Association Between the Type of Fuel Use with Acute Respiratory Infections among Children Under-five in Bangladesh

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Background:

- Acute respiratory infection (ARI), an intense infection that prevents normal breathing function, causes mortality in under five children in Bangladesh.
- Low-income families often depend on the biofuels such as wood, coal, straws, and animal dung as the primary source of energy for cooking and heating, yet 19.0%, 6.8%, and 50.9% of households in Bangladesh use crop, animal dung and wood, respectively, for cooking, heating and lighting.
- Dependence on polluting fuels (wood, coal, crop residues, animal dung, paraffin) for cooking and heating exposes countless women and young children in developing countries to elevated air pollution concentration indoor.
- According to the World Health Organization (WHO), acute respiratory infections kill an estimated 2.6 million children annually worldwide.

Objective:

- To detect the effects of biomass fuel usage on ARI in under five children in Bangladesh.

Methodology (Study Design):

- We used Bangladesh Demographic and Health Survey 2014.
- The mothers of total 7886 children under 5 years were asked about pregnancy, demographic, economic and various health issues, including ARI symptoms.
- A final data set of 966 observations was obtained after excluding non-eligible cases.

Methodology (Statistical Analysis):

- Chi square test was used to identify factors associated with ARI in the children.
- A multiple logistic regression was carried out with the selected predictor variables and variables with a p-value > 0.05 were excluded.
- In the crude model, only the ARI and fuel type was used and for the adjusted model, other confounding variables with ARI were considered.

Crude model

ARI ~ Fuel type

Adjusted model

ARI~ Fuel type + Age(child) + Sex (child) + Residence + Stunting + Wasting + Cooking fuel + Toilet facilities + Medication for intestinal parasites + Education(mother) + Age(mother) + body mass index + Size at birth(child).

Results:

- The crude model of multiple logistic regression analysis showed that the risk for the ARI is 1.63% higher in children where parents use biomass fuel (Table 1).
- When other confounding variables adjusted in adjusted model, the risk is still higher and it is 1.56 (Table 2)

Table 1: Odds ratio of the adjusted multiple logistic regression model

	Relative Risk	95% CI	P-value
Fuel (Biomass vs Fossil)	1.63	1.16 - 2.36	0.007

*Crude Model (only type of fuel used is in the model)

Table 2: Odds ratio of the adjusted multiple logistic regression model

	Relative Risk	95% CI	P-value
Fuel (Biomass vs Fossil)	1.56	0.99 - 2.57	0.049

*Adjusted Model (mother's education and other covariates are in the model)

Key findings:

- The biomass fuel significantly increases children's risk of ARI in Bangladesh.

Limitation of the Data:

This study such as the information was derived from a secondary source, number of children under age of 5 was not enough. Insufficient information was available about usage of fuel.

Conclusions:

This study reveals that biomass fuel significantly increases children's risk of ARI in Bangladesh and our study also suggests that ARI, which is already at a very large scale, is increasing at the double. This findings underscore the need to improve cooking fuel in order to reduce ARI disease in many parts of the country and government should invest greater resources in ARI prevention and control, and explicitly consider ARI as a top priority phase and scenario.

Competing interests: The authors declare that they have no competing interests (financial or non-financial).

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