prevailed (Table 1), such as vodka, cognac, etc. (73,6% vs 70,4%), which generally corresponds to Russian traditions and the trend of alcohol consumption in Russia described in earlier studies [9-11].

HTN is today considered the most important RF for other CVD and, at the same time, an independent disease [3]. The proportion of people informed by a doctor or other medical professional that they have high BP was 43,1% (Table 1). Since all these cases were documented, the obtained value can be considered the prevalence of HTN in the region. There were also 79 subjects (4,8%) who answered in the negative and who had high office BP (SBP and/or DBP ⩾140/90 mm Hg). Given these cases, the proportion of people with high BP in the Omsk region reaches 47,9% (n=790).

The mean SBP in patients with CVD was 132,4 mm Hg (95% CI 125,8÷139,0), DBP — 84,0 mm Hg (95% CI 79,8÷88,2). Similar parameters in the group of subjects without CVD were lower: 119,6 mm Hg (95% CI 113,6÷125,6) and 76,1 mm Hg (95% CI 68,0÷75,2), respectively. If we take into account that all persons with established HTN were included in group A, and all of them used antihypertensive therapy before inclusion in the study, then the mean BP in the group can be a tool to assess the therapy efficiency. Given the value of mean BP in individuals with CVD (group A) who did not reach the target level (<130/80 mm Hg), we may indicate the low effectiveness of antihypertensive treatment.

Diabetes is another disease that is considered RF for CVD [3]. The prevalence of both types of diabetes in the Omsk region was 6,7%, and among patients with CVD (group A), the odds for having diabetes were much higher than in group B (without CVD): OR 3,95 (2,52÷6,18) (Table 1). In group A, the prevalence of T2D in comparison with group B was significantly higher (p=0,000005), which is not the case for type 1 diabetes.

Study limitation. Analysis of RF was limited to the age range of 25-64 years according to the Protocol requirements [4]. Alcohol as a risk factor was evaluated only by the frequency of consumption (over 12 months, per month) and the preferred type of drink.

Conclusion

Among the Omsk region population, the most common risk factors for CVD were HTN (47,9% — overall; 43,1% — according to ambulatory medical record), AO (56,8%), positive family history of early CVD (62,0%), alcohol consumption over the past 12 months (71,7%). However, a significant part of subjects (41,3%) consumed alcohol no more often than 1 time/month. All of these indicators, including T2D, are significant CVD-associated R for the population of the Omsk region.

Current smokers and alcohol consumers (at least 2 times/month) prevailed in the group of healthy people. This is probably due to a change in the lifestyle of people with CVD and higher motivation to break bad habits in order to regain

health. Both groups had the same preferred type of alcohol: 73,6% of healthy people and 70,4% of people with CVD preferred strong drinks.

Data on RF for CVD, which are widespread among the population of the Omsk region, can be useful for creating regional programs for monitoring, screening and primary prevention of CVD.

Relationships and Activities. The study was funded by the federal budget. Omsk State Medical University participated in an open competition for conducting this study in the Omsk region, which resulted in the conclusion of a civil contract № 2/4/17000062 of May 24, 2017.

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