Prevalence of the metabolic syndrome diagnosed using three different definitions and risk of ischemic heart disease among Kaunas adult population

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Key words: *metabolic syndrome, ischemic heart disease.*

Summary. *The aim of this study was to compare the prevalence of the metabolic syndrome diagnosed using three different definitions and to evaluate its associations with ischemic heart disease in Kaunas adult population.*

Material and methods. Data of preventive screening carried out in Kaunas in 2001–2002 according to the MONICA study protocol were used for analysis; a total of 1336 persons aged 35–64 years (603 men and 733 women) were recruited. The metabolic syndrome was defined by the World Health Organization, Adult Treatment Panel III, and International Diabetes Federation definitions. Ischemic heart disease was diagnosed based on the following criteria: a documented history of myocardial infarction, angina pectoris, or ischemic changes on electrocardiogram.

Results. The metabolic syndrome was identified for 11.3% of men and for 9.4% of women using the World Health Organization definition, for 19.4% of men and for 26.3% of women using the Adult Treatment Panel III definition, and for 30.0% of men and for 37.7% of women using the International Diabetes Federation definition. In male and female groups, the prevalence of the metabolic syndrome (irrespective of definition) significantly increased with age ($P<0.05$). After adjusting for age, men diagnosed with the metabolic syndrome using the International Diabetes Federation definition (OR=2.30; P=0.001) and Adult Treatment Panel III definition (OR=1.97; P=0.01) and women diagnosed with metabolic syndrome using the International Diabetes Federation definition (OR=1.50; P=0.039) had a significantly higher risk of having ischemic heart disease as compared with those without the metabolic syndrome by the same definitions. The metabolic syndrome diagnosed using the World Health Organization definition was not associated with a significant risk of ischemic heart disease in men and women.

Conclusion. In Kaunas population aged 35–64 years, the highest prevalence of the metabolic syndrome was determined according to the International Diabetes Federation definition. Usage of the International Diabetes Federation and the Adult Treatment Panel III definitions in establishing diagnosis of the metabolic syndrome provides more opportunities to identify subjects with ischemic heart disease.

Introduction

The metabolic syndrome is a cluster of metabolic abnormalities including abdominal obesity, glucose intolerance, arterial hypertension, dyslipidemia and is associated with an increased risk of cardiovascular disease. Since the initial description of the metabolic syndrome, several expert groups produced different definitions: between 1998 and 2006, the definitions of the metabolic syndrome were proposed six times. Different definitions of the metabolic syndrome require different cut points and have different mandatory inclusion criteria (1). The last definition of the metabolic syndrome was proposed in 2005 by the International Diabetes Federation (IDF). This IDF definition of the metabolic syndrome for worldwide use included central obesity as a prerequisite (2), and it varied from the earlier Third Report of the National Cholesterol Education Program-Adult Treatment Panel (NCEP-ATP III) definition with broader criteria for waist circumference and fasting plasma glucose (3). These two clinical approaches to the metabolic syndrome particularly varied from the World Health

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Organization (WHO) definition, which was proposed in 1998 (4). Thus, the prevalence of the metabolic syndrome within individual cohorts varies with the definition used. In addition, the prevalence of the metabolic syndrome varies according to the definition used (WHO, NCEP-ATP III, and IDF), and it is very important in identifying people at increased risk for the development of cardiovascular diseases (5, 6). The recent research literature showed that there is a lack of diagnostic concordance between different definitions (1, 7).

The impact of changes of criteria on the prevalence of the metabolic syndrome, in particular the use of differing values for defining central obesity, fasting plasma glucose, arterial hypertension, has not been studied in Kaunas city population before. Our aim was to compare the prevalence of the metabolic syndrome diagnosed using the WHO, NCEP-ATPIII, and IDF definitions of the metabolic syndrome and to evaluate its associations with ischemic heart disease (IHD) in Kaunas adult population

Material and methods

Study design. A health survey was carried out in Kaunas city, Lithuania, from 2001 to 2002 according to the WHO MONICA study (MONItoring of trends and determinants in CArdiovascular disease) protocol (8). A random sample of subjects aged 35 to 64 years was selected. The sample was stratified by age and sex so that at least 200 men and women would be screened in every 10-year age group (35–44 years, 45–54 years, 55–64 years). The health survey was performed by the scientific staff of the Laboratory of Population Studies at the Institute of Cardiology, Kaunas University of Medicine. A total of 1403 persons were screened (626 men and 777 women; response rate, 62.4%). Data of 1336 subjects (603 men and 733 women), who were examined for all five MS components, were approved for statistics analysis.

Measurements. Arterial blood pressure was measured two times with an accuracy of 2 mm using a mercury sphygmomanometer, and the average values were used for the analysis.

Waist circumference was measured (without upper clothes) by a standard meter with an accuracy of 0.5 cm. Body mass index (BMI) was calculated as weight (kg)/height squared (m^2).

Laboratory analyses. Biochemical analyses were done for responders (fasting for at least for 12 hours) on an empty stomach. Concentration of glucose in capillary blood was determined by an individual glucometer "Gliukotrent" (9). Serum triglycerides and high-density lipoprotein (HDL) cholesterol concentrations were determined enzymatically: triglycerides by the GPO-PAP method (10) and HDL cholesterol by the CHOD-PAP Monotest, Boehringer-Manheim method, after precipitation of serum very low-density lipoprotein (VLDL) and low-density lipoprotein (LDL) (11).

Definitions of the metabolic syndrome. The diagnostic criteria for the metabolic syndrome by three definitions (WHO, NCEP-ATP III, and IDF) are show in Table 1.

Criteria for ischemic heart disease and diabetes mellitus. IHD was determined according to the following: 1) documented history of myocardial infarction (MI) and (or) ischemic changes on electrocardiogram (ECG) coded by the Minnesota codes (MC) 1-1 or 1-2 (12); 2) angina pectoris was defined by G. Rose questionnaire (without MI and (or) MC 1-1 or 1-2) (13); 3) ECG findings by MC 1-3, 4-1, 4-2, 4-3, 5-1, 5-2, 5-3, 6-1, 6-2, 7-1, 8-3 (without MI and (or) MC 1-1, 1-2 and without angina pectoris) (14).

Diabetes mellitus was determined according to the answers of responders to the question, "Has a doctor ever told that you have diabetes?" and/or glucose level of ≥11.1 mmol/L after 2-hour glucose load (75 g). Impaired fasting glucose was considered at ≥6.1 mmol/L.

Statistical analysis. All data were analyzed in male and female groups separately. Mean values of continuous variables and percentages of categorical variables according to presence or absence of the metabolic syndrome were calculated. Student's *t* test or analysis of variance was used for between-group comparisons for continuous variables and χ^2 test for categorical variables. The prevalence rates were given in percent (%). Logistic regression analysis was used to determine the independent associations between the metabolic syndrome (by three definitions) and IHD events, expressed as odds ratio (OR) with 95% confidence intervals (CI). Independent variables including age and metabolic syndrome status were entered into a model. All statistical analyses were performed using EPIINFO6, SPSS 13.0 software. *P* values of <0.05 were considered statistically significant.

Results

The metabolic syndrome was identified in 68 men (11.3%) and in 69 women (9.4%) using the WHO definition, in 117 men (19.4%) and in 193 women (26.3%) using the NCEP-ATP III definition, and 181 men (30.0%) and 276 women (37.7%) using the IDF

Table 1. Diagnostic criteria for the metabolic syndrome by three definitions (WHO, NCEP-ATP III, and IDF)

Component	WHO (modified) (4)	NCEP-ATP III (3)	IDF (2)
Fasting plasma glucose or impaired glucose tolerance, 2 h	≥6.1 mmol/L ≥7.8 mmol/L or T2DM	≥6.1 mmol/L	≥5.6 mmol/L or T2DM
Waist circumference	–	≥102 cm (men) ≥88 cm (women)	≥94 cm (men) ≥80 cm (women)
Body mass index or waist-hip ratio	≥30 kg/m^2 >0.9 (men) >0.85 (women)	–	–
Blood pressure	≥140/90 mm Hg	≥130/85 mm Hg	≥130/85 mm Hg or receiving treatment
Triglycerides	≥1.7 mmol/L	≥1.7 mmol/L	≥1.7 mmol/L or receiving treatment
High-density lipoprotein cholesterol	<0.9 mmol/L (men) <1.0 mmol/L (women)	<1.04 mmol/L (men) <1.30 mmol/L (women)	<1.04 mmol/L (men) <1.30 mmol/L (women) or receiving treatment
Definition of metabolic syndrome and number of components for diagnosis	Raised fasting plasma glucose or T2DM plus ≥2 others components	≥3 of the components above	Central obesity (increased waist circumference) plus ≥2 others components

WHO, World Health Organization; NCEP-ATP III, National Cholesterol Education Program-Adult Treatment Panel III; IDF, International Diabetes Federation; T2DM, type 2 diabetes mellitus.

WHO (modified) – microalbuminuria was not used for diagnosis.

definition. Only 52 (8.6%) men and 62 (8.5%) women were identified as having the metabolic syndrome using all the three definitions. The prevalence of the metabolic syndrome was higher in women than in men using the NCEP-ATP III (P=0.002) and IDF definitions (P=0.003), but there was no significant difference comparing both genders using the WHO definition.

The distribution of Kaunas city inhabitants with metabolic syndrome diagnosed using three definitions (WHO, NCEP-ATP III, and IDF) and without any metabolic syndrome by 10-year age groups is depicted in Fig. 1.

The highest prevalence of the metabolic syndrome (irrespective of definition) was recorded in men and women aged 55–64 years. In male and female groups, the prevalence of the metabolic syndrome (irrespective of definition) significantly increased with age (P<0.05). On the contrary, the proportions of individuals without any metabolic syndrome (no MS) significantly decreased with age (P<0.05).

The baseline characteristics of 35–64-year-old men and women fulfilling the three definitions (WHO, NCEP-ATP III and IDF) of the metabolic syndrome are shown in Tables 2 and 3. Except for HDL cholesterol concentration and smoking, all risk factors were more prevalent (P<0.05) in the groups with metabolic syndrome (irrespective of definition) than in the corresponding male and female groups without the metabolic syndrome. HDL cholesterol concentration was significantly (P<0.05) lower in the groups with the metabolic syndrome (irrespective of definition) than in the corresponding male and female groups without metabolic syndrome. Smoking rate was significantly (P<0.05) lower in the male and female groups with the metabolic syndrome defined by the IDF definition and in the female group with the metabolic syndrome defined by the NCEP-ATP III definition than in the corresponding groups without metabolic syndrome.

The concordance and disparity between diagnoses of the metabolic syndrome using the modified WHO definition, the NCEP (ATPIII) definition, and the IDF definition among those Kaunas city inhabitants aged 35–64 years are shown in Fig. 2.

The lack of diagnostic concordance between different definitions of the metabolic syndrome is a dilemma (1, 15). Only 25.5% of people appeared to be diagnosable by all three definitions; 33.7% of men and 46.8% of women appeared to be diagnosable by two definitions (mostly by NCEP-ATPIII and IDF). More than one-third (39.8%) of men and 31.2% of women diagnosed with the metabolic syndrome were

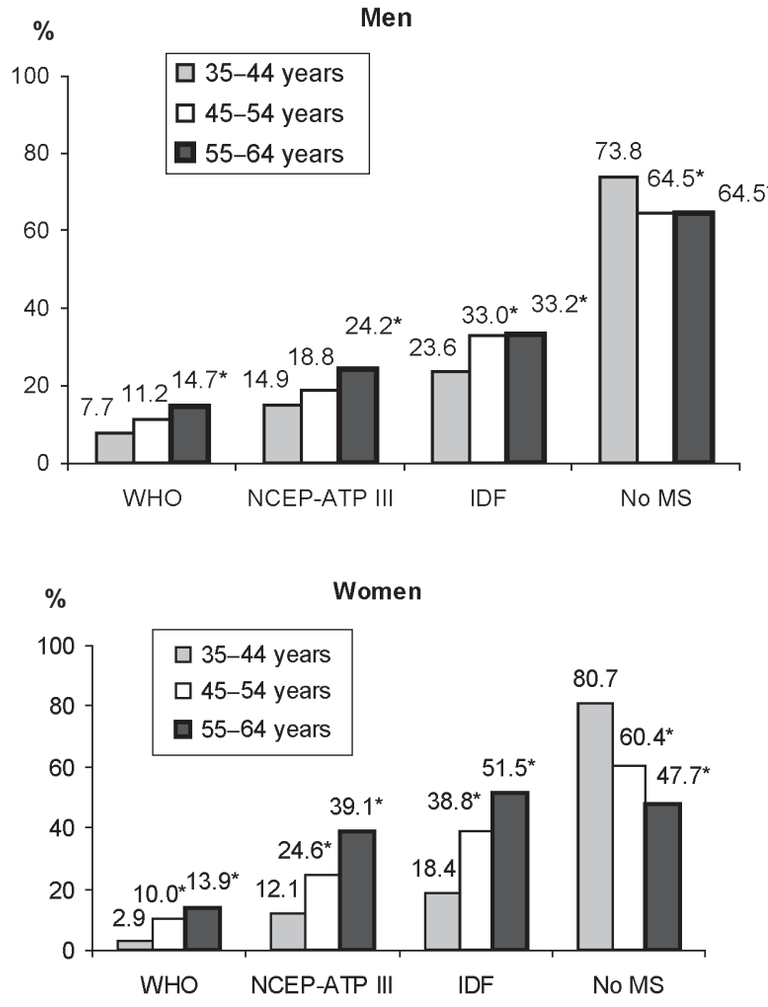

Fig. 1. Distribution of Kaunas city inhabitants with the metabolic syndrome diagnosed using three definitions (WHO, NCEP-ATP III, and IDF) and without any metabolic syndrome by 10-year age groups

WHO, World Health Organization; NCEP-ATP III, National Cholesterol Education Program-Adult Treatment Panel III; IDF, International Diabetes Federation; MS, metabolic syndrome.
*$P<0.05$ as compared to 35–44-year age group.

only eligible for such classification using one definition; the metabolic syndrome diagnosed only by IDF definition was present in 35.2% of men and 30.1% of women.

Associations between the metabolic syndrome and risk of ischemic heart disease. IHD was identified in 86 men (14.3%) and in 142 women (19.4%). Except for the metabolic syndrome by the WHO definition in the female group, the prevalence of IHD was significantly ($P<0.05$) higher in the groups with the metabolic syndrome (irrespective of definition) than in the corresponding male and female groups without the metabolic syndrome (Tables 2 and 3).

After adjusting for age, men diagnosed with metabolic syndrome according to the two definitions (IDF and NCEP-ATP III) were more likely to have IHD as compared with those without the metabolic syndrome by the same definitions (Table 4). After adjusting for age, women diagnosed with the metabolic syndrome according to only one – IDF definition – had significantly higher odds of having IDH as compared with those without metabolic syndrome by the same definition.

Discussion

The WHO, NCEP-ATP III, and IDF definitions of the metabolic syndrome agree on essential components – glucose intolerance, obesity, hypertension, and dyslipidemia – but they differ in the cut-off points for the criteria of each component of the cluster and the method of combining them to define the metabolic syndrome. The IDF criteria are closest to NCEP-ATP III in that they include the same variables, but they

Table 2. Baseline characteristics of 35–64-year-old men in relation to the presence of the metabolic syndrome according to three definitions (WHO, NCEP-ATP III, and IDF)

Parameter	WHO		NCEP-ATP III		IDF	
	no	yes	no	yes	no	yes
N	535	68	486	117	422	181
Age, years	49.4±8.5	51.9±7.5*	49.2±8.4	51.5±8.5*	49.1±8.5	50.9±8.1*
Impaired fasting glucose and T2DM, %	6.7	100*	8.2	54.7*	8.1	38.6*
Ischemic heart disease, %	13.1	23.5*	12.1	23.1*	10.7	22.7*
Body mass index, kg/m^2	27.0±3.9	31.7±4.3*	26.5±3.5	32.0±4.4*	25.8±3.2	31.6±3.6*
Waist circumference, cm	90.9±10.3	104.6±12.5*	89.4±8.9	105.1±11.9*	87.5±8.31	103.8±9.4*
Glucose (fasting), mmol/L	5.33±0.8	7.26±1.7*	5.32±0.8	6.47±1.7*	5.27±0.8	6.19±1.4*
Systolic blood pressure, mm Hg	134.8±21.6	148.2±21.3*	133.2±21.1	149.4±20.7*	131.1±19.5	148.5±22.6*
Diastolic blood pressure, mm Hg	86.2±12.5	94.3±11.2*	85.0±11.8	95.9±12.1*	83.7±10.9	95.1±12.8*
Triglycerides, mmol/L	1.55±0.9	2.36±1.2*	1.43±0.82	2.53±1.1*	1.40±0.81	2.22±1.07*
HDL cholesterol, mmol/L	1.43±0.4	1.23±0.4*	1.47±0.4	1.14±0.3*	1.48±0.4	1.23±0.4*
Total cholesterol, mmol/L	6.05±1.3	6.62±1.4*	6.02±1.3	6.50±1.3*	6.01±1.3	6.37±1.4*
Smoking, %	43.0	38.2	43.6	37.6	45.5	35.4*

Values are means ± standard deviation unless otherwise indicated.
WHO, World Health Organization; NCEP-ATP III, National Cholesterol Education Program-Adult Treatment Panel III; IDF, International Diabetes Federation; HDL, high-density lipoprotein; T2DM, type 2 diabetes mellitus.
*P<0.05 as compared to corresponding group without the metabolic syndrome.

Table 3. Baseline characteristics of 35–64-year-old women in relation to the presence of the metabolic syndrome according to three definitions (WHO, NCEP-ATP III, and IDF)

Parameter	WHO		NCEP-ATP III		IDF	
	no	yes	no	yes	no	yes
N	664	69	540	193	457	276
Age, years	49.6±8.1	54.1±6.6*	48.7±8.0	53.5±7.4*	48.2±8.1	52.9±7.3*
Impaired fasting glucose and T2DM, %	6.2	100*	6.5	38.9*	5.0	31.5*
Ischemic heart disease, %	18.7	26.1	17.4	24.9*	15.8	25.3*
Body mass index, kg/m^2	28.3±5.2	36.4±6.4*	27.0±4.5	34.6±5.6*	26.3±4.2	33.5±5.4*
Waist circumference, cm	83.4±11.9	102.4±14.0*	80.2±10.1	99.1±11.3*	78.4±9.4	96.4±11.3*
Glucose (fasting), mmol/L	5.33±1.0	8.01±3.7*	5.29±1.1	6.39±2.6*	5.24±1.1	6.15±2.2*
Systolic blood pressure, mm Hg	131.3±22.2	154.0±19.6*	128.0±21.4	148.6±20.0*	126.0±20.5	145.7±21.4*
Diastolic blood pressure, mm Hg	81.8±11.5	90.9±12.3*	79.9±11.1	90.4±10.5*	78.8±10.7	89.1±10.7*
Triglycerides, mmol/L	1.41±0.8	2.23±1.2*	1.20±0.6	2.30±1.1*	1.16±0.6	2.04±1.1*
HDL cholesterol, mmol/L	1.61±0.4	1.36±0.4*	1.68±0.4	1.33±0.3*	1.69±0.3	1.41±0.4*
Total cholesterol, mmol/L	6.27±1.4	6.62±1.5*	6.14±1.3	6.76±1.6*	6.07±1.3	6.69±1.5*
Smoking, %	11.4	4.3	12.2	6.7*	12.7	7.6*

Values are means ± standard deviation unless otherwise indicated.
WHO, World Health Organization; NCEP-ATP III, National Cholesterol Education Program-Adult Treatment Panel III; IDF, International Diabetes Federation; HDL, high-density lipoprotein; T2DM, type 2 diabetes mellitus.
*P<0.05 as compared to corresponding group without the metabolic syndrome.

differ in that central obesity is an essential component. In addition, the waist measurement is set at a lower level than in NCEP-ATP III and it is ethnic-specific. However, fasting hyperglycemia is not an obligatory component, which sets it apart from the WHO definition. Thus, the prevalence of the metabolic syndrome within individual cohorts varies with the definition used. In the United States, 39% of adults were classified as having the metabolic syndrome using the IDF definition, a figure that is higher than that estimated by the NCEP-ATP III definition (34.5%) (16). Similarly, in a study done in South Australia, the prevalence of the metabolic syndrome was higher using the IDF definition (22.8%) as compared to the NCEP-ATP III definition (15%) (17). Results of this study have demonstrated a high prevalence of the metabolic syndrome using the new IDF definition. The prevalence of the metabolic syndrome using the IDF definition was higher in men and in women than using the NCEP-ATP III definition and WHO

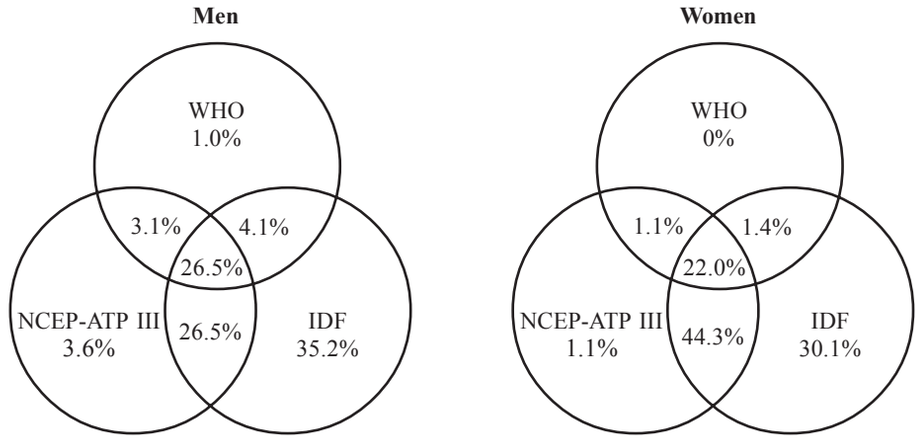

Fig. 2. Venn diagrams showing the agreement and disparity in the diagnosis of the metabolic syndrome using the modified WHO definition, the NCEP-ATPIII definition, and the IDF definition among those 35–64-year-old 196 men and 282 women who qualified for the diagnosis of the metabolic syndrome by at least one of these definitions

WHO, World Health Organization; NCEP-ATP III, National Cholesterol Education Program-Adult Treatment Panel III; IDF, International Diabetes Federation.

Table 4. Age-adjusted odds ratios (OR) for ischemic heart disease among 35–64-year-old persons according to three definitions of the metabolic syndrome (WHO, NCEP-ATP III, and IDF)

Metabolic syndrome definition	Men		Women	
	OR (95% CI)	*P* value	OR (95% CI)	*P* value
WHO	1.85 (0.99–3.45)	0.053	1.25 (0.70–2.25)	0.449
NCEP-ATP III	**1.97 (1.17–3.31)**	**0.010**	1.27 (0.84–1.92)	0.254
IDF	**2.30 (1.44–3.69)**	**0.001**	**1.50 (1.02–2.21)**	**0.039**

WHO, World Health Organization; NCEP-ATP III, National Cholesterol Education Program-Adult Treatment Panel III; IDF, International Diabetes Federation; CI, confidence intervals.

definition (in men 30.0%, 19.4%, 11.3%; in women 37.7%, 26.3%, 9.4%, respectively). Thus, in men and women aged 35–64 years, the IDF definition categorized about 10% more people as having the metabolic syndrome than the NCEP-ATP III definition and about 20% more people than the WHO definition ($P<0.05$).

As expected, the prevalence of the metabolic syndrome varied by age group. We found that the prevalence of the metabolic syndrome increased with age irrespective of the definitions used. The highest prevalence of the metabolic syndrome (irrespective of definition) was recorded in men and women aged 55–64 years. These findings are similar to those of previous reports in the literature that prevalence of the metabolic syndrome increased with age (17, 18).

Recent analyses have estimated that people who have the metabolic syndrome are at increased risk of developing cardiovascular disease (19–22). Data show that the metabolic syndrome-associated increase in the risk of cardiovascular disease may depend on the definition used (6, 22). Our study has demonstrated that 35–64-year-old men diagnosed with the metabolic syndrome using two definitions (IDF and NCEP-ATP III) and women at the same age diagnosed with the metabolic syndrome using the IDF definition were more likely to have IHD compared with those without metabolic syndrome by the same definitions (data adjusted by age). One of the reasons for such differences is the lack of diagnostic concordance between different definitions for the metabolic syndrome. Recent analyses have estimated that about 30% of people appear to be diagnosed by most definitions, and about 35–40% of people diagnosed with the metabolic syndrome is only classified as such using one definition (1). Our study has demonstrated that among people who qualified for the diagnosis of the metabolic syndrome by at least one of these definitions, only about 25% of people appeared to be diagnosable by all three definitions; about 34% of men and 47% of women appeared to be diagnosable by two definitions (major part NCEP-ATPIII and

IDF), and about 40% of men and 30% of women diagnosed with the metabolic syndrome were only eligible for such classification using one definition (particularly using IDF definition). Prospective long-term studies are needed to validate the prognostic power of these definitions of the metabolic syndrome. In recent research literature, there are currently debates regarding the validity of the term metabolic syndrome, but most authors made a conclusion that the presence of one cardiovascular risk factor should raise suspicion that additional risk factors may also be present and encourage investigation (1, 7, 15). On the other hand, as the metabolic syndrome defined by the IDF definition is more prevalent in comparison with the WHO and NCEP-ATP III definitions, its recommends "aggressive and uncompromising" management of those classified to reduce the risk of cardiovascular disease (1, 2, 17). If this definition gains widespread acceptance, then substantially more people will receive management, including drug therapy (17). Therefore, a diagnosis of the metabolic syndrome should be used in order to find high-risk individuals to motivate for lifestyle changes, not to label low-risk individuals. The authors of some studies (23–26) suggested that life-course socioeconomic position appeared to be an important confounder in the association of the metabolic syndrome with IHD risk. In our study, the impact of the socioeconomic status on the IHD was not analyzed, so this is a limitation of this study. Yet, our previous data have showed that combination of the metabolic syndrome defined by the NCEP-ATP III definition and oxidative stress and smoking were associated with IHD among 45–64-year-old persons (27, 28). Therefore, increasing recognition of risk levels in the population with a simple focus on waist size and hypertension, along with corrected lifestyle habits (smoking, physical activity, healthy nutrition habits), are important steps in the addressing metabolic problems. Public health strategies in Lithuania might need to focus on perception and prevention of the metabolic syndrome (diagnosed using the IDF and NCEP-ATP III definitions), as the main risk factor for cardiovascular disease.

Limitation of the study. We cannot assert that the study population of Kaunas city is perfectly representative of the general population of Lithuania.

Conclusion

In Kaunas population aged 35–64 years, the prevalence of the metabolic syndrome diagnosed using the IDF definition was higher in comparison with the WHO and NCEP-ATP III definitions. After adjusting for age, men with the metabolic syndrome according to the IDF definition and NCEP-ATP III definition and women with the metabolic syndrome diagnosed using the IDF definition had a significantly higher risk of ischemic heart disease compared with those without the metabolic syndrome by the same definitions. Metabolic syndrome according to the WHO definition was not associated with a significant risk of ischemic heart disease both in men and women.

Metabolinio sindromo, nustatyto pagal tris skirtingus apibrėžimus, paplitimas ir išeminės širdies ligos rizika tarp vidutinio amžiaus Kauno gyventojų

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Raktažodžiai: metabolinis sindromas, išeminė širdies liga.

Santrauka. *Tyrimo tikslas.* Palyginti metabolinio sindromo, nustatyto pagal trijų skirtingų apibrėžimų, paplitimą ir įvertinti jų ryšį su išemine širdies liga tarp vidutinio amžiaus Kauno gyventojų.

Medžiaga ir metodai. Analizei panaudoti profilaktinės patikros, kuri atlikta 2001–2002 m. vadovaujantis tarptautinės programos MONICA protokolu, 1336 asmenų (603 vyrų ir 733 moterų) 35–64 metų duomenys. Metabolinis sindromas nustatytas remiantis Pasaulinės sveikatos organizacijos, Suaugusiųjų gydymo gairės III ir Tarptautinės diabeto federacijos apibrėžimais. Išeminė širdies liga diagnozuota, remiantis šiais epidemiologiniais kriterijais: persirgtas miokardo infarktas, nustatyta įtampos krūtinės angina ir išeminiai pokyčiai elektrokardiogramoje.

Rezultatai. Metabolinio sindromo dažnis, remiantis Pasaulinės sveikatos organizacijos apibrėžimu, nustatytas 11,3 proc. vyrų ir 9,4 proc. moterų; remiantis Suaugusiųjų gydymo gairės III apibrėžimu, 19,4 proc.

vyrų ir 26,3 proc. moterų; remiantis Tarptautinės diabeto federacijos apibrėžimu – 30,0 proc. vyrų ir 37,7 proc. moterų. Ir vyrų, ir moterų grupėse metabolinio sindromo paplitimas didėjo su amžiumi ($p<0,05$). Vyrams, kuriems nustatytas metabolinis sindromas, remiantis Tarptautinės diabeto federacijos apibrėžimu ir Suaugusiųjų gydymo gairės III apibrėžimu, reikšmingai didino išeminės širdies ligos riziką, palyginus su vyrais, kuriems šio sindromo nerasta (šansų santykis – 2,30 ir 1,97, atitinkamai ($p<0,05$)). Moterims, kurioms nustatytas metabolinis sindromas, remiantis Tarptautinės diabeto federacijos apibrėžimu, reikšmingai didino išeminės širdies ligos riziką (šansų santykis – 1,50; $p=0,039$) palyginus su moterimis, kurioms šio sindromo nerasta. Tiek vyrams, tiek moterims metabolinis sindromas, nustatytas remiantis Pasaulinės sveikatos organizacijos apibrėžimu, nebuvo reikšmingai susijęs su išeminės širdies ligos rizika.

Išvada. Tarp 35–64 metų Kauno gyventojų didžiausias metabolinio sindromo dažnis nustatytas taikant Tarptautinės diabeto federacijos apibrėžimą. Metabolinis sindromas, nustatytas remiantis Tarptautinės diabeto federacijos ir Suaugusiųjų gydymo gairės III apibrėžimais, reikšmingai didino riziką vidutinio amžiaus žmonėms sirgti išemine širdies liga.

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