Inter-relationships Between Body Mass Index, C-reactive Protein and Blood Pressure in a Hispanic Pediatric Population

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BACKGROUND
The link between inflammation, obesity, and cardiovascular disease (CVD) has been described in adult populations but few data are available with respect to children. The aim of this study was to describe the inter-relationships between adiposity, C-reactive protein (CRP) plasma concentrations, and blood pressure levels in a Hispanic pediatric population.

METHODS
We included 325 schoolchildren (mean age, 10.0 years) selected from the school population of Bucaramanga, Colombia. Blood pressure, lipid profile, glucose, and CRP plasma concentration were measured using standard procedures. Body mass index (BMI) was used for evaluating the children's nutritional condition. Correlation coefficients were calculated for all the variables using Spearman's test.

RESULTS
As expected, a positive correlation was found between BMI and systolic blood pressure (SBP) in both genders, and between CRP and SBP levels in boys. After a multivariate regression analysis, the association between adiposity and blood pressure remained significant, whereas the CRP concentrations were no longer associated with SBP.

CONCLUSIONS
The results obtained in our study of Hispanic school-age children show that adiposity is correlated with CRP concentrations and SBP values as has been earlier described in Caucasian populations. However, we failed to find a significant relationship between low-grade inflammation and SBP levels. Further studies are needed in order to explore alternative pathophysiological mechanisms linking obesity and high blood pressure in children and to define the impact of these associations on the cardiovascular risk of our pediatric population.


Obesity in childhood and adolescence has become a global epidemic over the past few decades. This major health problem is of particular relevance in developing countries, where it coexists with the transplanted lifestyle characterized by a high intake of high-calorie foods, animal fats, and processed sugars, along with deficient physical activity. Further, results from the most recent US National Health and Nutrition Examination Survey (NHANES) showed higher rates of overweight and obesity in children from minority groups when compared with non-Hispanic whites, thereby suggesting that the Hispanic pediatric population has an ethnic predisposition to develop increased adiposity.

Overweight and obesity in childhood are factors that induce a high risk of morbidity and mortality from cardiovascular diseases (CVDs). Obesity is a common cause of insulin resistance in children, and is associated with an increasing risk of dyslipidemia, type 2 diabetes mellitus, and atherosclerosis. Essential hypertension, most commonly found in adults, may also have its origins in childhood obesity. It has been earlier reported, in studies of pediatric populations, that systolic and diastolic blood pressures are significantly and positively related to body mass index (BMI).

Adipose tissue produces proinflammatory cytokines that stimulate the hepatic synthesis of C-reactive protein (CRP). Plasma concentrations of CRP are a highly sensitive measure of overall inflammatory activity, and are significantly correlated with adiposity levels and components of the metabolic syndrome in adults. A high CRP level has also been shown to be a predictor of CVDs such as myocardial infarction and stroke. Studies performed in pediatric populations from developed countries have shown that the association between cardiovascular risk factors and CRP concentrations in children seems to be similar to that found in adult populations.