AIR POLLUTION

Brown haze settling over a city, exhaust billows across a busy highway, or plume/black clouds belching from industrial smokestack constitute air pollution. It is not seen, but its pungent smell alerts everyone but may be odourless.

It causes Respiratory Diseases (Asthma, Emphysema, Chronic Obstructive Pulmonary Disease, Chronic Bronchitis), Cardiovascular Disease (Haemorrhagic Stroke, Calcification in Arteries, Lower Levels of High Density Lipoprotein, Hypertension among Pregnant Women leading to foetal & maternal morbidity and mortality); Cancer (Breast Cancer, Leukaemia, non-Hodgkin's Lymphoma, Lung Cancer), Diabetes Mellitus; Obesity, Reproductive, Neurological (Parkinson's disease, Alzheimer's disease, Dementia), Immune System Disorders and Attention–deficit Hyperactivity Disorder (ADHD).

It is associated with oxidative stress and inflammation in human cells, which lays foundation for Chronic Diseases and Cancer. World Health Organization (WHO) classified air pollution as a human carcinogen.

It is a mix of hazardous substances from both human-made and natural sources.

Vehicle emissions, fuel oils and natural gas to heat homes, by-products of manufacturing and power generation plants, particularly coal-fuelled power plants, and fumes from chemical production are the primary sources of human-made air pollution.

Nature releases hazardous substances into the air such as smoke from wildfires, ash and gases from volcanic eruptions and gases such as methane, which are emitted from decomposing organic matter in soils.

Traffic-Related Air Pollution (TRAP) : from motor vehicle emissions is the most dangerous form of air pollution. It contains most of the elements of human-made air pollution – ground-level ozone, various forms of Carbon, Nitrogen dioxide, Sulphur oxides, Volatile Organic Compounds (VOC), Polycyclic Aromatic Hydrocarbons (PAH) and fine Particulate Matter (PM).

Ground Level Ozone : an atmospheric gas dimming the sky lineis called smog (**smo**ke + **f**og) when at ground level. It is the smelly exhaust of an old car that burns oil. It is created when pollutants emitted by cars, power plants, industrial boilers, refineries, and other sources chemically react in the presence of sunlight.

Noxious gases : including Carbon dioxide, Carbon monoxide, Nitrogen dioxides and Sulphur dioxides are components of motor vehicle emissions and by products of industrial processes.

Particulate matter (PM) : is composed of chemicals such as Sulphates, Nitrates, Carbon, or mineral dusts. Vehicle and industrial emissions from fossil fuel combustion, cigarette smoke, and burning organic matter, such as wildfires all contain PM.

A subset of PM, fine particulate matter (PM 2.5) is 30 times thinner than a human hair. It can be inhaled deeply into lung tissue.

Volatile Organic Compounds (VOC) : are given off by paints, cleaning supplies, pesticides, furnishings and even craft materials like glue. Gasoline and natural gas are major sources of VOCs which are released during combustion.

Polycyclic Aromatic Hydrocarbons (PAH) : combustion, industrial processes, such as iron, steel, and rubber product manufacturing, power generation produce PAHs as a by-product.

Health effects :

Air pollution affects everyone's health, but certain groups may be at a higher risk. Almost 9 out of 10 people who live in urban areas worldwide are affected by air pollution.

The effects of air pollution vary from person to person. A healthy adult who is exposed to these pollutants for a short time or at low dose may not have long-term problems. But it is different for people with a heart or respiratory condition. For these people, even a small dose or a short exposure can make symptoms worse. Longer exposure or a higher dose can lead to serious illness. In some cases, it can lead to death. Children and older adults are more likely to be affected by air pollution than others. They can suffer the effects at lower pollution levels.

Genes play a role in respiratory health. People with specific gene variants, which made them more likely to have lung inflammation, had a greater chance of suffering from asthma if they lived close to major roadways.

Breathing dust from mine tailings, created by active and abandoned mining operations, affects lung function.

Both outside air and the air in one's home/workplace can have these pollutants. The amount of pollutant in the air and the length of time one is exposed to it determines how the pollutant will affect one.

When one breathe in gases such as Carbon monoxide or Nitrogen dioxide, the cells that line the airways to the Lungs absorb them. Once taken in, the gases can pass into your blood and travel to internal organs. If the pollution isn't absorbed into the blood, damage can still be done to the lungs.

Large particles in the air are filtered out by the small hairs (cilia) that line your respiratory tract but smaller particles reach airways and lungs. Particles of all sizes land on crops and in water. Over time, they are eaten by humans and by animals that humans eat.

Air Quality Index (AQI) :

The AQI is a national index for 6 major air pollutants regulated by the Clean Air Act:

- **Ground-level ozone**
- **Particle pollution**
- **Carbon monoxide**
- **Lead**
- **Sulphur dioxide**
- **Nitrogen dioxide**

The index tells one how clean or polluted the air is. It also tells one what health effects one may have in a few hours or days after breathing polluted air.

Preventive Measures :

There is sufficient irrevocable conclusive link between the environmental pollution – be it in the air we breathe, food we eat, soil we grow, fuel we burn, noise we hear or even the stress we bear and Cardiovascular Disease progression. Strict implementation of air quality regulation and pollution levels will contribute to a meaningful increase in life expectancy and reduction in cardiovascular mortality :

1. **Air Pollution levels displays should be available in each city at crowded places to increase the awareness.**
2. **Battery electric vehicles must be encouraged.**
3. **People should be discouraged to walk/exercise at places with high air pollution levels.**
4. **The use of vehicle emanating fewer pollutants be made mandatory and strictly enforced.**
5. **In text books, documents Environmental factors should be referred to as reversible risk factors for Atherosclerotic Coronary Artery Disease.**
6. **Awareness of Pollution Hazard should be displayed at par with smoking and tobacco in advertisements.**
7. **Posters and slides at multiplexes and shopping malls must support the message.**
8. **Innovative catchy cartoons and drawings be displayed at school fetes and functions.**

Public is hereby advised to adhere to the following DO's and DON'Ts :

DO's :

- **Consult Doctors in case of breathlessness, giddiness, cough, chest discomfort or pain, irritation in eyes (red or watery)**
- **Persons with airway, lung or heart illness should keep their medication readily available.**
- **Use certified N95 masks and follow user instructions.**
- **Continue use of clean smokeless fuels gas or electricity for cooking and heating purpose.**
- **Use public transportation as much as possible.**

DON'Ts

- **Don't burn leaves, wood agriculture products, garbage.**
- **Don't go to places with heavy traffic and areas near polluting places, construction sites etc.**
- **Don't go for morning and late evening walks, running, jogging or physical exercise.**
- **Don't open doors and windows during morning and late evenings.**
- **Don't smoke cigarettes, *beedies* and related tobacco products.**
- **Avoid driving cars, scooters and other motorized vehicles.**

Sd/
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