

More household air pollution and COPD at higher altitude - a population-based, observational FRESH AIR study in rural Kyrgyzstan

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Aim: Chronic obstructive pulmonary disease (COPD) has become the third leading cause of death worldwide. Household air pollution (HAP) is a major contributor to COPD. Although 400 million people live at high altitude, the association between altitude, HAP-exposure and COPD prevalence remains unclear. Therefore, we aim to compare HAP and COPD between high- and low altitude areas.

Method We conducted a population-based, observational study in a highland and lowland setting in rural Kyrgyzstan. We measured particulate matter with an aerodynamic diameter $<2.5 \mu\text{m}$ ($\text{PM}_{2.5}$) in randomly selected households, performed spirometry with adult residents, and administered a questionnaire. The association between HAP and COPD was assessed using adjusted logistic regression analyses.

Results Complete information was obtained from 199 highlanders and 193 lowlanders (41 households per setting). Highlanders were significantly more exposed to HAP sources (using higher risk types of fuels, stoves, ventilation, and cooking locations) and to $\text{PM}_{2.5}$ (median $\text{PM}_{2.5}$ 290.0 vs 72.0 $\mu\text{g}/\text{m}^3$, $p < 0.001$). COPD and chronic respiratory symptoms were more prevalent among highlanders than lowlanders (36.7% vs 10.4% and 23.6% vs. 7.8% respectively, both $p < 0.001$).

Conclusion In this study, as to date the first spirometry-based prevalence study in Central-Asia, we found a high COPD prevalence in both rural areas. Our study also showed high associated HAP-exposure among both highlanders and lowlanders. Highlanders were significantly more exposed to HAP and suffered from COPD more often. Although generalisability to other highland settings has to be assessed, (preventive) interventions seem of particular importance in these highland settings.

Declaration of Interest

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The authors declare to have no conflicts of interests.