

TITLE: Association between Household Air Pollution and Lung Function in Adults across 11 Low- and Middle- Income Countries

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STUDENT SUBMISSION: Yes

TOPIC/TARGET AUDIENCE: Air pollution and health/Researchers

ABSTRACT: Background: Globally, household air pollution (HAP) is attributed to 2.6 million deaths annually, most occurring in developing countries where solid fuel combustion for cooking is a common practice. Lung function is an important predictor of health and longevity, but few studies have assessed the associations between HAP and lung function across a diverse range of socioeconomic and geographic settings. Objectives: Evaluate the association between HAP and lung function in the prospective urban and rural epidemiology (PURE) study using baseline cross-sectional data. Methods: We studied baseline data (2005-2015) from 77,439 adults at 35 to 70 y of age from 349 urban and rural communities in 11 low- and middle- income countries (Bangladesh, Brazil, Chile, China, Colombia, India, Pakistan, Philippines, South Africa, Tanzania, and Zimbabwe) where solid fuel use was common. Pre-bronchodilator lung function was collected to measure forced expiratory volume in 1 s (FEV1) and forced vital capacity (FVC). We defined airflow obstruction (AO) as FEV1/FVC lower than 70%. We used generalized linear mixed models adjusted for individual, household, and community-level characteristics to compare the levels of FEV1, FVC, and FEV1/FVC, as well as AO prevalence, for individuals living in households that used solid fuels for cooking to those using electricity or gas. Results: We found that 40.3% of participants lived in households using solid fuels as their primary cooking fuel. Compared with electricity or gas, solid fuel use was associated with reductions of -24.67 mL (95% CI: -36.47, -12.88) for FEV1, -19.61 mL (95% CI: -33.32, -5.90) for FVC, and -0.29 (95% CI: -0.53, -0.05) for the FEV1/FVC ratio, adjusting for age, sex, urban/rural status, baseline chronic conditions, ambient PM2.5, BMI, smoking, education, and community and regional random effects. However, compared with electricity or gas, we did not find any association between solid fuel use and prevalence of AO in our fully adjusted models. Conclusion: Use of solid fuels for cooking was associated with reduced lung function across a diverse range of communities and countries.

OBJECTIVE(S): Evaluate the association between household air pollution and lung function in the Prospective Urban and Rural Epidemiology (PURE) study using baseline cross-sectional data.
