

## HEALTH STATUS OF DELHIITES DUE TO HUGE POLLUTION INDEX - A STUDY

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### ABSTRACT

Delhi has consistently ranked among the world's most polluted cities (IQ Air 2021). Just in 2019, air pollution was responsible for almost 17,000 premature deaths and a loss of economic activity equal to 1,207 million US dollars in the nation's capital. The year 2020 was an outlier with relation to the quality of the air. The precautions taken in response to the pandemic-induced lockdown afforded a little reprieve from the consistently bad air quality. Over the course of the past decade, the Government of Delhi has implemented a number of different programmes in an effort to reduce the amount of air pollution that exists within the city. Nevertheless, additional steps are required in order to bring the levels of air pollution further down. The measures that are now in place require both reinforcement and amplification so that they can be used on a greater scale. In addition to the response from the authorities, the participation of the community is essential if there is to be any discernible influence made on the decrease of pollution. There is a pressing need to promote the use of public transportation. The utilisation of the Metro train system may be improved. It is important that people be made more aware of the need to turn off their automobiles when they are waiting in traffic. This study is an attempt to showcase the level of pollution in Delhi & how Delhiites are getting affected due to this HPI & what's the impact on them.

**Keywords :** Health, Delhiites, Pollution, Index, Delhi

## **INTRODUCTION**

Air pollution is a significant factor in the development of a wide variety of health issues in large cities. Recently, there has been a substantial improvement in Delhi's air pollution situation, both in terms of the levels of the pollutants and the efforts that have been taken to minimise them. In this fact-based essay, we take a look at the levels of air pollution in Delhi, the consequences that it has on human health, and the various management techniques that are currently in place. According to the urban air database maintained by the World Health Organization (WHO). Industrial operations and vehicle emissions have been linked to Delhi's interior as well as outdoor air pollution. According to research conducted in Delhi on the relationship between air pollution and mortality, the overall death and morbidity rate increased as levels of air pollution rose. Over the past ten years, the city of Delhi has implemented a number of measures to cut down on the amount of pollution in the city's air. To make a major dent in the amount of pollution in the air, additional work and effort are required.

The term "pollution" refers to the act of contaminating the environment with compounds that are harmful to ecosystems, human health, or quality of life. Soil contamination, noise pollution, air pollution, and water pollution are among the main types of pollution. Thermal pollution and radioactive dangers are two other forms that receive less attention than the others. It is impossible to identify a single form of pollution as the most significant threat to human health; yet, it appears both air and water pollution are to blame for a significant proportion of the health issues that are caused by pollution.

Recently, there has been a substantial improvement in Delhi's air pollution situation, both in terms of the levels of the pollutants and the efforts that have been taken to minimise them. The levels of air pollution in Delhi, the effects on human health, and the present control strategies are all examined in this article using factual evidence. In order to convey to the general public how contaminated the air now is or how dirty it is expected to become, government agencies make use of something called an air quality index, abbreviated as AQI. Values from an air quality sensor are averaged to produce the AQI, and these readings can rise owing to factors such as increased vehicle traffic, forest fires, or anything else that has the potential to raise levels of air pollution. Ozone, nitrogen dioxide, and sulphur dioxide are among the various pollutants that have been analysed.

As the Air Quality Index (AQI) rises, there is a corresponding increase in the dangers to public health, which disproportionately affect younger and older populations, as well as those who suffer from respiratory or cardiovascular conditions. During these times, government agencies typically advise the general public to decrease the amount of time spent engaging in outdoor physical activity or even to refrain from going outside entirely. Masks for the face, such as those made of fabric, might also be recommended for use.

### **Review Literature**

Nandini Bhalla, Jane O'boyle, and Dan Haun (2018) addressed their findings as they relate to "Air pollution is a substantial contributor to the development of respiratory infections, cardiovascular disease, and lung cancer. It is also the second greatest cause of cancer overall. Nearly 3 million people around the world lost their lives due to the effects of outdoor pollution in underdeveloped countries. This grave threat to people's health is common knowledge across the globe.

According to India State-Level Disease Burden Initiative Air Pollution Collaborators (2018), air pollution is a problem in the country "With an upward trend in exposure to

ambient particulate matter pollution and a downward trend in household air pollution, air pollution was the second most significant risk factor contributing to disease burden in India in 2016. Malnutrition was the most significant risk factor contributing to disease burden in India in 2016.

SA Rizwan, Sanjeev Kumar Gupta, and Baridalyne Nongkynrih, and (2013) highlighted that a study that was conducted out in 1991–1994 to review the impacts of air pollution. The study was commissioned by the World Health Organization (WHO) and sponsored by the United Nations Environment Program (UNEP) (funded by the World Bank Development Research Group). During the course of this investigation, the overall level of total suspended particle matter (TSP) in Delhi was about five times higher than the yearly average standard set by the WHO. The research also discovered that premature deaths were linked to Delhi's high levels of air pollution and occurred at younger ages. In 1997, the Government of India's Ministry of Environment and Forests conducted an assessment of the state of Delhi's environment. According to the findings of this study, one of the primary areas of concern is air pollution. It was estimated that approximately 3000 metric tonnes of air pollutants were emitted every single day in Delhi, with a substantial contribution coming from pollution caused by vehicles (67%), followed by pollution caused by coal-based thermal power plants (12%). The Central Pollution Control Board found that between the years 1989 and 1997, there was a discernible upward trend. As a direct result of a rise in the total number of vehicles on the road, the concentrations of carbon monoxide (CO) in the atmosphere increased by 92% between the years 1989 and 1996. This was measured in the United States. In comparison to other parts of India, Delhi has the highest concentration of small-scale industrial units, which together are responsible for approximately 12% of the country's total air pollution. One of the most major causes to the air pollution in Delhi is the pollution caused by vehicles. According to the Department of Transport of the Government of the National Capital Territory of Delhi, the number of vehicles is projected to be more than 34 lacks, with a growth rate of 7% per annum. This is an increase from the previous year. The World Health Organization's Air Quality Guideline recommends a mean annual concentration of 20 micrograms per cubic metre for PM10 pollution. If the levels go above this, then there is an increased risk for adverse consequences on cardiopulmonary health. Exposure to PM10 poses a number of significant risks to human health, the most significant of which are an increased risk of developing lung cancer as well as an increased risk of passing away prematurely. People with pre-existing lung conditions, such as chronic lung disease, influenza, or asthma, as well as youngsters and the elderly, are more likely to have adverse consequences from exposure to particle matter.

According to Terry Gordion et al. (2019), the rapid growth of the industrial, power, and transportation sectors on a national basis have contributed to the rapid increase in the levels of AAP (Ambient air pollution) in India. It is anticipated that the rapid increase in the number of automobiles and the production of electricity based on coal would considerably contribute to the deterioration of air quality in India over the course of the next ten years. More than half of the cities that are part of the National Air Quality Monitoring Program (NAMP), two important metrics (PM2.5 and PM10) are predicted to surpass what is recognised by the World Health Organization (WHO). In India, there has not been a sufficient investigation into the factors that cause air pollution, and there is insufficient information accessible regarding sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and carbon monoxide (CO). These levels of SO<sub>2</sub> are remain unhealthy, despite the fact that a decrease in SO<sub>2</sub> concentrations has been

reported in a number of cities in recent years. Sources of air pollution in urban and rural locations include fixed sources, emissions from mobile vehicles, and emissions unique to the region. Automobiles, manufacturing, the generation of electricity, dust from construction and road dust, burning agricultural waste, household combustion of oil, coal, and biomass, and salt from the sea are some of the well-known regional sources of emissions in India. Other sources include road dust and road dust from construction. The eastern states of India, including Bihar, West Bengal, Jharkhand, Orissa, and Chhattisgarh, are home to numerous huge coal mines and power plants. This, combined with the substantial use of biomass, places these areas among the most polluted in the country.

### Objective of the Study

- To examine health status of Delhiites due to huge pollution index
- To suggest findings & recommendations

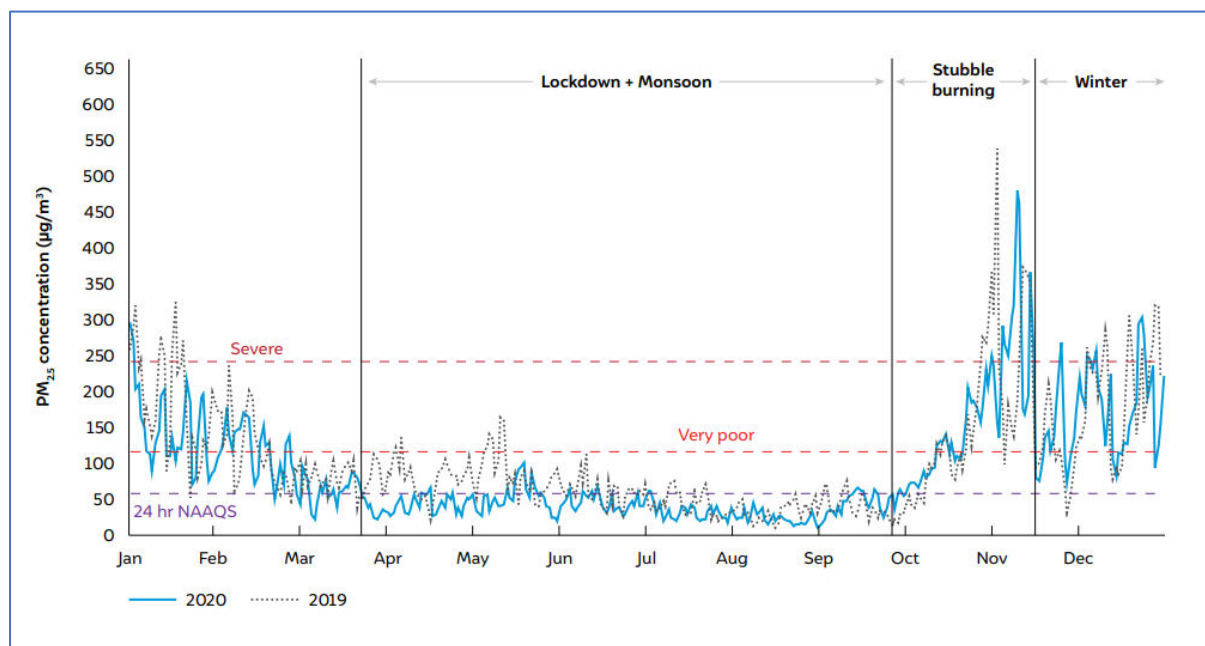
### Research methodology

This research is purely based on secondary data collected from various websites, news paper blogs & published articles. This study is specific to Delhi, so various government web portal also searched for grabbing accurate information.

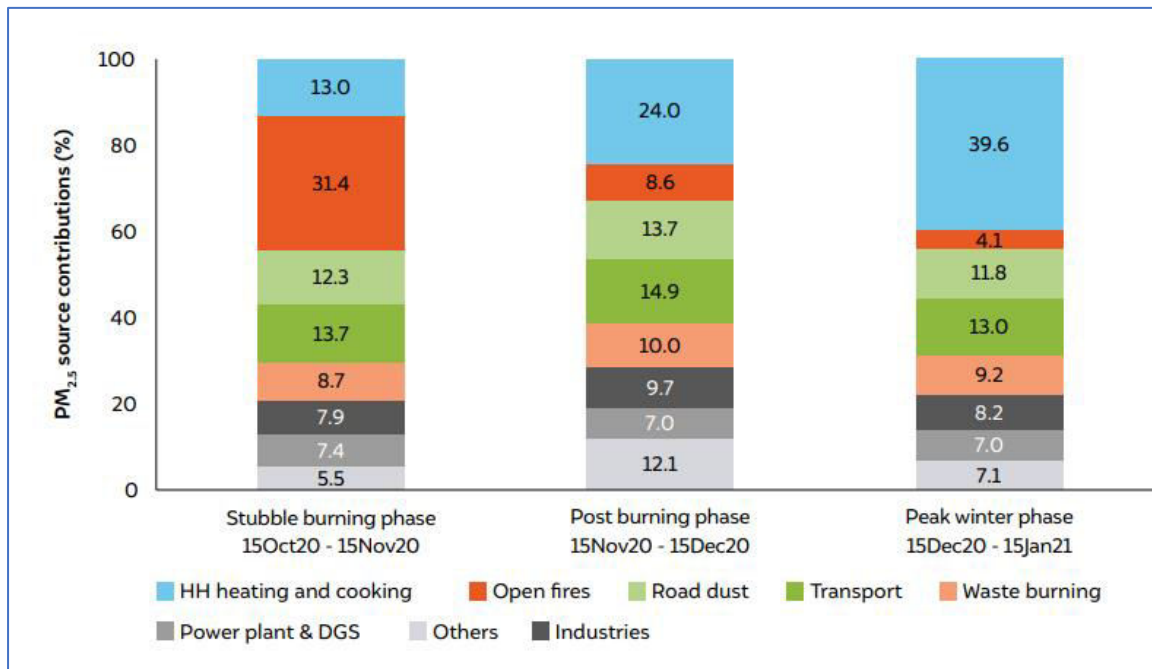
### High Risk Group

People with pre-existing lung conditions and those who work in jobs with significant exposure to air pollution, such as traffic cops, street vendors, and delivery workers, are most at risk. High pollution levels have also been connected to premature births and children's pneumonia-related fatalities.

According to the State of Global Air report, more than 116,000 infants in India passed away within a month of birth in 2019 as a result of exposure to high levels of pollution. Pneumonia, which claimed an estimated 126, 535 children in India in 2017, is the second-most prevalent cause of death for children under the age of five. According to the publication Fighting for Breath - Call to Action, 27% of these deaths were related to outdoor air pollution and 22% to indoor air pollution.



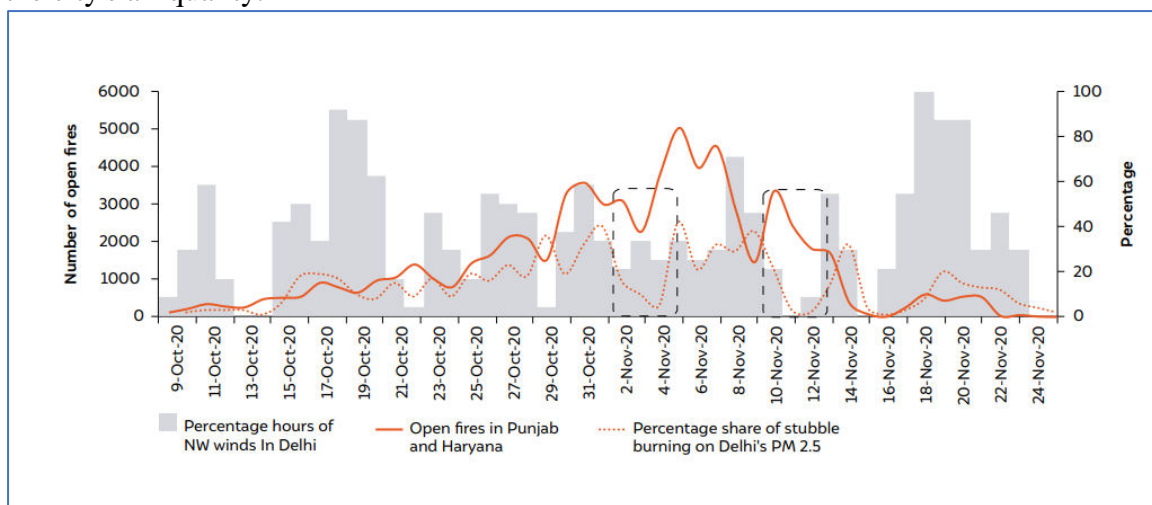
**Figure 1 : ES1 Air quality gains made from lockdown were lost in winter with the unlock (2019-2020)**



**Figure 2 : The primary contributor to pollution changes as the season progresses (2020-2021)**

**Calmer winds in October and November amplified the impact of farm fires on Delhi’s air quality**

During the stubble burning phase (15 October to 15 November), the wind speed was less than 5 kilometres per hour for 172 hours in 2020, which is a 70 percent increase over the 101 hours recorded in 2019. The smoke that was produced by farm fires was able to be transported with the assistance of winds that primarily came from the direction of the north-west, and the lack of wind in Delhi added to the severity of the smoke's negative influence on the city's air quality.





**Figure 3: Fire counts**

It is interesting to note that, for brief moments during the season, even when significant fire counts were reported in Punjab as well as Haryana, the air quality in Delhi was not harmed since favourable climatic conditions (easterly and southerly winds) prevailed. Low wind speeds and a low mixing height are examples of unfavourable meteorological circumstances.

**In order to expedite the implementation of preventative measures, Delhi need a specialised air quality forecasting unit.**

An individual site's air quality index (AQI) is simply the air quality index value that is highest for each pollutant that is monitored at that location. This value is referred to as the "peak" air quality index value for that location.

AQI Category (Range)	PM <sub>10</sub> (24hr)	PM <sub>2.5</sub> (24hr)	NO <sub>2</sub> (24hr)	O <sub>3</sub> (8hr)	CO (8hr)	SO <sub>2</sub> (24hr)	NH <sub>3</sub> (24hr)	Pb (24hr)	Colour
Good (0–50)	0–50	0–30	0–40	0–50	0–1.0	0–40	0–200	0–0.5	Deep Green
Satisfactory (51–100)	51–100	31–60	41–80	51–100	1.1–2.0	41–80	201–400	0.5–1.0	Light Green
Moderate (101–200)	101–250	61–90	81–180	101–168	2.1–10	81–380	401–800	1.1–2.0	Yellow
Poor (201–300)	251–350	91–120	181–280	169–208	10–17	381–800	801–1200	2.1–3.0	Orange
Severe (301–400)	351–430	121–250	281–400	209–748	17–34	801–1600	1200–1800	3.1–3.5	Red
Hazardous (401–500)	430+	250+	400+	748+	34+	1600+	1800+	3.5+	Maroon

**Figure 4: AQI Category, Pollutants and Health Breakpoints**

AQI	Associated Health Impacts
Good (0–50)	Minimal impact
Satisfactory (51–100)	May cause minor breathing discomfort to sensitive people.
Moderate (101–200)	May cause breathing discomfort to people with lung disease such as asthma, and discomfort to people with heart disease, children and older adults.
Poor (201–300)	May cause breathing discomfort to people on prolonged exposure, and discomfort to people with heart disease.
Severe (301–400)	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases.
Hazardous (401–500)	May cause respiratory impact even on healthy people, and serious health impacts on people with lung/heart disease. The health impacts may be experienced even during light physical activity.

**Figure 5: AQI bands, with health advice.**

**The health effects of Delhi's pollution levels might be long-lasting.**

Long-term exposure to air pollution, particularly dust from building activities in severe weather, affects the respiratory system in addition to causing heart and neurological issues such cardiac arrests, strokes, and stomach distress.



In addition to being bad for respiratory health, prolonged exposure to high levels of air pollution, like what Delhi is currently experiencing, can also cause problems with the heart, nervous system, and stomach, which can reduce people's productivity, according to specialists. People's health is also placed at danger by the dust pollution from building sites brought on by the widespread violation of the ban.

Long-term exposure to air pollution, particularly dust from building activities in this weather, affects the respiratory system in addition to causing heart and neurological issues like cardiac arrests, strokes, and gastrointestinal distress, the expert claimed. In addition to nitrogen oxide and sulphur dioxide emissions from heavy machinery and vehicles, silica dust pollution exposure around construction sites has both short- and long-term negative consequences.

### **The state of people's health in Delhi as a result of the city's extremely high pollution index**

An increase in the number of emissions into the air may cause the AQI to rise. For instance, when there is heavy traffic during rush hour, when there is a forest fire upwind, or when there is insufficient dispersion of air pollutants. The presence of stagnant air, which is frequently brought on by an anticyclone, a temperature inversion, or a lack of wind speed, allows air pollution to persist in a limited area. This results in high concentrations of pollutants, chemical interactions between air contaminants, and foggy conditions.

### **When it is anticipated that the AQI will be high due to the presence of fine particle pollution on a given day, a government agency or a public health organisation might:**

- people with respiratory or cardiovascular conditions, as well as the elderly and children, should be advised to refrain from engaging in strenuous activity outside.
- Dedicate a day as a "action day" to promote the adoption of self-help strategies for lowering emissions into the atmosphere, such as taking advantage of public transportation.
- strongly encourage individuals to use masks in order to prevent minute particles from entering the lungs.

Agencies may use emergency plans to order major emitters (like coal-burning industries) to reduce emissions until the hazardous conditions pass during a period of extremely poor air quality, such as an air pollution episode, when the AQI indicates that acute exposure may cause significant harm to the public health.

#### **06 ways funders and campaigners can contribute to this effort**

- Increase team understanding of the advantages of clean air by developing internal knowledge.
- Increase and broaden the demand for clean air by highlighting the advantages of clean air to your work in your advocacy, lobbying, and communications.
- Assist in the provision of clean air by tackling the issue using your area-of-expertise knowledge.
- Use statistics and information on air pollution to comprehend how it affects your work and vice versa.
- Get involved in the areas you serve to form partnerships with the most impacted groups.
- Assist in making the case for more effective funding and initiatives that combine various development goals.

#### **Recommendations:**

We understand the advantages of minimal air pollution. It is crucial to maintain this low AQI and make sure the population continue to benefit from it. The government can take the following actions to reduce air pollution and keep Delhi's AQI levels low.

1. Promote greater planting and outlaw tree-cutting
2. Promote the use of electric vehicles by providing subsidies
3. Dispose of noncompliant vehicles and cut back on emissions
4. Promote the usage of public transportation
5. Promote cycling or walking and make facilities available.
6. Create strict regulations
7. Promote the use of carpools
8. Establish tight regulations for the construction of buildings
9. Increase the number of public vehicles at a reasonable price.
10. Allowing IT workers in other cities to work from home may also lessen the amount of traffic in major cities, which will reduce air pollution.
11. To assist balance air pollution, the Indian government can schedule a lockdown once every six months for a few days.
12. If a lockdown for the entire country cannot be implemented at once, consider implementing lockdowns in different cities on various days.

#### **Suggestions**

Over the past ten years, the government of Delhi's National Capital Territory has implemented a number of measures to lower the city's air pollution levels. The readings demonstrate the advantages of air pollution mitigation techniques. To further lower the levels of air pollution, more work must be done. It is necessary to reinforce and scale up the currently implemented initiatives. Governmental actions on their own are insufficient. Community involvement is essential to having a noticeable impact on pollution reduction. Promoting the use of public transportation is necessary. By placing enough feeder buses at Metro stations that run at the desired frequency, it is possible to promote the use of Metro rail. The local authorities should verify Pollution Under Control Certificates more frequently to make sure that automobiles are producing gases below acceptable limits. People need to be



reminded to turn off their cars when parked at junctions. Furthermore, it's important to address the "upstream" causes of pollution. By developing and establishing economic possibilities in the periphery and suburban districts, it is possible to lessen the continuously rising influx of migrants and stop additional congestion in Delhi, the nation's capital.

We all know that health is a topic that touches everyone involved in human growth, not just those working in the health department. From Charaka through Hippocrates, many great thinkers have emphasised the significance of the environment for a person's health. As a result, everyone involved in altering the environment, for whatever cause, must help to protect people's health by limiting any elements that have an impact on it.

## CONCLUSION

The AQI in Delhi was improved according to the study mentioned above. As everyone is aware, the COVID-19 lockdown results in a drop in AQI values from a minimum of 42% to a maximum of 66%, which falls into the acceptable to satisfactory category and promotes a comfortable standard of living for people. But because of the lockdown strategy, the entire country is experiencing a severe economic crisis, making this the more expensive experience. It is crucial to manage air pollution at a lower level to keep people healthy. This can be done through a methodical process, rigorous government regulations, and strict adherence to those regulations by both individuals and businesses. The Indian government may even consider implementing a lockdown every six months in different cities on different days. The society urgently need a rise in the number of people, automobiles, factories, and technology. The transformation in agriculture, industry, and technology is unavoidable. However, development should be constrained so as not to adversely affect diverse natural aspects. Natural processes like the Coronavirus seek to repair or reestablish itself when we overstep the bounds and harm the environment. Without harming the local economy or way of life, more research can be done on maintaining and lowering the low AQI values and pollution levels.

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