Diabetes & Metabolic Syndrome: Clinical Research & Reviews xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Diabetes & Metabolic Syndrome: Clinical Research & Reviews

journal homepage: www.elsevier.com/locate/dsx

Cardiovascular risk factors: Is the metabolic syndrome related to aging? Epidemiology in a Portuguese population

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ARTICLE INFO

Article history:
Available online xxx

Keywords:
Metabolic syndrome
Diabetes
Hipertension
Anthropometric assessment

ABSTRACT

Aims: The primary objective of our study is to determine the prevalence of the metabolic syndrome in the population. The secondary objective is to determine the prevalence of cardiovascular risk factors, anthropometric alterations and the prevalence of target organ damage and their relationship with aging.
Material and Methods: The sample for the study was obtained by means of a consecutive population-based demonstration in 803 adults over 18 years of age belonging to the labor force of the company Grupo Delta SA. The study was carried out according to the guidelines of the Declaration of Helsinki. The individuals included in the study voluntarily participated, once informed of the purpose of the study, giving their prior verbal consent, to the company's human resources department, in the case of Delta Group workers.
Results: 23.8% of the population has metabolic syndrome more prevalent in males, no smoking, no significant alcohol consumption, sedentary, with a high Body mass index (BMI). Its prevalence increases with age.
Conclusion: We found that the prevalence of metabolic syndrome increases with age and is present in people of working age, increasing the risk of cardiovascular diseases, work-related absences, and socio-economic costs.

1. Introduction

Metabolic syndrome (MS) is recognized by a set of cardiovascular risk factors that usually coincide with insulin resistance and hyperglycemia. The modified National Cholesterol Education Program Adult Treatment Panel III (NCEP/ATP III) (NCEP/ATP III) criteria were used for the diagnosis of the metabolic syndrome [1,2]. A person who had three or more of the following risk components was considered to have MS: fasting glucose greater than 100 mg/dl or on antidiabetic medication [1], high blood pressure (SAD ≥ 130 mmHg and TAD ≥ 85 mmHg) or on antihypertensive medication, triglycerides increase (≥150 mg / dl) or on antihyperlipidemic medication, decreased HDL levels <40 mg/dl in men or < 50 mg/dl in women) and central obesity (waist circumference ≥102 cm in men and ≥88 cm in women) [3]. MS continues to grow worldwide and is related to aging, obesity and lifestyle changes, becoming a public health and clinical problem [3,4]. People with metabolic syndrome are more susceptible to developing type-1 diabetes mellitus, some cancers and cardiovascular diseases [5,6]. increasing the risk of morbidity and mortality. Some studies have attempted to correlate MS with autoimmune diseases, such as rheumatoid arthritis, and these are also considered as cardiovascular risk factors [7].

Several epidemiological studies have detected a great variability in the prevalence of MS at a global level, depending on the geographical area, sex and age group, suggesting relevance in genetic and environmental risk factors, as well as the influence of different diagnostic criteria applied. In the US, data from The Third National Health and Nutrition Examination Survey III (NHANES III) show that 7% of individuals aged 20–29 years, 42% of individuals aged 60–69 years and 44% of individuals over the age of 70 have metabolic syndrome. Still, other studies indicate that the prevalence in Western societies is higher and shows an increasing tendency, as a consequence of the Obesity epidemic, particularly in the younger age groups [8].

The first study on the prevalence of MS in Portugal and its implications on the risk of cardiovascular diseases, designated as VALSIM study, showed that adult patients at primary care level have a higher risk, reaching 27.5%. A total of 16,856 subjects with a

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https://doi.org/10.1016/j.dsx.2018.05.010
1871-4021/

mean age of 58 ± 15.1 years were included. The study results indicate a higher prevalence in women (28.7%) than in men (26%). In terms of geographical distribution, the prevalence of MS presented significant regional variations, being more prevalent in the Alentejo, Madeira and Central regions and less prevalent in the Algarve, Lisbon, the Tagus Valley and the Azores [8]. In Portugal, the VALSIM study showed an increase in the prevalence of MS related to age, body mass index and abdominal perimeter. This study detected an important association between metabolic risk factors, including MS and the occurrence of coronary disease, cerebrovascular accident, and diabetes mellitus [9].

Since this syndrome consists of known cardiovascular risk factors, in which the effect of the different factors is synergistic and multiplicative, greatly amplifying the effects of each, it is often not possible to make a cause-effect relationship between some risk factors and MS.

MS is considered to be an important independent disorder that represents an increased risk of suffering a cardiovascular event and of developing diabetes mellitus type 2 (DM2). Due to the impact of these risk factors, the need for urgent and urgent changes in the mentality of the population and in health policies is obvious. A better understanding of CVR that frequently occur in aggregation frequently leads to the presence of an integral element of the syndrome identified in a given individual to be imperative for the search and recognition of other associated clinical situations, thus leading to early introduction of therapeutic measures, whether pharmacological or not. As a public health problem, policy decisions should be taken to reduce obesity and promote healthy behaviors (habitual physical activity, dietary measures, etc.). As a clinical problem, patients with metabolic syndrome must be identified so that their multiple problems can be solved, thus reducing the associated cardiovascular events, since patients with MS are twice as likely to develop cardiovascular disease in a period of time of 5 years, unlike people without MS. There are no studies that reflect reality in the North of Alentejo. Thus, the primary objective of our study is to determine the prevalence of the metabolic syndrome in the studied geographic area. The secondary objective is to determine the prevalence of cardiovascular risk factors, anthropometric alterations and the prevalence of target organ damage and their relationship with aging.

The interest of the investigation that arises is based on the need to know the prevalence of the metabolic syndrome in Portuguese active population of an area with an important load of Cardiovascular Risk Factors, since patients with MS have an increased risk of developing cardiovascular disease over a period of 5 years.

Knowledge of the reality at the local level will have a real impact on the population, since it can help in the implementation of preventive strategies, thus reducing the incidence of cardiovascular events with the consequent reduction of morbidity and mortality and socio-economic costs derived from these.

2. Materials and methods

2.1. Subjects

The sample for the study will be obtained by consecutive demonstration. The selection of the sample will include patients older than 18 years who work in Grupo Delta S.A.

Exclusion criteria were concomitant serious diseases that may cause alterations in nutritional status: active or curative neoplastic diseases less than 6 months old, eating disorders (bulimia or anorexia), inflammatory bowel disease, pregnant women, terminal patients, advanced renal, hepatic or cardiac insufficiency, dehydration states.

All sample members will be asked to sign an informed consent for inclusion in the study.

An anamnesis will be conducted to investigate smoking habits, exercise habits, previous pathophysiological conditions, family and personal history of cardiovascular diseases.

Both systolic and diastolic blood pressure (SBP and DBP) will be evaluated with a digital sphygmomanometer validated in three serial determinations, after which the arithmetic mean will be discovered.

2.2. Anthropometric assessment

The following anthropometric measures will be determined: weight, height, abdominal perimeter measurement, bitrocantéreo perimeter measurement, body mass index (BMI) (weight in kg / height in cm^2), wrist circumference, abdominal mass index (weight in kg / Waist circumference in cm / perimeter birefrost in cm), waist size index (abdominal perimeter in cm / size in cm^2), relation abdominal perimeter (abdominal perimeter in cm) x body mass index (weight in kg / height in cm^2). For the collection of these measures, an analog scale, a height measuring device incorporated into the scale with a right angled square bracket and adapted measuring tape will be used. Participants will be weighed in underwear, barefoot, standing in the center of the scale without support and with the weight distributed on both feet. Individuals will be measured standing, erect, barefoot, feet, heels and knees together; the head will be aligned in Frankfurt plane (orbital arch at the same level as the ears). The measurement will be made at the end of a maximum inspiration, the result being recorded in centimeters with a decimal. The abdominal perimeter will be measured based on the midpoint of the distance between the last floating rib and the iliac crest.

2.3. Laboratory assays

In addition, the following biochemical parameters will be determined in the Santa Luzia Hospital of Elvas laboratory: hemogram, renal and hepatic profile, total cholesterol, HDL cholesterol, LDL cholesterol, basal glycemia, fasting insulinemia, HbA1c, uric acid, Albuminuria.

All elements of the sample will be submitted to 12-lead ECG to assess LVH according to Sokoloft-Lyons criteria. Three-channel electrocardiograph will be used.

2.4. Statistical analysis

In addition to the descriptive statistics procedures, the Student's *t*-test will be performed in order to study the differences between the sexes with respect to the quantitative variables. The univariate association between quantitative variables will be explored through the Pearson correlation model. The multivariate analysis will be performed following the multiple linear regression model. Any level of $p < 0.05$ will be considered significant. For statistical analysis SPSS software for Windows will be used.

3. Results

The sample of this work is made up of 803 people, of which 434 (54%) are female and 369 are male (46%). 23.8% of people were diagnosed with metabolic syndrome and 56.5% (n = 108) are men (Graphic 1). The ages vary between 18 and 75 years, with a mean age of 44.62, with the standard deviation of 10.27.

Of the individuals in the sample, 43.3% (n = 348) were between 31 and 45 years of age, followed by the group with less than 30 years, corresponding to 30.7% of the people (n = 247), then age

Please cite this article in press as: A.S. Ribeiro, et al., Cardiovascular risk factors: Is the metabolic syndrome related to aging? Epidemiology in a Portuguese population, Diab Met Syndr: Clin Res Rev (2018), https://doi.org/10.1016/j.dsx.2018.05.010