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Editorial

Impact of Air Pollution on Respiratory Health in Urban Areas

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ABSTRACT

Urban areas are severely threatened by air pollution, which kills 6.5 million people annually. Particulate matter (PM), particularly PM 2.5, is a crucial marker of exposure. Research continuously connects PM exposure to lung function impairment and respiratory symptoms in a variety of populations. Reducing healthcare expenses and improving health are two benefits of mitigating particle emissions, which calls for extensive environmental regulations, financial incentives, and technological developments. Longitudinal health studies and interdisciplinary collaboration are essential for comprehending the complex, long-term effects of air pollution. People can make a difference by planting trees, making sustainable decisions, and organizing community clean-ups. Communities are given the power to make decisions for a cleaner, healthier urban environment when they are informed about the complex relationship between air quality and health and are educated about it. Stricter air quality laws, greener transportation options, more green spaces, and increased public awareness which emphasizes the need for teamwork in promoting sustainable practices, technological advancements, and policy changes are some of the recommendations for improvement.

Keywords: Respiratory health; Urban areas; Particulate matter

The greatest environmental threat to human health is air pollution. The World Health Organization estimates that 6.5 million people die each year from illnesses linked to air pollution, of which 4.2 million are completely attributable to outdoor air pollution[1]. Air pollution may have a negative influence on human health in several ways, increasing mortality and morbidity. While many air pollutants, including NO_2, carbon monoxide, and Sulphur dioxides, are linked to significant excess mortality or morbidity, particulate matter (PM2.5 µm) is the air pollutant that has undergone the most in-depth research and is most frequently used as a proxy indicator of exposure to air pollution more generally. The discovery of particulate matter (PM) can be traced back to the initial observations of the visible effects of air pollution. Black smoke was first released when coal burned, providing a clear signal. As industrialized nations decreased their use of coal-derived black smoke in the 20th century, carbonaceous particles from automobile traffic began to dominate PM. Ammonium salts and other secondary pollutants appeared. PM, which is a broad mixture of substances and sizes, now comes from unusual sources such as cooking aerosols and non-exhaust road particles[2].The primary components of PM include sulphates, nitrates, ammonia, mineral dust, and water etc. The most hazardous to human health are particles with a diameter of 10 µm or less that can penetrate and lodge deep into the lungs. Short-term and long-term exposure to air pollution has been related to adverse health impacts. Even at incredibly low concentrations, small particle pollution harms human health; there is no safe level of exposure[1,2]. The WHO Air quality guidelines (AQGs) recommend aiming for and achieving the lowest PM concentrations feasible as a consequence[3].

Numerous studies have examined the connection between urban air pollution and respiratory health. One study that appeared in the Journal of The Science of the Total Environment found a correlation between exposure to PM in urban areas and an increased risk of respiratory symptoms such coughing, wheezing, and shortness of breath[4]. In a second study, the researchers looked at how chronic exposure to air pollution affects lung function in older German women who live in cities. They discovered that exposure to NO_2 and PM 10 was linked to a deterioration in lung function over the course of 20 years, particularly in women who were either current or former smokers. The researchers assert that lowering air pollution may be able to halt the deterioration of lung function that comes with ageing[5]. In this study, the researchers examined the connection between children's long-term exposure to traffic-related air pollution and the growth of their lungs. They found that between the ages of 10 and 18, exposure to pollutants associated with traffic, such as nitrogen dioxide (NO_2) and (PM), was associated with both an increased chance of developing asthma and a significant decrease in lung function growth[6].

Reduced work absence, better health, and lower health insurance costs are just a few of the many advantages of reduced particle emissions. Many developing nations lack the institutional resources and technical know-how necessary to handle environmental challenges. For a comprehensive environmental policy to be implemented in the medium term, incentives and economic tools are crucial. Improved fuel quality, appropriate building practices, and the installation of appropriate end-of-pipe control technology are examples of mitigation methods[4]. The advancement of sophisticated technologies, like cutting-edge air quality monitoring systems and innovative emission reduction techniques, is largely attributed to scientists in the field of pollution mitigation[7,8]. Prioritizing interdisciplinary collaboration can promote collaborative efforts among environmental science, engineering, and health disciplines[7,8]. To understand the complex and long-term effects of air pollution on a range of populations, longitudinal health studies are essential. To spark systemic change, it is essential to advocate for strict laws that are supported by empirical data[9]. Research projects should also emphasize the integration and promotion of green technologies, as this will help with cleaner energy sources and sustainable urban planning[10].

People can take an active role in mitigating pollution by lowering their own carbon footprints through sustainable lifestyle choices[11]. Encouraging the planting of trees and green spaces helps to filter pollutants naturally[12]. It is critical to educate the public about the complex connection between health and air quality[13]. Participating in community cleanups highlights our shared responsibility for environmental stewardship while also directly improving the quality of the local air. Scientifically grounded public advocacy for sustainable policies enables communities to make better decisions that lead to a cleaner, healthier environment[14].

To improve health in urban areas, implement stricter air quality regulations, promote cleaner transportation options, enhance green spaces, and raise public awareness about the health risks of air pollution. Encourage sustainable urban planning, reduce industrial emissions, and prioritize healthcare access for all residents.

Conflict of Interest

All authors affirm there are no conflicts of interest with research endeavors.

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