Obesity as a susceptibility factor to indoor particulate matter health effects in COPD

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Abstract

Our goal was to investigate whether obesity increases susceptibility to the adverse effects of indoor particulate matter on respiratory morbidity among individuals with chronic obstructive pulmonary disease (COPD).

Participants with COPD were studied at baseline, 3 and 6 months. Obesity was defined as a body mass index ≥30 kg·m^{-2}. At each time point, indoor air was sampled for 5–7 days and particulate matter (PM) with an aerodynamic size ≤2.5 μm (PM2.5) and 2.5–10 μm (PM2.5–10) was measured. Respiratory symptoms, health status, rescue medication use, exacerbations, blood biomarkers and exhaled nitric oxide were assessed simultaneously.

Of the 84 participants enrolled, 56% were obese and all were former smokers with moderate-to-severe COPD. Obese participants tended to have less severe disease as assessed by Global Initiative for Chronic Obstructive Pulmonary Disease stage and fewer pack-years of smoking. There was evidence that obesity modified the effects of indoor PM on COPD respiratory outcomes. Increases in PM2.5 and PM2.5–10 were associated with greater increases in nocturnal symptoms, dyspnoea and rescue medication use among obese *versus* non-obese participants. The impact of indoor PM on exacerbations, respiratory status and wheeze also tended to be greater among obese *versus* non-obese participants, as were differences in airway and systemic inflammatory responses to indoor PM.

We found evidence that obesity was associated with exaggerated responses to indoor fine and coarse PM exposure among individuals with COPD.