

THE IMPACT OF AIR POLLUTION ON OUR HEALTH

Asatullayev Rustamjon Baxtiyarovich

Trainee assistant at Samarkand State Medical University

Student: Sodiqjonova Fotima Sodiqjon qizi

Abstract: *Air pollution remains one of the most pressing environmental and public health challenges of the modern era. It results from both natural phenomena and human activities, including industrial emissions, vehicular exhaust, and the combustion of fossil fuels. Pollutants such as particulate matter (PM_{2.5} and PM₁₀), ozone (O₃), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and carbon monoxide (CO) significantly impair air quality and contribute to a range of acute and chronic health effects. Exposure to these substances affects the respiratory, cardiovascular, and immune systems, leading to conditions such as asthma, allergies, bronchitis, and heart disease. Meteorological factors, including temperature, wind, and humidity, influence the concentration and dispersion of pollutants, further impacting human health outcomes. This article discusses the main sources and types of air pollutants, their physiological effects, and the importance of adopting preventive measures. A collective effort involving policy intervention, technological innovation, and public awareness is essential to mitigate the adverse health impacts of air pollution and promote a sustainable environment.*

Keywords: *Pollution, Poisoning, Allergy, Asthma, Meteorological factor, Ozone (O₃), Particulate Matter (PM), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Carbon Monoxide (CO)*

Introduction

Air pollution occurs when the amount of harmful substances released into the atmosphere exceeds the atmosphere's natural self-cleaning capacity. Humanity first began polluting the air when it discovered fire, and currently, environmental pollution has increased even further following the Industrial Revolution. The increase of toxic substances in the atmosphere seriously affects the human body, leading to various diseases, allergies, and even death.

Weather conditions also have a significant impact on air pollution. Factors such as wind and the vertical distribution of temperature are considered direct influencing factors on air pollution. Wind plays an important role in the diffusion of toxic substances. The vertical distribution of temperature affects the stability of the atmosphere, thus influencing the speed

at which pollutants disperse. Specifically, if the air temperature decreases, the air becomes denser, and the substances tend to move downwards.

Furthermore, meteorological factors cause physical and chemical interactions between pollutants, leading to the formation of even more various toxic substances. Meteorological factors directly affect air pollution. For instance, if the weather is warmer or colder, fuel consumption for heating or cooling increases.

Meteorological factors also have a great impact on human health. In very cold or very hot conditions, the number of deaths and illnesses among the elderly increases significantly. When the air temperature becomes extremely high, the resulting damage, due to the increased ozone concentration, can lead to a synergistic effect and increase the overall harm.

Sources of Air Pollution

Natural Sources:

Natural air pollution occurs as a result of uncontrolled phenomena such as forest fires, volcanic eruptions, and dust storms. These events release particles and gases into the atmosphere, temporarily affecting air quality.

Anthropogenic Sources:

The main factor in atmospheric pollution is human activity. Major anthropogenic sources include industrial processes, transport (vehicle emissions), energy production (burning of fossil fuels), agriculture (chemicals and dust), and residential activities like heating and cooking (burning wood and biomass).

Particulate Matter (PM):

Particulate matter includes microscopic particles of various sizes and compositions. PM_{2.5} (particles with a diameter of 2.5 micrometers or less) and PM₁₀ (particles with a diameter of 10 micrometers or less) are particularly concerning because they penetrate deep into the respiratory system, leading to health problems.

Ground-level Ozone (O₃):

Ground-level ozone, a component of smog, is formed when volatile organic compounds and nitrogen oxides (NO) react in sunlight. It irritates the respiratory system and exacerbates pre-existing conditions like asthma.

Nitrogen Dioxide (NO₂):

NO₂ is primarily produced as a result of combustion processes, especially from motor vehicles and industrial facilities. It causes respiratory problems and contributes to the development of lung diseases.

Sulfur Dioxide (SO₂):

(SO₂) emissions arise from the combustion of sulfur-containing fuels. Prolonged exposure can lead to respiratory problems, particularly in people with pre-existing conditions.

Carbon Monoxide (CO):

CO, a colorless, odorless gas, is produced during the incomplete combustion of carbon-based fuels. It interferes with the body's ability to transport oxygen and can be fatal in high concentrations.

Air pollution causes various diseases in the human respiratory tract, circulatory system, and skin. Diseases of the respiratory tract are the most common. Symptoms such as coughing, irritation of the nose and throat, difficulty breathing, and asthma may occur. Athletes' ability to engage in sports decreases due to air pollution, and they feel tired quickly. Conditions may worsen for patients suffering from asthma or chronic lung disease. Air pollution not only causes respiratory diseases but also worsens the condition of patients suffering from heart diseases.

Conclusion

Air pollution poses a serious threat to human health, affecting multiple body systems and increasing the risk of various diseases. Addressing this issue requires a comprehensive approach that includes government regulations, industrial cooperation, and individual responsibility. By implementing stricter standards, adopting cleaner technologies, and raising public awareness, we strive to reduce the health risks associated with air pollution and create a healthier environment for all.

References:

1. World Health Organization (WHO). (2023). *Ambient (outdoor) air pollution*. Retrieved from <https://www.who.int>
2. United Nations Environment Programme (UNEP). (2022). *Actions on Air Quality: A Global Summary of Policies and Programmes to Reduce Air Pollution*.
3. Pope, C. A., & Dockery, D. W. (2006). Health effects of fine particulate air pollution: Lines that connect. *Journal of the Air & Waste Management Association*, 56(6), 709–742. <https://doi.org/10.1080/10473289.2006.10464485>
4. Brook, R. D., Rajagopalan, S., Pope, C. A., et al. (2010). Particulate matter air pollution and cardiovascular disease. *Circulation*, 121(21), 2331–2378. <https://doi.org/10.1161/CIR.0b013e3181dbecel>
5. Environmental Protection Agency (EPA). (2024). *Integrated Science Assessment for Particulate Matter*. Washington, DC: U.S. Environmental Protection Agency.

6. Schraufnagel, D. E. (2020). The health effects of air pollution. *Chest*, 158(1), 249–257.

<https://doi.org/10.1016/j.chest.2020.03.028>

7. Seinfeld, J. H., & Pandis, S. N. (2016). *Atmospheric Chemistry and Physics: From Air Pollution to Climate Change* (3rd ed.). Hoboken, NJ: Wiley.