schoolchildren has made it possible to establish that the rare use of some products is related to the lack of products for sale, the high cost and the rare import of some products due to the transport infrastructure of the Arctic regions of the Republic of Sakha (Yakutia).

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ETHNICITY-DEPENDENT EVALUATION OF EXCESSIVE BODY MASS AND OBESITY IN THE NATIVE POPULATION OF NORTHERN YAKUTIA

ABSTRACT

In the expeditionary conditions in the North of Yakutia, representatives of the indigenous population (Evenks, Dolgan, Evens, Yukagirs, Chukchi, Yakuts) were examined in order to identify overweight and obesity. Overweight in terms of BMI ranged from 27.1% in Dolgans to 37.8% in Yakuts, and there were no significant differences, more often it was observed in men. Obesity was significantly more common in the Evenks compared with the Evens, the Yukagirs and the Chukchi, the Yakuts compared with the Evens and the Chukchi, and the Dolgans compared with the Chukchi. Women suffered most often.

The mean values of systolic blood pressure in Evenks and Yakuts were higher compared to other ethnic groups. There was a high frequency of hypertension in all ethnic groups. A strong positive correlation of BMI with the level of systolic blood pressure was revealed.

Keywords: overweight, obesity, arterial hypertension, indigenous people, arctic zone, Yakutia.

Introduction. Excessive body mass and obesity had large-scale implications over the past few decades, contributing to mortality, affecting it directly and indirectly. Among the main causes of death in people with obesity are cardiovascular diseases (CVD). There is an increase in overweight and obese population in many developed countries. We analyzed medical examination data of 20.607 people aged 25–65 years in 12 regions of the Russian Federation, the prevalence of hypertension equaled to 41.6%. In the north of Russia, in particular in the Tyumen region, a high frequency of arterial hypertension (AH) (49%) and obesity (40.3%) was noted as part of a multicenter observational study of ESSE-RF. Previously, numerous studies have been conducted using the definition of body mass index (BMI) in the indigenous population of Yakutia, in particular Yakuts, where a relatively low incidence of increased body mass and obesity was noted compared with the non-native population. But in recent years, many researchers have noted their growth among the Yakuts, as well as among certain groups of indigenous minorities of Yakutia, particularly the Evenks, Evens and the Dolgans. Changes in the traditional lifestyle of the indigenous people of the Arctic zone of Yakutia led to "diseases of civilization", such as hypertension, diabetes, obesity, etc.

Objective: to assess the frequency of ethnicity-dependent overweightness and obesity among the indigenous population of Northern Yakutia.

Materials and research methods. The collection of study material was carried out in the expeditionary conditions in the north of Yakutia, including the places of compact residence of the indigenous peoples. For a comparative analysis, 6 groups of 529 people, representatives of the indigenous population (Yakuts, Evenks, Evens, Dolgans, Chukchi, Yukagirs) were formed: 1st - Evenks (n = 67), of whom 13 were men, 54 were women; 2nd - Dolgans (n = 85), of whom 26 were men, 59 were women; The 3rd is the Evens (n = 141), of whom 51 were men, 90 were women; The 4th is the Yukagir (n = 77), of whom 34 were men, 43 were women; The 5th is the Chukchi (n = 40), of whom 20 were men, 20 were women; The 6th group is the Yakuts (n = 119), of which 30 were men and 89 were women. The average age of the respondents was 45.59 ± 0.55 years.

Exclusion criteria: representatives of non-indigenous nationalities.

The research program included following sections: a survey to assess the general state of the respondent; the informed consent of the respondent to conduct research (according to the protocol of the Ethics Committee of the YSC CMP); anthropometric examination with height and weight measurement. Growth was measured in the standing position without shoes using a stadiometer with an accuracy of up to 0.5 cm. To measure body weight, we used mechanical physician scales that passed metrological control. The weight was recorded with an accuracy of up to 100 g. For further analysis, the traditional indicator was used - body mass index (BMI) or Quetelet index, which was calculated by the following formula [Khaltaeva ED, Khaltayev NG, 1982, Pyorala K. et al ., 1994]: BMI (kg / m²) = body weight (kg) / height (m²). Overweight was considered to be a BMI ≥ 25 and <30 kg/m², obesity was determined at a BMI of ≥ 30 kg/m² [according to European recommendations of the III revision, 2003]. Blood pressure was measured on the right arm in a sitting position after 5 minutes of rest with an OMRON M2 Basic tonometer. The level of blood pressure was measured twice with an interval of about 2-3 min-

utes. The analysis took into account the average of two measurements. AH was determined at a systolic blood pressure level (SBP) of ≥140 mm Hg. and/or diastolic blood pressure (DBP) ≥90 mm Hg, or if the patient received antihypertensive drugs (recommendations developed by RMSAH (Russian Medical Society for Arterial Hypertension) and RSC (Russian Society of Cardiology) Committee of Experts, 2008).

Statistical data processing was carried out by means of standard methods of mathematical statistics, using the software package of SPSS (version 19.0). Data are submitted as M±m where M – average value of the sign size, and m – an average error of the sign size. Intergroup differences were estimated by means of the variance analysis or nonparametric criteria. The differences were considered as statistically significant at p<0.05.

The research was conducted within research projects of YSC CMP "A contribution of a metabolic syndrome to development of atherosclerosis of coronary arteries in residents of Yakutia", "Development of new technologies of treatment and risk prediction of hypertension and insult in the Republic of Sakha (Yakutia)" (Government contract No. 1133).

Research results and discussion. To assess overweightness and obesity, we conducted a study of average body mass index (BMI) (Table 1). It is shown that the average values of BMI are higher than the reference (BMI <25) for all ethnic groups from 26.4 ± 0.66 for the Chukchi to 30.79 ± 0.72 for the Evenks. Comparing the average BMI between ethnic groups, it was found that the Evenks had a BMI significantly higher compared to others, with the exception of the Yakuts. The Yakuts also had statistically significant differences compared to the Evens, the Yukagirs and the Chukchi.

Overweightness (OW) in terms of BMI among ethnic groups varied from 27.1% among Dolgans to 37.8% among Yakuts and did not have significant differences between them (Fig. 1). When analyzing the gender affiliation, it should be noted that OW is most often observed in men than in women, with the exception of Dolgans. Statistically significant differences between men and women were observed in the Evenk and Yakut populations.

As for obesity by the criterion of BMI (Fig. 2), it was significantly more common in Evenks compared to Evens, Yukagirs and Chukchi, also in Yakuts compared to Evens and Chukchi, and among Dolgans compared to Chukchi. The main contribution to the frequency of obesity, in contrast to OW, was made by women.

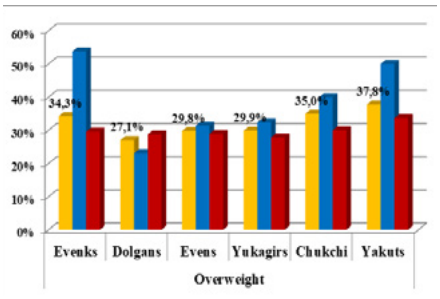

Fig. 1. The frequency of overweight on the value of BMI, depending on ethnic and gender identity
*- p<0,05.

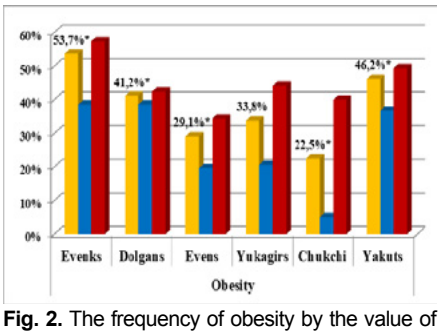

Fig. 2. The frequency of obesity by the value of BMI, depending on ethnic and gender identity.
*- p<0.05

A comparative analysis of the average values of SBP among respondents was conducted, and it ranged from 132.0 to 145.63 (Table 2). Statistically significant differences in the level of SBP were observed in the Evenks and Yakuts compared to the Chukchi and Dolgans, between the Yakuts and Yukagirs. The mean values of both BMI and SBP, among Evenks and Yakuts were higher compared to other ethnic groups. Comparing the SBP by gender, large values of SBP were observed in women, there were no significant differences. This is confirmed by many studies conducted in Russia based on ESSE-RF studies [3, 6, 8, 9].

The prevalence of AH among the indigenous population of the Arctic zone of Yakutia was determined. Thus, there was a high frequency of AH in all ethnic groups and it averaged 53.7%. There were significant differences in the frequency of AH among the Chukchi compared to the Evenks (37.5 and 64.2%, respectively, p=0.008) and Yakuts (63%, p=0.006).

We also found a correlation between body mass index and AH level. Among all respondents, there was a strong positive association of BMI with the level of SBP (r=0.418, p=0.000).

Table 1

Comparative analysis of body mass index depending on ethnicity and gender

	Evenks	Dolgans	Evens	Yukagirs	Chukchi	Yakuts
	1	2	3	4	5	6
BMI	30.79±0.72	28.6±0.68	26.74±0.47	27.58±0.68	26.4±0.66	29.52±0.51
p	p_{1-2}=0.031 p_{1-3}=0.000 p_{14}=0.002 p_{15}=0.000	p_{2-3}=0.024 p_{2-5}=0.047	p_{3-6}=0.000	p_{4-6}=0.022	p_{5-6}=0.001	
men	29.0±1.20	27.35±0.88	25.29±0.63	25.74±0.71	24.8±0.55	28.0±0.65
women	31.22±0.84	29.15±0.90	27.57±0.63	29.05±1.03	28.0±1.10	30.03±0.63
P_{m-w}	>0.05	>0.05	<0.05	<0.05	<0.05	>0.05

Table 2

Comparative analysis of mean systolic blood pressure depending on ethnic and gender affiliation

	Evenks	Dolgans	Evens	Yukagirs	Chukchi	Yakuts
	1	2	3	4	5	6
SBP	144.48	132.0	140.0	137.14	132.0	145.63
p	p_{1-5}=0.012 p_{1-2}=0.002	p_{2-6}=0.002		p_{4-6}=0.019	p_{5-6}=0.002	
men	137.69	131.54	138.24	133.82	131.0	141.67
women	146.11	132.20	141.0	139.77	133.0	146.97
P_{m-w}	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05

Conclusion. The conducted research revealed a high incidence of arterial hypertension, overweightness and obesity among the indigenous population of the Yakutian North. The highest frequency of all indicators was observed in the Evenks and Yakuts, in comparison to other ethnic groups. This is not only a medical, but also a social problem of our community. The change in the traditional way of life, eating habits (mainly due to the carbohydrate/fat component), as well as low physical activity changed the perception of a low incidence of hypertension and obesity among the indigenous population of the North.

Our study confirmed the opinion of scientists all over the world that body mass index is closely associated with AH [14]. Thus, by correcting obesity, we can influence blood pressure.

The current situation requires an integrated approach from regional authorities towards the state's policies in healthcare to: control population values of body weight, starting from childhood, providing conditions for sports in walking distance, promote healthy eating, and healthy lifestyle.

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