

IMPACT OF AN INDOOR COOK STOVE INTERVENTION ON MEASURES OF SYSTEMIC INFLAMMATION

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Background and Aims: Approximately three billion people use inefficient and poorly-vented indoor cook stoves, which can result in high indoor air pollution concentrations. Few studies have evaluated the cardiovascular effects of indoor biomass burning. Evidence from ambient air pollution research suggests that systemic inflammation plays a central role in the biologic pathway linking air pollution exposure and cardiovascular disease.

Methods: We conducted a pilot-level cook stove intervention in 123 Nicaraguan households. Forty women provided finger-stick dried blood spot samples at baseline and one year following the improved cook stove introduction. We measured several markers of systemic inflammation in the dried blood spots. Additionally, we measured 48-hour indoor particulate matter (PM_{2.5}) concentrations in a subgroup before and after improved stove introduction.

Results: Approximately half of the population reported continued use of the traditional open fire (solely or in conjunction with the improved stove) during the follow-up year. A 68% reduction in PM_{2.5} was observed among the entire sample with exposure data (n=34); a larger reduction (78%) was observed among those not reporting any open fire use in the follow-up year (n=16). Among participants adopting the improved stove (n=18), we observed a 36% mean reduction (95% confidence interval: 1-71%) in C-reactive protein from baseline to follow-up; less consistent associations were observed for other inflammatory markers. We generally observed larger reductions in inflammation among obese participants.

Conclusions: This study incorporated a novel method for measuring systemic inflammation in dried blood. Mixed use of traditional and improved stoves may have limited our ability to detect consistent reductions in inflammatory markers. Given the ubiquity of traditional cook stove use combined with increasing cardiovascular disease and obesity in developing countries, cook stove research should evaluate a broader range of health effects.

This abstract does not necessarily reflect the policies of the U.S. Environmental Protection Agency.