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ESTIMATION OF BODY MASS INDEX IN PATIENTS WITH CORONARY HEART DISEASE AGED OVER 60 IN THE CASE OF YAKUTIAN CITIZENS

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ABSTRACT

An analysis of the body mass index (BMI) revealed the ethnic, gender, age differences among the groups of hospital patients with coronary heart disease (CHD) aged over 60. Significantly higher value of BMI was identified in non-indigenous patients compared to Yakut group that was respective to the obesity of p <0,001. Maximum values of BMI were established in the older group aged between 60 and 74 years. The decrease in BMI can be observed with the age in the senile age group and more clearer dependency on age in the indigenous group. When comparing the BMI among the age groups: older, senile age and long-livers, the lower value of BMI was noted among long-livers (p <0,001). The obesity was identified significantly more often among women.

Keywords: body mass index, obesity, chronic coronary heart disease, non-indigenous, indigenous (Yakut), older, senile age, long-livers, Yakutia.

Introduction. Obesity is an independent risk factor of cardiovascular diseases, including arterial hypertension, coronary heart disease and heart failure, and is related to the increased risk of morbidity and mortality [4]. The prevalence of obesity increases with age [6] and there is enough evidence to consider the decrease in body mass as an important action preventing cardiovascular, endocrine and other diseases. The obesity is common among the patients with CHD and higher death rate is observed at values of BMI equivalent < 20 kg/m2 and ≥ 30 kg/m2 [5]. Epidemiological studies have proven the overweight and obesity to be the risk factors of increased human mortality [7].

The purpose of study - the examination of overweight and obesity prevalence on BMI in the group of patients with CHD aged 60 and older living in Republic of Sakha (Yakutia).

Material and research methods. The research included 354 patients under the age of 60 and older with verified diagnosis of CHD, who passed the examination and treatment in cardiological department of Geriatric center, Yakutsk city. The examined population consists of native group - Yakuts (100%) (n=205, average age 77,6±0,6) and European group – Russians (91,3%), Ukrainians, Tatars and Germans (8,7%) (n=149, average age 75,5±0,7). The studied groups were divided based on gender – men (n=187) and women (n=167), age – older (from 60 to 74 years old, n=154), senile (from 75 to 89 years old, n=149) and long-livers (90 years and older, n=51) (WHO, 1963). Body mass index (BMI) or Quetele II index was used to assess the ration of weight and height. BMI was calculated using the following formula: BMI (kg/m2) = weight (kg)/height (m2). Body weight was considered excessive with the BMI of ≥25 kg / m², and the presence of obesity was indicated with the BMI value of ≥30 kg / m² (European Guidelines for the III review, 2003).

The research was conducted as part of research work program "The contribution of metabolic syndrome to the development of coronary arteries atherosclerosis among Yakutian residents" of Yakut Science Center of Complex Medical Problems and was approved by the local committee on biomedical ethics at the YSC CMP. All the surveyed voluntarily gave the approval to take part in biomedical research.

Statistical processing of the results was performed using the methods of parametric and non-parametric statistics. Student's t-criterion was used to assess the intergroup differences in the values of indicators with the continuous distribution and Pearson's χ2-criterion was applied for the comparison of the frequency values. Methods of multiple intergroup differences, namely Kruskal – Wallis H-test and single-factor analysis of variance (ANOVA) were also used. The analysis of the dependence between the indicators was performed using the Pearson r-test, Spirmen's rs-test and the Pearson χ2-criterion. Statistical processing of the material was carried out on a computer using the standard software package of the statistical analysis (Statistica for Windows, v. 6.0). The critical level of validity of the null statistical hypothesis (about the absence of significant differences or factorial effects) was taken as 0.05.

Results and discussions. The probability of the development of cardiovascular disease increases with the rise of BMI [8]. Higher BMI was found in non-indigenous group compared with Yakut group (Table 1).

The estimation of BMI in patients (aged from 60 to 106 years old) revealed more frequent presence of obesity (p <0,001) in non-native patients while Yakut group had normal BMI (p <0,001) (Table 2).

An analysis of the dependence of BMI on age, taking into account ethnicity, was carried out in order to monitor the amount of body weight with age. It has been revealed that BMI decreases with age and most significantly traced in the Yakut group compared with non-indigenous people (r = –0.27, p <0.001 and r = –0.16, p = 0.058, respectively) (Figure 1).

The significant decrease in BMI was

detected when comparing the BMI values of older, senile age groups and long-livers regardless to ethnicity (Table 3).

By the age of 90 years and older, the majority (80.4%) of long-livers have a normal body weight – significantly more often than the older (36.9%) and senile age groups (37.0%); they were significantly less likely to be overweight and obese. The maximum values of BMI in the examined patients were found in the group of older people aged between 60 and 74 years (Table 4).

Statistically significant differences in BMI ($\chi 2$ = 33.68; p <0.001) were found between the groups of patients of older, senile age and long-livers (Table 4).

Applied non-parametric Kruskal-Wallis test and univariate analysis of variance for the determination of the value of BMI revealed statistically significant differences in BMI in the group of men and women (Table 5).

The highest BMI is significantly more often registered in the older group among women, compared with representatives of other age groups.

Significantly lower values of body mass and BMI were established in men among long-livers compared with men of older and senile age (H = 11.97; p = 0.003 and H = 10.15; p = 0.007, respectively). In the group of women significantly lower body weight and BMI were also found among long-livers (H = 23.68; p <0.001 and H = 19.79; p <0.001, respectively).

Similar indicators were obtained in the Khanty-Mansiysk Autonomous region as a result of a study of 109 long-livers having cardiovascular pathology. The age of long-livers at the time of the survey was 90-101 years [2].

it was noted that a large proportion of men and women have normal body weight (44.9%; 41.3%, respectively) when evaluating the BMI of men and women, without regard to ethnicity and age, (Table 6).

At the same time, women are significantly more likely to have obesity than men (25.7% and 13.4%, respectively; $\chi 2$ = 7.93; p <0.005), and their BMI is higher than in men ($\chi 2$ = 9.11; p = 0.011) (see Table 6).

Similar results were also obtained in the works of other researchers while identifying ethnic differences in BMI, where the most common BMI corresponding to obesity was found among the non-native population compared to the native and in the group of women unlike men [1, 3].

Conclusions. 1. Significantly higher BMI values corresponding to obesity were found in patients of non-native nationality compared to Yakut group of patients.

Table 1

The value of BMI in both native and non-native group of patients with CHD aged 60 and older (n=354)

Indicator	Population		t	p	z *	p
	non-native (n=149)	native (n=205)				
BMI. kg/m²	27.3±0.4	25.0±0.3	4.57	<0.001	4.38	<0.001

* - z-approximation for the non-parametric Wilcoxon-Mann-Whitney U-test

Table 2

The estimation of BMI in non-native patients with CHD aged 60 and older (n=354)

BMI, кг/м2	Population				X^2	p
	non-native (n=149)		native (n=205)			
	abs.	rel., %	abs.	rel., %		
18.5–24.9	48	32.2	105	51.2	11.94	<0.001
25.0–29.9	60	40.3	74	36.1	0.47	>0.10
30.0 and more	41	27.5	27	13.2	10.54	<0.001

Note: BMI < 18,5 кг/м² – body mass deficit; 18,5–24,9 кг/м² – kg/m2 – normal; 25,0–29,9 kg/m2 – excessive body weight; ≥ 30,0 kg/m2 – obesity.

Table 3

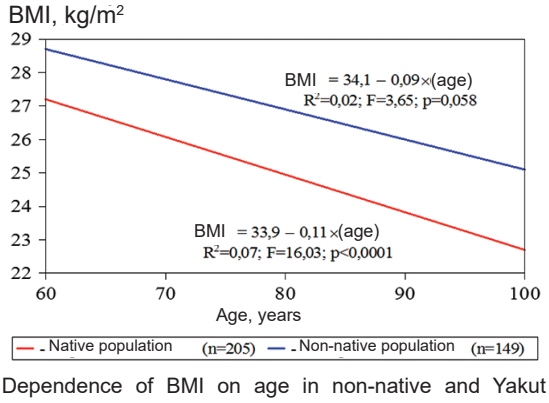
The value of BMI in the non-native and Yakut groups of patients of older, senile age and long-livers with CHD (n=354)

Indicator	Age (years)			H	p	F	p
	60–74 (n=154)	75–89 (n=149)	≥90 (n=51)				
BMI, kg/m²	26,8±4,8	26,3±3,8	23,4±2,8	30,60	<0,001	13,23	<0,001

2. The maximum values of BMI are established in the older group (between 60 and 74 years old). Significantly lower BMI is found among long-livers compared with the older and senile age groups.

3. The decrease in BMI is observed with age and is more pronounced in the Yakut group, in the non-native group there is only a tendency to the decrease in body weight.

4. Obesity is significantly more common in women than in men.



Dependence of BMI on age in non-native and Yakut patients with CHD aged 60 years and older (n=354)

Table 4

The estimation of BMI in older, senile age groups and long-livers with CHD (n=354)

BMI, kg/m2	Age, years						X^2	p
	60–74 (n=154)		75–89 (n=149)		90 and more (n=51)			
	абс.	отн., %	абс.	отн., %	абс.	отн., %		
18.5–24.9	57	37.0	55	36.9	41	80.4	33.55	<0.001
25.0–29.9	63	40.9	63	42.3	7	13.7	14.50	<0.001
30.0 and more	34	22.1	31	20.8	3	5.9	6.90	=0.032

Note: χ^2=33,68; p<0,001.

Table 5

The BMI value in the non-native and Yakut group of men and women with CHD aged 60 years and older (according to the results of the Kruskal-Wallis test and single-factor analysis of variance) (n=354)

Age, years	Gender				H	p	F	p
	men n=187)		women (n=167)					
	n	M±m	n	M±m				
60–74	83	25.9±0.4	71	27.8±0.7	30.60	<0.001	13.23	<0.001
75–89	79	25.9±0.4	70	26.8±0.5				
90 and older	25	23.7±0.5	26	23.0±0.6				

Table 6

The estimation of BMI in men and women with CHD aged 60 and older (n=354)

BMI, kg/m2	Gender				X^2	p
	men (n=187)		women (n=167)			
	abs.	rel., %	abs.	rel., %		
18.5–24.9	84	44.9	69	41.3	0.33	>0.10
25.0–29.9	78	41.7	55	32.9	2.54	>0.10
30.0 and more	25	13.4	43	25.7	7.93	<0.005

Note: X^2=9,11; p=0,011.

References

1. Mulerova T.A, Filimonov S.N, Onishchenko E.G et al. Klinicheskoe znachenie indeksa massy tela, okruzhnosti talii i indeksa taliya/bedro u pacientov s arterial'noj gipertenziej v Respublike Altaj [The clinical significance of body mass index, waist circumference and waist / hip index in patients with arterial hypertension in the Altai Republic]. Fundamental'nye issledovaniya, 2012, №6, p.335-339. https://www.fundamental-research.ru/pdf/2012/4-2/20.pdf
2. Rupcheva I.N. Sostoyanie kardiorespiratornoj sistemy, social'no-fiziologicheskaya harakteristika dolgozhitelej Hanty-Mansijskogo avtonomnogo okruga-YUgry, Avtoref. dis. … kand. med. nauk [The state of the cardiorespiratory system, the socio-physiological characteristics of long-livers of the Khanty-Mansiysk autonomous region: abstract of Ph. D thesis.]. Tyumen, 2005, 24 p.
3. Cygankova D.P. Faktory serdechno-sosudistogo riska u korennogo i nekorennogo naseleniya Gornoj SHorii [Cardiovascular risk factors in the indigenous and non-indigenous population of Mountain Shoria: abstract of Ph. D thesis.]. Kemerovo, 2017. 167 p.
4. Artham S.M., Lavie C. J., Patel H.M. [et al.]. Impact of obesity on the risk of heart failure and its prognosis. J Cardiometab Syndr, 2008, no. 3. pp. 155–161. DOI:10.1111/j.1559-4572.2008.00001.x.
5. Kragelund C., Hassager C., Hildebrandt P [et al.]. Impact of obesity on long-term prognosis following acute myocardial infarction. Int J Cardiol, 2005, no. 98. pp. 123-31. DOI:10.1016/j.ijcard.2004.03.042.
6. Kuk JL, Ardern CI. Influence of age on the association between various measures of obesity and all-cause mortality. J Am Geriatr Soc., 2009. no. 57. pp. 2077– 2084. DOI: 10.1111/j.1532-5415.2009.02486.x.
7. Samaras T.T., Storm L.H., Elrick H. Longevity, mortality and body weight. Ageing Res. Rev, 2002, vol. 1, no 4, pp. 673-691.
https://pdfs.semanticscholar.org/e397/a3316268d5cd203f6f880cffb071b9b-1fad3.pdf.
8. WHO. Prevention and Management of the Global Epidemic of Obesity. Report of the WHO consultation on obesity. Geneva, 1997, p. 132.
http://www.who.int/iris/handle/10665/63854

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SEROLOGICAL AND MOLECULAR-BIOLOGICAL VERIFICATION OF VIRAL HEPATITIS B, C, D AND E IN VARIOUS POPULATIONS OF THE REPUBLIC SAKHA (YAKUTIA)

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ABSTRACT

The **purpose** of the study is the serological and molecular-biological monitoring of the latitude of viral hepatitis B, C, D and E in the Republic of Sakha (Yakutia).

Materials and methods. Used official statistics and annual reports. The analysis of the incidence of acute and chronic viral hepatitis B and C, hepatitis carriers for the period from 1999 to 2016, as well as serological and molecular biological monitoring of the latitude of viral hepatitis B, C, D and E in the Republic of Sakha (Yakutia).

Results and discussion. In the dynamics of the incidence of AVG B, the carriage of VGV and VG C in Yakutia, there is no existence of any of their own laws that are not inherent in many regions of Russia. In general, based on the level and dynamics of the incidence of chronic viral hepatitis In the country, it is possible to characterize the overall epidemiological situation as unfavorable, even despite a noticeable decrease in the incidence. The unstable undulating nature of the incidence and their increase in recent years indicate the persistence of epidemiological tension with respect to viral hepatitis B. A distinctive feature of the structure of chronic viral hepatitis in the Republic of Sakha (Yakutia) is the high incidence of chronic viral hepatitis B and the steady growth of chronic viral hepatitis C. The infection of the population of the Republic with hepatitis B and C viruses can be determined as high. This situation, given the high frequency and severity of the adverse effects of HBV, HCV infections, as well as the endemicity of HDV infection, poses a threat to public health. According to the results of serological, molecular biological studies, a high incidence and infection rate of the population of the republic with all known hepatitis viruses was stated. An increased circulation of hepatitis E virus, previously considered a tropical infection, was also detected in the Arctic zone of Russia.

Conclusion. In general, an epidemiological analysis of the incidence of acute and chronic viral hepatitis showed that in the Republic of Sakha (Yakutia) a highly endemic area with respect to viral hepatitis C, B, D and E, and such a tense epidemiological situation requires urgent appropriate measures. Studies of the genetic heterogeneity of the identified hepatitis viruses and the pathogenetic mechanisms of the development of the disease among the indigenous people of the Russian North are also required.

Keywords: acute hepatitis B and C, chronic hepatitis B and C, hepatitis D, hepatitis E, HBsAg, HBV DNA, a-HCV, HCV RNA, a-HDV, a-HEV.