ABSTRACT

**Background:** Solid fuels are burnt in inefficient stoves in poorly ventilated spaces in close proximity to household members especially women and children creating an exposure situation that lasts literally an entire lifetime in rural households of developing countries. In India, up to 444,000 premature deaths in children under 5 years, 34,000 cases of chronic respiratory disease in women under 45 years are attributable to exposure to Indoor Air Pollution due to solid fuel use by households. The burden of disease attributable to use of biomass fuels in India is estimated as 5-6 percent of the national burden of disease.

Levels of respirable particulate are generally lower in Southern India. There are substantial climatic and socio-cultural differences between the northern and southern regions, including different food habits and the use of solid fuels for heating, which could have an important bearing on household exposures. Hence, generation of region specific health data and information regarding risk factors association with select health outcomes will aid the policy makers to implement appropriate corrective measures. *This study was initiated with an aim to refine the estimates of association between biomass fuel and respiratory illness among rural population of Tamilnadu.*

**Objectives:** To evaluate the association of biomass fuel use with *Acute lower respiratory tract illness* in children under 5; To evaluate the association of biomass fuel use and *Pulmonary TB* in rural women; To estimate the prevalence of *Chronic Obstructive Pulmonary Disease* in rural women.
Methods: Community based longitudinal cohort study was conducted for ARI for a period of one year where 1173 children under five were recruited. A two-week recall of ARI was collected from the primary care giver. Hospital-based 1:2 (100:200) case control study design was chosen for examining the association of IAP and TB. Cross sectional study was conducted for estimating the prevalence of Chronic Obstructive Pulmonary Disease (COPD) and the study included 900 females above 30 years, from 45 rural villages of Tiruvallur district. Exposure and health questionnaires were administered and clinical examination was done. Pulmonary Function Test (PFT) was done for all suspected cases of COPD to confirm the diagnosis. Multiple logistic regression analysis was applied to analyze the impact of several exposure variables on the health outcomes.

Results: Risk of ARI among children of biomass user household is 1.38 times (1.03 – 1.85) higher than clean fuel users and was also higher in male children, young children and in children living in poor hygiene households. Statistically significant association could not be found between the biomass smoke exposure and TB in adult women. The other significant risk factors were poor socio economic status, living indoors, Illiteracy and contact with TB. Overall prevalence of COPD was found to be 2.44% (95% CI 1.43- 3.45). COPD prevalence was higher in biomass fuel users than clean fuel users 2.5% Vs 2 %, and it was two times higher (3%) in women who spend more time in kitchen involved in cooking and it was also higher in women with cooking duration of more than 20 years (2.9%Vs1.2%).

Conclusion: Biomass fuel use shows a significant increase in risk for exposed young children suggesting early implementation of interventions. Despite
cooking smoke being a known risk factor for TB, the evidence of the cause and relationship couldn’t be made out suggesting further exploration. This study has estimated the prevalence of COPD in women among biomass fuel users and is higher than clean fuel users. This observation emphasizes the need for the health-care system to identify this category of vulnerable population in order to prevent progression of the disease and also to implement interventions to reduce the exposure and possibly the risk of COPD.