

IMPACT OF AIR POLLUTION ON HUMAN HEALTH

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ABSTRACT

Air pollution is a significant problem in the newly civilised globe. It has a significant toxicological influence on both human health and the natural environment. The most significant contributors to air pollution are motor vehicles and industrial operations, despite the fact that there are a number of other sources of emissions. Particle pollution, ground-level ozone, carbon monoxide, sulphur oxides, nitrogen oxides, and lead are the six primary air pollutants that have been identified by the World Health Organisation. Lead is the seventh important air pollutant. Both short and long-term exposure to airborne toxicants has distinct toxicological effects on humans. These effects include an increased risk of developing illnesses of the respiratory and cardiovascular systems, neuropsychiatric problems, eye irritation, skin disorders, and long-term chronic diseases like cancer. The direct relationship between exposure to poor air quality and a rising incidence of morbidity and death, primarily owing to cardiovascular and respiratory disorders, has been highlighted by a number of studies and has been confirmed by other publications. Most important Large-scale industries including power plants, steel plants, cement plants, and other manufacturing facilities like crushers and smelters plants are the primary contributors to air pollution. Automobiles, buses, aeroplanes, trucks, and trains are examples of some of the more manageable sources. Human activities and naturally occurring causes, such as dust swept by the wind and volcanic eruptions, are both contributors to air pollution. The development that normally takes place in nations as they become industrialised, the growth of cities, the increase in traffic, fast economic development and industrialisation, and increased levels of energy consumption have all contributed to the worsening of air pollution. In India, the majority of the country's population lives in metropolitan areas, which have the highest concentration of polluting cars, as well as a few other regions that have a large number of polluting businesses and thermal power plants.

keywords: *Pollution, Human, Health*

INTRODUCTION

Removal of the Cause of Because pollution has such negative consequences on both people's health and the environment, it has become a major cause for worry on a worldwide scale. There are many distinct manifestations of environmental pollution, including but not limited to air pollution, water pollution, soil contamination, and so on and so forth. Air pollution is the presence of one or more pollutants in the atmosphere, such as dust, mist, smoke, and colour, that are harmful to human beings, plants, and animals. These contaminants include dust, mist, smoke, and colour. There are many different compounds in the air, some of which can be harmful to the health of humans, plants, and animals, as well as limit visibility. These are produced both by natural processes and by the actions of humans. The term "pollutant" refers to any substance that is either not normally present in the atmosphere or that is present in either higher quantities

or in different areas than is typical. Individual responses to air pollutants are determined by the nature of the pollutant to which a person is exposed, the intensity of that exposure, the person's current state of health, and their genetic makeup. On days when there is heavy smog, people are more likely to be exposed to the contaminants that are in the air. It is anticipated that the usage of motorised transportation will also continue to rise over the next few years, which might result in a deterioration of the air quality. It has been established that poor air quality has a direct and significant impact on the health of the general population.

OBJECTIVES

- In order to determine the underlying cause of air pollution,
- In order to determine how the quality of the air affects the health of individuals,
- To decide whether or not it is necessary to take action to limit the causes of air pollution.

DEFINITIONS

The term "air pollution" refers to all of the negative impacts that may be attributed to any causes that contribute to the contamination of the atmosphere and/or the destruction of the environment. Human activities and/or natural occurrences can both contribute to the formation of polluted air. It is composed of a wide variety of different types of contaminants, including substances in the solid, liquid, and gaseous states. In this particular piece of writing, we will not be focusing on the air pollution that occurs indoors. The Pollutant Standard Index, often known as the PSI, is a numerical number and indication of pollutants that is typically utilised to make the risk assessment process easier. It is a figure in the range from zero to five hundred. In 1974, Thom and Ott were the ones who came up with the idea of using PSI as a guideline for reporting the quality of the air. As a result, it would offer a means of contrasting the respective contributions of the various pollutants to the overall risk. The concentration of five primary air pollutants, including particulate matters (PMs), sulphur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and ozone (O₃) in the air are used in the computation of PSI. According to Johnson et al., "air quality index (AQI) is defined as a measure of the condition of air relative to the requirements of one or more biotic species or to any human need." AQI stands for "air quality index." The AQI is broken down into ranges, which are then numbered; color-coded indicators are used to denote each individual range. It gives a figure that ranges from zero, which is the healthy standard level, to above 300, which is a very dangerous level, to represent the amount of health risk that is connected with the air quality. According to the PSI, air quality is categorised into six key indices, each of which is denoted by a colour code. These colour codes correlate to varying levels of health risks, and each colour has its own unique meaning. In general, the colour green is considered to be an indicative of healthy air quality, whereas the colours yellow, orange, red, purple, and maroon, respectively, represent moderately unhealthy air quality, unhealthy air quality for sensitive populations, unhealthy air quality, very unhealthy air quality, and hazardous air quality. These ranges and codes could be interpreted differently according to the various categorization systems used in various nations.

RESEARCH METHODOLOGY

Secondary data are gathered from a variety of sources, including the internet, the annual reports of private and public sector undertakings, technical journals, regulatory commissions, the gazette of the government of India, and conference proceedings. This also covers significant government publications, statistics abstracts and reports, as well as Indian and foreign periodicals. Financial Institutional Investors are also included.

In order to evaluate an ambient air quality that is carrying out a Nation-wide (NAMP) National Air Quality Monitoring Programme, a comprehensive research of the official websites of government organisations has been carried out. The network is made up of 332 stations that are actively broadcasting, and it covers 121 cities and towns in 25 states and 4 union territories around the country.

i) The National Ambient Air Quality Monitoring Programme (often abbreviated as NAMP).

ii) The Tamilnadu Pollution Control Board (TNPCB), which is classified as a state-level agency

CONCEPTUAL FRAME WORK FOR ASSESSMENT & TECHNIQUES OF AIR QUALITY

To determine the status and trends of ambient air quality; to determine whether the prescribed ambient air quality standards are being violated; to identify cities that do not attain these standards; to obtain the knowledge and understanding necessary for developing preventive and corrective measures; and to understand the natural cleansing process that is occurring in the environment through pollution dilution, dispersion, wind-based movement, dry deposition, precipitation, and churning. These are the objectives of the National Ambient Air Monitoring Programme (NAMP).

The composition of **Good Air to Inhale** is given below:

Composition of Gases	Content Level
Nitrogen	78%
Oxygen	21%
Argon	less than 1%
Carbon dioxide	0.037%
Water vapour	Remaining
Ozone, Helium and ammonia	Trace amount

The National Ambient Air Quality Standard (NAAQS) has been used as a benchmark to evaluate the air quality in a number of cities and towns around the country. On the basis of an Exceedence Factor, the quality of the air has been divided into four major categories. An Exceedence Factor is the ratio of the annual mean concentration of a pollutant to that of a relevant criterion.

The four air quality categories are:

- The level of pollution is considered critical (C) when the Exceedence Factor is more than 1,500 ug/m³.
- When the Exceedence Factor is between 1.0 and 1.5 ug/m³, the level of pollution is considered to be high (H).
- The level of pollution is considered to be moderate, or M, when the Exceedence Factor is between 0.5 and 1.0 ug/m³.

- The level of pollution is considered to be low (L) when the Exceedence Factor is at or below 0.5 ug/m³.

Pollutants can be classified as either primary or secondary.

- Primary pollutants are chemicals that are directly created by a process, such as ash from a volcanic eruption or the carbon monoxide gas from the exhaust of a motor vehicle. Secondary pollutants are pollutants that are produced in addition to primary pollutants.
- No emissions of secondary pollutants are produced. Instead, they are formed in the air as a result of reactions or interactions between main contaminants. One of the numerous secondary pollutants that contribute to the formation of photochemical smog is ground-level ozone, which serves as an essential illustration of a secondary pollutant.

Even while some pollutants can be both primary and secondary, this simply means that they can come into being either directly or as a result of the formation of other primary pollutants.

Primary pollutants produced by human activity includes...

- Compounds composed of sulphur, nitrogen, and carbon oxides
- Particulate particles, including smoke and dust;
- metal oxides, particularly those of lead,
- cadmium, copper, and iron;
- chlorofluorocarbons (cfc);
- hazardous air pollutants (hap);
- persistent organic pollutants (pops); odours

Secondary pollutantsIn photochemical smog, some of the particles that make up the smog are generated from gaseous main pollutants and compounds. These chemicals and gases include nitrogen dioxide, ground-level ozone, and peroxyacetyl nitrate (PAN).

COMMON ATMOSPHERIC POLLUTION SOURCES AND THEIR POLLUTANTS

Sl.N o	Category	Source	Emitting pollutants
1	Forest/Agriculture/Natural Sources (Strom/Volcanic Eruption etc...	Open burning	Carbon monoxide, volatile organic compounds, and particulate debris that is suspended in the air
			Particulate matter in

2	Mining and quarrying	Coal mining, Crude oil and gas production, Stone quarrying	suspension, sulphur dioxide, oxides of nitrogen, and volatile organic compounds are examples of pollutants.
3	Power generation	Electricity, gas, steam	Particulate matter in suspension, sulphur dioxide, oxides of nitrogen, carbon monoxide, sulphur trioxide, lead, and volatile organic compounds are all examples of pollutants.
4	Transport	Combustion engines	Particulate matter in suspension, sulphur dioxide, oxides of nitrogen, carbon monoxide, volatile organic compounds, and lead all contribute to air pollution.
5	Community service	Municipal incinerators	Lead, lead compounds, particulate matter in suspension, sulphur dioxide, oxides of nitrogen, carbon monoxide, and volatile organic compounds

Major air pollutants in India include SUSPENDED PARTICULATE MATTER (SPM), SULPHUR DIOXIDE (SO₂), and OXIDES OF NITROGEN (NO_X). India is home to a wide range of different air pollutants.

IMPACT OF AIR POLLUTION ON HEALTH OF PEOPLE

Some of the gases can have a significant and negative impact on people's health, and the authority in charge of this matter ought to pay the appropriate amount of attention to this matter. The gases listed below are the most common types of air pollutants found in outdoor environments; however, certain types of these pollutants can and can exist inside depending on the nature of the sources.

Tobacco smoke. Not only does the act of smoking tobacco expose the smoker to a broad variety of carcinogenic chemicals, but it also exposes others around them who are passive smokers to those same chemicals. Passive smoking increases the risk of developing lung cancer. A burning feeling in the eyes or nose, irritation of the throat, cancer, bronchitis, severe asthma, and a loss in lung function are some of the recognised negative effects of smoking for a passive smoker. A passive smoker is

defined as a person who is in the same room as a smoker but does not smoke themselves.

Biological pollutants. These are mostly allergens that can cause asthma, hay fever, and other allergic diseases.

Volatile organic compounds. Compounds that are volatile have the potential to irritate the eyes, nose, and throat. Headaches, nausea, and a lack of coordination may accompany more severe occurrences of the condition. Some of them are thought to cause harm to the liver as well as other organs of the body over the course of a longer period of time.

Formaldehyde. The eyes and nose get irritated, and some people may have allergic reactions as a result of the exposure.

Lead. Prolonged exposure can result in harm to the digestive system, difficulties with the brain system, and in rare circumstances can even cause cancer. It poses a particular threat to infants and young children.

Radon. It is a radioactive gas that may build up within the home and comes from the rocks and soil that are located underneath the house. The amount of this gas is determined mostly by the air that is found outside as well as, to some extent, by the gases that are released inside the house. Lung cancer is more likely to develop in those who have been exposed to this gas.

Ozone. This gas causes our eyes to itch and burn, and it has also been linked to an increase in the prevalence of respiratory conditions like asthma. It makes us less resistant to illnesses like the common cold and pneumonia.

Oxides of nitrogen. In the winter, children exposed to this gas may have an increased risk of developing respiratory disorders.

Carbon monoxide. When CO (carbon monoxide) binds to haemoglobin, it reduces the quantity of oxygen that is taken into the bloodstream from the lungs. Alterations in the function of the organs that are affected, such as the brain and the cardiovascular system, as well as the developing foetus, are brought on by the binding of the afflicted heme protein to other heme proteins. It can make it difficult for us to concentrate, slow down our reflexes, cause confusion, and cause us to feel tired.

Sulphur dioxide. The increased burning of fossil fuels is the primary contributor to the presence of sulphur dioxide (SO₂) in the atmosphere. It is possible for it to oxidise and produce a sulfuric acid mist. The presence of SO₂ in the air is a contributing factor in the development of lung illnesses as well as other lung ailments, such as wheezing and shortness of breath. Due to the fact that SO₂ exposure is frequently mixed with SPM exposure, determining its long-term impacts is more challenging.

SPM (suspended particulate matter). Dust, vapours, mist, and smoke are all examples of what make up suspended matter. Lead is the most concerning of the several chemical components that may be found in SPM. Other problematic chemical components include nickel, arsenic, and those that are found in diesel exhaust. When

we breathe these particles in, they become lodged in the tissues of our lungs, causing damage to our lungs as well as troubles breathing.

It is necessary to place a particular focus on the significance of SPM as a significant pollutant because

- a) On a consistent basis, it impacts a greater number of people around the globe than any other pollution.
- b) This pollutant has the widest availability of monitoring information of any other pollutant.
- c) More epidemiological evidence than has been collected on any other pollution has been collected on the exposure to this pollutant.

Air pollution control Measures

1. Plantation.

It is imperative that an increasing number of trees be planted everywhere. Protecting the environment should be prioritised alongside other types of development work in India, such as manufacturing and infrastructure construction. The purpose of establishing a green belt differs from nation to country and area to region. Green Belt Development is an important tool that aims at overall improvement in the environmental conditions of the region. The common goal is to protect natural environments such as biodiversity and other such things, to improve the air quality of the region, for pollution control to maintain the microclimate of the region, and Green Belt Development is an important tool that aims at improving the environmental conditions of the region." GO GREEN LIVE CLEAN" is the message.

2. Alternative Sources of Energy.

Alternative energy refers to any form of energy that may be used as an alternative to fossil fuels like coal. These forms of alternative energy are, in essence, forms of renewable energy. These types of energy sources are...

- Biomass plants with Advanced ESP's
- Fuel Cells
- Geothermal
- Hydro-electric
- Solar
- Solar Thermal
- Wind

3. Alternative Fuel to Transport Vehicles.

A vehicle that operates on a fuel other than conventional petroleum fuels (such as petrol or diesel fuel) is said to utilise an alternative fuel for its engine. These alternative fuels include...

- Biodiesel
- Compressed Natural Gas (CNG)
- Electric Vehicles (EVs)
- Ethanol (E85) - Flexible Fuel Vehicles
- Hydrogen & Fuel Cell Vehicles
- Liquefied Natural Gas (LNG)
- Liquefied Petroleum Gas (LPG / Propane)
- LPG and CNG Conversions
- Neighborhood Electric Vehicles (NEVs)

The development of fuel cells, alternate kinds of combustion such as GDI and HCCI, and even the stored energy of compressed air are the primary focuses of alternative sources of power (for example, electric cars, hybrid electric vehicles, and solar-powered vehicles).

4. Shifting of Industries.

Either polluting businesses should be modernised to an acceptable amount of pollution or they should be transferred from residential areas to industrial regions in order to preserve the atmosphere of the city and maintain a pollution-free environment in significant and historic sections of the city.

5. Establishment of Automobile Traffic Control Areas.

There should be sections of roadways that are set out just for car traffic. On the other hand, heavily used roads and lanes had to be designated as car traffic management zones. In order to reduce pollution, it is necessary to conduct an investigation into an area with heavy traffic and to set up a smoke observer.

6. Alternate Mode of Transport inside Urban Area.

The usage of bicycles should be promoted as a viable mode of transportation for local reasons. China serves as the best example.

7. Electric Trains.

Commuters coming from suburban regions could potentially benefit from the use of electric trains. It will be helpful in preventing traffic and controlling the amount of pollutants that is released into the air in metropolitan areas.

8. Pollution Check of Vehicles.

A prohibition on older automobiles that are more than ten years old needs immediate action from the government. The Vehicle Pollution Test should be taken very seriously and performed on a regular basis.

9. Environmental Impact Assessment.

It is important to conduct environmental impact assessments on a regular basis in order to detect and analyse the possible and detrimental affects that companies might have on the environment.

10. Strict Action:

If an industry discharges a greater quality of pollutants than the threshold that is prescribed by the State Pollution Control Board, the government should take harsh action against such industry.

CONCLUSION

Particularly prevalent in developing nations like Iran is the negative influence that air pollution has on human health. These negative effects include the activation and induction of a wide variety of illnesses, which in turn leads to high rates of morbidity and mortality. Controlling air pollution is essential, and the governments of the world ought to place it at the very top of their list of priorities. All of the rules and regulations that are linked to air pollution in these nations need to be brought up to date by the policy makers and lawmakers. An influential environmental protection organisation is required to take the lead in coordinating efforts across the several departments that are contributing to air pollution. Breathing is the foundation of life; without it (and oxygen), we are unable to continue living. Breathing is the engine that drives life. The (oxygen-containing) air that we breathe keeps us alive. Therefore, let us work together to ensure that everybody has a wonderful day every day. "NO POLLUTANTS, NO POLLUTION" is our motto. We need assistance from everyone in order to bring pollution under control. Because there is a need for consistently enlightening and educating the public about the causes and an effect on air pollution, which helps us realise the dangers and health hazards of living in a polluted environment, there is a need for ongoing public awareness campaigns.

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