

Environmental Pollution: An Alarming Cause of Global High Death Tolls Which Requires Urgent Attention

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OVERVIEW

It has been revealed that one of the causes of global premature death, of 9.0 million per annum is ascribable to environmental pollution; this was reported 5 years ago.¹ The fact is that both household and ambient air pollution are identified as the cause of the highest death toll, that is, 6.7 million in 2019, compared with water pollution alone, which caused earlier deaths of 1.4 million people across the countries.¹ Unfortunately, the situation has not improved until today. The recent report explained that air pollution contributed to 8.1 million deaths in 2023, which is identified as the second highest risk factor for premature death, also, it shortens the lifespan by 1 year and 8 months and is a cause of high blood pressure.²

In this context, we need to look back, the Lancet Commission on Pollution and Health updated this estimate using data from the Global Burden of Diseases, Injuries, and Risk Factor study in 2019, and they estimated that deaths arising from industrialisation and urbanisation have increased by over 66% since 2000.³ However, to reduce this fatality rate, the UN agencies and other partners have made their efforts, but the situation has not improved in developed countries. Unfortunately, data from low-income and middle-income countries are unavailable, and it assumes that pollution levels are most severe amongst the populations of less well-off countries.⁴ Hazardous chemical pollution, climate change, and biodiversity are closely linked with air pollution.

The identified compounds and elements causing air pollution-related higher morbidity and mortality rates are described as constituents of traffic-related air pollution (TRAP). From TRAP, a mixture of gases and particles, such as ground-level ozone, various forms of carbon, nitrogen oxides, sulphur oxides, volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), and fine particulate matter are accumulated in the environment.⁵

Specifically, these consist of:

- **Ozone:** Pollutants emitted by automobiles, power plants, industrial boilers, refineries, etc., react with sunlight, and develop "ground-level" ozone, popularly known as "smog".
- **Noxious gases:** For example, carbon dioxide, carbon monoxide, nitrogen oxides (NOx), and sulphur oxides (SOx), are components of motor vehicle emissions and by-products of industrial processes.
- **Particulate matter (PM):** For example, Mineral dust from fossil fuel combustion from cars, cigarette smoke, and burning organic matter, such as wildfires, all contain PM. Specifically, fine PM (of 2.5 micrometre diameter), which is 30 times thinner than

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human hair, and are hence inhaled deep down into lung tissues, represent a cause of serious health illness. PM 2.5 accounts for most adverse health effects from air pollution in the USA.⁶

- **Volatile organic compounds (VOC):** These organic compound products are vaporised at room temperature and are therefore volatile. Most cleaning and painting products fall into this category.⁷
- **Polycyclic aromatic hydrocarbons (PAH):** More than 100 of these organic compounds exist in our environment, and 15 of them can cause cancer. PAH are usually generated during industrial processes, for example, iron, steel, and rubber product manufacturing plants during power generation.⁸

How is Your Health Affected by Environmental Air Pollution?

The researchers of the National Institute of Environmental Health Sciences, USA (NIEHS) reported on six cities (US cities), and established an association between fine PM and mortality, as outlined below.⁹

There are many major concerns that air pollution is strongly related to the induction and progression of cancer, cardiovascular, and respiratory diseases, along with diabetes and reproductive, neurological, and immune system disorders.

Below, we highlight the fatal diseases involved:

Cancer

A study on 57,000 women living near major roadways detected that they are at risk of the development of breast cancer.⁶ Occupational exposure to benzene causes leukaemia and non-Hodgkin's Lymphoma.⁸ It has been found that there is a strong association between those involved in energy generation from coal and lung cancer.⁷ Indeed, the researchers found that older adults, who are exposed to PM_{2.5} and NO₂ for 10 years or more have an increased risk of colorectal and prostate cancers.⁹

Cardiovascular Disease

The blood vessels are rapidly calcified by fine PM, and this is a cause of impaired blood flow in blood vessels.¹⁰ A link between short-term daily exposure to nitrogen oxides by post-menopausal women and a higher risk of haemorrhagic stroke has been found.¹¹ For some older Americans, exposure to TRAP can result in lowered levels of high-density lipoprotein, which removes cholesterol from the bloodstream and is often known as good cholesterol, and this increases their risk of cardiovascular disease.^{12,13} Also, the National Toxicology Program (NTP) found that pregnant women are at risk for high blood pressure and are exposed to TRAP, and this is the leading cause of pre-term births, low birth weights, and a high rate of maternal morbidity and mortality.¹⁴

CONCLUSION

Special efforts need to be initiated to develop an environmental policy, especially on the phase-out of fossil fuel, and coal-based energy production, and the generation of clean and renewable energy, which will help prevent pollution and the cause of high morbidity and mortality rates globally. There is therefore a major requirement for multifaceted measures to be taken against environmental pollution. Of these, the science–policy interface, translational research, and most importantly, funding are all essential in order to tackle this critically important issue. Therefore, an urgent framework convention and translational research-based actions are required to tackle this fatal and disabling global health situation related to environmental pollution.

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