Cardiovascular risk assessment among rural population in Russian Federation: A case study of Irkutsk region

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Resumen

This article reports on the prevalence of cardiovascular risk factors among the rural population of the Irkutsk region, RF. A cross-sectional population study was carried out to on a random sample of rural people in 2016. This study involved 1611 respondents, 658 males and 953 females 30-69 years of age. Respondents were offered a standard questionnaire made by experts of the National Medical Research Center for Preventive Medicine (NMRC P, Moscow, Russian Federation). The patients all underwent clinical instrumental examination and some anthropometric measurements were taken. The overall cardiovascular risk was evaluated using SCORE, a European risk scale. The prevalence of cardiovascular risk factors among a random sample of rural population turned out to be high. Among these factors, nutritional disorders were found in 76.1% of respondents, hypercholesterolemia – in 62%, sedentary lifestyle – in 52.6%, hypertension – in 39.2%, hypertriglyceridemia – in 27%, current smoking habits – in 24%, and alcohol abuse – 11.7%. Some risk factors were found to be associated with gender. Smoking habits, alcohol abuse and nutritional disorders were found more in men, while women reported on hypertension and abdominal obesity. Among studied population, high and very high SCORE risks were found in 19% of cases.

Keywords: risk factors, cardiovascular diseases, rural population, rate.

Abstract

Este artículo informa sobre la prevalencia de factores de riesgo cardiovascular en la población rural de la región de Irkutsk, RF. Se realizó un estudio transversal de población en una muestra aleatoria de personas rurales en 2016. En este estudio participaron 1611 encuestados, 658 hombres y 953 mujeres de 30 a 69 años de edad. A los encuestados se les ofreció un cuestionario estándar realizado por expertos del Centro Nacional de Investigación Médica para Medicina Preventiva (NMRC P, Moscú, Federación Rusa). A todos los pacientes se les realizó un examen clínico instrumental y se tomaron algunas medidas antropométricas. El riesgo cardiovascular general se evaluó utilizando SCORE, una escala de riesgo europea. La prevalencia de factores de riesgo cardiovascular en una muestra aleatoria de población rural resultó ser alta. Entre estos factores, se encontraron trastornos nutricionales en el 76,1% de los encuestados, hipercolesterolemia en el 62%, estilo de vida sedentario en el 52,6%, hipertensión en el 39,2%, hipertrigliceridemia en el 27%, hábitos de fumar actuales en el 24% y abuso de alcohol - 11,7%. Se encontró que algunos factores de riesgo estaban asociados con el género. Los hábitos de fumar, el abuso del alcohol y los trastornos nutricionales se encontraron más en los hombres, mientras que las mujeres informaron sobre la hipertensión y la obesidad abdominal. Entre la población estudiada, se encontraron riesgos de SCORE altos y muy altos en el 19% de los casos.

Palabras clave: Factores de riesgo, enfermedades cardiovasculares, población rural, tasa.

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Introduction

Cardiovascular diseases and associated complications are dominant reasons for mortality and early disablement among adult population all over the world (Mancia et al., 2005), including modern Russia (Oganov & Maslennikova, 2014). Traditional risk factors associated with heart diseases are hypertension, tobacco usage, malnutrition, physical inactivity, harmful use of alcohol, chronic stress. Over the last 20-30 years, the attention was drawn to the effect of metabolic risk factors (obesity, hyperglycemia, hypertriglyceridemia, hypercholesterolemia and low high-density lipoprotein cholesterol) have on the occurrence of cardiovascular diseases. Metabolic risk factors in conjunction with traditional ones are able to increase two- and threefold the likelihood of heart diseases and associated complications. Besides these risks, cardiovascular diseases are associated with some socio-economical parameters, such as education, income and settlement. For example, farmers have a higher risk of cardiovascular diseases and death (Shan et al., 2012; Şengüldür et al, 2018; Jalili et al, 2016). Moreover, mortality rates have been showing an increase over the recent decade. In RF, mortality rate amounted to more than 38 million people in rural, distant or hard to reach regions. According to official statistics, mortality rate for diseases of the circulatory system is higher for rural residents than for urban ones (753.8 people vs 678.6 people per 100 thousand) (Medical and demographic characteristics of the Russian Federation, 2016). Reasons for this picture embrace a wide range of factors. Factors that can influence mortality are the lifestyle and the access to medical care (Anderson et al., 2015; Baykalova et al, 2018). Rural residents have troubles getting emergency and non-emergency care, as well consultations with a qualified specialist (Shishkin et al., 2007). According to Russian data, insufficient availability of roads to central hospitals can lead to problems with healthcare access (Rastegaev, 2011; Yazdani et al, 2018; Hariri Movahhed & Omidvari, 2015). Thus, cardiovascular risk profile for rural residents is a matter of interest. Further studies are also required to identify[1] the significance of differences in cardiovascular risk factors between rural and urban population and[2] the relationship between the prevalence of these risks and the mortality difference between rural and urban areas. It should be noted that cardiovascular risk factors, especially metabolic ones, for rural residents of RF remain little studies. The purpose of this research is to study the prevalence of traditional and metabolic cardiovascular risk factors and to find the overall cardiovascular risk on a random sample of adult rural residents living in the Irkutsk region.

Materials and methods

This is a cross-sectional population study carried out in 2016 on a random sample of rural residents living in the Irkutsk region, RF.

Sampling
This study uses a stratified three-stage sampling approach. First and second stages: samples of areas are chosen. Out of 27 districts of the Irkutsk region, ten were randomly selected: Kuytunsky District, Nizhnekamsky District, Nizhneudinsky District, Slyudyansky District, Tayshetsky District, Usolsky District, Ust-Kutsky District, Shelekhovsky District, Bokhansky District, and Ekhirit-Bulagatsky District. Then, tree rural areas covered by a therapist were selected within each district. The total number of such areas is 30. Third stage: a sample of population was selected. The sample included 60 respondents from each district. Thereby, the sample is drawn from rural residents of the Irkutsk region. It was expected to include 1800 respondents. However, only 89.5 percent of residents responded to our invitation. In these circumstances, this study involves 1611 respondents, 658 males and 953 females.

Socio-Demographic Characteristics of Respondents
The majority of respondents were aged between 40 and 49 years and between 50 and 59 years, 31.6% and 37.2%, respectively. Respondents under age 30-39 and those aged 60-69 together made up <40%. Respondents were representatives of different ethnic groups: Russians – 86%, Buryats – 12%, and others – 2%. Among respondents, 77% were married, 23% divorced, unmarried and widowed.

Respondents educated up to university level made up 14% of the total sample, up to vocational school – 23%. Secondary school graduates make up 56%, while the rest 7% did not finish secondary school. Among respondents, 68.8% were employed and 31.2% were not engaged in any occupation.

Questionnaire survey
Respondents were offered a standard questionnaire made by experts of the National Medical Research Center for Preventive Medicine (NMRC P, Moscow, Russian Federation).

The questionnaire is divided into 11 sections covering the following information:
- Personal data;
- Anthropometric indicators;
- Bad habits: alcohol use and smoking status;
- Genetic burden of cardiovascular diseases and diabetes;
- Physical activity;
- Nutrition characteristics;
- Psychosocial status;
- History of diseases and operations: the presence of cardiovascular diseases (hypertension, chronic heart

failure, myocardial infarction), cerebral stroke, diabetes and other chronic non-infectious diseases, menopause for women.
- Biochemical data;
- ECG recordings coded according to the modified Minnesota code at rest;

The questionnaire was designed to obtain information about the smoking status of respondents (never smoker, former smoker and current smoker). People who smoke at least one cigarette a day were considered daily smokers. Daily smokers are subdivided into groups and this questionnaire implies distributions by gender. Males can be considered light daily smokers (smoking no more than 15 cigarettes/day), moderate daily smokers (smoking 16 to 20 cigarettes/day), and heavy smokers (smoking more than 20 cigarettes/day). Females can be considered either moderate daily smokers (smoking no more than 6 cigarettes/day), or heavy smokers (smoking more than 6 cigarettes/day).

The questionnaire was designed to obtain information about the lifetime alcohol abstention, drinking frequency and volume. For men, response categories are never in past 12 months, <168 g of ethanol per week (light-to-moderate drinkers), >168 g per week (heavy drinkers). For women, response categories are <84 g of ethanol per week (light-to-moderate drinkers), and >84 g per week (heavy drinkers).

To measure physical activity, two categories of responses were offered: normally active (defined as <5 hours per day of sitting time, >30 minutes of daily walking and/or >2 hours of the week spent on exercising) and sedentary (defined as >5 hours per day of sitting time, <30 minutes of daily walking and/or <2 hours of the week spent on exercising).

Core items concerned with a typical diet embrace the consumption of salt, carbohydrates, animal fats and protein. Respondents were divided into groups according to diet violations: insignificant violations (carbohydrates, fats or minerals, either of three is consumed in amounts higher/lower than normal); moderate violations (carbohydrates, fats or minerals, two of three are consumed in amounts higher/lower than normal); significant violations (all three are consumed in abnormal amounts). Healthy diet have those residents, who consume carbohydrates, fats and minerals in proper amounts.

Clinical examination and anthropometric measures
Blood pressure (BP) and heart rate (HR) were measured using standard methods. To find residents with hypertension, they were asked about their blood pressure. Those, who were not diagnosed with hypertension previously, underwent clinical examination to take measurements. The blood pressure cutoff for hypertension diagnosis is 140/90 mm Hg. Those, who have been diagnosed with hypertension but underwent antihypertensive therapy, were referred to re-examination. If BP remained high, then treatment was considered ineffective.

By the heart rate variable, respondents were divided into 3 groups: excellent-to-average (normal HR between 60 and 72 beats per min), average-to-below-average (normal HR between 73 and 79 beats per min), and poor (80+ beats per min).

All respondents underwent ECG monitoring at rest and recordings were coded according to the modified Minnesota code.

Anthropometric survey provided measurements of height in centimeters and weight in kilos.nBased on these measurements, the body mass index (BMI) or Quetelet index, defined as the weight in kilos divided by the square of height in centimeters, was derived.

Waist circumference was measured between the lower edge of the lower rib and the iliac crest. Abdominal obesity was estimated according to the Adult Treatment Panel III (ATP III) criteria (waist circumference >100 cm for male and >88 cm for female) and the International Diabetes Federation (IDF) criteria (waist circumference >94 cm for male and >80 cm for female).

For the combined effect of BMI on cardiovascular mortality, BMI was grouped into five categories (below 21, 21.0–24.0, 24.2–29.0, 29.1-31.0 and higher).

For biochemical analysis, blood samples were taken from the ulnar vein in the morning, following a 12 h fast. Total cholesterol and tryglycerides (mmol/l) in serum were measured by CHOD-PAP-enzymatic colorimetric method with an Alcyon 160 analyzer and corresponding liquicolor test kits (HUMAN Diagnostics, Germany). The total cholesterol cutoff for hypercholesterolemia diagnosis is >5 mmol/l. The tryglyceride cutoff for hypertryglyceridemia diagnosis is >1.7 mmol/l.

The overall cardiovascular risk was assessed using SCORE, a European risk scale, considering risk factors, such as age, gender, smoking status, systolic blood pressure and total cholesterol in percentage. According to this model, low cardiovascular risk is < 1%, moderate is 1-4%, high is 5-10% and very high is >10.

Statistical data processing
Statistical analysis of findings was conducted using Statistical Analysis System 2 (SAS). Numerical characteristics of studied variables, such as a mean, a frequency, a standard deviation, were obtained using PROC SUMMATY, PROC UNIVARIAT, PROC FREQ. The analysis used standard criteria of significance: x^2, Student's two-sample t-test, Fisher's F-test, and Analysis of Variance (ANOVA).

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Prevalence of cardiovascular risk
This research studies the prevalence of cardiovascular risk factors among the rural residents of the Irkutsk region:

Smoking Status
Among respondents of employable age, 66% were never smokers, 24% current smokers, and 10% former smokers. However, there is significant difference between males and females. Among men, 48% were current smokers, 15% former smokers, and 37% never smokers. Among women, 86% were never smokers and only 8% current smokers, who were predominantly females 30-39 years of age. Speaking of men, there were no statistically significant differences in the smoking status between age groups of 30-39, 40-49 and 50-59 years, whereas older residents made up a twofold smaller portion of current smokers. The portion of former male smokers increases with age, from 8% in 30-39 years of age to 26% in 60-69.

Tobacco use has reached epidemic proportions worldwide. By 2030, if the trend continues, the number of deaths will rise to eight million (Martin, 2018). As of 1998 and 2004, smoking prevalence was higher in rural than in urban men – 66.4% vs 57.7% and 49.8% vs 42.9%, respectively by years (Shal'nova et al., 1998; Balanova et al., 2005). At the same time, this variable increased twofold for females, both rural and urban (Shal'nova et al., 1998; Balanova et al., 2008).

According to 2009 Global Adult Tobacco Survey, smoking prevalence is lower in rural (35.9%) than in urban area (40.2%) (Shan et al., 2012). However, rural residents smoke more cigarettes a day than urban residents do, spending less money on them. This assumes that they buy cheaper brands of cigarettes.

As of 2011-2013, smoking prevalence among urban and rural population did not improve significantly – 25.8% vs 23.4% (Balanova et al., 2014). However, smoking prevalence turned out to be higher in urban than in rural females – 14.5% vs 12.7%.

Accordingly, there was a relatively small gap in the smoking status between urban and rural areas in Russia. International proportions of urban-rural smokers vary – in West Europe, urban smokers dominate rural ones and this difference increases with urbanization (Völzke et al., 2006), while in the USA, the proportion of rural smokers is higher compared to urban ones (29.6% vs 24.2%) (Shan et al., 2012).

Alcohol abuse
Generally, 11.7% of respondents, in a random sample, consume alcohol. Gender analysis shows that almost every third man abuses alcohol (31.2%), while among women this indicator is <1.5%.

Among men in the age groups of 30-39, 40-49 and 50-59 years, the percentage of light-to-moderate drinkers and non-drinkers is about 70%, among men aged 60-69 this is about 82%. Every third man aged 30-59 abuses alcohol. In the older age group, the number of men who abuse alcohol is 18%, which is significantly less compared with men aged 50-59. Among women, the number of alcohol abusers is increasing with age. At the age of 30-39, the number of females abusing alcohol is 0.7%, at the age of 40-49 years - 1.1%, at the age of 50-59 years - 1.7%, while at the age of 60-69 it is 2.3%.

Alcohol abusing significantly increases the risk of death among Russian population (Zaridze et al., 2014). In the early 2000s, there was a steady tendency of more frequent alcohol poisoning among the rural population of Russia, which indicates consumption of a lower quality alcohol in rural areas compared to urban (The problems of high morbidity and premature mortality from noncommunicable diseases and injuries in the Russian Federation and their solutions, 2006). During this period, urban people consumed wine 1.5–2 times more often, and moonshine — twice as less than rural population (Klimova, 2007). According to the results of research conducted in 2003–2004 in the Russian Federation (Balanova et al., 2005), the proportion of people abusing alcohol among men in the city was higher than in the countryside - 45.2% vs 42.4%. According to 2010 studies, in rural areas the proportion of people who abuse alcohol was lower (45.9%) than in the city (53.2%). However, in rural areas, male drinkers drank on average more than in urban areas, and more often consumed strong alcoholic beverages (Roshhina, 2013). According to a study of 2011-2013. ESSE-Russian (Balanova et al., 2014), there were no significant differences in the frequency of alcohol abuse among men and women based on their settlement. Thus, information of alcohol abuse associated with the type of settlement turned out to be contradictory for both Russia and other countries (Mateos et al., 2002; Office for National Statistics 2013; Bhadoria et al., 2014). However, the preference for strong and low-quality drinks in rural areas, may contribute to the formation of mortality rate even in the absence of differences in the prevalence of alcohol abuse in comparison with the urban population.

Diet violations
In a random sample, in 76.1% of individuals were found nutrition disorders of varying intensity. Disorders prevail among men: insignificant violations - 38% moderate violations - 32%, significant violations - 12.1%. Nutrition disorders prevail among women: insignificant violations - 43%, moderate violations - 24.3% (found in every firth women), significant violations - in 5.5%. A comparative analysis of nutrition habits between men and women shows that the number of males with moderate and significant nutritional disorders is more frequent than for females (p <0.001), the number of females without nutrition disorders is statistically higher than for males (p <0.001).

According to literary data in rural areas, the consumption of unhealthy food, such as confectionery, is more frequent, and a lower frequency of consumption of recom-

mended food, such as vegetables and fruits, have been revealed (Balanova et al., 2014; Rybikova, 2014; Baljakina, 2012; Mhurchu et al., 2013). This may be due to the difference in levels of education that determine the nutritional culture, economic factors that affect the availability of products. Differences in food patterns may influence the formation of mortality rate, but further studies are needed.

Sedentary lifestyle

Analysis of physical activity among males aged 30-39 years and 40-49 years showed that sedentary lifestyle have 43% and 46%, respectively. Among 50-59 years and 60-69 years aged groups, every second male has sedentary lifestyle. There is a similar pattern among females. The prevalence of a sedentary lifestyle is not statistically different between men and women of identical age.

According to the WHO, low physical activity is the fourth largest input to the mortality risk factors (Global recommendations on physical activity for health, 2010). However, this factor is still not well studied in relation to the prevalence rate of urban-rural. In Russia, the prevalence of this risk factor is higher in urban areas (Balanova et al., 2014; The problems of high morbidity and premature mortality from noncommunicable diseases and injuries in the Russian Federation and their solutions, 2006), in the USA and Western Europe — in rural areas (Patterson et al., 2004; Lindroth et al., 2014).

Hypertension

On average, 39.2% of respondents have hypertension of varying severity. Among men, it was found in every third, while among women it is found significantly more often - 32.2% vs 43.7%, (p <0.002). Among those aged 30-39 years, hypertension was diagnosed in 11%, at the age of 40-49 - in 25%, at the age of 50-59 - in 48.8%, and for the older age group - in 64%. The frequency of hypertension is somehow associated with gender in different age periods. Among middle-aged women, hypertension is significantly more frequent compared with men.

77.6% of respondents with hypertension (72% of men and 82% of women) received antihypertensive therapy. Every second respondent had their blood pressure reached to target level.

Hypertension is a significant risk factor determining cardiovascular mortality worldwide (Chow et al., 2013). Based on monitoring, the prevalence of hypertension, as risk factor, has increased in Russia over the past 20-25 years (from 39.9% vs 38% in 1992-1995 (Shal'nova et al., 2001) to 51.8% vs 47.5% among men and 42.9% vs 40.2% among women in 2012-2013 (Bojcov et al., 2012) in both urban and rural areas) mostly in rural areas these indicators are higher compared to urban. Similar results were obtained in European studies (Lindroth et al., 2014) and in some Asian countries (Anchala et al., 2014; Li et al., 2016), although there are differences in terms of urban / rural prevalence rate. Hypertension is the result of the cumulative effect on behavioral and socio-economic factors, and its high prevalence among rural residents is undoubtedly a significant factor determining the formation of mortality rate.

Tachycardia

Tachycardia (HR> 80 beats / min) was found in 18.6% of respondents. In all age ranges, approximately one in five respondents has tachycardia. Among young men, tachycardia was diagnosed in 22.6%, then was noted the tendency of decrease in its frequency in the older age - 14.7%, 16.5% and 17.7%, respectively. Tachycardia is less common for women aged 30-39 years - 15.4%, in other age ranges varies from 18.9% to 22.5%.

Hyperuricemia

The main causes of hyperuricemia include excess intake of purines with food, ATP metabolism disorder, alcohol consumption, tissue hypoxia, increase in nucleic acid turnover, and increase in kidney reabsorption/decrease in secretion. Uric acid can have diabetogenic, hypertensive, and caffeine-like effects (Aringazina et al., 2017).

Hypercholesterolemia and hyperlipidemia

Hypercholesterolemia was diagnosed in 62% of respondents. In the age period of 30-39 years, the average total cholesterol is 4,9 mmol/l, in the older age groups there is an increase in its content starting (40-49 years – an average of 5,3 mmol/l., 50-59 years – 5,6 mmol/l., 60-69 years – 6,0 mmol/l.). And this trend is typical for both men and women. In older age groups, the average total cholesterol was significantly higher among women compared to men of the same age (6.4 mmol/l versus 5,8 mmol/l).

The largest number of respondents have mild hypercholesterolemia (5,0-6,4 mmol/l) - 43.2% among men and 44% — among women. Moderate (6, 5-8, 0 mmol/l) and severe (> 8 mmol/l) hypercholesterolemia is more common in women — 17.3% and 3.4%, respectively.

According to a representative sample (2005-2007) (Balanova et al., 2005) hypercholesterolemia in Russia is more common among rural residents, both in men — 33.8 vs 30.5%, and in women — 38% vs 33. 6%. A similar pattern is observed in European countries (Aringazina et al., 2017). The trend towards higher prevalence of hypercholesterolemia among villagers may reflect dietary and physical activity patterns described above.

Hyperlipidemia (>1,7 mmol/l) in a random sample was detected in 27% of cases: in men in 28.5%, in women in 26% of cases. Mild hyperlipidemia (1,7-2,2 mmol/l) was diagnosed in 15.7% of respondents, moderate (2,3-4,5 mmol/l) in 9.8% of cases, while severe (>4,5 mmol/l) — in 1.4% of respondents. At the age of 30-39 years, one in five has hyperlipidemia (19.8%), at the age of 50-59 years and 60-69 years, every third — 29.4% and 29.7%, respectively, which is significantly more often compared with the age of 30-39 years.

Abdominal obesity

To assess the degree of obesity and abdominal obesity, the Quetelet index and waist circumference were studied. Ev-

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ery second man has a normal body weight, among women a similar figure was found in 44.2%. The number of overweight men and women is approximately the same, 38.4% and 34.4% respectively. However, obesity as a risk factor among women is almost 3 times more common compared to men. Abdominal obesity according to the criteria of ATP III (2001) occurs in every fifth respondent in a random sample of 30-69 years. Among men – 16.4% (waist circumference >102 cm), among women – 27.9% (waist circumference >88 cm). This difference is accurate (p <0.0001).

According to the criteria of the International Diabetes Federation, abdominal obesity in a random sample was noted much more often — 48% (for men waist circumference > 94 cm, for women waist circumference >80 cm). According to IDF criteria, abdominal obesity among men was observed in 27.4%, among women – in 60% of cases.

According to the criteria of ATP III, the prevalence of abdominal obesity increases with age, so at the age of 30-39 years only 5% have abdominal obesity, 40-49 years – 14%,

50-59 years ~ 25%, 60-69 years ~ 30%. This pattern is well monitored in women. With the exception of the 30-39 year age period, in all other cases, abdominal obesity is twice as common among women as among men.

In recent years, there has been an increase in the number of obese people worldwide (Finucane et al., 2011). In most countries (Lindroth et al., 2014; Bhadoria et al., 2014; Bonney et al., 2015), including Russia (Balanova et al., 2005; Balanova et al., 2014), obesity is more common in rural areas, which can also be a reflection of differences in lifestyle, including diet and physical activity.

Hereditary burden on cardiovascular diseases
Family history of cardiovascular diseases, including myocardial infarction, angina, hypertension, cerebral stroke and metabolic disorders (diabetes and obesity) had 40.4% of the respondents, 37% of the total number of men and 42.5% of the total number of women.

In general, hereditary burden was registered in 14.7% of respondents for coronary heart disease, 27.6% — for hypertension of various degrees, 10.2% — for obesity, 9.7% — for cerebral stroke and 5% —for diabetes. However, the majority (70% of cases) have a combination of the above pathologies.

Assessing the overall cardiovascular risk on the SCORE Scale
Tables 1 and 2 show the overall cardiovascular risk averages among men and women in different age categories.

Among men and women, the level of total cardiovascular risk increases with age. If among men aged 30-39 years, the total cardiovascular risk is zero (practically absent), then, starting from 40-49 years, it increases proportionally. Compared with the age category 40-49 years in older age periods, the risk increases by 100% and 200%, respectively.

A similar pattern is observed in women. At the age of 50-59 years in women the level of total cardiovascular risk is 4 times higher, and at the age of 60-69 years is 10 times higher compared to the age category of 40-49 years. In three age periods in men the total cardiovascular risk is significantly higher compared to women.

Table 1. Distribution of average and absolute values of total CVR among male respondents by age				
The overall CVR	Female age groups			
	30-39 years	40-49 years	50-59 years	60-69 years
Average	0.16 ± 0.06	0.33 ± 0.08	$1.48 + 0.09$ p_1 p_2	$3.71 + 0.17$ p_1 p_2
Raw numbers (n)	0 - 5	0 - 5	0 - 5	0 - 12

Note. p_2 <0.0001 accuracy of difference compared to age group 40-49 years; p_4<0.0001 significance of accuracy compared to age group 50-59 years; p_1<0.001, p_3<0.0001 accuracy of difference in comparison with women of identical age.

Table 2. Distribution of average and absolute values of total CVR among female respondents by age				
The overall CVR	Male age groups			
	30-39 years	40-49 years	50-59 years	60-69 years
Average	0	1.14 ± 0.1 p_1	3.1 ± 0.13 p_2 p_3	6.83 ± 0.38 p_2 p_3 p_4
Raw numbers (n)	0 - 0	0 - 6	1 - 12	1 - 29

Note. p_1<0.0001 accuracy of the difference compared to the age period 30-39 years; p_2<0.0001 accuracy of the difference compared to the age period 40-49 years.

In general, in a random sample of adults, the majority of respondents have a low (39.4%) and moderate (41.8%) total cardiovascular risk, while a high and very high risk was observed in 18.8% of cases.

The study determined the frequency of high and very high total cardiovascular risk in different social groups. It turned out that among the unmarried a high risk was of 7%, among married — 18.1% and single — 14.9% (p <0.05 compared with unmarried). There were no accurate differences between married, unmarried and single respondents in the frequency of very high cardiovascular risk (0.9%, 2.3% and 1.6%, respectively). Among those with higher, specialized and secondary education, the frequency of high cardiovascular risk was approximately the same, while among those with lower secondary education its frequency was 2 times higher. A similar trend was noted in terms of a very high total cardiovascular risk. Among respondents with higher, specialized and secondary edu-

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cation, its level does not exceed 2%, while among those with lower secondary education there is a 6 times more very high risk, which is 13.1% (p <0.002).

Conclusions

n a random sample of rural residents of the Irkutsk region aged 30-69, risk factors for cardiovascular diseases have a high prevalence. 76.1% of the respondents have nutritional disorders of varying severity, 62% have hypercholesterolemia, 52.6% lead a sedentary lifestyle, 39.2% have hypertension, 27% have hypertriglyceridemia, 24% are current smokers, 11.7% abuse alcohol. One of the most common additional risk factors is abdominal obesity (22.1%). The number of identified risk factors increases with age. The prevalence of risk factors, such as sedentary lifestyle, tachycardia and hyperuricemia in different age ranges is the same. Gender features of distribution of some risk factors were established. Smoking, excessive alcohol consumption and nutritional disorders are more common among men, while hypertension and abdominal obesity are more common among women. In the surveyed population, a high and very high risk on the SCORE scale was found in 19% of cases. The frequency of high and very high cardiovascular risk among men was accurately higher compared to women — 25.2% and 14.6% (p <0.001).

Literature analysis showed that the prevalence of risk factors for cardiovascular disease among rural residents is characterized by significant variability in different countries, multidirectional urban/rural gradient, when in some countries the risk factor may be more prevalent in the urban population, and in others — in rural. In high-income countries, as a rule, the risk factors profile in rural areas is worse, in middle-income countries, including Russia, the situation may be different with respect to different risk factors, and in low-income countries — the risk factors profile in rural areas is better than in the city, although this does not lead to lower mortality, because in this case, socio-economic factors and the availability of health care play a great role.

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