

**Particulars of Particulate Pollution...**

Particulate matter (PM) is made up of solid and liquid particles that are discharged directly into the air because of diesel use, road and agricultural dust, and industrial activity. Particulate matter is classified into three main groups: coarse particles (PM<sub>10</sub>), fine particles (PM<sub>2.5</sub>), and ultrafine particles (PM<sub>0.1</sub>). These particle sizes, in general, differ in origin and health effects. These remain suspended in the air leading to air pollution. PM<sub>2.5</sub> comprises particles with an aerodynamic diameter of 2.5 µm or less, capable of penetrating deep into our lungs and even entering our bloodstream. PM<sub>2.5</sub> also contains elevated levels of elements, including Al, As, Br, Ca, Cl, Cr, Fr, K, Mg, Mn, Na, Pb, Ti, and Zn, as well as sulfate, nitrate, and ammonium ions which also have toxic effects.

PM<sub>2.5</sub> is primarily responsible for the air pollution found so rampantly in the metropolitan cities. In addition to its deleterious effects in elderly population with preexisting morbidities such as respiratory and cardiovascular disorders, air pollution has been associated with adverse effects on apparently healthy individuals as well.

The Global Burden of Disease (GBD) study estimated that 5 million deaths are caused by PM<sub>2.5</sub> annually. Primary PM<sub>2.5</sub> particles originate from dust storms, forest fires, fossil fuel combustion, cigarette smoke, and biomass burning. Studies have hypothesized that inhaled PM leads to release of inflammatory cytokines as well as imbalance in the autonomic nervous system (ANS) and neuroendocrine pathway. In the lungs, PM<sub>2.5</sub> damages mucociliary clearance, increases epithelial permeability, inflammation, disrupts the normal physical and immunological function of the lung surfactants and disrupts the expression of toll-like receptors (TLRs).

Recently, chronic exposure to PM<sub>2.5</sub> has been associated with the development of diabetes mellitus (DM), insulin resistance (IR), adipose inflammation, chronic renal disease, and hepatic endoplasmic reticulum (ER) stress. In addition, PM<sub>2.5</sub> influences several other adverse health effects such as bone damage, liver fibrosis, lung cancer, macrosomia, Alzheimer's disease, ovarian dysfunction, hormone dysregulation, and adverse pregnancy outcomes such as preterm birth and hypertensive disorders.

The long-term complications are too catastrophic to ignore any further. We need to plan development that is in sync with nature, sustainable and with no further insults to our ecosystem.

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