

## Assessment of current situation of Air pollution in Delhi and Its Impact on Health

Dr. Piyush M. Maurya

Lecturer, Department of Chemistry,  
Zeal Education Society's, Zeal Polytechnic Pune, Maharashtra, India

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### Abstract

*The capital of India, New Delhi, has been recognized as the most polluted city in the world. The World Health Organization (WHO) reported on this according to its results in 2017. In fact, it is an alarming problem for the health of our future generations in India. This document provides an evidence-based view of the state of air pollution in Delhi and its effects on health and established control measures. It was found that vehicle emissions and industrial activities were associated with indoor and outdoor air pollution in Delhi. Air pollution is responsible for many health problems in urban areas. In recent times, the state of air pollution in Delhi has undergone many changes in terms of pollutant levels and the control measures taken to reduce them. Studies on air pollution and mortality in Delhi have found that mortality and morbidity caused by natural causes increase with increasing air pollution.*

**Keywords:** Air pollution Delhi, health, Pollutants, Health Status, Environment etc.

### INTRODUCTION

New Delhi is a busy metropolitan city, the capital of India. In May 2014 it was found that particulate matter (PM) of less than 2.5 micrometers in concentrations measured in diameter is more than 350 micrograms per cubic meter of air in the city of New Delhi, which makes it the most polluted city in the world. This higher concentration of PM of various sizes in the atmosphere is due to the increase in vehicle exhausts and the increase in coal factories in cities. Pollution is a real threat to the health and well-being of humanity. Studies conducted by the WHO reveal that seven million people have died worldwide due to exposure to air pollution. These include death due to exposure to toxic pollutants both within and in the environment.

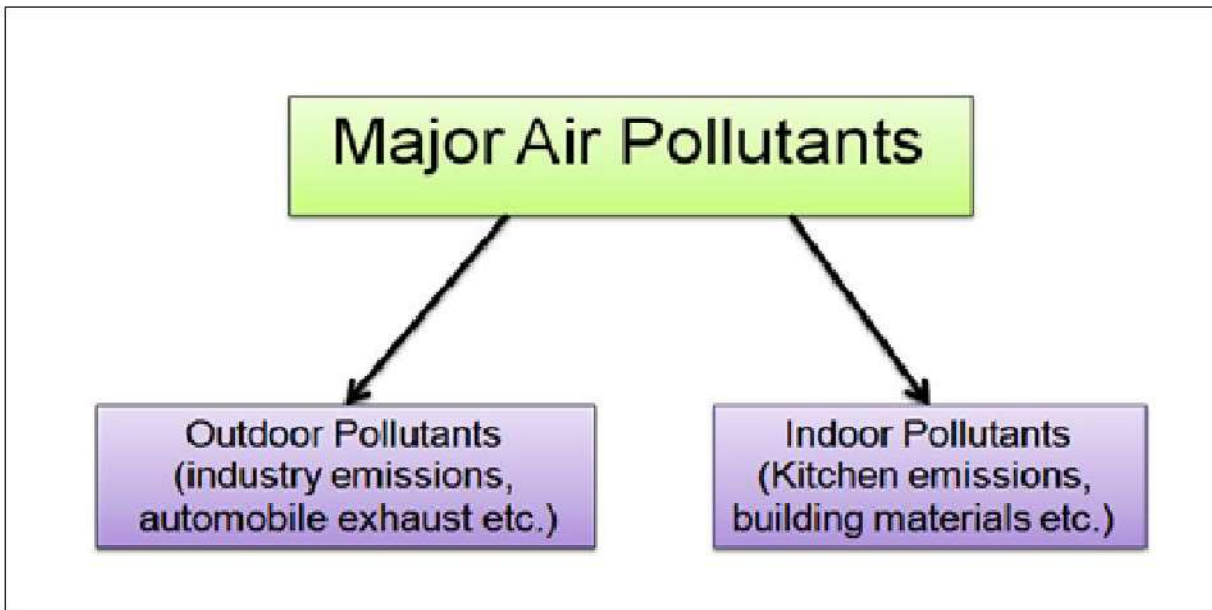
### MAJOR AIR POLLUTANTS

The main sources of air pollution in India and in the world are car exhaust and industrial emissions, the main air pollutants have generally been classified as indoor and outdoor pollutants (Fig.1). External pollutants include traces of fossil fuels, carbon particles and metal particles in the atmosphere from industrial and automotive emissions, toxic gases, such as nitrogen dioxide, carbon monoxide, sulfur dioxide, etc. And ozone, tobacco smoke, etc. On the other hand, indoor pollutants include toxic gases produced from cooking fuels, building materials, such as asbestos, lead, etc. tobacco smoke, etc.

The PM10 standard is generally used to measure air quality. The PM10 standard includes particles with a diameter of 10  $\mu\text{m}$  or less (0.0004 inches or one seventh of the width of a human hair). These small particles are likely to be responsible for adverse health effects due to their ability to reach the lower regions of the respiratory tract. According to the guideline of the World Health Organization's air quality, the recommended mean annual PM10 concentration was 20  $\mu\text{g} / \text{m}^3$ , above which an increased risk of cardiopulmonary health effects was observed.

The main human health concerns arising from exposure to PM10 include effects on respiration and respiratory systems, damage to lung tissue, cancer and premature death. Older people, children and people with chronic lung disease, flu or asthma are particularly sensitive to the effects of particles. The urban air database published by the World Health Organization in September 2017 reported that Delhi exceeded the PM10 limit of almost 10 times by

198 ug / m<sup>3</sup>, remaining in third place after Ludhiana and Kanpur. Vehicle emissions and industrial activities have been associated with indoor and outdoor air pollution in Delhi.



[Fig.1. Major Air pollutants]

### Status of Air Pollution in Delhi

Delhi (or National Capital Territory of Delhi), is jointly administered by central and state governments. Hosts nearly 167.5 lakh people (Indian Census 2011). Meters around the world are the most affected by environmental pollution, too, Delhi is on the receiving side of India in 1991-1994 conducted a study funded by the Development Bank Research Group. World to study the effects of air pollution During the study period, the total average level of suspended particles (PST) in Delhi was about five times the annual average standard of the World Health Organization suspended in Delhi during this period particles exceeded the Organization's 24-hour rule World Health Organization in 97% of every day the readings were taken, the study concluded that the impact of particulate matter in total The non-traumatic deaths in Delhi were less than the effects found in the United States of America, but they reported a death associated with air pollution in Delhi that would have lost more years of life because these deaths occurred at a young age.

A report by India's Ministry of Environment and Forests, in 1997, examined the environmental situation in Delhi for concerns about deteriorating conditions. Air pollution was one of the areas of concern identified in this study. It has been estimated that around 3000 tons of air pollutants emitted every day in Delhi, with a significant contribution from vehicle pollution (67%), followed by coal-fired power plants (12%). There was an upward trend from 1989 to 1997, as monitored by the Central Pollution Control Board (CPCB). The carbon monoxide concentrations of vehicle emissions in 1996 showed an increase of 92% compared to the values observed in 1989, following the increase in the vehicular population.

The concentrations of lead in the particles seemed to have control; this was attributable to the elimination of petrol and restrictions on the management units of industrial leads. Delhi has the highest group of small-scale industries in India that contributes 12% of air pollutants along with other industrial units.

Vehicle pollution is an important contribution to air pollution in Delhi. According to the Department of Transportation, Government of the Territory of Delhi Capital, the vehicle population is estimated at more than 3.4

million, reaching here a growth rate of 7% per annum. While this segment contributes two-thirds to air pollution, there has been a palpable decrease from the 1995-1996 levels.

## RESULT AND DISCUSSION

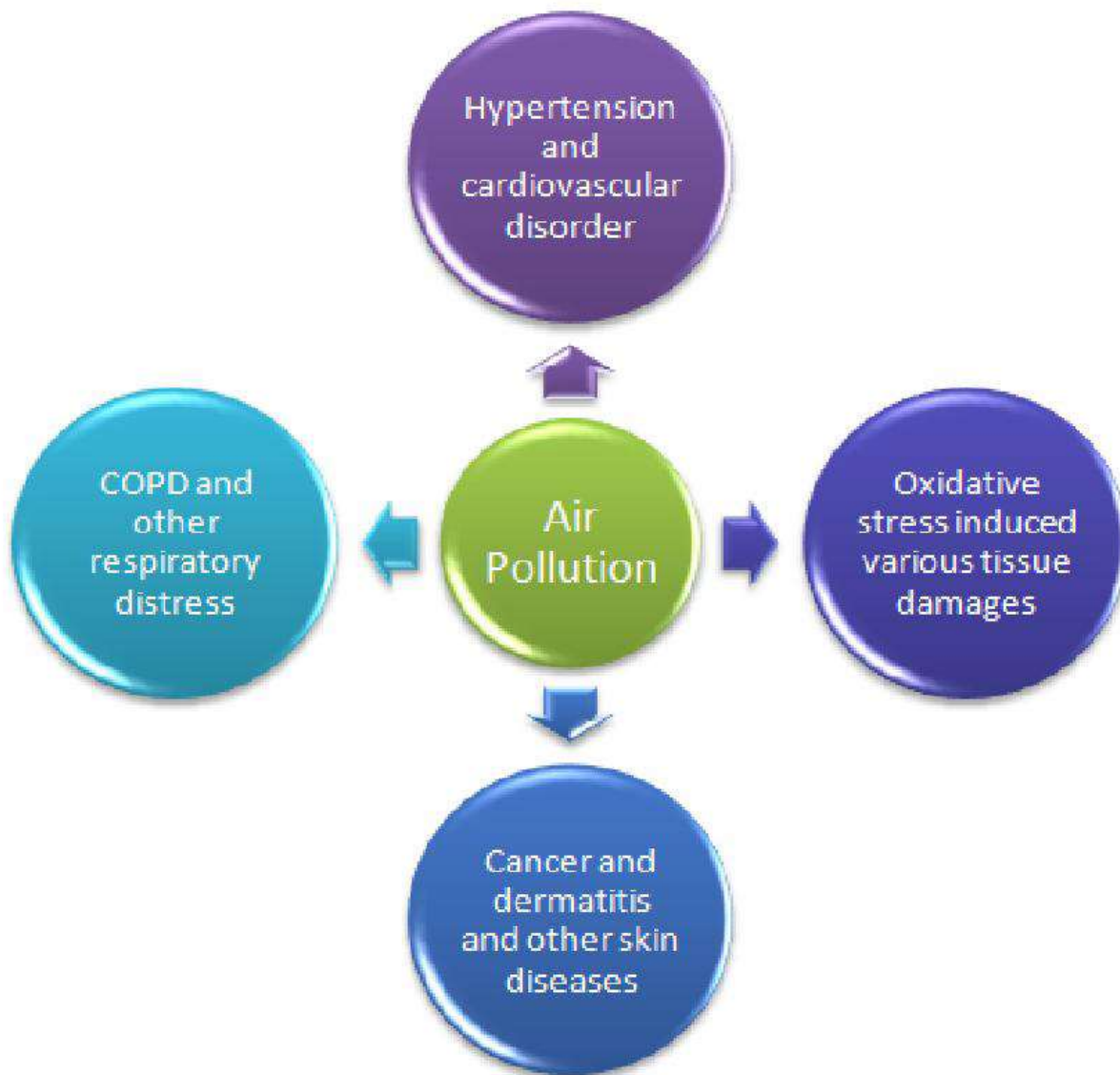
### Effects of Air Pollution on Health

Studies that have examined the composite effect of meteorological conditions on air pollution have found that winter worsens air quality both indoors and outdoors. They also found a positive correlation between the winter climate and the increase in the number of patients with chronic obstructive airway disease in hospitals. There was a relative scarcity of studies that personally measured the levels of external air pollutants and then tried to correlate them objectively with adverse health effects. However, some studies have measured levels of air pollutants and have found a correlation with health-related events.

A time series study on air pollution and mortality in Delhi found that natural cause's mortality increases with increasing air pollution. In another study, the gaseous pollutants, although at a lower level than the admissible level, showed a more consistent association with respiratory admissions. In a study conducted in a hospital, there was an increase in emergency room visits to asthma, chronic obstructive airway disease and acute coronary events, with an increase in atmospheric pollutant levels. A large number of studies in Delhi examined the effect of air pollution on respiratory functions and associated morbidity. The most complete study among them was conducted by the Central Pollution Control Board in 2008, which identified significant associations with all negative health outcomes. The results were compared with a rural control population in West Bengal. It was found that Delhi had 1.7-times higher prevalence of respiratory symptoms (in the past 3 months) compared with rural controls ( $P < 0.001$ ); the odds ratio of upper respiratory symptoms in the past 3 months in Delhi was 1.59 (95% CI 1.32-1.91) and for lower respiratory symptoms (dry cough, wheeze, breathlessness, chest discomfort) was 1.67 (95% CI 1.32-1.93).

Prevalence of current asthma (in the last 12 months) and physician-diagnosed asthma among the participants of Delhi was significantly higher than in controls. Lung function was reduced in 40.3% individuals of Delhi compared with 20.1% in the control group. Delhi showed a statistically significant ( $P < 0.05$ ) increased prevalence of restrictive (22.5% vs. 11.4% in control), obstructive (10.7% vs. 6.6%) as well as combined (both obstructive and restrictive) type of lung functions deficits (7.1% vs. 2.0%). Metaplasia and dysplasia of airway epithelial cells were more frequent in Delhi, and Delhi had the greater prevalence of several cytological changes in sputum. Besides these, non-respiratory effects were also seen to be more in Delhi than in rural controls.

The prevalence of hypertension was 36% in Delhi against 9.5% in the controls, which was found to be positively correlated with respirable suspended particulate matter (PM<sub>10</sub>) level in ambient air. Delhi had significantly higher levels of chronic headache, eye irritation and skin irritation. Several other community-based studies have found that air pollution is associated with respiratory morbidity. Numerous studies have reported an association between indoor air pollution and respiratory morbidity. Some of these studies have focused on respiratory morbidity in children. Other studies in children have found similar correlations between particulate matter in ambient air and attention deficit hyperactivity disorder between airborne pollution and increased levels of lead in the blood (a potential risk factor for development). Mental abnormality in children) and between the decrease in serum vitamin D metabolite concentration and the lower average turbidity score (an approximate measure of ultraviolet B radiation reaching the ground)



[Fig. 2. Health impact of Air pollution]

### Physiological Disorders and Air Pollution

On February 13, 2013, the Center for Science and the Environment (CSE) organized a seminar on "The burden of diseases: atmospheric pollution among the main killers" in New Delhi, in collaboration with the Indian Medical Research Council, New Delhi and the Institute of Health Effects, Boston, United States. His report showed that air pollution is one of the ten best killers in the world. The small particles of this size come from dirt and dust on the road, land from vehicles<sup>6</sup>. These small particulate materials are the most harmful. Because of their small size, they can easily enter the circulation and reach the tissues. Air pollution leads to various types of pathological conditions, such as lung carcinoma, COPD and even skin problems. Disorders such as bronchitis, breathing difficulties, dermatitis, etc. They are very common with exposure to toxic environmental pollutants.

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### **Control Measures Instituted by the Government of Delhi**

The nodal ministry for the protection of the environment is the Ministry of Environment and Forests of the Center and the Department of the Environment of the Government of the Territory of the National Capital of Delhi. The Central Committee for Pollution Control, established in 1974 under the Water Act, is the main control body for carrying out the functions established in environmental laws, the implementation of the national air quality monitoring program and other activities. The Delhi Pollution Control Agency is the state-level body responsible. From time to time, the judiciary took note of the deterioration of environmental conditions in Delhi in response to public disputes. One of the first cases of this type was the judgment of India's Supreme Court to deal with the serious problem of pollution of vehicles in Delhi in response to a petition presented in 1985. Subsequently, it ordered the closure of the harmful industries and -Mix dangerous and -Mix and brick kilns operating in Delhi.

### **Vehicular Policy**

Control measures so far instituted include introduction of unleaded petrol (1998), catalytic converter in passenger cars (1995), reduction of sulfur content in diesel (2000) and reduction of benzene content in fuels (2000). Others include construction of flyovers and subways for smooth traffic flow, introduction of Metro rail and CNG for commercial transport vehicles (buses, taxis, and auto rickshaws), phasing out of very old commercial vehicles, and introduction of mandatory "Pollution under Control" certificate with 3-month validity and stringent enforcement of emission norms complying with Bharat Stage II/Euro-II or higher emission norms. The introduction of The Air Ambience Fund, collected from diesel sales and the establishment of stringent emission standards for industries and power plants, are other measures. Environmental awareness campaigns are also carried out at regular intervals. The Delhi Pollution Control Committee conducts monthly monitoring of ambient air quality in 40 locations in Delhi and takes corrective action when necessary.

### **Industrial Policy**

The first Industrial Policy for Delhi was introduced in 1982. Subsequently, a second Industrial policy (2010–2021) was issued by the Department of Industries, Government of Delhi. It is a comprehensive document envisioning higher industrial development in Delhi, with one of its mandates being to develop clean and non-polluting industries and details of steps to be undertaken in this direction have been described. There are many other organizations that work synergistically with the government efforts to reduce air pollution. These include the Centre for Science and Environment and The Energy and Resources Institute, and the Indian Association for Air Pollution Control.

Representatives of the industries include Confederation of Indian Industry and Society of Indian Automobile Manufacturers. Government agencies like Factories Inspectorate are also involved in the control of pollution. Research and academic institutions include National Environmental Engineering Research Institute, Indian Institute of Technology, Council of Scientific and Industrial Research institutions, Indian Agricultural Research Institute and various other academic institutions in and around Delhi. Professional organizations like the Indian National Science Academy, the Indian Institute of Chemical Engineers and the Indian Institute of Engineers are also involved in pollution control.

### **CONCLUSION**

The Indian government has already taken several measures to prevent and control air pollution in the country. In addition, the government must enact laws to prevent this increase in air pollution and the standard of emissions of air pollutants. Electrostatic precipitators have been added to the chimneys of the industries to prevent the emission of particles into the environment. We should also seriously consider the use of alternative and renewable energies to reduce pollution. The use of respiratory masks should be encouraged by traffic police and other people regularly exposed to toxic atmospheric pollutants.



The Government of the National Capital Territory of Delhi has taken several measures to reduce the level of air pollution in the city over the last 10 years. The benefits of air pollution control measures are indicated in the readings. However, much remains to be done to further reduce air pollution levels. Existing measures should be strengthened and expanded on a larger scale. Government efforts alone are not enough. Community participation is essential to achieving a tangible effect in reducing pollution. Use of public transport must be promoted. The use of the Metro Rail can be encouraged by providing an adequate number of power buses to the subway stations that handle the desired frequency. Civic authorities must conduct more frequent monitoring of pollution under control to ensure that vehicles emit gas within the permitted rules. People must be educated to turn off their vehicles when they wait for traffic jams. Furthermore, the "responsible" factors of pollution must also be addressed.

The increasing influx of migrants can be reduced by developing and creating job opportunities in peripheral and suburban areas, thus avoiding further congestion of the already submerged capital of Delhi. Health, as we all know, is a ubiquitous problem, which resides not only in the health department, but in all those involved in human development.

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