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THE PREVELANCE OF METABOLIC SYNDROME ON THE SAMPLE OF PARAMEDICS

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Abstract

Objectives: The term metabolic syndrome (MetS) refers to the coexistence of interlinked risk factors of metabolic origin, contributing to the development of arteriosclerotic cardiovascular diseases as well as type 2 diabetes and their cardiovascular complications. The aim of the study is the assessment of the prevalence of MetS among paramedics of the Świętokrzyskie Center of Emergency Medical Services, depending on the adopted diagnostic criteria. **Material and Methods:** The study included 140 paramedics (2 women and 138 men), aged 23–60 years old (median = 43 years, average age = 41.5 years, standard deviation = 10.8 years). The age distribution of the subjects was significantly different from the normal distribution (p-value < 0.0001). The oldest age group (50 years old and above) was overrepresented by nearly a half compared to the youngest group (up to 29 years old). Metabolic syndrome was defined on the basis of the International Diabetes Federation (IDF) criteria from 2005 and IDF in agreement with the American Heart Association/National Heart, Lung and Blood Institute (AHA/NHLBI) from 2009. **Results:** According to the IDF/2005 criteria, in which the necessary condition is the diagnosis of central obesity, MetS was recorded in 26.4% of the subjects (37 people). This is statistically significantly less often than the IDF/AHA/NHLBI/2009 definition of p = 0.001 – 35%. The frequency of the MetS occurrence was statistically significantly related to the age of the subjects and the age groups. **Conclusions:** The prevalence of the MetS in the subject group is evaluated to be significant. The prevalence of MetS is diversified by the applied diagnostic criteria with age being the factor increasing its frequency. The most common factor influencing the prevalence of MetS is blood pressure and waist circumference. Int J Occup Med Environ Health 2018;31(6):741–751

Key words:
Metabolic syndrome, Paramedics, Prevalence, Criterion, IDF/2005, IDF/2009

INTRODUCTION

The term „metabolic syndrome" (MetS) was used for the first time in 1981 and was defined by the researchers Hanefeld and Leonhart [1]. The components of the syndrome include: obesity, hyperlipidemia, diabetes, gout and hypertension, while its development is favored by: excessive food consumption, lack of physical activity and genetic predisposition [1]. However, the above cited researchers were not the first ones who made an attempt at systematizing the notion of metabolic syndrome. The first report is associated with the name of Dutch scientist Nicolaas Tulp and his work published in 1641, entitled

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Observationum medicarum libri tres [2]. The studies on MetS are still the subject of several scientific publications. The interests of contemporary researchers involve the etiology and pathogenesis of MetS, resulting from the possibilities provided by technological development, related particularly to molecular, genetic and new studies.

The growing epidemiological problem of MetS made it necessary to adjust the diagnostic criteria and devise it so that everyday clinical practice would not limit the possibility of application and in a simple way allow us to diagnose MetS.

Metabolic syndrome has been defined by the World Health Organization (WHO) [3], the European Group for the Study of Insulin Resistance (EGIR) [4], the National Cholesterol Education Program (NCEP), the Adult Treatment Panel (ATP III) [5,6], the American Association of Clinical Endocrinologist (AACE) [7]. The adopted criteria were criticized and they were applied in various degrees. Researchers involved in the assessment of MetS prevalence, applying different criteria obtained a different degree of its prevalence [8,9]. Therefore, there was the need to devise a uniform diagnostic criteria for MetS.

In 2005, the International Diabetes Federation (IDF) announced diagnostic criteria for defining MetS, being a modification of the NCEP-ATP III criteria. The essential condition of MetS diagnosis involves central obesity. The definition of MetS does not take into account the drug resistance to insulin given that the latter is highly connected to the central obesity and as such there is no need to focus on it. In line with IDF/2005, the occurrence of MetS is confirmed by: central obesity (≥ 94 cm (males – M), 80 cm (females – F)) and at least 2 out of 4 following factors: triglycerides concentration ≥ 150 mg/dl, high-density lipoprotein (HDL) cholesterol concentration – men: < 40 mg/dl; women: < 50 mg/dl, blood pressure: systolic ≥ 130 mm Hg or diastolic ≥ 85 mm Hg, fasting glucose concentration ≥ 100 mg/dl (≥ 5,6 mmol/l) [10] (Table 1). An obvious advantage of this definition is its simplicity, facilitating diagnostics and identification of individuals with MetS. However, the assumption that MetS may only occur in people with central obesity seems controversial. This criticism resulted in further adjustments – NCEP-ATP III [11].

Table 1. Definition of metabolic syndrome according to International Diabetes Federation (IDF) [10]

Factor	Reference values
Essential condition	
central obesity	waist circumference – men: > 94 cm; women: > 80 cm in the European population; and specific values for other ethnic groups. If body mass index (BMI) equals > 30 kg/m^2, the measurement of waist circumference is not necessary to determine central obesity
Additional criterion[a]	
triglycerides	≥ 150 mg/dl (≥ 1.7 mmol/l) or hypertriglyceridemia treatment
high density liprotein (HDL) cholesterol	men: < 40 mg/dl (< 1.03 mmol/l); women: < 50 mg/dl (< 1.29 mmol/l) or the treatment of low HDL cholesterol concentration
blood pressure	systolic ≥ 130 mm Hg or diastolic ≥ 85 mm Hg, or the treatment of pre-diagnosed hypertension
fasting glucose	≥ 100 mg/dl (≥ 5.6 mmol/l); or pre-diagnosed diabetes. If fasting glucose concentration has a higher value than the one stated above, it is necessary to conduct the oral glucose tolerance test (OGTT), which is not essential to diagnose metabolic syndrome

[a] At least 2 out of 4 factors.
Based on: Zimmet et al. [10].

Table 2. Modified International Diabetes Federation (IDF) criteria in agreement with American Heart Association/ National Heart, Lung and Blood Institute (AHA/NHLBI) from 2009 [12]

Essential condition[a]	Reference values
Waist circumference (dependent on the population group)	Caucasian ≥ 94 cm (males (M)), ≥ 80 cm (females (F)) American (USA, Canada) ≥ 102 cm (M), ≥ 88 cm (F) Middle East and Mediterranean countries ≥ 94 cm (M), ≥ 80 cm (F) Asian ≥ 90 cm (M), ≥ 80 cm (F)
Triglycerides	≥ 150 mg/dl or administered hypolipemizing treatment
High density liprotein (HDL) cholesterol	< 40 mg/dl (M), < 50 mg/dl (F) or administered treatment
Blood pressure	≥ 130/85 mm Hg or administered antihypertensive treatment
Glycemia	≥ 100 mg/dl or applied hypoglycemic treatment

[a] At least 3 out of the factors.
Based on: Alberti et al. [12].

The consensus in this issue involves the criteria from 2009, announced by the IDF in agreement with the American Heart Association/National Heart, the Lung and Blood Institute (AHA/NHLBI). According to their recommendations, for the evaluation of MetS, 3 out of 5 factors need to be confirmed: central obesity (≥ 94 cm (M), 80 cm (F)), triglycerides concentration ≥ 150 mg/dl, HDL cholesterol concentration < 40 mg/dl (M), < 50 mg/dl (F), values of blood pressure ≥ 130/85 mm Hg and glycemia ≥ 100 mg/dl [12] (Table 2).

The term metabolic syndrome refers to the coexistence of interlinked risk factors of metabolic origin, contributing to the development of arteriosclerotic cardiovascular diseases as well as type 2 diabetes and their cardiovascular complications. Dominating etiological MetS factors include closely interrelated abdominal obesity and drug resistance to insulin [11,13].

The most recognized elements of MetS are among others: higher blood pressure [6]. Inclusion of the higher blood pressure into the diagnostic criteria of MetS results most likely for the fact that among around 50% of the patients with blood pressure, the drug resistance to insulin is also recognized. Those patients are at the same time in the risk group of the cardiovascular diseases [14].

The aim of the study is the assessment of the prevalence of MetS among paramedics of the Świętokrzyskie Center of Emergency Medical Services depending on the adopted diagnostic criteria.

MATERIAL AND METHODS

The studies were carried out in the Research Studies Laboratory of the Institute of Medical Sciences, the Faculty of Medicine and Health Sciences of the Jan Kochanowski University in Kielce, in the framework of the conducted research project financed with the statutory research funds, the title of which is Professional Suitability of Paramedics through the Psychophysical Aspects like Obesity and Coherence. The studies were approved by the Bioethical Commission, permit No. 14/2014 and the management board of Świętokrzyskie Center of Emergency Medical Services (ŚCRMiTS) in Kielce. The studies were carried out between October–December 2015.

The subject group comprised of emergency medical professionals of the Świętokrzyskie Center of Emergency Medical Services in Kielce (ŚCRMiTS) excluding doctors. The group selection was based on target screening. The inclusion criteria of the studied group included:

– possessing qualifications which entitle a person to work in emergency medical teams with the exclusion of doctors (the aim was to focus on paramedics themselves, not the emergency teams which include doctors and/or nurses),
– active performance of the job paramedics,
– performing emergency medical activities in out-of-clinic conditions and Emergency Communication Center.

The study included 140 paramedics (2 female and 138 male), aged 23–60 years old (median (Me) = 43 years, mean (M) = 41.5 years, standard deviation (SD) = 10.8 years). The age distribution of the subjects was significantly different from the normal distribution (p-value < 0.0001). The oldest age group (50 years and above) was overrepresented by nearly a half more compared to the youngest group (up to 29 years). A degree in the profession of emergency medical services was declared by 133 people (95% of all participants), and 7 people (5%) had a nursing background.

The studies were conducted by a qualified nurse in a treatment room of certain Ambulance Stations and Substations of ŚCRMiTS. The procedure involved a questionnaire interview, blood pressure measurements, taking fasting venous blood samples as well as anthropometric measurements.

Assessment of health

Blood pressure measurements were performed according to the recommendations included in the 2013 European Society for Hypertension/European Society for Cardiology (ESH/ESC) Guidelines concerning the procedure in the case of blood hypertension – the Working Group of the European Society for Hypertension (ESH) and European Society for Cardiology (ESC) for hypertension management [15] by means of a semi-automatic (one model) auscultatory sphygmomanometer, at rest, when seated, on the right upper arm.

Biochemical tests included fasting lipidogram and fasting glycemia. Fasting venous samples were collected while the subject was seated, by means of a vacuum system, the transport (max 2 h) temperature was the same as the temperature of the diagnostic laboratory of the Provincial Polyclinic Hospital in Kielce. The blood samples were coded, the questionnaire interview was designated with the same number. Blood tests were performed by means of the biochemical AU 680 Beckman Coulter analyzer. Beckman Coulter reagents were used in order to mark total and HDL cholesterol, triglycerides and glucose. Low-density lipoprotein (LDL) cholesterol concentration was calculated by means of the Friedewald formula.

Waist circumference was measured with an approved BASELINE anthropometric tape. The measurement was performed when the subject was in an upright positon, the measurement taken between the costal margin and iliac wings.

Metabolic syndrome (MetS) was defined on the basis of the IDF criteria (International Diabetes Federation) from 2005 and IDF in agreement with AHA (American Heart Association)/NHLBI (National Heart, Lung and Blood Institute) from 2009 (Tables 1 and 2).

Statistical analysis

For data compilation, a Microsoft Excel 2010 worksheet was used. The statistical analysis was performed by means of MS Excel, Statistica (StatSoft, Inc. (2014) programs: Statistica (data analysis software system), version 12 and R version 3.1.2.

In order to present quantitative data, the minimum, maximum, average, median and standard deviation were applied. The distributions of qualitative data were described by means of absolute values and percentages. The normality of the distributions was evaluated with the use of the Shapiro-Wilk test. In the case of qualitative data: for the assessment of the significance of differences between the groups, the analysis of variance or the Kruskal-Wallis test was applied (when ANOVA assumptions were not met). After rejecting the hypothesis on the ba-

sis of a lack of differences between the groups, multiple comparisons tests were used (the *post-hoc* Tukey test or the signed-rank test). The correlation between qualitative data was analyzed by means of the Pearson linear correlation coefficient or Spearman's rank correlation coefficient. The association between the qualitative data was determined by means of the Chi^2 test or the Fisher's exact test. All applied statistical tests were two-tailed. A statistical significance was confirmed when the p-value was lower than 0.05.

Examination findings presented in the study are part of a more comprehensive project relating to the professional suitability of paramedics.

RESULTS

Prevalence of the MetS factors

Metabolic syndrome was not found in 2 female study participants. The prevalence of the MetS components in the subject group were compiled (IDF/2005 and IDF/NHLBI/AHA/2009) (Table 3). Hypertension was the most frequently diagnosed abnormal score (or administered antihypertensive treatment), which was diagnosed in 75% of the subjects. It statistically significantly varied in the subject age groups (p = 0.03). The least frequent was a low HDL concentration, which concerned 20.7% of the subjects. Glucose concentration increased statistically significantly with age. Abnormal values were found in 24.3% of all subjects. Abnormal triglycerides concentrations were present in the oldest group (40–49 years) – 54.1%, and the greatest percentage of people (60.5%) with excess waist circumference was found in the 50–60-year-olds.

For each subject a number of factors listed in the IDF criteria from 2005 and 2009 was determined. Percentage factors were analyzed: central obesity, triglycerides, HDL cholesterol and glucose concentration, and blood pressure. Only in 5% of all subjects, none of these factors was found, but also in 5% a coexistence of 5 possible factors occurred (group 40–49 years and 50–60 years). In all subjects, 2 MetS factors were found most often – 33.6%. The group up to 29 years old was characterized by the most frequent occurrence of 1 factor, in the group of 30–39 years old and 40–49 years old – 2 factors, while the 50–60-year-olds were characterized by 3 factors (Table 4).

Table 3. The prevalence of metabolic syndrome (MetS) components in the subject age group compiled from IDF/2005 [10] and IDF/NHLBI/AHA from 2009 [12]

Age group	MetS components									
	hypertension[a] (N = 105 (75%))		triglycerides[b] (N = 64 (45.7%))		waist circumference[c] (N = 72 (51.4%))		glycemia[d] (N = 34 (24.3%))		HDL[e] (N = 29 (20.7%))	
	n (%)	p	n (%)	p	n (%)	p	n (%)	p	n (%)	p
≤ 29 years	20 (69.0)	0.03	11 (37.9)	0.31	11 (37.9)	0.32	2 (6.9)	< 0.0001	4 (13.8)	0.66
30–39 years	19 (61.3)	0.03	11 (35.5)	0.31	16 (51.6)	0.32	1 (3.2)	< 0.0001	8 (25.8)	0.66
40–49 years	30 (81.1)	0.03	20 (54.1)	0.31	19 (51.4)	0.32	8 (21.6)	< 0.0001	7 (18.9)	0.66
50–60 years	36 (83.7)	0.03	22 (51.2)	0.31	26 (60.5)	0.32	23 (53.5)	< 0.0001	10 (23.3)	0.66

[a] Blood pressure ≥ 130/85 mm Hg or administered antihypertensive treatment.
[b] Triglycerides concentration ≥ 150 mg/dl or administered hypolipemizing treatment.
[c] ≥ 94 cm (males (M)), ≥ 80 cm (females (F)).
[d] Glycemia ≥ 100 mg/dl or applied hypoglycemic treatment.
[e] High density liprotein (HDL) cholesterol concentration < 40 mg/dl (M), < 50 mg/dl (F) or administered treatment.

Table 4. Metabolic syndrome (MetS) components according to International Diabetes Federation/American Heart Association/ National Heart, Lung and Blood Institute – IDF/ AHA/NHLBI/2009 in the subject group [12]

Age group	Components of metabolic syndrome [n (%)]					
	0	1	2	3	4	5
≤ 29 years (N = 29)	0 (0.0)	14 (48.3)	12 (41.4)	2 (6.9)	1 (3.5)	0 (0.0)
30–39 years (N = 31)	2 (6.5)	10 (32.3)	14 (45.2)	3 (9.7)	2 (6.5)	0 (0.0)
40–49 years (N = 37)	3 (8.1)	6 (16.2)	13 (35.1)	10 (27.0)	3 (8.1)	2 (5.4)
50–60 years (N = 43)	2 (4.7)	7 (16.3)	8 (18.6)	15 (34.9)	6 (14.0)	5 (11.6)
Total (N = 140)	7 (5.0)	37 (26.4)	47 (33.6)	30 (21.4)	12 (8.6)	7 (5.0)

Prevalence of MetS related to applied critieria

IDF/NHLBI/AHA/2009

At least 3 of the analyzed factors were confirmed in 35% of all subjects (49 individuals), therefore showing MetS occurrence, according to the IDF/NHLBI/AHA criteria from 2009.

In the group with MetS, the criterion related to blood pressure (systolic ≥ 130 mm Hg or diastolic ≥ 85 mm Hg or administered antihypertensive treatment) was met by 95.9% (47 subjects) of all individuals in this group, while the exceeded values of systolic and diastolic blood pressure were noted in 32 individuals (in the remaining 14 subjects too high values of blood pressure, systolic or diastolic was observed). The criterion related to triglycerides, waist circumference, glycemia and HDL, was met respectively by 81.6%, 77.6%, 57.1% and 40.8% individuals in the group with MetS (Table 5). The frequency of MetS occurrence was statistically significantly (p-value < 0.001) related to the age of the subjects and in the age groups up to 29 years old, 30–39 years old, 40–49 years old and 50–60 years old equaled respectively 10.3%, 16.1%, 40.5% and 60.5% (Figure 1).

IDF/2005

While evaluating the prevalence of MetS, according to the IDF/2005 criteria, for the occurrence of which central obesity constitutes an essential condition, MetS was recorded in 26.4% subjects (37 individuals), statistically

Table 5. Prevalence of metabolic syndrome (MetS) components among researched people with MetS according to Diabetes Federation/American Heart Association/National Heart, Lung and Blood Institute (IDF/AHA/NHLBI)/2009 [12] and IDF/2005 [10]

Factor	Subjects [n (%)]	
	IDF/AHA/NHLBI/2009 (N = 49)	IDF/2005 (N = 37)
Waist circumference/central obesity (≥ 94 cm (males (M)), ≥ 80 cm (females (F))	38 (77.6)	37 (100.0)
Triglycerides (≥ 150 mg/dl)	40 (81.6)	29 (78.4)
High density lipoprotein cholesterol (HDL) (< 40 mg/dl (M))	20 (40.8)	14 (37.8)
Blood pressure (≥ 130/85 mm Hg)	47 (95.9)	35 (94.6)
Glycemia (≥ 100 mg/dl)	28 (57.1)	20 (54.1)

significantly less often than in the case of the IDF/AHA/NHBLI/2009 definition, at p = 0.001. In this group, blood pressure was also a factor present most often and concerned 94.6% of the subjects with MetS. Next, the following was noted: triglycerides – 78.4%, glycemia – 54.1%, the lowest percentage was obtained in the scope of HDL cholesterol – 37.8% (Table 5). The average age in the group with MetS was significantly higher in comparison with the group without MetS (48.9 years old vs. 38.8 years old, p < 0.0001). The frequency of MetS occurrence was significantly correlated with age (p = 0.0002) and in the age groups ≤ 29 years old, 30–39 years old, 40–49 years old, 50–60 years old equaled respectively 6.9%, 12.9%, 27% and 48.8% (Figure 1).

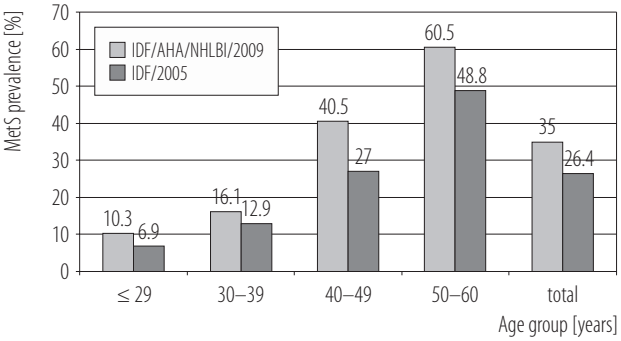

Fig. 1. Prevalence of metabolic syndrome (MetS) evaluated in accordance with International Diabetes Federation/American Heart Association/National Heart, Lung and Blood Institute (IDF/AHA/NHLBI/2009) [12] and IDF/2005 [10] in general and in age groups

DISCUSSION

Main points of the study are prevalence of MetS factors and diagnostic differences resulting from application of different criteria.

The attempt to assess the degree of MetS prevalence and its components was made because of the current state of increase of prevalence and clinical significance of their occurrence and due to the fat that MetS constitutes a risk factor in cardiovascular diseases and type 2 diabetes. The presence of MetS increases the risk of cardiovascular diseases twofold, raising the risk of the development of type 2 diabetes 5 times, increases the chances of general mortality by 6–7% and due to cardiovascular reasons, by 12–17%, with cardiovascular death occurring 3.5–5.5 times more often in patients with MetS as compared with the general population [16–19]. For each subject, a number of the MetS risk factors was determined, included in the discussed criteria. Only in 5% of subjects, none of these factors was found. The most frequently noted abnormal score was hypertension (or administered antihypertensive treatment), which was diagnosed in 75% of the subjects. The least frequent was HDL concentration, which concerned 20.7% of the subjects. Similarly, in NATPOL PLUS (Nadciśnienie Tętnicze w Polsce Plus Zaburzenia Lipidowe i Cukrzyca – the Arterial Hypertension in Poland Plus Lipid Disorders and Diabetes) (NCEP-ATP III) studies, an increased blood pressure was the most frequently revealed deviation from the adopted values and concerned 69% of men. Followed by an increase of triglycerides concentration – 34% [20] in our own studies – 45.7%. In PONS studies the most frequently observed abnormality was abdominal obesity and it concerned 75.1% of the subjects. Hypertension came second – 71%. Lastly, similar to our own studies, was the low HDL concentration [21]. The studies conducted in the European countries of Italy and France confirm increased blood pressure to be the most common abnormality [22,23].

Metabolic syndrome evaluated according to the IDF/AHA/NHLBI criteria from 2009 and IDF from 2005, was found respectively in 35% and 26.4% of all subject paramedics in the Świętokrzyskie Province (23–60-year-olds). Authors have not encountered any other study similar to theirs done on the sample of paramedics. The prevalence of MetS in general population in the Świętokrzyskie Province is revealed by the results of PONS studies (IDF/AHA/NHLBI/2009). According to these studies, MetS concerned 39.5% of the general population and

49.9% of men (45–64 years) [21]. The degree of prevalence of the MetS occurrence in Poland was assessed by (criteria NCEP-ATP III) the NATPOL PLUS studies – 20.3% of the general population and 18% of men, Pol-MONICA (Multinational Monitoring of Trends and Determinants in Cardiovascular Disease – Polish arm) studies – 20% men aged between 35–64 years old and WOBASZ (Wieloośrodkowe Ogólnopolskie Badanie Stanu Zdrowia Ludności – the Multi-center National Population Health Examination Survey) studies – for men: 26% (AHA/NHLBI/2005) or 30.7% (IDF/2005) or 19.5% (NCEP-ATP/2001) or 22.80% (NCEP-ATP/2005) [20,24–26].

Among 40- and 50-year-old men from Wrocław, MetS was confirmed at the level of 35.5% (IDF/AHA/NHBLI/2009) and 31.4% (IDF/2005). In the division into age groups, the researchers noted the degree of MetS prevalence for 40-year-olds at 40.5% and 27% and for 50-year-olds at 42.1% and 36.6% [27]. In the subject study group, higher indicators were found. In the group of 40–49-year-olds, it was 40.5% and 27%, and in the group of 50–60-year-olds, it was significantly higher – 60.5% and 48.8%. A higher indicator of the MetS occurrence according to IDF/2005, than in our own studies, was obtained by a researcher in the male population of the employees in the KGHM „Polska Miedź SA" holding company (402 men, 30–60 years old) – 44.78% of all subjects [28]. Literature of the subject confirms a growing tendency of MetS along with age [20,21,26,28–31]. Such a correlation was also achieved in our own studies. The frequency of the MetS occurrence was statistically significantly correlated with the age of the subjects and in the age groups up to 29-year-olds, 30–39-year-olds, 40–49-year-olds and 50–60-year-olds and equaled respectively 10.3%, 16.1%, 40.5% and 60.5% according to IDF/AHA/NHBLI/2009 and 6.9%, 12.9%, 27%, 48.8% according to IDF/2009. Among the inhabitants of the Świętokrzyskie Province (IDF/2009) aged between 45–49 years old, the MetS prevalence equaled 27%, 50–54-year-olds almost – 35%, 55–59-year-olds – slightly higher than 40%, 60–64-year-olds – 47% [21], so a lower frequency than in our own studies. Among men from Wrocław, MetS was evaluated at the level of 30.4% in 40-year-olds, and 42.1% in 50-year-olds [28]. The differences in the values between our own studies and the cited ones may result from the significant difference of the number of participants in the subject groups. A higher prevalence of MetS occurrence obtained in particular age groups among paramedics and a confirmed upward tendency may be worrying and may constitute the basis for providing medical care for this group. It should be emphasized that in the youngest group up to 29 years old, MetS, depending on the adopted criteria, was found at the level of 10.3% and 6.9%. In further age brackets the frequency of MetS almost doubled, with the exception of the last group, where a smaller increase was observed.

Extensive studies on MetS show several associations of the occurrence and prevalence of MetS. It was observed, among others, that in people with metabolic syndrome the risk of cardiovascular diseases and diabetes increased proportionally to the number of the MetS components [32]. In the group of emergency medical professionals with MetS (IDF/2009) the criterion of blood pressure was met by 95.9%, triglycerides 81.6%, waist circumference – 77.6%, hyperglycemia – 57.1% and HDL – 40.8% individuals with MetS. Taking the above into consideration, activities aimed at the prevention of cardiovascular complications and the development of diabetes in the subject group of emergency workers with MetS should become a priority, and in the broader perspective, a decrease in the predicted prognosis of metabolic syndrome in the assessment of risk related to cardiovascular and diabetes mortality.

The results of the conducted analyses point to the difference between the achieved degree of the MetS prevalence in the subject group, depending on the applied diagnostic criteria. Metabolic syndrome was found statistically more often according the IDF/AHA/NHBLI/2009 crite-

ria – 35% than IDF/2005 – 26.4% in the general population. The difference was also visible in age groups. Differences in the level of MetS prevalence, depending on the adopted criteria, have been confirmed in several scientific publications and raise further doubts, among others, in the scope of treatment. There have not been any prospective clinical studies conducted, either, which would assess how MetS treatment affects prognosis. Researchers also indicate the need to diagnose MetS on the basis of prospective clinical observations based on medical evidence (evidence based medicine – EBM) and not on experts' opinions [33,34]. However, one of the important directions of studies on MetS involves the identification of people characterized by an increased risk of cardiovascular disease, who should be provided with relevant medical care [35]. The survey indicates that it will be a clinicist to choose diagnostic criteria followed by appropriate treatment and prevention.

CONCLUSIONS

The prevalence of the MetS in the subject group is evaluated to be significant. The prevalence of MetS is diversified by the applied diagnostic criteria with age being the factor increasing its frequency.

The most common factor influencing the prevalence of MetS is blood pressure and waist circumference.

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