



# Impact of a Clean Cookstove Intervention on Acute Respiratory Infection Incidence in Children Under Five in Nyarugusu Refugee Camp, Tanzania

**Godfrey Mwita<sup>1,2</sup>, Amina Juma<sup>2,3</sup>, Neema Ally<sup>4,5</sup>, Baraka Mfinanga<sup>4,6</sup>**

<sup>1</sup> Department of Pediatrics, State University of Zanzibar (SUZA)

<sup>2</sup> Tanzania Commission for Science and Technology (COSTECH)

<sup>3</sup> Department of Clinical Research, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

<sup>4</sup> Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

<sup>5</sup> State University of Zanzibar (SUZA)

<sup>6</sup> Sokoine University of Agriculture (SUA), Morogoro

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**Correspondence:** [gmwita@hotmail.com](mailto:gmwita@hotmail.com)

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## Author notes

*Godfrey Mwita is affiliated with Department of Pediatrics, State University of Zanzibar (SUZA) and focuses on Medicine research in Africa.*

*Amina Juma is affiliated with Department of Clinical Research, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha and focuses on Medicine research in Africa.*

*Neema Ally is affiliated with Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha and focuses on Medicine research in Africa.*

*Baraka Mfinanga is affiliated with Sokoine University of Agriculture (SUA), Morogoro and focuses on Medicine research in Africa.*

## Abstract

Household air pollution from traditional biomass cooking is a significant environmental health risk in humanitarian settings. Acute respiratory infections (ARIs) are a major cause of mortality in children under five. Nyarugusu Refugee Camp in Tanzania relies predominantly on biomass fuels, creating a high-risk environment for paediatric ARI. This study evaluated the impact of a clean cookstove intervention on the incidence of ARIs in children under five residing in Nyarugusu Refugee Camp. A quasi-experimental design was employed. Households with a child under five were allocated to an intervention group receiving a clean cookstove or a control group using traditional three-stone fires. Primary caregivers reported child health symptoms weekly for six months. ARI incidence was defined using WHO integrated management of childhood illness criteria. Data were analysed using Poisson regression. The intervention group experienced a statistically significant reduction in ARI incidence. The incidence rate ratio was 0.72 (95% CI: 0.65–0.80), indicating a 28% lower incidence of ARI in the clean cookstove group compared to the control group. The introduction of clean cookstoves was associated with a substantial reduction in ARI incidence among children under five in a refugee camp setting. This supports clean cooking interventions as an important public health measure to protect child respiratory health in humanitarian

contexts. Programmatic scale-up of clean cookstove distribution in Nyarugusu and similar refugee settings is recommended. This should be integrated with comprehensive health promotion on stove use and maintenance. Further research should assess long-term adherence and health impacts. household air pollution, clean cookstove, acute respiratory infection, refugee health, child health, humanitarian setting, Tanzania This study provides evidence on the effectiveness of a clean cookstove intervention for reducing ARI incidence in young children within a large, protracted refugee camp setting, informing public health policy and programming.

**Keywords:** *household air pollution, acute respiratory infection, cookstove intervention, sub-Saharan Africa, child health, humanitarian setting, randomised controlled trial*

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