

Air pollution in states of India

*Pragnyanidhi Sabbineni*¹

¹Research scientist, DKR Labs, Hyderabad, India.

Corresponding Author: Pragnyanidhi95@gmail.com

Abstract: With nearly 1.3 billion inhabitants, India is the second most populous country in the world. A serious health risk in India is air pollution. According to World Health Organization research, air pollution in India results in more than 500,000 premature deaths annually. The state of Delhi is particularly affected by air pollution. In November 2019, the level of particulate matter in the air was more than 10 times the safe limit the World Health Organization set. This caused schools to close and people to stay indoors. India's main sources of air pollution are emissions from vehicles, power plants, and industries. Burning coal and biomass, such as wood and cow dung, also contributes to air pollution. In addition, dust from construction sites, agricultural fields, and unpaved roads adds to the problem.

Key Words: —Air pollution, ozone, particulate matter.

I. INTRODUCTION

Air pollution is a burning issue at this time! While we know that air pollution can cause various health issues, we have yet to determine how much of a financial toll it takes on society. For the different Indian states, it is vital to comprehend the ramifications of this.

Air pollution is a significant cause of premature death and sickness and a threat to public health on a global scale. Besides being bad for people's health and shortening their life expectancy, the economy also feels the pinch (Kankaria, 2014). Reduced air pollution fatalities and diseases are part of the Sustainable Development Goals (SDG).

The most often used air pollution measurements are ambient particulate matter pollution, indoor air pollution, and tropospheric ozone exposure. India's primary causes of air pollution include construction waste incineration, domestic and commercial biomass burning, windblown mineral dust, coal combustion for power generation, and industrial pollutants. In addition to agricultural stubble burning, landfill incineration, and garbage incineration, there are several other sources (Rani, 2021).

Manuscript revised November 30, 2022; accepted December 01, 2022. Date of publication December 02, 2022.

This paper available online at www.ijprse.com

ISSN (Online): 2582-7898; SJIF: 5.59

Using solid fuels, including wood, manure, agricultural wastes, coal, and charcoal, primarily causes home air pollution.

Oxygen is generated when air pollution from automobiles and other sources combines with hydrocarbons produced by many sources in the sunshine. In India, air pollution has been shown to harm human health, according to several studies. Strong evidence links brief and extended exposure periods to increased disease and death rates in India.

How air pollution impacts illness, average life span, and fatality throughout the states of India was examined in a 2017 Global Burden of Disease Study (GBD) released by the India State-Level Illness Burden Initiative (ISLDBI) (GBD).

GBD 2018's revised methodology and fresh data resulted in a shift in air pollution's influence on death and illness burden. Detailed information on India and its many states is given on this page (Jindal, 2020).

II. METHODS

The prevalence of exposure to particulate matter, airborne ozone pollution, and home air pollution in each of India's states was evaluated as part of the 2018 Global Disease Burden Study (GBD).

Our research utilized data from all of India's states in combination with the World Bank's Cost of Disease methodology to calculate the economic toll that air pollution has taken on each region individually.

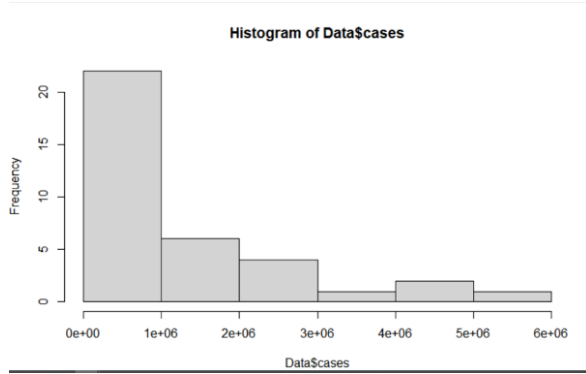


Fig.1. The histogram for death and cases.

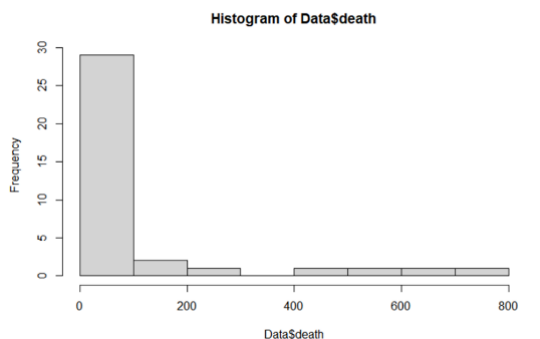


Fig.2. Total cases and death are high at the start and low at the end.

III. FINDINGS

According to the WHO, air pollution was responsible for the deaths of 1.67 million Indians in 2018, or 17% of the country's overall death toll in 2018. According to the study, most of these fatalities were caused by air pollution, mainly particulate matter and indoor air pollution. From 1990 to 2018, there was an increase of 115.3% in ambient particulate matter pollution and a rise of 139.2% in ambient ozone pollution. Despite this, the death rate attributable to residential air pollution fell by 64.2 percent (Balakrishnan, 2014).

cases		death	
Min. :	24100	Min. :	0.00
1st Qu.:	86152	1st Qu.:	6.75
Median :	440148	Median :	26.50
Mean :	1140102	Mean :	100.22
3rd Qu.:	1733757	3rd Qu.:	70.25
Max. :	5857820	Max. :	732.00

Fig.3. Descriptive statistics

WHO estimates that in 2018, illnesses and premature deaths in India costed US\$8.0 billion and US\$ 28.8 billion, respectively, due to air pollution. A total of \$36.8 billion was lost, equivalent to 16.66% of the country's GDP! From 0.67

percent to 2.15 percent of the state's GDP, other states reported economic losses due to the disaster. Those states with the highest GDP per capita, like Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, and Bihar, suffered tremendous economic losses (Khilnani, 2018). After Haryana, Delhi had the most excellent per-capita cost of pollution in 2018 based on per-person losses.

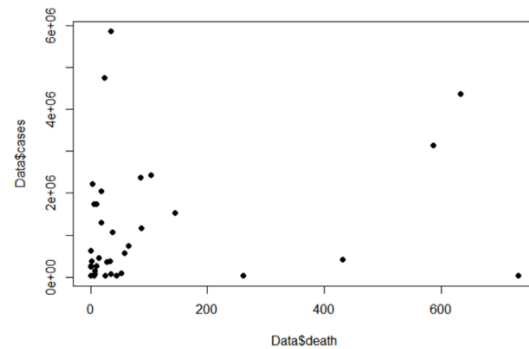


Fig.4. Death, and cases are scattered throughout a large area. There is no linear relationship between death and cases.

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Call:
lm(formula = cases ~ death, data = Data)

Residuals:
    Min       1Q   Median       3Q      Max
-2158912 -939066 -569367  747943  4826685

Coefficients:
(Intercept)  972660  273916  3.551  0.00115 **
death        1671     1298  1.287  0.20676

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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1446000 on 34 degrees of freedom
Multiple R-squared:  0.04646, Adjusted R-squared:  0.01841
F-statistic: 1.657 on 1 and 34 DF, p-value: 0.2068
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Fig.5. Relation between cases and death

There is a positive relationship between cases and death, where the increase in cases leads to an increase in death.

IV. INTERPRETATION

India's plan to reach a \$5 trillion economy by 2024 is in jeopardy if the country's air quality does not improve significantly. Air pollution is responsible for a significant portion of premature deaths and illnesses and has a significant negative economic effect due to lost productivity. State-specific efforts to reduce air pollution in India would have significant advantages for the people's health and economic growth if they were successful.

V. CONCLUSION

Air pollution in the states of India is a pressing environmental

issue. The burning of fossil fuels, such as coal and oil, releases harmful chemicals into the air. These substances can cause birth defects, cancer, heart disease, stroke, and respiratory infections, among other serious health problems. Additionally, it aids in climate change.

The government has taken some steps to address the problem of air pollution, but more needs to be done. Emissions from power plants could be decreased by switching to sustainable energy sources like wind and solar energy. Implementing stricter emissions standards for vehicles would also make a difference!

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