

COPD 2016: Indoor air pollution and COPD Postgraduate Institute of Medical Education & Research, India

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Over 400 million people worldwide suffer from COPD. The estimated burden in India is around 15 million cases (~ 9 million men and ~ 6 million women). Besides air pollution from smoking, indoor air pollution in particular is a major risk factor for COPD in India and other developing countries. Women cooking with solid fuels have increased respiratory symptoms, including chronic cough and phlegm. Decreased lung function and COPD are present in 7% of the biomass in women who have never smoked in their lives. In contrast, only 1.8% of never-smoking LPG users suffered from COPD. A number of studies have shown that in India the incidence of chronic pulmonary heart is similar in men and women despite the fact that 75% of men and only 10% of women smoke. In women, the chronic pulmonary heart was found to be more common in the youngest. This has been attributed to domestic air pollution due to the combustion of solid biomass fuels leading to chronic bronchitis and emphysema which result in chronic pulmonary heart. A number of studies on our part have shown that exposure to biomass fuel produces various respiratory symptoms, including COPD, impaired lung function (lung function, especially FVC is affected by pollution of the air). indoor air due to domestic cooking more with biomass fuel), high blood levels carboxyhemoglobin levels and respiratory symptoms in children (mixed fuel and kerosene had the worst effects on the respiratory system children whose households used these fuels). The influence on the choice of fuel used is multifactorial, but cost and socio-economic status seem to be the main drivers. Less affluent households spend most of their income on food, clothing and medical expenses. Depending on the availability of biomass fuels and the distance to travel to acquire them, the inhabitants of the least developed countries can devote on average 2 to 3 hours per week to collect biomass, which leaves little or no enough time for education and work, which makes it very difficult for these families to improve their socio-economic status. Poor families in rural areas of developing countries often receive subsidies for clean fuels. However, many return to biomass when they cannot even afford the subsidized fuel, making them dependent on cheaper but dirtier alternatives. The other

important factor is the unavailability of clean fuels in rural areas, due to the lack of a sustainable supply chain mechanism and / or the infrastructure necessary to provide clean fuels. As a result, clean fuel is not available at all or the demand for clean fuel cannot be met in a consistent manner, forcing rural residents to continue to depend on biomass fuels.

Traditional stoves that burn solid fuels have a very low energy conversion efficiency ranging from 12% to 25% depending on the type of fuel. About 8-10% of solid fuels undergo partial combustion, often due to insufficient oxygen supply. As a result, one of the main components of biomass smoke is carbon (5-20% of wood smoke as particulate mass), which is found in the particulate fraction of the smoke and is present in a range particle sizes. Biomass smoke also contains > 250 organic compounds, varying mainly depending on the type of fuel burned and the combustion conditions. Partial oxidation of organic matter generates high levels of carbon monoxide, as well as hydrogen cyanide, ammonia and nitrogen oxides. In addition, a large number of other toxic and carcinogenic compounds, such as polycyclic aromatic hydrocarbons (PAH) (for example benzo [a] pyrene (BaP)), aldehydes and free radicals have been highlighted in the biomass smoke. Although fuels from biomass tend to have low levels of halogenated compounds, they can be contaminated with chemicals such as pesticides or mixed with plastics. Certain varieties of coal, notably in China, have a particularly high content of fluorine or silica. Therefore, the combustion of these specific fuels can result in the production of toxic halogen compounds, such as hydrogen chloride, phosgene, dioxin, chloromethane, bromomethane and other halocarbons.

Bottom line: This abstract is partly presented at 3rd International Conference on Chronic Obstructive Pulmonary Disease on July 11-12, 2016 held at Brisbane, Australia

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