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Prevalence and risk factors for metabolic syndrome in Medellin and surrounding municipalities, Colombia, 2008–2010

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ABSTRACT

Objective. We assessed the prevalence of and risk factors for metabolic syndrome (MetS) among adults 25–64 years of age from Medellin and surrounding municipalities, Colombia.

Method. We used 2008–2010 data from the Antioquia STEPwise approach to Surveillance (STEPS), a multi-stage complex cross-sectional survey designed according to World Health Organization guidelines. The revised 2005 International Diabetes Federation definition of MetS was used.

Results. There were a total of 3000 participants. Of these, 21.4% had high blood pressure (HBP) and 64% had abdominal obesity (AO). In the subsample with serum data (n = 943), 19.8% had high fasting serum glucose, 43.9% had high triglycerides (HTG), and 56.6% had low HDL cholesterol (L-HDL). Among those with data to define MetS (n = 901), 41% had MetS. Older age was associated with MetS and all components except L-HDL. Female sex [odds ratio (OR) = 2.85, 95% confidence interval (CI): 2.20–3.70], being married (OR = 1.40, CI: 1.09–1.82), and high physical activity (OR = 0.59, CI: 0.39–0.91) were associated with AO, smoking with HTG (OR = 1.76, CI: 1.16–2.67) and L-HDL (OR = 1.67, CI: 1.10–2.51) and rural residence with HBP (OR = 3.42, CI: 1.83–6.37) and L-HDL (OR = 1.18, CI: 1.10–2.51).

Conclusion. The prevalence of MetS and AO was high in this Colombian region. Targeted strategies for promoting healthy behaviors are needed.

Introduction

According to the World Health Organization (WHO), cardiovascular diseases (CVD) are a global health problem responsible for approximately 30% of deaths in the world, with 80% of these experienced by individuals in low to middle income countries (WHO, 2011). CVD has emerged as a public health concern in Latin America due to recent economic changes and evolving infrastructure that have led to a transition to a western diet and lifestyle (Albala et al., 2001). One measure of CVD risk is metabolic syndrome (MetS), a condition defined as the clustering of risk factors for CVD and type 2 diabetes. Findings from a meta-analysis showed relative risks of 1.35 for increased mortality, 1.53 for incidence of CVD, 1.52 for coronary heart disease (CHD), and 1.76 for stroke comparing individuals with MetS to those without (Galassi et al., 2006). Although the current global prevalence of MetS is not known, it is likely to be high since 6.4% of the world population had diabetes in 2010. Global prevalence of diabetes is predicted to increase to 7.7% by 2030, with the largest increase in developing versus already developed countries (69% versus 20%) (Shaw et al., 2010).

Although there have been studies that have assessed the prevalence of MetS in Colombia, these have been conducted in specific subgroups, such as children (Villa-Roel et al., 2009), college students (Feliciano-Alfonso et al., 2010), middle-aged university employees (Dosman et al., 2009; Trivino et al., 2009), pilots (Arteaga-Arredondo and Fajardo-Rodríguez, 2010), and employed men (Mesa et al., 2011). Furthermore, risk factors for MetS and its components in Latin America have seldom been investigated. For example, in the Cardiovascular Risk Factor Multiple Evaluation in Latin America (CARMELA) study, a cross-sectional study that investigated CVD risk factors in seven Latin American cities including the city of Bogota in Colombia (Escobedo et al., 2009), risk factors for MetS were not assessed. We assessed the prevalence and risk factors for MetS and its components using data from a representative sample of adults from Medellin, the second largest city in Colombia, and data from other municipalities in Antioquia, one of the 32 departments in Colombia.

Materials and methods

Sample

We used data from the STEPwise approach to Surveillance (STEPS) survey that was conducted in Antioquia, Colombia from 2008 to 2010 among adults between the ages of 25–64 years (n = 3000). The STEPS survey is a

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multi-stage complex sample cross-sectional survey designed by the World Health Organization (WHO) to have a standardized method of collecting, analyzing, and disseminating chronic disease health data (self-reported, physical examination, and serum laboratory data) from various countries among adults 25 to 64 years of age (WHO, 2012). Country needs and resources dictate the available data in each STEPS survey. More details about the survey are available in the WHO STEPS website (WHO, 2012). Serum laboratory data were only available in a subsample (n = 943), which consisted of residents of Medellin and the municipalities of Itagui and Copacabana.

Outcome measures

The revised 2005 International Diabetes Federation (IDF) definition for MetS and abdominal obesity for Ethnic Central and South American was used (Alberti et al., 2009). In the revised IDF definition, abdominal obesity was no longer a required component to define MetS. Specifically, MetS was defined as having ≥3 of the following risk factors: abdominal obesity (men: ≥90 cm; women: ≥80 cm); high triglyceride levels (≥150 mg/dl); low high-density lipoprotein (HDL) cholesterol (men: <40 mg/dl; women: <50 mg/dl); high blood pressure (HBP) (≥130 mm Hg systolic BP or ≥85 mm Hg diastolic BP, or taking antihypertensive medication); high fasting serum glucose (≥100 mg/dl or taking diabetes medication).

Exposure measures

The exposure variables included in this study and in all logistic regression models are shown in Table 2 and are based on self-report. Socioeconomic status was based on place of residence (e.g., zip code) and census data for Antioquia. Physical activity (PA) level was based on the Global Physical Activity Questionnaire tool (WHO, 2010).

Analyses

Stratified analyses were conducted to assess the weighted prevalence of the metabolic syndrome and its components by sex and age group, as recommended in the WHO STEPS guidelines for analyzing and presenting results (WHO, 2012). In addition, logistic regression analyses were conducted to investigate risk factors for MetS and its components, with regressions adjusting for all variables in Table 2. All analyses were weighted and adjusted for survey design. Statistical significance was set at 0.05 alpha level. All analyses were conducted using STATA software version 10.0 (StataCorp, 2001).

Results

Data for high blood pressure was available on 2957 adults and abdominal obesity on 2928 adults. Data for fasting serum glucose, triglycerides and HDL cholesterol were only available for 943 residents from Medellin, Itagui and Copacabana. Data on diabetes medication and fasting serum glucose was available on 1026 adults. Metabolic syndrome status could only be determined for the 901 participants having complete data for the five components of the metabolic syndrome. Among these 901 participants, 277 (30.7%) were males and 624 (69.3%) were females. The sample included 141 adults (15.6%) between 25 and 34 years of age, 175 (19.4%) between 35 and 44 years of age, 273 (30.3%) between 45 and 54 years of age, and 312 (34.7%) adults between 55 and 64 years of age.

The weighted prevalence estimates of MetS and its five components both overall and among the 8 strata of age group and sex are shown in Table 1. The overall prevalence of MetS was 40.7% (confidence interval, CI: 36.4–45.3), of high fasting serum glucose 19.8% (CI: 15.8–24.4), of HBP 21.4% (CI: 17.9–25.5), of high triglycerides 43.9% (CI: 39.8–48.0), of low HDL cholesterol 56.6% (CI: 51.2–61.8), and of abdominal obesity 64.0% (CI: 59.4–68.4). Males and females tended to have similar overall prevalence estimates of both MetS and its five components except for high triglycerides, which was approximately 14% higher in males (53.1% vs. 39.1%), and abdominal obesity, which was approximately 26% higher in females (74.5% vs. 48.9%). Prevalence of HBP and abdominal obesity was significantly

Table 1
Weighted prevalence estimates of the metabolic syndrome and its components by sex and age group—WHO STEPS, Medellin and surrounding municipalities, Colombia, 2008–2010.

	Prevalence % (95% CI)					
	Metabolic syndrome (≥3 risk factors)[a]	High fasting blood glucose[a]	High blood pressure	High triglyceride levels[a]	Low HDL cholesterol[a]	Abdominal obesity
Unweighted sample size	n = 901	n = 1026	n = 2957	n = 943	n = 943	n = 2928
Men						
25–34 years	–	–	–	–	–	36.1 (27.8–45.4)
35–44 years	–	–	18.3 (13.0–25.2)	64.6 (58.6–70.1)	–	49.8 (42.3–57.3)
45–54 years	–	–	31.9 (24.8–40.1)	64.7 (49.9–77.1)	60.1 (39.0–77.9)	58.2 (49.0–66.9)
55–64 years	46.9 (44.1–49.7)	31.9 (26.2–38.1)	39.8 (32.6–47.4)	56.5 (46.5–66.0)	44.0 (38.0–50.3)	62.6 (55.3–69.4)
All ages	39.3 (31.0–48.3)	18.4 (13.8–24.1)	20.7 (16.1–26.1)	53.1 (46.1–60.0)	48.1 (36.4–60.1)	48.9 (43.5–54.4)
Women						
25–34 years	–	–	–	–	58.6 (52.3–64.5)	62.8 (55.3–69.7)
35–44 years	37.9 (30.7–45.6)	–	13.1 (10.1–16.8)	37.8 (28.4–48.2)	70.4 (44.2–87.7)	72.2 (66.8–77.2)
45–54 years	48.0 (33.6–62.7)	28.0 (22.3–34.4)	33.0 (28.4–37.9)	41.0 (33.5–49.0)	56.8 (44.7–68.1)	80.5 (77.8–83.0)
55–64 years	57.5 (48.0–66.6)	33.6 (28.3–39.3)	44.8 (40.4–49.3)	52.0 (37.4–66.3)	59.1 (54.4–61.8)	87.4 (83.7–90.3)
All ages	41.5 (36.5–47.1)	20.4 (15.2–27.0)	21.9 (17.0–27.8)	39.1 (34.8–43.6)	60.9 (53.6–67.7)	74.5 (70.3–78.3)
Total	40.7 (36.4–45.3)	19.8 (15.8–24.4)	21.4 (17.9–25.5)	43.9 (39.8–48.0)	56.6 (51.2–61.8)	64.0 (59.4–68.4)

– Data of estimates from a sample of less than 30 are considered statistically unreliable and therefore not shown (Centers for Disease Control, Prevention, 2002).

[a] Data for fasting serum glucose, triglycerides and HDL cholesterol were only available for a maximum of 943 (unweighted sample size) residents from Medellin and two surrounding municipalities (Itagui and Copacabana). Metabolic syndrome status could only be determined for 901 participants having complete data for the five components of the metabolic syndrome. Sample size for high fasting serum glucose is greater than 943 due to the addition of the question "taking anti-diabetic medication" to its definition, which was available for all 3000 participants (unweighted sample size) of the Antioquia stepwise survey.