Cardiovascular Risk Associated With Pollution in Indoor Environment

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Abstract:

Air pollution exposure and cardiovascular diseases are closely linked, and this relationship is an increasing global concern. Cumulative exposures to pollutants are associated with various cardiovascular conditions, like myocardial infarction, ischemia, heart failure, leading to high mortality rates. Most of the studies on air pollution and cardiovascular diseases are focused on outdoor air pollution leaving the issues faced by rural populations largely unaddressed. In India, more than five hundred million women cook with solid biomass fuel and are continuously exposed to a host of particulates and pollutants which are emitted in the indoor air. The levels of these pollutants released are higher than the standards given by the National Ambient Air Quality Standard recommended by the US Environmental Protection Agency. In our study, we have measured hypertension and platelet activation which is a risk factor for many cardiovascular diseases. Platelet P selectin and platelet leukocyte aggregates were measured by flow cytometry, soluble P selectin (sP-sel) by Enzyme linked immunosorbent assay (ELISA), platelet aggregation by aggregometry in women cooking with biomass fuel and was compared with control women who cooked with liquefied petroleum gas (LPG). Particulate pollution level in cooking areas was measured for particulate matter less than diameter of 10 microns (PM10) and of less than 2.5 microns (PM2.5), respectively). Women exposed to smoke from biomass fuel burning had elevated P-selectin expression (two-fold increase), higher level of soluble P selectin (nine-fold increase), higher platelet aggregation, increased aggregation of platelet-leukocytes and were more hypertensive. These findings not only predict thrombotic consumptive platelet disorders, but they can also reflect endothelial cell activation and vascular injury. Therefore, women exposed to indoor air pollution from biomass cooking fuels are at a significantly increased risk of developing cardiovascular diseases.

Keywords:

P selectin, cardiovascular, hypertension, indoor air.