ACTUAL TOPIC

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METABOLIC SYNDROME AMONG YAKUTIA'S INDIGENOUS FEMALE POPULATION

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ABSTRACT

The aim of the study was to assess the prevalence and structure of metabolic syndrome among the indigenous female population (n=628) of the Republic of Sakha (Yakutia). The screening survey was conducted among the female population of 2 districts of the Republic of Sakha (Yakutia) at the age of 20 and older (Oimyakonsky, Gorny, Tattinsky). IDF metabolic syndrome was established in 142 women, thus prevalence was at 22.6%. The most common variant of the clinical manifestations of metabolic syndrome was a combination of abdominal obesity with high blood pressure and dyslipidemia (in 62.7% of cases). The dynamics of the frequency of metabolic disorders in different age groups suggests that abdominal obesity is the main pathogenetic factor contributing to the development of a chain of metabolic disorders in a given population.

Keywords: metabolic syndrome, Yakutia, abdominal obesity, diabetes mellitus, fasting hyperglycemia.

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Introduction. Metabolic syndrome is a complex of pathological conditions characterized by abdominal obesity, insulin resistance, hypertension, and hyperlipidemia. The syndrome contributes to the development of diseases such as diabetes mellitus type 2, coronary heart disease, stroke, and other disorders. The prevalence of metabolic syndrome has increased markedly over the past decades worldwide [5]. The main reasons for this are the changes in nutrition and a decrease in physical activity [6].

In the Sakha (Yakutia) Republic, changes in the socio-economic structure of the population in the 20th century changed the structure of diseases and their prevalence. Epidemiological transition is accompanied by an increase in the number of non-communicable diseases, including cardiovascular and type 2 diabetes. According to the state statistics bodies, the incidence of type 2 diabetes among the adult population of the republic increased from 2004 to 2017. from 14 to 40.3 per 1000 population, diseases of the circulatory system from 164.8 to 236.2 per 1000 population. Undoubtedly, this also entails an increase in longevity, but on the whole, indicates a significant burden on society. Effective control of risk factors for these diseases is possible with an objective assessment of the epidemiological situation.

In this regard, the purpose of the study was to assess the prevalence and structure of the metabolic syndrome among the indigenous female population of the Sakha (Yakutia) Republic.

Materials and Methods. A screening survey was conducted in 2017 among the female population of 2 districts of the Republic of Sakha (Yakutia) aged 20 and over (Oymyakonsky, Gorny, Tattinsky), representatives of indigenous ethnic groups (Yakuts, Evens, Evenks). The study was conducted subject to the voluntary informed consent of the participants. The examination program included: anthropometric examination by the standard method, triple measurement of blood pressure (BP), fasting venous blood sampling. The content of glucose, total cholesterol (cholesterol), triglycerides, high-density lipoproteins (HDL cholesterol) was determined on the express analyzer Cardiochek PA, USA. The concentration of low-density lipoprotein cholesterol (LDL cholesterol) was calculated using the Friedwald formula with a blood triglyceride level of less than 4.5 mmol/L. Hypertriglyceridemia was established with a triglyceride content of ≥ 1.7 mmol/L, hypercholesterolemia – at a concentration of HDL cholesterol < 1.0 mmol/L in men and < 1.3 mmol/L in women; elevated blood pressure – with systolic blood pressure (SBP) ≥ 130 mmHg and/or diastolic blood pressure (DBP) ≥ 85 mm Hg; fasting hyperglycemia (FHG) – when the plasma glucose level is ≥ 5.6 mmol/L, or when an established diagnosis of diabetes mellitus (DM). Persons receiving specific medical treatment for these conditions were also referred to as persons with these disorders. As criteria for metabolic syndrome, IDF 2006 criteria were used, according to which MS was established in the presence of abdominal obesity (waist circumference more than 80 cm) and 2 or more of the 4 above-mentioned risk factors [6].

Statistical data analysis was performed in the IBM SPSS STATISTICS 22 package. When comparing groups depending on the type of data, Kruskal-Wallis and Pearson χ^2 criteria were used. The critical value of the level of statistical significance of differences (p) was taken to be 5%. Descriptive statistics of quantitative data are presented as median (Me) and interquartile range

(Q1-Q2). Frequencies are presented with a 95% confidence interval (95% CI). In calculating the age-standardized prevalence rate, MS used the age structure of the world population (WHO World Standard) [4].

The work was carried out as part of the research "The Contribution of Metabolic Syndrome to the Development of Atherosclerosis of the Coronary Arteries in Yakutia Residents Reg. No. 01-20-128-08-00 Modern Conditions" (Registration Number AAAA-A17-117021310139-5, 17.6344.2017/8.9.).

Results and Discussion. During the epidemiological study, 628 women 20 years and older were examined. The average age of participants was 47.4 (standard deviation 15.1) years. The proportion of women 50–59 years old was 28%, 20-39 years old – 32.7%, 40-49 years old – 19.4%, 60 and older – 19.6%.

Table 1 presents the main anthropometric and metabolic characteristics of the women examined. The dynamics of indicators in the age groups corresponded to the natural changes associated with the age of the subjects. The growth of women of young age groups was statistically significantly higher than that of older women, which reflects acceleration processes. The median value of body mass index from 40-49 years was in the range of "increased" body weight. The median waist circumference, ranging from 30-39 years, met the criteria for abdominal obesity. From 40-49 years for dap and 50-59 years for CAD, the values of blood pressure corresponding to the upper quartile of the distribution were in the range of "arterial hypertension" according to the criteria of Moscow Society of Obstetrician Gynecologists (www.moag.pro). The cholesterol content was elevated from 40-49 years old, while the proportion of HDL cholesterol was maintained at a fairly high level in all age groups. Low triglyceride levels are noteworthy. Thus, in general, the metabolic profile of women of Yakutia of indigenous nationality is characterized by the following features: increased body mass index, abdominal obesity, a fairly favorable lipid profile, and normal blood glucose. These results are consistent with data previously obtained in epidemiological studies among the Yakut population [1].

The frequency of metabolic syndrome and its components, depending on the age of the examined, is presented in table 2. If we consider the frequency of metabolic disorders in the whole group, abdominal obesity was detected in 444 women and its prevalence was 70.7% (95% CI: 66.9 -74.2). In 283 women, the blood pressure level was rated as "elevated", prevalence rates were 45.1% (95% CI: 41.2-49.0). Reduced HDL cholesterol levels were found in 162 patients, which was 25.8% (95% CI: 22.5-29.4). Hypertriglyceridemia occurred in 63 women, respectively, the prevalence was 10.0% (95% CI: 7.9-12.7). Fasting hyperglycemia or an earlier diagnosis of diabetes was found in 72 women, 11.5% (95% CI: 9.2-14.3). The frequency of all these disorders increased significantly from the age of 40-49 years.

IDF metabolic syndrome was established in 142 women, the prevalence was respectively 22.6% (95% CI: 19.5-26.1). The highest frequency of MS was observed at the age of 50-69 years. The age-standardized MS prevalence rate by IDF criteria among the female indigenous population of Yakutia was 21.2% (95% CI: 17.7-24.7). The study of the prevalence of MS among various groups of the population of Yakutia was also carried out by other authors. Thus, the prevalence of MS according to IDF criteria, among indigenous women in Yakutsk 60 years and older was 34.8%, which is comparable

Table 1

The main anthropometric and metabolic characteristics of the female indigenous population of Yakutia, Me (Q_1-Q_3)

Indicator	20 years and older N=628	20-29 years n=91	30-39 years n=114	40-49 years n=122	50-59 years n=178	60-69 years n=72	70 years and older n=51	p
SBP, mm Hg	120.0 (110.0-140.0)	108.2 (100.0-115.0)	110.0 (100.0-120.3)	119.0 (107.5-135.3)	130.0 (113.8-150.0)	140.0 (120.0-160.0)	140.0 (125.0-170.0)	<0.001
DBP, mm Hg	80.0 (70.0-90.0)	72.3 (65.0-80.0)	79.5 (70.0-84.0)	80.0 (70.0-90.0)	82.7 (75.3-99.3)	81.5 (71.8-95.3)	90.0 (80.0-100.0)	<0.001
Height, cm	155.5 (151.0-160.0)	158.8 (155.0-163.2)	158.0 (155.0-163.0)	157.0 (154.0-161.0)	154.3 (151.0-158.5)	151.0 (147.6-154.2)	148.0 (143.0-151.0)	<0.001
Body mass, kg	61.8 (53.3-72.0)	54.2 (49.2-61.3)	58.5 (53.3-68.0)	64.0 (55.4-75.0)	65.0 (56.9-75.8)	64.0 (54.8-74.8)	61.0 (48.5-68.0)	<0.001
Body mass index, kg/m^2	25.3 (22.2-29.7)	21.7 (19.4-24.2)	23.5 (21.2-26.6)	26.2 (23.2-30.1)	27.3 (24.1-31.2)	27.3 (24.2-32.9)	27.1 (22.5-31.4)	<0.001
Waist circumference, cm	87.0 (78.0-97.2)	75.0 (70.0-84.0)	80.0 (71.8-85.5)	85.0 (79.0-97.1)	93.9 (85.0-102.0)	95.4 (86.3-106.5)	92.0 (84.0-102.0)	<0.001
Cholesterol mmol/L	5.2 (4.4-5.9)	4.2 (3.6-4.9)	4.8 (4.1-5.5)	5.2 (4.6-5.7)	5.7 (5.1-6.3)	5.4 (4.7-6.2)	5.3 (4.6-6.1)	<0.001
HDL mmol/L	1.6 (1.3-1.9)	1.7 (1.3-2.1)	1.6 (1.3-1.9)	1.6 (1.3-2.0)	1.6 (1.3-1.9)	1.5 (1.2-1.7)	1.4 (1.1-1.7)	<0.001
LDL mmol/L	2.9 (2.2-3.6)	1.9 (1.5-2.4)	2.5 (2.0-3.2)	3.0 (2.4-3.4)	3.2 (2.7-3.9)	3.3 (2.5-4.0)	3.4 (2.8-4.1)	0.003
VLDL mmol/L	0.4 (0.3-0.6)	0.3 (0.3-0.5)	0.4 (0.3-0.5)	0.5 (0.3-0.7)	0.5 (0.4-0.7)	0.4 (0.3-0.6)	0.4 (0.3-0.6)	<0.001
Triglycerides mmol/L	0.9 (0.7-1.2)	0.8 (0.6-1.0)	0.8 (0.6-1.0)	0.9 (0.7-1.3)	1.0 (0.8-1.4)	1.0 (0.8-1.4)	0.9 (0.7-1.2)	<0.001
Glucose mmol/L	4.4 (4.0-5.0)	4.3 (3.9-4.9)	4.1 (3.9-4.6)	4.4 (4.0-5.2)	4.5 (4.1-5.1)	4.4 (4.0-5.2)	4.3 (4.1-4.7)	<0.001

Note: p-value is an achieved level of significance of differences when comparing groups by age (Kruskal–Wallis test).

Table 2

Prevalence of metabolic syndrome and its components among the female indigenous population of Yakutia

Age	Возраст						Total n=628
	20-29 years n=91	30-39 years n=114	40-49 years n=122	50-59 years n=178	60-69 years n=72	70-79 years n=51	
Triglycerides ≥ 1.7 mmol/L							
n	4	6	14	28	8	3	63
% (95%ДИ)	4.4 (0.6-11.9)	5.3 (1.6-11.8)	11.5 (6.4-18.9)	15.7 (10.8-22.1)	11.1 (4.6-21.6)	5.9 (0-18.1)	10.0 (7.9-12.7)
HDL < 1.29 mmol/L							
n	17	31	30	42	24	18	162
% (95%ДИ)	18.7 (11.3-28.6)	27.2 (19.4-36.5)	24.6 (17.4-33.4)	23.6 (17.7-30.6)	33.3 (22.7-45.6)	35.3 (22.3-50.3)	25.8 (22.5-29.4)
Fasting blood glucose ≥ 5.6 mmol/L or Type 2 Diabetes							
n	6	3	17	31	12	3	72
% (95%ДИ)	6.6 (2.1-14.7)	2.6 (0-8.5)	13.9 (8.4-21.7)	17.4 (12.3-23.9)	16.7 (8.8-27.9)	5.9 (0-18)	11.5 (9.2-14.3)
SBP ≥ 130 mm Hg and/or DBP ≥ 85 mm Hg							
n	12	31	52	101	49	38	283
% (95%ДИ)	13.2 (6.9-22.4)	27.2 (19.4-36.5)	42.6 (33.8-51.9)	56.7 (49.2-64.0)	68.1 (55.8-78.5)	74.5 (59.7-85.9)	45.1 (41.2-49.0)
Waist circumference more than 80 cm							
n	34	61	89	150	64	46	444
% (95%ДИ)	37.4 (27.5-48.2)	53.5 (44.0-62.8)	73.0 (64.0-80.5)	84.3 (77.9-89.2)	88.9 (78.4-95.4)	90.2 (77.2-97.6)	70.7 (66.9-74.2)
Metabolic syndrome by IDF criteria							
n	3	13	30	54	27	15	142
% (95%ДИ)	3.3 (0-10.5)	11.4 (6.2-19.2)	24.6 (17.4-33.4)	30.3 (23.8-37.7)	37.5 (26.4-49.9)	29.4 (17.4-44.4)	22.6 (19.5-26.1)

with our data in the corresponding age group (33.5%) [2]. In a study conducted among small indigenous peoples of the North, the prevalence of MS according to the criteria of GNOK ranged from 25 to 61% [3].

Elevated blood pressure was one of the components of MS in 90.1% of cases of MS, hypercholesterolemia in 71.1%, Fasting Hyperglycemia/Diabetes Mellitus in 35.9%, and GGT in 34.5%. The most common variant of the clinical manifestations of MS was the combination of abdominal obesity with high blood pressure and dyslipidemia (Table 3). This combination of risk factors was observed in 89 of 142 women with MS. A combination of 4 risk factors (abdominal obesity, elevated blood pressure, dyslipidemia, fasting hyperglycemia (DM)) was detected in 21 cases of MS. In 18 women, MS was a combination of abdominal obesity, elevated blood pressure and fasting hyperglycemia (or DM). A rare variant of MS without elevated blood pressure was found in 10 women aged 30-69 years. Four cases of isolated lipid spectrum disorders in the form of a combination of hypertriglyceridemia and a reduced level of HDL cholesterol on the background of abdominal obesity were recorded in different age groups, and possibly reflect cases of primary dyslipidemia. In general, options with the inclusion of disorders of carbohydrate metabolism in the form of fasting hyperglycemia or diabetes were recorded from the age of 40-49 years. This suggests that in this population abdominal obesity is the main pathogenetic factor contributing to the development of a chain of metabolic disorders.

Conclusion. Thus, according to the results of a screening survey, the prevalence of metabolic syndrome accord-

Table 3

Variants of clinical manifestations of metabolic syndrome depending on the age of the examined, %

Age	AO+EBP+ DLP		AO+EBP+ FHG/ DM+DLP		AO+EBP+ FHG/DM		AO+FHG/ DM+DLP		DLP (GGT, CS HDL ↓)	
	n	%	n	%	n	%	n	%	n	%
20-29 years n=3	2	66.6	0	0	0	0	0	0	1	33.3
30-39 years n=13	12	92.3	0	0	0	0	1	7.7	0	0.0
40-49 years n=30	17	56.6	5	16.6	3	10.0	5	16.7	0	0.0
50-59 years n=54	29	53.7	9	16.7	11	20.4	3	5.6	2	3.7
60-69 years n=27	17	63.0	6	22.2	3	11.1	1	3.7	0	0.0
70-79 years n=15	12	80.0	1	6.7	1	6.7	0	0.0	1	6.7
Total n=142	89	62.7	21	14.8	18	12.7	10	7.0	4	2.8

Note. AO – abdominal obesity; EBP – elevated blood pressure; DLP – dyslipoproteinemia; FHG/DM – fasting hyperglycemia and/or proven case of DM.

ing to IDF criteria among the indigenous female population was 22.6% (95% CI: 19.5-26.1). With standardization on the age structure of the world's population, the prevalence of MS was 21.2% (95% CI: 17.7-24.7). The most common variant of the clinical manifestations of MS was a combination of abdominal obesity with high blood pressure and dyslipidemia (in 62.7% of cases). A combination of 4 risk factors (abdominal obesity, elevated blood pressure, dyslipidemia, fasting hyperglycemia/diabetes) was detected in 14.8% of cases of MS. Variants with the inclusion of disorders of carbohydrate metabolism in the form of FHG/DM were recorded from the age of 40-49 years. The dynamics of the frequency of metabolic disorders in different age groups suggests that abdominal obesity is the main pathogenetic factor contributing to the development of a chain of metabolic disorders in a given population. The statement of this fact contains the potential for correction by informing the public about the risks, creating conditions for an active lifestyle, improving the eating habits of the population, restricting advertising of unhealthy foods in the media, etc.

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THE HETEROGENEITY OF NON-MOTOR SYMPTOMS IN PATIENTS WITH PARKINSON'S DISEASE IN TOMSK REGION

This study was designed to survey the prevalence and distribution of non-motor symptoms (NMS) in Parkinson's disease (PD) patients in Siberian region, Russia, and to investigate the association between NMS and health-related quality of life.

Materials and methods. Two hundred six PD patients were evaluated using a battery of validated scales recommended by leading PD research Societies (Movement Disorders Society and the European Academy of Neurology). Clinical assessments were conducted using Uniform Parkinson's Disease Rating Scale (UPDRS), Hospital Anxiety and Depression Scale, Beck depression inventory II, Apathy Scale, Montreal Cognitive Assessment (MoCAtest), Epworth Sleepiness Scale, Sleep Assessment Questionnaire, Columbia-Suicide Severity Rating Scale, Parkinson's Disease Questionnaire-39 – PDQ-39. **Results.** Each PD patient had eight different individual NMS on average. The constipation (87%), depression (67%), insomnia (66%), anxiety (52%), apathy (35%), and impulsive behavior disorders (27%) were the most frequent complaints. NMS prevalence in PD patients in Tomsk region was consistent with that in the international study, although the composition proportions were different. There was a significant association of PDQ-39 score with anxiety (r = 0,474, p = 0,000), depression (r = 0,471, p = 0,000), apathy (r = 0,322, p = 0,000), UPDRS III score (r = 0,316, p = 0,000), Hoehn and Yahr stage (r = 0,267, p = 0,000), disease duration (r = 0,220, p = 0,005), and levodopa equivalent dosage (r = 0,213, p = 0,001).

Conclusion. This study confirmed that NMS are common in PD, occurring across all disease stages and have a great impact on quality of life. NMS progression contributes significantly to health-related quality of life decline, and should be well recognized and treated.

Keywords: Parkinson's disease, apathy, anxiety, depression, impulsive behavioral disorders, insomnia, constipation.

Introduction. Parkinson's Disease (PD) is one of the most common neurological disease reaching 1% among population with age more than 60. PD's morbidity is up to 40 cases per 100 000 of population per year. According to the results of different epidemiological researches conducted in the USA and some European countries the prevalence of this neurodegenerative disease ranges in wide limits from 18 to 328 cases per 100 000 of population, but on the average it is about 120 cases per 100 000 of population [9]. In the Russian Federation the prevalence of PD is at worldwide level and according to the epidemiological