

The Coronavirus outbreak and the AIR QUALITY INDEX of Delhi, a blessing in disguise.

Submitted by-

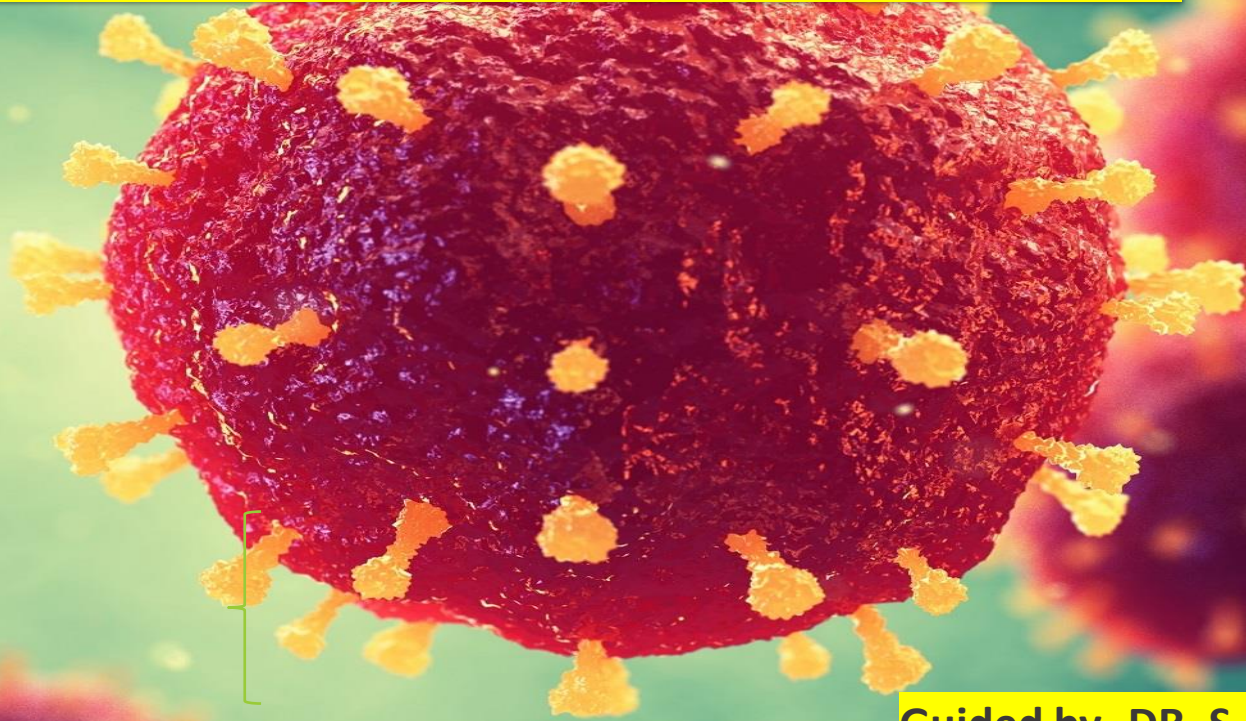
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INTRODUCTION

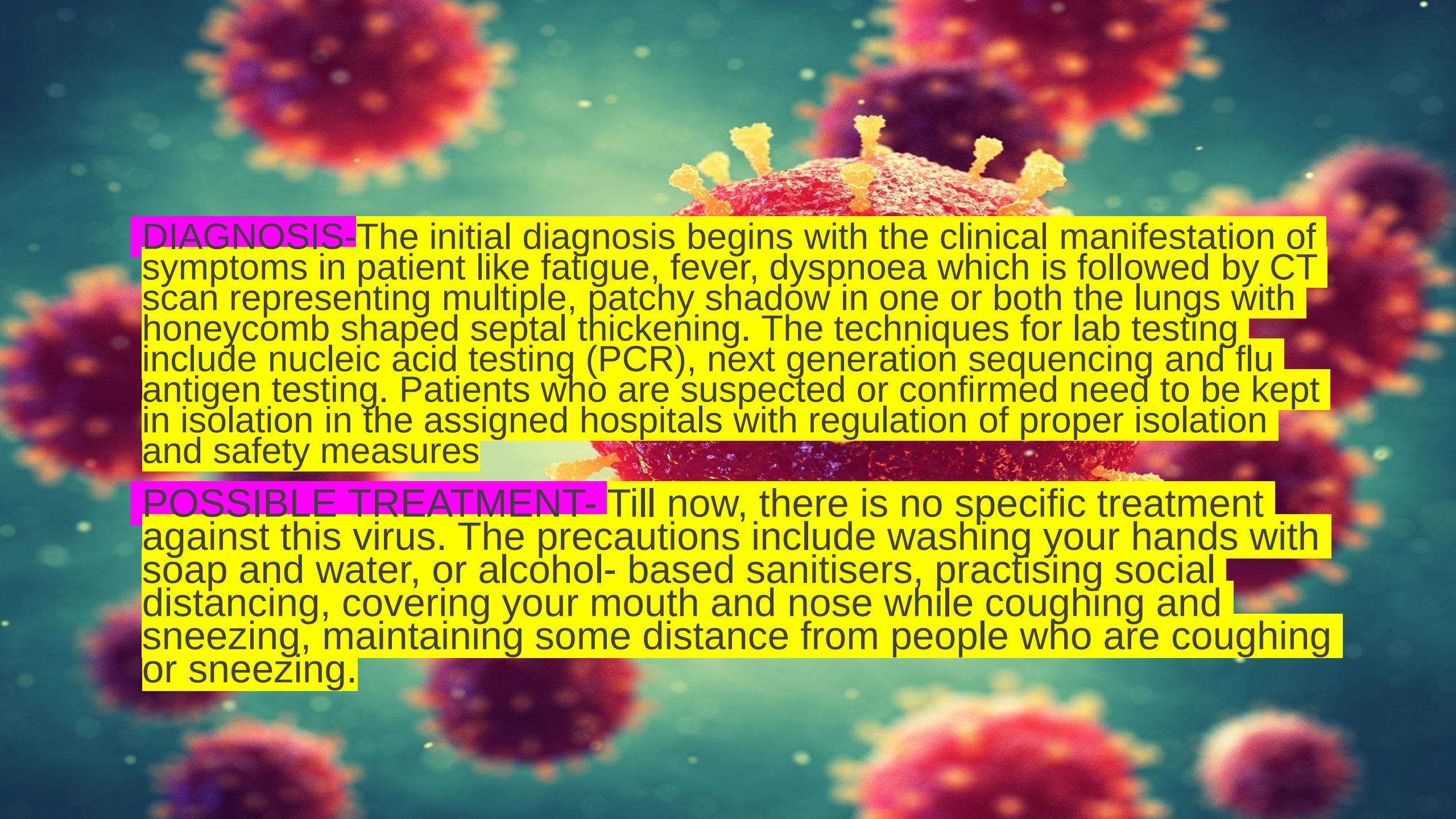
WHAT IS CORONAVIRUS ? Coronavirus is a virus that is found in mammals, which can be transmitted from animals to human and from person to person. The symptoms of the coronavirus include cough, fever and shortness of breath. However, the total confirmed cases in Delhi were 14000 with 600 deaths according to WHO.

TRANSMISSION OF CORONAVIRUS- It is a respiratory virus and the mode of transmission is through droplets generated by an affected person through cough, sneeze, exchange of saliva or any dispense from nose. It can also be transmitted directly by coming in close contact with an infected person who has any of these respiratory symptoms.

INCUBATION PERIOD- Incubation period is defined as the duration between catching the virus and starting to show symptoms of the virus. The incubation period of covid-19 varies from 0 to 14 days.

HIGHLY SUSCEPTIBLE- The elderly population above 60 years, people with pre-existing medical condition or immunocompromised patients are highly susceptible.

EPIDEMIC CURVE- One of the public health strategies is the epidemic curve which gives us a visual representation of the data concerning the number of infected people who are in need of healthcare. In case of a pandemic, the number of infected people can exceed and the healthcare system loses its capacity to provide proper healthcare which can lead to the breakdown of the healthcare system. Flattening of this epidemic curve is a result of slow spread of pandemic.



DIAGNOSIS- The initial diagnosis begins with the clinical manifestation of symptoms in patient like fatigue, fever, dyspnoea which is followed by CT scan representing multiple, patchy shadow in one or both the lungs with honeycomb shaped septal thickening. The techniques for lab testing include nucleic acid testing (PCR), next generation sequencing and flu antigen testing. Patients who are suspected or confirmed need to be kept in isolation in the assigned hospitals with regulation of proper isolation and safety measures

POSSIBLE TREATMENT- Till now, there is no specific treatment against this virus. The precautions include washing your hands with soap and water, or alcohol- based sanitisers, practising social distancing, covering your mouth and nose while coughing and sneezing, maintaining some distance from people who are coughing or sneezing.

WHAT IS AIR QUALITY INDEX ?

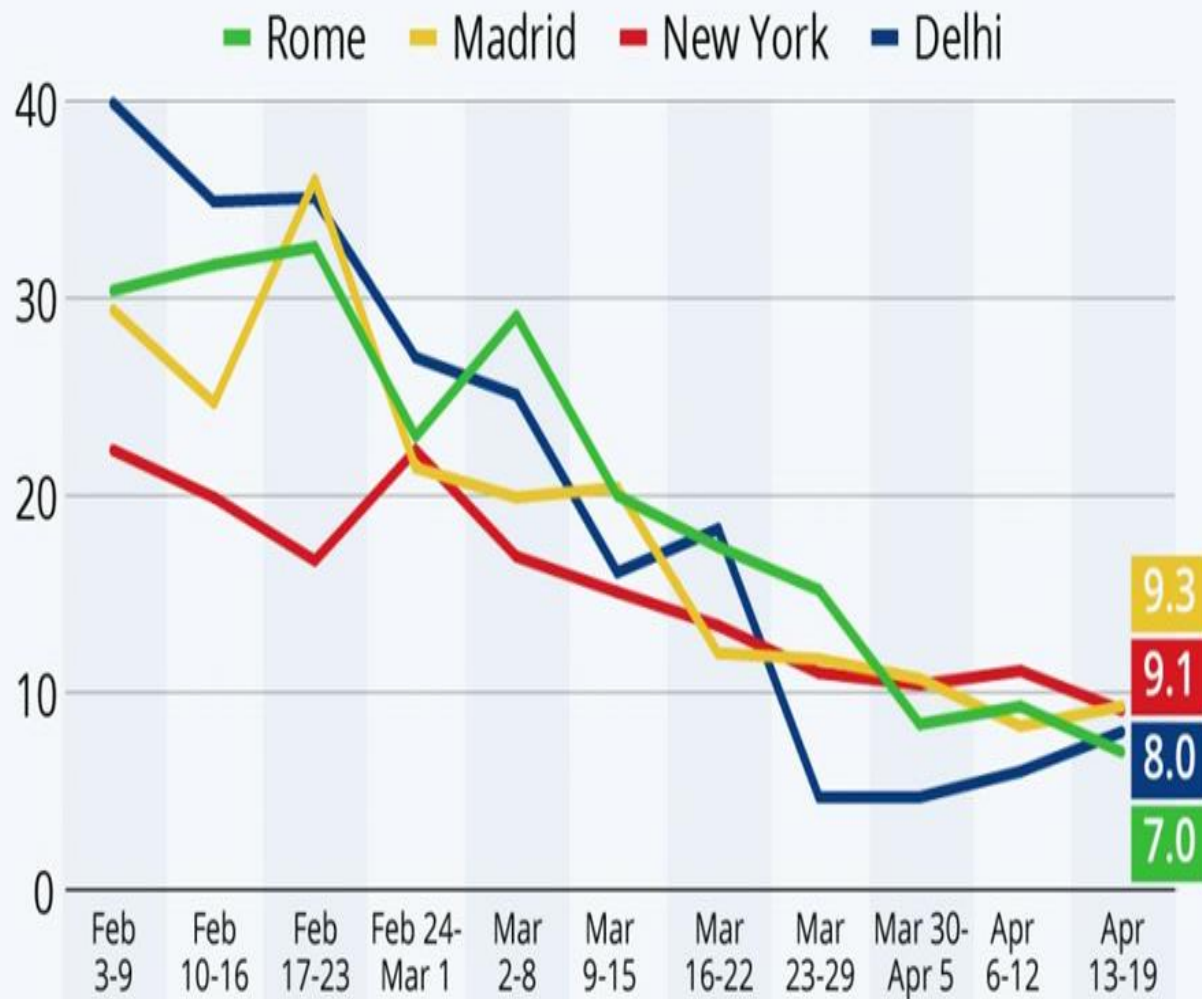
The air quality index (AQI) is an index for reporting air quality on a daily basis. It is a measure of how air pollution affects one's health within a short time period. The purpose of the AQI is to help people know how the local air quality impacts their health. The Environmental Protection Agency (EPA) calculates the AQI for five major air pollutants, for which national air quality standards have been established to safeguard public health.

1. Ground-level ozone
2. Particle pollution/particulate matter (PM_{2.5}/pm 10)
3. Carbon Monoxide
4. Sulfur dioxide
5. Nitrogen dioxide

The higher the AQI value, the greater the level of air pollution and the greater the health concerns.

AIR QUALITY INDEX

Air Quality Index (AQI) Values	Levels of Health Concern	Health Effects
0 to 50	Good	Little or no risk
51 to 100	Moderate	Acceptable quality
101 to 150	Unhealthy for Sensitive Groups	General Public not likely affected
151 to 200	Unhealthy	All may experience some effects
201 to 300	Very Unhealthy	All may experience more serious effects
301 to 500	Hazardous	Emergency conditions



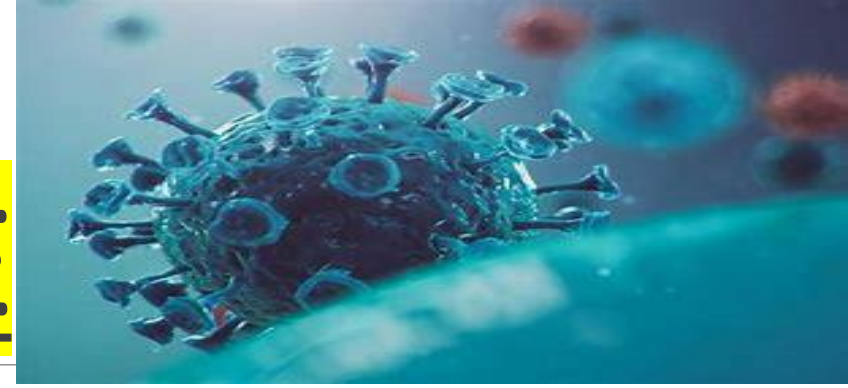
Central locations

* 95 percent of NO₂ in the air is caused by fossil fuel combustion

Source: World Air Quality Index (WAQI)

The above graph clearly illustrates how Air quality index has affected the daily air quality in the past few month. AQI communicates to us how unhealthy or clean the air quality is, and what might be the consequences associated with it. The major issue targeted through this study is the purpose of the AQI and how it impacts the health of an individual. The AQI is divided into six major groups. When the AQI is between 0 to 50, it is considered as good and is symbolised by green colour, when it is between 101 and 150, it is usually considered unhealthy for sensitive people and is symbolised by orange colour. However, more than 150 is considered unhealthy and more than 300 is hazardous for individual. Therefore, this index is very important because it provides simple information regarding the air quality, effects of unhealthy air on individuals and how can we protect ourselves.

REVIEW OF LITERATURE



1. Indirect Impact of COVID-19 on Environment: A Brief Study in Indian context

Sneha Lokhandwala, Pratibha Gautam (PubMed)

- A closer look into the refinement of the environment during the lockdown as compared to before the lockdown supported with evidence.
- However, it lacks the basic understanding of the Air Quality index and how it largely affects the health of an individual.

2. Possible Environmental Effects on the Spread of COVID-19 in China

Hao Xu, Chonghuai Yan (PubMed)

The basis of the study was Poisson regression model and the effects it had on the AQI. An analysis was done on the confirmed cases which showed that the effect of AQI on confirmed patients were associated with a hike in each unit of AQI.

3. Association Between Ambient Temperature and COVID-19 Infection in 122 Cities from China

Jingui Xie, Yongjian Zhu

- The results of this study show that the mean temperature has a positive linear relationship with the number of COVID-19 cases with a threshold of 3 °C. There is no evidence supporting that case counts of COVID-19 could decline when the weather becomes warmer, which provides useful implications for policymakers and the public.

4. 21-Day Lockdown in India Dramatically Reduced Air Pollution Indices in Lucknow and New Delhi

Sudhakar shrivastav, Amit kumar

- The author scientifically made an analysis through the available data on primary air pollutants (PM₂, NO₂, SO₂, CO) from Lucknow and New Delhi.
- The analysis was on the basis of comparison of the quality of air pre and post the lockdown.
- A reduction in the pollution and refinement of the air quality was seen in Lucknow and New Delhi.
- The author also presents a perspective to control air pollution in the future by adopting lockdown as a tool.

5. Decline in PM_{2.5} Concentrations Over Major Cities Around the World Associated With COVID-19

Akansha Chauhan, Ramesh P Singh

- The author represents a significant decline in the particulate matter (Pm_{2.5}) which shows the Air quality of a location. The major reason "social distancing" which resulted in less movement of people.

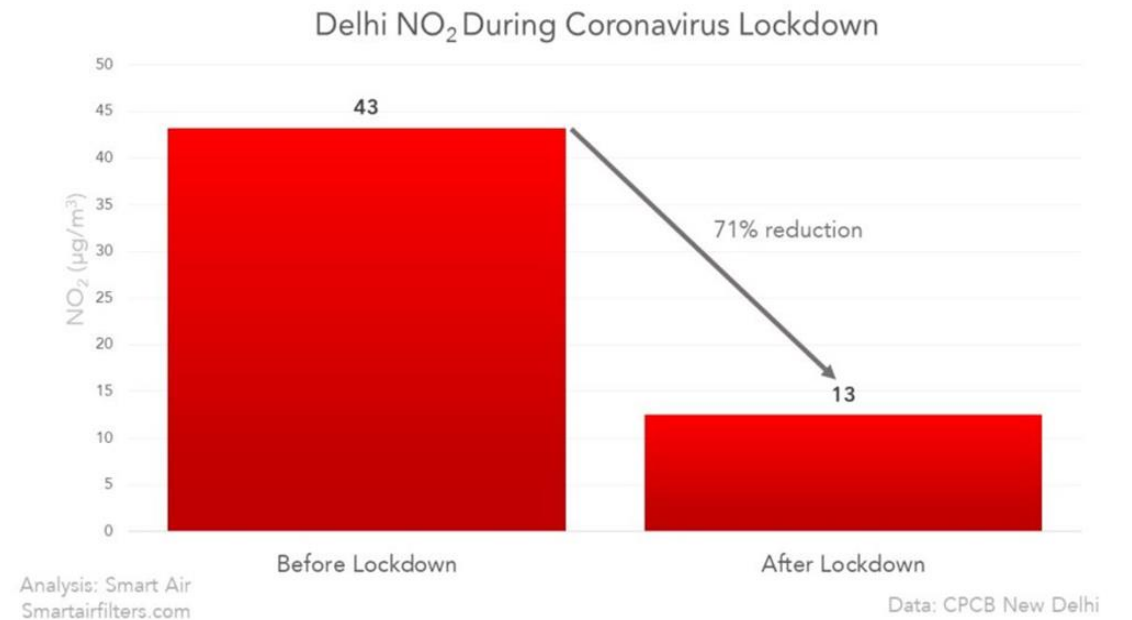
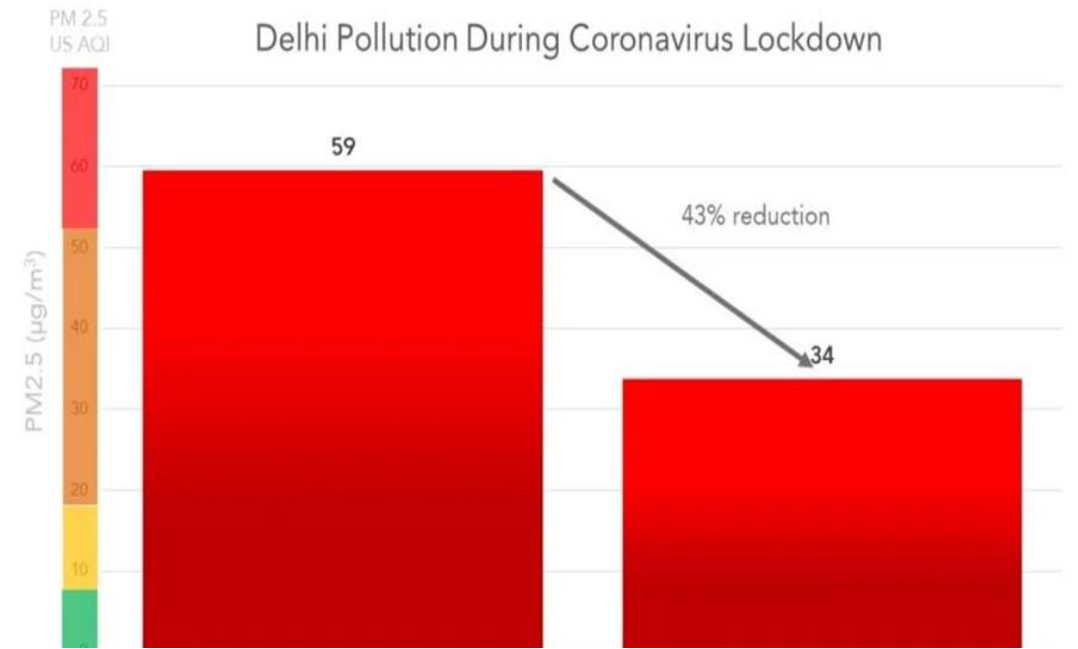
METHODOLOGY

A primary research was done using an online questionnaire survey, created using google forms. Non-Probability sampling was done to select the respondents. The respondents were forwarded a survey of 14 questions using mail ids and social media platforms. As many as 100 responded to the survey from the capital state Delhi which is a hotspot of the pandemic

a detailed description was given to the participants about what is the importance of the study and why is it conducted. Also, the survey was anonymous to maintain confidentiality. After giving the details, the respondents were presented with the initial questions regarding the demographic details. The participants were asked about their location in Delhi (East, west, north and south). Reasoning questions were asked which were based on the reasons in perception of air quality before and after the lockdown in Delhi.



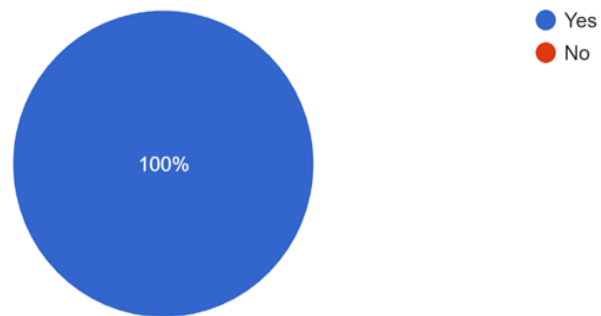
before lockdown				During lockdown				Overall variation		
NCT Delhi avg.	Industrial locations avg.	Transport locations avg.	Residential and other locations avg.	NCT Delhi avg.	Industrial locations avg.	Transport locations avg.	Residential and other locations avg.	Net	%	
PM ₁₀	176.07	190.74	195.77	160.48	84.79	91.25	90.11	76.48	-91.28	-51.85
PM _{2.5}	80.51	88.05	94.83	72.67	37.75	39.67	44.23	31.09	-42.76	-53.11
SO ₂	16.08	15.48	14.56	14.17	13.19	14.07	12.53	11.20	-2.89	-17.97
NO ₂	42.59	34.81	47.35	48.75	20.16	18.80	23.38	18.79	-22.44	-52.68
CO	1.03	1.33	1.13	1.01	0.72	1.04	0.71	0.64	-0.31	-30.35
O ₃	34.05	26.37	35.07	37.36	34.32	31.00	38.87	37.97	0.27	0.78
NH ₃	33.93	38.43	38.02	30.66	29.75	35.84	33.06	25.97	-4.18	-12.33
NAQI	185.99	196.38	215.29	174.78	72.64	92.45	87.29	79.8	-113.36	-60.95



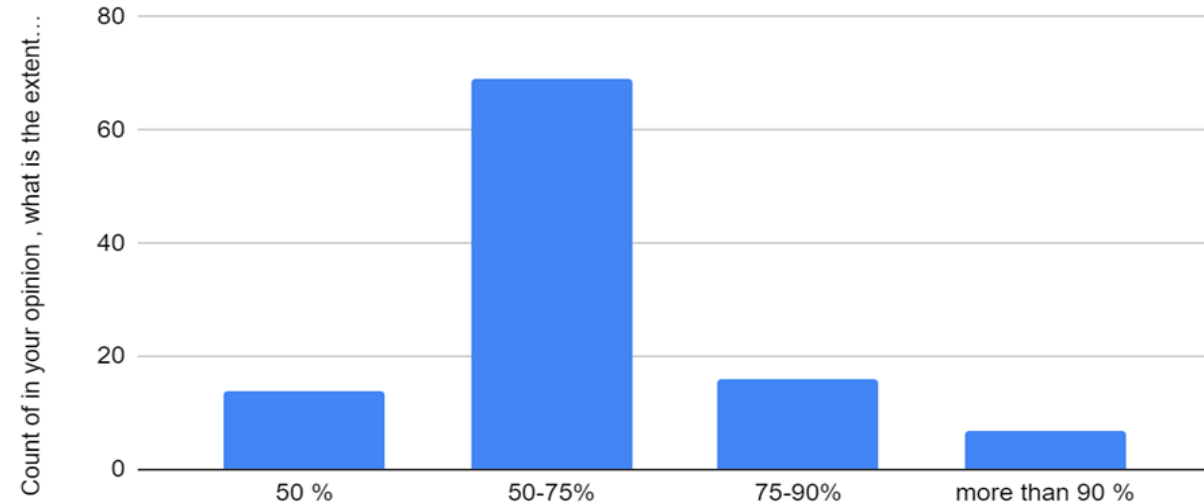
KEY FINDINGS

Do you think the pollution level in delhi has reduced due to this lockdown ?

106 responses



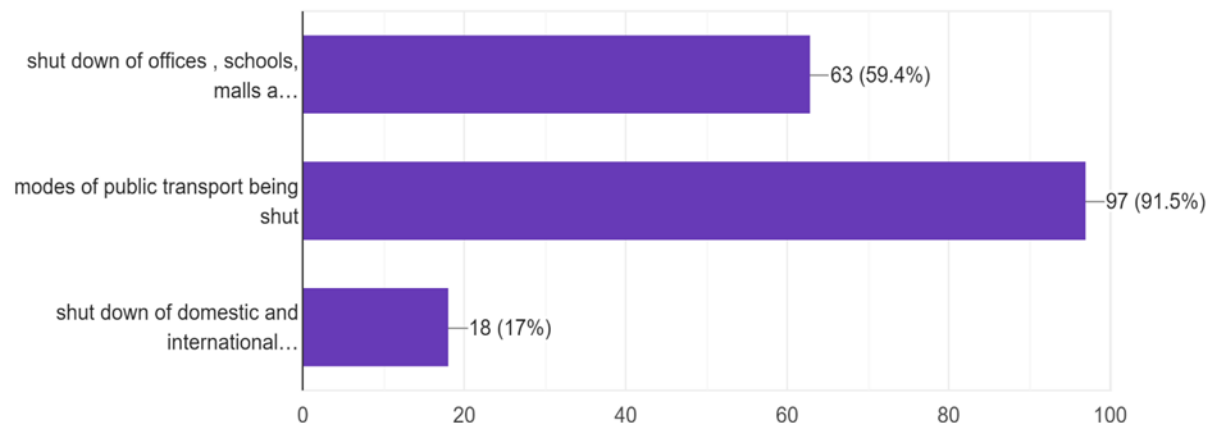
Count of in your opinion , what is the extent of improvement of weather in Delhi?



in your opinion , what is the extent of improvement of weather in Delhi?

What are the major reasons for the improvement in the weather in Delhi?

106 responses



Every single participant thinks that the pollution level has reduced post this lockdown which brings our attention to the reason behind it.

Approximately 91% people think that the major reason behind this is the shut down of the mode of public transport in major areas of Delhi.

About 59 % participants have an opinion that due to the schools, offices and malls being closed, people have had to stay indoors which leads to the improvement in the weather conditions.

However, a small minority about 18 % people contribute this to the domestic and international airports being closed. Whatever the reason might be the sky appears to be blue and cities have little traffic or commercial movement. As shown by the statistics, almost 50-75% participants think that there is improvement in the weather condition of Delhi. However, only a small amount of people think that the extent is more than 90 %.

DISCUSSION

Specifically, this lockdown served as a way to reflect on the extent of air quality.

Therefore, which brings into light the six major pollutants which play a role in the air pollution and hamper the national capital. First is Pm_{2.5} which lowered down to an average of 35ug/m³. The second one is Pm₁₀. The main contributor of this is road dust and construction dust. With low traffic and limited construction activities, it dropped down to an average of 35. The next is Sulphur dioxide and nitric oxide. The major drop was seen in the average of nitric oxide as its main source is combustion of vehicles. The last is carbon monoxide and ozone which drop down from 600-1000 to 500-800 and 15-40 to 25-70 respectively.

This explains to us that the nation needed an intervention at such a huge level where the movement was completely restricted and all industrial activities stopped. This needs to be an awakening for us. Without our presence, the nature is nurturing itself and hence, it is a blessing in disguise.

THANK YOU
