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Chronic obstructive pulmonary disease and body mass index in five Latin America cities: The PLATINO study

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Summary

Background: The body mass index (BMI) is a prognostic factor for chronic obstructive pulmonary disease (COPD). Despite its importance, little information is available regarding BMI alteration in COPD from a population-based study. We examined characteristics by BMI categories in the total and COPD populations in five Latin-American cities, and explored the factors influencing BMI in COPD.

Methods: COPD was defined as a postbronchodilator forced expiratory volume in the first second/forced vital capacity (FEV₁/FVC) <0.70. BMI was categorized as underweight (<20 kg/m²), normal weight (20–24.9 kg/m²), overweight (25.0–29.9 kg/m²), and obese (≥30.0 kg/m²).

Results: Interviews were completed in 5571 subjects from 6711 eligible individuals, and spirometry was performed in 5314 subjects. There were 759 subjects with COPD and 4555 without COPD. Compared with the non-COPD group, there was a higher proportion of COPD

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subjects in the underweight and normal weight categories, and a lower proportion in the obese category. Over one-half COPD subjects had BMI over 25 kg/m². No differences in BMI strata among countries were found in COPD subjects. Factors associated with lower BMI in males with COPD were aging, current smoking, and global initiative for chronic obstructive lung disease (GOLD) stages III–IV, whereas wheeze and residing in Santiago and Montevideo were associated with higher BMI. In females with COPD, current smoking, lower education, and GOLD stages II–IV were associated with lower BMI, while dyspnea and wheeze were associated with higher BMI.

Conclusions: BMI alterations are common in COPD with no significant differences among countries. Current smoking, age, GOLD stages, education level, residing in Santiago and Montevideo, dyspnea and wheeze were independently associated with BMI in COPD.

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Introduction

Chronic obstructive pulmonary disease (COPD) has been re-defined¹ to indicate that, apart from the deleterious effects on the lungs, the disease is associated with clinically relevant extrapulmonary manifestations.^{2–11} Systemic consequences now recognized as important features of the disease contribute to exercise intolerance, decreased health status, and increased mortality.^{7,12–19} Among the most extensively studied systemic features are unexplained weight loss, alterations in the body mass index (BMI) and in body composition. Data from epidemiologic studies have shown that the prevalence of COPD is higher in those patients with lower BMI.^{20,21} In addition results from longitudinal studies have shown that low BMI is an important risk factor for subsequent development of COPD in men, for increased FEV₁ decline in the same gender and for having a new exacerbation in patients hospitalized for severe exacerbation.^{22–24} BMI has also been identified as an independent prognostic factor for COPD, with a clear association between decreased BMI and increased mortality, both in clinical patient series and in subjects from a population sample.^{1–3,18,19} Several studies indicate that the prevalence of nutritional abnormalities increases from 20% in stable outpatients up to 35% in patients eligible for pulmonary rehabilitation.^{25–27}

To date, most studies concerning the prevalence of nutritional depletion in COPD have been performed in selected populations.^{26,28–33} In general they found that the prevalence of nutritional depletion in COPD was high, especially in females, and was not associated with lower levels of airway obstruction. Despite the fact that nutritional depletion has been associated with different deleterious effects and important outcomes in patients with COPD, little information is available regarding BMI alteration in COPD patients from a multicenter population-based study that includes spirometry.^{18,19} Population-based studies are necessary because they represent more accurately the total spectrum of patients with the disease, thus allowing unbiased inferences. Furthermore, it is still unclear if BMI alteration in COPD is associated with the severity of airflow limitation or with other factors like gender, age, ethnicity, education, employment, tobacco consumption, clinical symptoms, and geographical variation.

The aims of this study were (a) to evaluate the characteristics by BMI categories of the total population

and of subjects with COPD drawn from a multicenter population-based survey conducted in five Latin American cities and (b) to explore the possible factors that influence BMI in COPD.

Methods and materials

The Proyecto Latinoamericano de Investigación en Obstrucción Pulmonar (PLATINO) study was a population-based epidemiologic study conducted in five Latin American cities: São Paulo (Brazil), Santiago (Chile), Mexico City (Mexico), Montevideo (Uruguay), and Caracas (Venezuela).²⁰ Complete details of the methodology and detailed descriptions of participation rates and sample characteristics have been published elsewhere.^{20,34–36} Briefly, a two-stage cluster sampling method was used at each site in order to obtain a probability sample of households. All adults aged 40 or older living in the selected households were invited to participate. Exclusion criteria for the study were mental illness and institutionalization. Approval was obtained from the ethical committee of the institutions involved in the study and written informed consent was obtained from each subject.

Information was collected on several factors potentially associated with COPD, including age, sex, ethnicity (self-reported), smoking habits, years of formal education, employment, respiratory symptoms, and prior spirometric testing. Copies of the questionnaires are available at the PLATINO website (<http://www.platino-alat.org>). A portable, battery-operated, ultrasound transit-time-based spirometer (Easy-One™; NDD Medical Technologies, Chelmsford MA and Zürich, Switzerland) was used to perform pulmonary function testing. Calibration was checked daily with a 3-liter syringe. Subjects performed up to 15 forced expiratory maneuvers (average 5–6) to obtain three American Thoracic Society (ATS) acceptable maneuvers, with forced vital capacity (FVC) and forced expiratory volume in the first second (FEV₁) reproducible within 150 mL.³⁷ Albuterol 200 mcg was then administered by inhalation through a 500-ml spacer, and the test was repeated 15 min later (average 4–5 maneuvers). All spirometric examinations were carried out with the subject seated, using a nose clip and a disposable mouthpiece. Exclusions for spirometry included recent thoracic or abdominal surgery, myocardial infarction, eye surgery or retinal detachment, hospitalization for any cardiac

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