

# Prevalence of Metabolic Syndrome in Outpatients of the Institute of Cardiology of Rio Grande do Sul

Márcia Bopp and Sandra Barbiero

Instituto de Cardiologia do Rio Grande do Sul - Fundação Universitária de Cardiologia - IC-UFC, Rio Grande do Sul, Brasil

## Summary

**Background:** Metabolic syndrome (MS) is considered a very important factor in the development of cardiovascular diseases (CVD).

**Objective:** To assess the prevalence of metabolic syndrome (MS) in outpatients undergoing secondary prevention of coronary artery disease in the Institute of Cardiology, University Foundation of Cardiology – IC-UFC, as well as to detect excess weight through body mass index (BMI) and the prevalence of abdominal obesity in patients with cardiovascular disease (CVD).

**Methods:** The final sample was comprised of 151 individuals (aged between 26 and 84 years) whose data were obtained from the first visit in which the following parameters were available: fasting blood tests, blood pressure (BP) measurement, waist circumference (WC) in centimeters, weight and height, gender and age. The NCEP-ATP III criteria were used for the assessment of MS.

**Results:** 64.9% of the sample was comprised of males. The overweight and obesity rates found were 50% and 21.3%, respectively; increased WC was found in 30.8% of the individuals, 20 of whom were men and 25 were women. The prevalence of MS, as diagnosed according to the NCEP-ATP III criteria, was 61.5%, including 54 men and 39 women.

**Conclusion:** We verified that the prevalence of MS in patients with CVD in the outpatient clinic for secondary prevention of CAD at IC-UFC is high, and so are the prevalences of overweight, obesity and increased WC. (Arq Bras Cardiol 2009; 93(5) : 439-442)

**Key Words:** Metabolic syndrome; prevalence; outpatients; Cardiology Institute (RS); Brazil.

## Introduction

Metabolic syndrome (MS) is considered a very important factor in the development of cardiovascular diseases (CVD) and has become increasingly more common in the United States<sup>1</sup>. Its prevalence has grown in the past decades, affecting 20 to 25% of the general population<sup>2</sup>, especially Afro-descendants, Mexican Americans and Hispanics<sup>3,4</sup>. Currently, there are approximately 47 million Americans with metabolic syndrome<sup>1,4,5</sup>. Epidemiological studies consider weight gain as an independent risk factor for the development of MS<sup>5,6</sup>, and central fat distribution plays an important role in cardiovascular events<sup>7</sup>. According to recent data from the World Health Organization (WHO), 44.58% of the Brazilian adult population is overweight and 12.41% is obese<sup>8</sup>.

Evidence shows that overweight and obesity predispose to the development of insulin resistance as well as of other characteristics of MS<sup>9-11</sup>. Hans et al<sup>12</sup> demonstrated that a waist circumference (WC) greater than 102cm in men and 88cm in women identifies a higher risk for CVD<sup>12</sup>. In Isooma et al<sup>13</sup> study, in turn, a two to three-fold higher

risk of cardiovascular morbidity was found in individuals with MS<sup>13</sup>.

In a study conducted in a Brazilian city in the State of Sao Paulo, the population showed an unfavorable cardiovascular profile associated with high rates of abdominal obesity<sup>14</sup>. In a rural area of the State of Bahia, Brazil, 30% of the population studied was diagnosed with MS. Of this total, 15% presented obesity and 41.3%, overweight, as classified using body mass index (BMI = kg/m<sup>2</sup>)<sup>15</sup>.

In view of the data presented, the objective of this study was to evaluate the prevalence of MS in patients seen in the outpatient clinic for secondary prevention of coronary artery disease (CAD) at the Institute of Cardiology of Rio Grande do Sul – University Foundation of Cardiology (IC-UFC), and to detect excess weight through BMI, as well as the prevalence of abdominal obesity in CVD.

## Methods

This retrospective cross-sectional study was approved by the Ethics Committee of the University Foundation of Cardiology and was based on the analysis of medical records of a target population comprised of patients followed-up in the outpatient clinic for secondary prevention of CAD at the Institute of Cardiology from August 2004 to December 2006. It included men and women of any age, in a total of 151 patients.

**Mailing Address:** Márcia Silva Bopp •

Rua Professor Pedro Santa Helena, 329 - Porto Alegre / RS - 91410-150

E-mail: marcia.bopp@via-rs.net

Manuscript received May 03, 2008; revised received September 14, 2008;

accepted September 25, 2008.

The population of this outpatient clinic was comprised of all patients who had been hospitalized in the IC-UFC, via the Brazilian Federal Health System, with the diagnosis of first acute myocardial infarction (AMI) and were seen in the outpatient clinic one month after discharge. At discharge, the patients were given a customized diet prescription provided by the nutritionist, and medical advice regarding the medications to be used as well as a referral to the outpatient clinic.

Data were obtained from the first visit in which the results of fasting blood tests, blood pressure (BP) measurements, WC in centimeters, weight and height were available; gender and age were also recorded. BP was measured with an aneroid sphygmomanometer with scale from 0 to 300 mmHg, with the patient in the sitting position, after a 5-minute rest, according to recommendations of the IV Brazilian Guidelines on Hypertension<sup>16</sup>. Waist circumference was measured with a flexible tape measure to the nearest 0.1 cm, midway between the lower costal margin and the iliac crest. Weight and height were measured using a platform scale with 100g precision for weight and 5cm precision for height, with the patient wearing a minimum of clothing and barefoot while standing on the scale, feet slightly apart and in a straight line, arms extended along the body and neck and head straight.

### Diagnostic criteria

For the assessment of MS, we used the National Cholesterol Education Program's Adult Treatment Panel III (NCEP-ATP III) definition, which requires at least three of the following criteria: abdominal obesity (WC greater than 102cm and 88cm for men and women, respectively); hypertension, defined by blood pressure levels equal to or higher than 130/85 mmHg; impaired glucose tolerance (fasting blood glucose between 110 and 125 mg/dL); hypertriglyceridemia (triglycerides(TG) equal

to or higher than 150 mg/dL); and low serum HDL-C levels (lower than 40 mg/dL for men and 50 mg/dL for women)<sup>1</sup>.

The WHO's classification was used to define overweight and obesity, where overweight is classified as a BMI equal to or higher than 25 kg/m<sup>2</sup> and obesity as a BMI equal to or higher than 30 kg/m<sup>2</sup> <sup>8</sup>, by dividing weight in kilograms by square height in meters (kg/m<sup>2</sup>).

### Statistical analysis

The SPSS version 15.0 software was used to carry out a descriptive analysis of the results, using the absolute and relative frequencies for categorical variables, and mean ± standard deviation (SD) for continuous variable, 95% confidence interval. The chi square test was used for comparison of the categorical variables. Results with  $p < 0.05$  were considered significant.

### Results

The final sample was comprised of 151 individuals; for 39 of them data were incomplete. Of the individuals with incomplete charts, 21.9% had three or more missing data, whether for BP measurement, height, weight, or blood tests.

The general sample characteristics are shown in Table 1. The male gender accounted for 64.9% of the sample; age ranged from 26 to 84 years; the mean BMI found was 27.64 kg/m<sup>2</sup>. The overweight and obesity rates were 50% and 21.3%, respectively, meaning that the weight of more than half of the sample was above healthy levels.

The prevalence of diabetes was 26%, and of impaired glucose tolerance was 31.9%; hypertension was found in 100% of the individuals, of which 98.7% were taking oral antihypertensive medication. Increased TG levels ( $\geq 150$  mg/dL) and decreased HDL-C levels were found in 94.6% and 56.1% of the individuals, respectively, with 88.7% of the sample taking oral lipid-lowering agents. Of the individuals with low HDL-C levels, 36 were men ( $\leq 40$  mg/dL) and 28 were women ( $\leq 50$  mg/dL); increased WC was found in 30.8% of the individuals, of whom 20 were men and 25 were women. The prevalence of MS, according to the NCEP-ATP III criteria, was 61.5%, including 54 men and 39 women (Table 2). If only the 112 patients who had medical charts with complete information had been considered, the prevalence of MS would be of 73.2%.

The sample was divided into three groups of approximately 50 individuals each, of three age ranges: 26 to 51 years; 52 to 62 years, and above 62 years, in order to verify differences in the prevalence of MS. No statistically significant difference was observed in the prevalence of MS among the age ranges, as can be observed in Table 3. When the diabetic group was compared to the non-diabetic group in relation to BMI  $\geq 25$  kg/m<sup>2</sup> and increased WC, no statistical difference was found between them either (Table 4).

### Discussion

The 61.5% MS prevalence found in the population studied is very high if compared to the rates of 20 to 25% found in the general population<sup>2</sup> and of 30%, on average among Afro-descendants, Mexican-Americans and Hispanics<sup>3,4</sup>. However,

Table 1 – General sample characteristics.

| Characteristic individuals*     | Value obtained from the sample of 151 |
|---------------------------------|---------------------------------------|
| Male gender                     | 64.9%                                 |
| Female gender                   | 35.1%                                 |
| Age (years)                     | 56.96±11.49                           |
| Weight (kg)                     | 75.2±13.93                            |
| Height (m)                      | 1.64±0.09                             |
| BMI (kg/m <sup>2</sup> )        | 27.64±4.68                            |
| Systolic Blood Pressure (mmHg)  | 132.55±22.43                          |
| Diastolic Blood Pressure (mmHg) | 79.56±11.37                           |
| Fasting plasma glucose (mg/dl)  | 114.02±56.07                          |
| Triglycerides (mg/dL)           | 153.10±97.26                          |
| HDL-C (mg/dL)                   | 43.87±10.48                           |
| HDL-c (mg/dl)                   | 43,87 ±10,48                          |

\* Values expressed as mean ± standard deviation or proportions (%).

this rate is close to that found by Pimenta et al<sup>17</sup> of 69.2% of MS in patients undergoing coronary artery bypass grafting in a hospital in the city of Sao Paulo<sup>17</sup>, thus showing that individuals with some associated disease are at greater risk of developing the characteristics that comprise the MS.

However, these rates are quite different among populations: 34.3% in 294 Filipina women and 12.9% in 379 Caucasian women with mean age of 60 years, all living in San Diego, California<sup>3</sup>; 21.4% in 98 native Japanese living in Japan, and 37.5% in 104 Japanese-Brazilians living in Brazil<sup>18</sup>; 35.5% in 200 patients of both genders and varying ages undergoing cardiologic follow-up in the State of Sao Paulo<sup>19</sup>; and 46.7% in 633 patients diagnosed with acute myocardial infarction in hospitals in France<sup>20</sup>.

Individuals with weight above healthy levels have been shown to be more exposed to cardiovascular risk factors related to MS<sup>6,21</sup>. In the present study, the prevalence of overweight and obesity, as well as of increased WC was not different from those observed in previous studies that showed a correlation of increased BMI and central fat distribution with increased cardiovascular risk<sup>9,11,22-24</sup>. Although overweight and obesity are also associated with the development of type-2 diabetes<sup>9,25,26</sup>, no statistically significant difference was found between diabetic and non-diabetic patients of the study population in relation to increased BMI and WC.

The high rate of individuals with hypertension and hypertriglyceridemia found in this study is greater than those found in similar studies that found a mean prevalence of 35% and 30%, respectively<sup>4,5</sup>. This is probably explained by the fact that this is a biased population sample, with individuals with CVD. Who had at least one episode of AMI each, and were consequently taking oral antihypertensive and lipid-lowering drugs.

The study population was also distinct in relation to the age of the individuals, which did not influence the prevalence of MS, as occurred in several studies that demonstrated increased prevalence of MS in more advanced ages<sup>4-6,15</sup>. Probably, many risk factors for the development of MS are present among this heart disease patient population, with no significant variations with age.

The number of medical charts with incomplete data may be considered a limitation of the present study. Another limitation may have been the small number of patients included, consequently leading to results without statistical significance when data such as age, MS, diabetes, WC and BMI were cross-correlated.

## Conclusions

This study demonstrated that the prevalence of MS in patients with cardiovascular diseases followed-up in the outpatient clinic for secondary prevention of CAD at IC-UFC is high, and so are the prevalences of overweight, obesity and increased waist circumference.

Based on the evidence presented, we observed that the weight of more than half of our population is above healthy levels, and the number of individuals with MS is increasing in our country. Therefore, the control of the risk factors for the development of MS is fundamental, especially in high-risk populations such as CVD patients.

**Table 2 – Metabolic Syndrome (MS) components**

| Components                              | Prevalence in the 151 individuals* |
|---|------------------------------------|
| Diabetes Mellitus                       | 26%                                |
| Fasting plasma glucose $\geq$ 110 mg/dL | 31.9%                              |
| Hypertension                            | 100%                               |
| Use of antihypertensive agents          | 98.7%                              |
| TG $\geq$ 150 mg/dL                     | 94.6%                              |
| HDL-C $\downarrow$ (M / W)              | 56.1% (36 / 28)                    |
| Use of oral lipid-lowering agents       | 88.7%                              |
| WC $\uparrow$ (M / W)                   | 30.8% (20 / 25)                    |
| Metabolic syndrome (M / W)              | 61.5% (54 / 39)                    |

\* Values expressed as proportions (%)

**Table 3 – Metabolic syndrome in three different age ranges.**

| Groups         | Prevalence |
|----------------|------------|
| 26 to 51 years | 60.4%      |
| 52 to 62 years | 63.3%      |
| > 62 years     | 61.2%      |

\* Values expressed as proportions (%)  
p value = 0.954

**Table 4 – Comparison between the diabetic and non-diabetic groups.**

| Groups   | BMI $\geq$ 25 <sup>1</sup> | Increased WC <sup>2</sup> |
|----------|----------------------------|---------------------------|
| DM       | 74.4%                      | 35.1%                     |
| Non - DM | 70.0%                      | 28.7%                     |

\* Values expressed in proportions (%)

<sup>1</sup> p = 0.756

<sup>2</sup> p = 0.598

## Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

## Sources of Funding

There were no external funding sources for this study.

## Study Association

This article is part of the conclusion of the Integrated Residence in Health submitted by Márcia Silva Bopp, from Instituto de Cardiologia do Rio Grande do Sul – Fundação Universitária de Cardiologia – IC/FUC.

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