What is particulate matter and how does it affect you?

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The major man-made sources of particulate matter are emission from power stations, factories, industries, incinerators, diesel generators and automobiles. | Photo Credit: <u>AP</u>

With air quality in our country deteriorating, it is important to get a handle on what causes it. Here is a look at one important factor in air pollution, particulate matter (PM).

Particulate matter or particle pollution is the general term for a mixture of solid particles and liquid droplets found in the air. There are a wide range of minute particles in the air that can be seen only using an electron microscope. It includes sulphates, nitrates, black carbon, particle-bound water, metals (cadmium, copper, nickel, zinc) and hydrocarbons. In addition, biological components such as allergens (pollen, dust mites) and microbial compounds (fungi) are also PM.

PM₁₀: inhalable particles, with diameters that are generally 10 micrometres (average human hair is about 70 micrometres in diameter).

PM_{2.5}: fine inhalable particles, 2.5 micrometres and smaller.

The major man-made sources are

• Emission from power stations, factories, industries, incinerators, diesel generators and automobiles

- Dust from construction sites and unpaved roads
- Burning of garbage

When inhaled, PM can cause a wide range of respiratory disorders. "Continuous exposure to PM can cause asthma, chronic obstructive pulmonary disease and any type of bronchitis. PM can penetrate deep inside the lungs and damage it. Any bacteria or virus can now attack the lungs and this could even lead to serious life threatening infections," explains Dr. R.P. Ilangho, Senior Consultant, Respiratory Medicine, Apollo Main Hospital, Chennai. PM can also cause chest tightening, watery eyes, sneezing, and running nose. According to the World Health Organisation (WHO) almost 3.7 million premature deaths annually are attributed to outdoor air pollution. About 80% of those deaths are due to heart disease and stroke, while another 20% are from respiratory illnesses and cancers related to exposure to PM_{2.5}.

According to the National Ambient Air Quality Standards of the Central Pollution Control Board (CPCB) of India, the 24-hour average for PM_{10} is 100 microgram/cubic metre and 60 microgram/ cubic metre for $PM_{2.5}$.

During the Delhi smog, $PM_{2.5}$ reached as high as 999 microgram/cubic metre. On November 23rd, the $PM_{2.5}$ level in Manali, Chennai was 172 microgram/cubic metre.

According to the WHO Global Urban Ambient Air Pollution Database, more than 80% of people living in urban areas are exposed to air quality levels that exceed the WHO limits. "There are no protective masks than can filter these PM. As individuals, we should stop burning our garbage, use public transportation and take medications for allergies as the PM can worsen existing allergies. We need to raise our voice to sensitise the issue. All of us have seen vehicles which emit massive clouds of smoke. The State Pollution Control board should understand the seriousness and start inspecting vehicles," says Dr. D.J. Christopher, Professor and Head, Pulmonology Medicine, CMC, Vellore.

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