



A Cohort Study of Improved Cookstove Adoption and Acute Respiratory Infection Incidence in Children Under Five in Rural Mchinji, Malawi

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Abstract

Acute respiratory infections (ARIs) are a leading cause of childhood mortality in sub-Saharan Africa. Household air pollution from traditional biomass cookstoves is a significant risk factor. While improved cookstoves are promoted as a public health intervention, evidence of their effectiveness in real-world rural African settings remains limited. This study aimed to quantify the association between improved cookstove adoption and the incidence of acute respiratory infections in children under five years of age in rural Malawi. A prospective cohort study was conducted in rural Mchinji District, Malawi. Households with children under five were enrolled and followed up. Exposure was defined by verified adoption of an improved cookstove (Chitetezo Mbaula). The primary outcome was caregiver-reported ARI symptoms (cough with fever or rapid breathing) in the preceding two weeks. Incidence rates were compared between adopter and non-adopter households using Poisson regression, adjusting for potential confounders. Among 452 children, the adjusted incidence rate ratio for ARI in children from households using the improved cookstove was 0.76 (95% CI: 0.61, 0.94) compared to those using traditional stoves. This represents a 24% reduction in the incidence rate of reported ARI symptoms. Verified adoption of an improved biomass cookstove was associated with a statistically significant reduction in the incidence of acute respiratory infection symptoms in young children in this rural Malawian setting. Programmes promoting improved cookstoves should incorporate robust monitoring of sustained adoption and use. Further research should investigate long-term health impacts and the role of complementary interventions, such as fuel quality and housing ventilation. household air pollution, improved cookstove, acute respiratory infection, child health, Malawi, cohort study This research provides quantitative evidence from a real-world setting on the potential child health benefits of improved cookstove adoption, informing public health policy and intervention design in rural Africa.

Keywords: *household air pollution, acute respiratory infection, improved cookstove, sub-Saharan Africa, cohort study, child health, biomass fuel*

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