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Effects of burning biomass on health in the developed Countries

J Sallsten*

Department of Geographical & Sustainability Sciences, University of Gothenburg, Lund, Sweden

*Corresponding author. E-mail: joa.sallsten@ac.se

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DESCRIPTION

Burning biomass causes both a process of global change and a geochemical cycling of gases and particles from the biosphere to the atmosphere. Biomass or vegetation burning, which encompasses burning brought on by lightning and human action, refers to the burning of both live and dead plants. A significant quantity of gaseous pollutants and aerosol particles are released into the atmosphere when biomass is burned, which has a negative impact on the environment, human health, and air quality. Burning both live and dead plants, such as grassland, woods, and agricultural waste, counts as burning biomass. It is a multi-step process that includes physical and chemical interactions, heat, and mass motion. Both naturally occurring and man-made fires can burn. Lightning-related fires are an example of natural fires, whereas burning plants for land clearing, repurposing land, and burning fuel wood are examples of man-made fires (Ager AA, 2019). The bulk of air pollution in many European towns occurred locally during the first half of the 20th century as a result of the combustion of fossil fuels for space heating, energy production, and industry. Thus, there were regular and often severe pollution outbreaks, as the smog outbreaks in London and the Meuse valley in Belgium, which were both connected to significant and abrupt increases in mortality. As a result of these and other events, the governments of several nations enacted air pollution limits. But more recent studies have revealed that air pollution continues to harm people's health even at far lower exposure levels.

The burning of agricultural waste and forest fires each generate 23% and 18% of the total emissions globally, respectively, whereas savannah fires account for around 43% of all biomass burning emissions globally. When burned, biomass material emits a wide range of gases, including CO, CO_2, CH_4, volatile and semi-volatile organic compounds, aldehyde, organic acid, and inorganic elements, as well as Particulate Matter (PM). The features of biomass burning depend on the environment, the fuel types burned, the moisture content, the weather, and the biomass's particle size and emission factor. The entire combustion of the biomass materials is ensured by their flaring, whereas their inadequate burning from smoldering results in the more noticeable formation of reactive gases and PM (Particulate Matter) (Beelen R, 2014). The health of humans may be seriously harmed by both gaseous and particle emissions from biomass burning. Biomass burning emissions, sickness and death are strongly correlated, according to epidemiological and toxicological studies. The burning of biomass releases a variety of gases and aerosols into the atmosphere that inevitably have an impact on the earth's radiative budget, visibility, global atmospheric chemistry, local air quality, and biogeochemical cycles.

Health effects of anthropogenic biomass combustion products

While a significant amount of study has been conducted on the harmful health effects of indoor air pollution brought on by biomass burning in underdeveloped nations, very few studies have examined the same issue in wealthy nations. We'll start by going over epidemiological research from areas where burning biomass, primarily wood, is a major source of ambient air pollution. The discussion that follows will focus on smaller-scale studies on people who live in homes that utilize wood for heating and/or cooking. wheeze, chest congestion, worsening lung function, hospitalizations for asthma, and connections between Particulate matter and these diseases in children. Smaller trials often found little evidence on the effects on sudden cardiac arrest, myocardial infarction, and heart rate variability.Particulate matter (Correia AW, 2013).

The effects of residential wood burning as a source of heat on chronic or sub - chronic exposure to biomass PM haven't been the subject of many epidemiological studies. In-depth mobile monitoring and geospatial modelling were done in order to construct a spatio-temporal model of ambient winter wood smoke in metropolitan Vancouver. Then, several health implications were examined using this model. Low birth weight, infant bronchiolitis, otitis media, and COPD hospitalization have all been positively associated. However, no correlation was discovered for either incidence childhood asthma or death from COPD. Studies have calculated the effects of particle source apportionment on acute exposure in areas where biomass combustion is a less significant source of ambient PM (Particulate matter). For instance, relationships between the biomass source percentage and hospital admissions for respiratory and cardiovascular conditions in the elderly (age>65 years) were identified in a Copenhagen research, but not for admissions for asthma-related conditions in children. After accounting for the contributions from other sources, only the relationships with respiratory admissions remained significant (Akagi SK, 2011).

There have been few studies on the effects of wood stove intervention measures on community or family health. Results on effects of interventions such as wood stove change out programmes on ambient PM (Particulate matter) levels in the developed world; shows the effects on indoor PM (Particulate matter) concentrations. A 4-year, survey-based study tracked parent-reported respiratory symptoms and conditions among school children during the community wood stove exchange in Libby, Montana, USA. Significant reductions in reported frequency per 5 $\mu g/m^{-3}$ decline in ambient PM 2.5 were observed for wheeze (27%), irritant symptoms such as watery eyes (33%), cold (25%), bronchitis (55%), flu (52%) and throat infection (45%). The reported cases of ear infections did not significantly decline, although the population under study did not fall into the age range where this ailment affects people most frequently. For school absences, no recurring impacts were seen in the same locality (Anderson JA, 1964).

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