

INTERACTION BETWEEN AIR POLLUTION AND BMI OVER LUNG FUNCTION AND EXHALED NITRIC OXIDE IN A COHORT OF ADOLESCENTS OBESE IN MEXICO CITY

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Background and Aim. Both, obesity and asthma are common conditions. Air pollution has been associated with decreased lung function and higher inflammation. The combined effect of weight loss and air pollution on lung function and inflammation had not been evaluated. We conducted a study to evaluate the effect of air pollution and weight-loss on lung function and airway inflammation in obese adolescents with and without asthma.

Methods: We studied a cohort of 121 asthmatic and 226 non-asthmatic adolescents with obesity, followed by 12 months average during a weight loss intervention program. Spirometric tests and measurements of FeNO were conducted each month during follow-up. Exposure was estimated from outdoor PM_{2.5} concentrations recorded by the Mexico City government at fixed-site central monitoring (RAMA). Data were analyzed using linear mixed effects models.

Results: PM_{2.5} concentrations ranged 4.6 to 56.8 $\mu\text{g}/\text{m}^3$ during study period (mean=25.8 $\mu\text{g}/\text{m}^3$). Mean BMI (kg/m^2) decreased from 30.2(SD=4.8) to 27.5 (SD=4.4) after 5 months of follow up average (2-22 months), 76 participants (22.4%) lost weight at 5% or more. At baseline, FeNO was higher among asthmatics than non asthmatics (41.7 vs 33.7 ppb, $p<0.05$); but no difference was observed for FEV₁, FVC and FEF₂₅₋₇₅. Days with high exposure (PM_{2.5}>25 $\mu\text{g}/\text{m}^3$) were associated with 1.06 ppb increase in FeNO, and inversely associated with FEV₁ (\bullet =-73.7 ml, $p= 0.004$) and FVC (\bullet =-125 ml, $p=0.033$). FEV₁ and FVC increased when lost weight 79.9 (95% CI:23.0, 136.8)ml and 69.4 (95% CI:-19.2,0.158.0) ml respectively, and fef₂₅₋₇₅ increased 131.0(95%CI:12.9,149.2) ml. FeNO decreased by 15 % (6.2 ppb) significantly, $p<0.05$. However the improvement in lung function was different on days with low and high pollution.

Conclusion: Weight reduction in obese adolescents is associated with improved lung function and reducing inflammation of the airways, this change might be altered by exposure to environmental pollutants.

References: Xu X, Yavar Z, Verdin M, et al. Effect of early particulate air pollution exposure on obesity in mice: role of p47phox. *Arterioscler Thromb Vasc Biol.* 2010 Dec;30(12):2518-27.