

THE IMPACT OF AIR POLLUTION ON OUR HEALTH

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Air pollution has become one of the most pressing environmental and public health challenges in the 21st century. Millions of people around the world are exposed to polluted air every day, resulting in severe health consequences. This study explores the causes of air pollution, its main pollutants, and the short- and long-term health effects it has on humans. The research also examines recent data and scientific findings on the correlation between air pollution exposure and diseases such as asthma, cardiovascular disorders, and cancer. The results show that prolonged exposure to air pollution significantly increases the risk of chronic illnesses and reduces life expectancy. This paper concludes by emphasizing the urgent need for global cooperation, stricter environmental laws, and lifestyle changes to ensure cleaner air and better public health

Introduction

Air pollution is defined as the presence of harmful or excessive substances in the atmosphere that can pose risks to living organisms and the environment. The World Health Organization (WHO) estimates that air pollution causes more than seven million premature deaths each year. The main sources of air pollution include vehicle emissions, industrial waste, agricultural activities, and household fuels such as coal and biomass.

Polluted air contains particulate matter (PM_{2.5} and PM₁₀), nitrogen oxides (NO_x), sulfur dioxide (SO₂), carbon monoxide (CO), and volatile organic compounds (VOCs). When inhaled, these pollutants penetrate deep into the lungs and bloodstream, causing a

wide range of diseases. Despite growing awareness, many cities still exceed the recommended limits for air quality. Therefore, understanding the impact of air pollution on health is essential to protect future generations and improve life quality. Methods

This paper is based on a qualitative review of scientific studies and reports published between

2015 and 2024. Data were collected from reputable organizations such as the World Health Organization (WHO), the Environmental Protection Agency (EPA), and medical journals like The Lancet and Environmental Health Perspectives.

The research focuses on analyzing three main aspects:

1. Types and sources of air pollutants – identifying the most harmful pollutants and where they come from.
2. Health impacts – examining both short-term (acute) and long-term (chronic) effects on human health.
3. Preventive measures – evaluating strategies used by governments and individuals to reduce exposure and emissions.

The findings were organized thematically to provide a comprehensive understanding of how air pollution affects different body systems and what actions are most effective in mitigating its impact.

Results

The analysis revealed that air pollution affects human health on multiple levels, from mild irritation to life-threatening diseases. The main findings are summarized as follows:

Respiratory Effects: Prolonged exposure to polluted air increases the risk of respiratory diseases such as asthma, bronchitis, and chronic obstructive pulmonary disease (COPD). Children and the elderly are especially vulnerable. Fine particulate matter (PM_{2.5}) can penetrate deep into lung tissues and cause inflammation, reducing lung capacity over time.

Cardiovascular Effects:

Numerous studies have confirmed that air pollution contributes to heart attacks, hypertension, and stroke. Polluted air causes oxidative stress and inflammation in blood vessels, which accelerates atherosclerosis. According to the WHO, exposure to PM_{2.5} leads to approximately 25% of global deaths from cardiovascular disease.

Neurological and Cognitive Effects:

Emerging research shows that air pollution also affects the brain. Long-term exposure to toxic air can lead to memory loss, reduced concentration, depression, and an increased risk

of Alzheimer's disease. Children living in highly polluted cities often have lower cognitive development scores compared to those in cleaner environments.

Reproductive and Developmental Effects:

Air pollution negatively impacts pregnancy outcomes, leading to premature births, low birth weight, and developmental delays in infants. Pollutants such as lead and mercury can interfere with hormonal balance and genetic development.

Cancer and Mortality:

Air pollution has been classified as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC). Long-term exposure to pollutants, especially benzene and diesel exhaust, increases the risk of lung cancer and other malignancies. Research estimates that polluted air shortens the average human lifespan by nearly three years globally.

Socioeconomic Impacts:

Beyond physical health, air pollution has economic consequences. The cost of healthcare, loss of productivity, and reduced labor efficiency result in billions of dollars in losses annually. Developing countries suffer the most due to weaker regulations and higher population density.

Conclusion
The findings of this study clearly demonstrate that air pollution is a silent but deadly threat to human health. Its effects are not limited to the lungs but extend to almost every organ system. Respiratory, cardiovascular, neurological, and reproductive health are all seriously endangered by constant exposure to harmful air pollutants. Moreover, the link between air pollution and premature death highlights the urgent need for global attention and intervention.

Governments, industries, and individuals must share responsibility in addressing this crisis. Governments should enforce stricter environmental laws, invest in renewable energy, and improve public transport systems to reduce vehicle emissions. Industries must adopt cleaner technologies and reduce toxic waste release into the atmosphere. On a personal level, individuals can contribute by planting trees, reducing plastic use, recycling waste, and using eco-friendly transport methods.

Education and awareness are also essential. People must understand that clean air is fundamental to life — just as vital as clean water and food. If no action is taken, the health and wellbeing of future generations will continue to deteriorate. However, with strong global cooperation and sustainable practices, we can protect the planet and ensure a healthier, cleaner future for all.

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