

Air Contamination or Pollution: Adverse Effects on Human Health and Its Preventions

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ABSTRACT: *Environmental pollution is the most concerning thing in the world right now because of its adverse effects on the human body and the ecosystem. Every country is suffering from pollution and hence it becomes the main focus of every government as well. Air pollution is major environmental contamination found almost in every country and so it is affecting a large population with hazardous air quality and resulting in severe health problems. For people it's really important to realise the severity of the problem and its corresponding high risk on both the physical and mental health. This paper aims to discuss the evidence based information and the preventive measures related to the air pollution. Awareness of people about the problem and its preventive measures can reduce the health risk and for Reducing air contamination. Also to minimize the cases of diseases like heart stoke, lung cancer and asthma. Environmental pollution is a long term issue which will take time to be reduce or managed and for it citizens awareness and actions must appropriate towards the issue*

KEYWORDS: *Air contamination, Environmental pollution, Health Risks, precautions, Preventive measures, WHO.*

INTRODUCTION

Nowadays Air contamination and severe environmental pollution is a major health and environmental risk. Reducing air pollution is a common concern for every country because reduction in air pollution level ultimately improves the health index of the countries, and so countries can also reduce the burden of disease rates like lung cancer, heart strokes, acute and chronic respiratory problems, which includes very common health conditions like asthma. So the much lower the severity of air contamination would be, the better the respiratory functionalities and cardiovascular health of the citizens will be, and most importantly in both short terms and long terms [1]. We will discuss all these aspects later in the paper.

What Is Air Pollution? It is the release of harmful pollutants into the atmosphere and air, it is hazardous to human health, ecosystem and the environment as a whole. What Causes Air Pollution? Evidently most of the air pollution comes from the non-renewable fuel, energy use and its production. Burning of fossil fuels releases gases and harmful chemicals into the air. Air pollutants not only contribute to change in climate but are also exacerbated by it. Moreover Air pollution in the form of oxides of carbon components and gases like methane increase the earth's temperature in a very significant way. Which leads to very adverse effects on the ecosystem. More specifically speaking effects of Air contamination includes major two types of effect: soot and smog. These are the most prevalent effects of air pollution visible in the environment.

Severe air pollution causes the heavy blanket of Smog in the atmosphere. Smog is generated because of the accumulation of hazardous pollutants like carbon monoxide (CO), nitrogen oxide (NO) and other volatile types of organic chemical compounds found in the smoke released by the vehicles, burning use of harmful fossil fuels and chemical industries smoke interacting with the sunlight. These results in kind of photochemical reactions based on chemical components and usually happens in the summer season which leads to generation of gases and bad ozone (O₃) responsible for the depletion of the ozone layer in the stratosphere. These gases are important pollutants which leads to development of smog. Smog includes fine particles of size of about 2.5 micrometre or even less so these are very prevalent and can be easily breath inside the human's body. This air contamination of air, smog adversely affects human health, and increases the health risk especially the respiratory organs and functionality of the cardiovascular systems which in long effect leads to premature deaths [2]. Figure 1 illustrate the seriousness of the severe air pollution.



Figure 1: Picture representing the seriousness of the severe air pollution in the cities, showing how development is contaminating the quality of air.

How to Reduce Air Pollution The less fossil fuels like gasoline we will utilize or burn, the better we will do to reduce the production of these harmful gases and pollutants which are main characteristic to reduce the air pollution and so the harmful effects of climate change, Use of public transports i.e. good choices based on the requirement and use of the available transportation system. Decide yourself When you can, ride a bike instead of a car or take public transportation or simply walk. And perhaps the most important aspect would be sporting the political leaders who prioritize sustainable development and increase the awareness for clean air, energy source and water

Research Questions

- What is air contamination and environmental pollution? What are the major factors causing the severity of the air pollution?
- What is Particulate Matter (PM)? How is it used to measure the quality of the air?
- What are the health risks involved with the severe air contamination and what are preventive measures one should take to avoid the health risk of air pollution?

LITERATURE REVIEW

Pollution is such a vast and serious issue for everyone from students to the governments and from doctors to environmentalists which are trying to save the ecosystem and so the environment. Hence numerous Research papers are available from the perspective of the different fields of people with different estimations and analysis. A Research paper with title “Indoor air quality and health” written by the A.P. Jones of School of Environmental Sciences, from the University of East Anglia, U.K. Has reviewed the relationship between indoor air pollution forms and corresponding human health the range of sources from which these indoor pollutants are generated. And their health impacts on the human body. A detailed discussion from exposure of indoor pollutants to burning products from the heating, so cooking, and also the smoking of tobacco are detailed examined [3]. The health risks associated with the inhaling of the biological mini particles and their role in causing the illness through the famous immune infectious and the direct body toxicity is also considered.

Another paper entitled “SMOG: Causes, Effects and Preventions “ written by Fizzah Arif has discussed the adequate Knowledge about the primary preventive and control measures that a person should take during the situation of severe smog. The instructions which must be spreader as it will only help the people to combat the situation. Ensuring the quality check avoids going outdoors if the situation is not suitable but if exposure is inescapable then a safe N18 facemask or equipped mask should be considered to be worn. Also discussed the problems of the Elderly and people experiencing any cardiac or respiratory illness [4] . These papers including the reports of the WHO are enough sources so give a reliable paper in the description of air pollution

and its preventions. The effect of indoor and outdoor pollution its control and prevention all of it collaboratively can help to reduce the air pollution overall

METHODOLOGY

1. Design:

Figure 2 shows hazardous health effects of the air pollution in pyramid form.

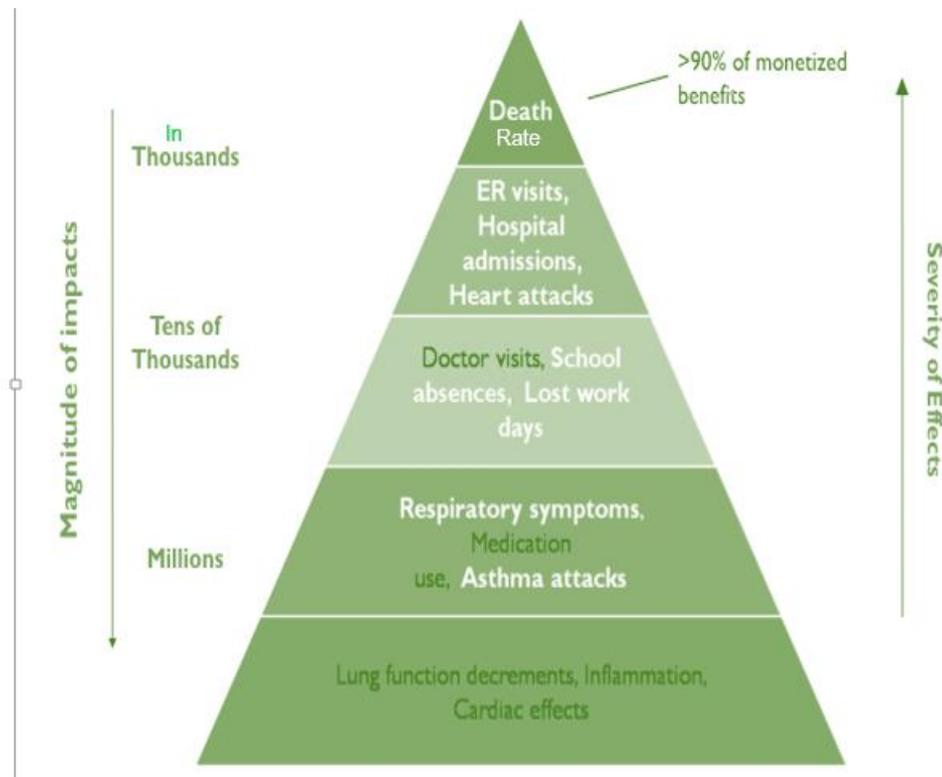


Figure 2: Representing the hazardous health effects of the air pollution in pyramid form based on the severity of the air pollution in the surroundings. Pyramid Effect from the air contamination.

What Are the Effects and Health Risks associated with the Air Pollution?

Contaminated air is the harmful black cloud generated from the automobiles discharged smoke, industrial chemical smoke, and combusting smoke of wood, firecrackers stack. All this smoke accumulates and reactively turnout in the blanket of smog in the upper layer of sky that settles around some metro cities mostly, and results in the dimming of the skyline. Sometimes when it is severe it smells like an old e vehicle that combusts oil. Sometimes the air pollution is also of invisible types. And are capable of causing the damage of the lung functionalities, severely cancer, or some other serious health problems in the people who are unaware or are lenient towards the health hazards of the serious air pollution even invisible particles are entering in your body and causing the organ damage. Now let's discuss these health effects of the pollutants and the gases involved in the development of the air pollution like Ground-level ozone, Sulphur dioxide, chlorofluorocarbon, Carbon monoxide, Nitrogen dioxide gases, and microscopic particle of Lead called particulate matter (PM) [5].

2. Data collection:

This paper referred to the trustworthy information and recommendations of the World Health Organisation (WHO). WHO provides proper guidelines for detecting the air quality around the surroundings of your location? Moreover the Global Update provided by WHO in 2005 gives a thorough analysis about the health effects of contaminated air and severe pollution. It also provides the thresholds for health risk and hazardous pollution levels. According to a WHO report in 2016, around 91% of the whole world public was living in areas with bad quality air and pollution affected areas. Considering the reports the Environmental resource contamination including the air pollution outdoors in metro cities, remote and rural areas leads to the premature deaths of an estimated 4.2 million of population worldwide only in the 2016. More accurately around 91% of them died in the developing countries where citizens have low and moderate incomes. The

greatest deaths reported by WHO was from Western Pacific regions and South-East Asian countries. So seeing these worst records and crisis situations, countries need policies to control the poor air quality. They need to invest in works supporting the cleaner transport facility, emphasis on energy-efficient houses, renewable and clean power generation, strictness on industry rules, recycling and better waste management are some important steps which would reduce key sources of outdoor air pollution [1]. Also with the outdoor air contamination, the indoor smoke in the houses mostly in rural areas where use of kerosene fuel for cooking, biomass and coal is common it leads to a serious health risk for more than 3 billion people dependent on such fuels.

3. Data analysis:

3.1. Prevention from hazardous effects of the air pollution.

A bad air quality can deteriorate the health of an individual who stays long in the open exposure of the air pollutants. So smog i.e. yellowish fog comprising harmful gases and fine particles warning should be in effect in the early stages as the effects of severe air pollution may affect differently to each individual's level of immunity and sensitivity [6]. So till our government manages to control these severe effects people can only be aware and cautions. Taking proper precautions is the only option left in these alarming situations to improve and secure the well-being of yourself. Also to minimize the hazardous effects that air pollution may cause. Figure 3 illustrate the list of the preventive measures to be taken to reduce the effect.

- Before going out verify the quality of air in your surroundings: Engaging in some outdoor activities in severe pollution levels is dangerous, so a habit of verifying the air quality in terms index declared by the WHO or other qualified agency in your region before going outside can protect you from health loss. Media also often broadcast smog warnings so watching the weather report is also not a bad option. so when you read in the newspaper or watch on the TV that air quality is deteriorating or air pollution is high, it's time to limit yourself jogging time and the children playing outside [7]. Moreover if the air quality index is too low, stay inside the house and keep the windows closed.
- Keep your medicines together: Maybe as a precaution, if a person is suffering from heart or some respiratory health problems, they should carry the emergency medication with themselves while going outdoors. Remembering the doctor's instructions properly is a must to keep the severe symptoms under control. Avoid areas influenced with severe air pollution.
- While exercising: When an individual is physically active, they breathe faster and deeper, putting himself in greater exposure to the air pollutants. Therefore, a limit is important in physical activities in case of severe air pollution to reduce its affecting intensity when the person is present in a polluted region. Such as running on sides of busy roads, in some industrialized areas.
- Limit the combustion of firecrackers and wood stoves in home especially in the winter season because bursting firecrackers and wood or coal combustion appliances contribute tremendously to smog generation during the winters [8].
- Reduction of outdoor air contamination: Every individual should contribute to reduction of pollution created outdoors. And for it the use of renewable sources of energy and supporting the sustainable methods is important for the public to be opted for [9].
- Try to maintain the good quality air inside the houses: Maintaining a good quality of air index is also important inside the houses as a bad air inside could prove sometime more harmful to human health. Certain outdoor pollutants like ozone particles, harmful gases they can easily enter into your houses and increase the health risk. Pollutants of tobacco smoke, or wood combustion stoves sometimes leads to death of people and news related to such cases are not very new. Avoiding long exposure to volatile and organic chemical compounds, found mainly from the common products, like in Whitehouse paints and other varnishing substances, in kinds of construction material composite of chemicals, like the fine dust particles of plywood panels or wooden chipboards [10]. So only choose the environmentally friendly and healthy products and related materials
- Use of exhaust or air purifier: If you have an exhaust or some central ventilation system then use it for fresh air exchange, and use of air purifiers which must be operated according to the proper instructions

given by the manufacturer. Installation of air purifiers in homes and offices is a good option as it cleans the surroundings and makes the air pure. Though proper maintenance of them regularly is required in order to maintain and uphold their efficiency.

OUTDOORS PREVENTIONS	INDOORS PREVENTIONS
1. Minimize air pollution from cars	1. Keep air-purifying indoor plants
2. Walk, bike or use public transportation	2. Open windows
3. Save energy	3. Use natural products
4. Maintain your wood stove or fireplace	4. Use essential oils
5. Recycle & buy recycled products	5. Test your home for radon
6. Consume less & choose sustainable products	6. Do not smoke indoors
7. Eat local, organic produce & less meat	7. Keep indoor humidity low
8. Grow your own food	8. Vacuum clean with a HEPA filter
9. Plant trees	9. Clean dust
10. Raise awareness	10. Use air purifiers

Figure 3: A list of the preventive measures to be taken to reduce the effect and health risk from the air pollution [10].

RESULTS AND DISCUSSION

Studying environmental pollution is itself a huge task as it includes a number of different types of environmental contamination caused by human actions. This paper particularly discusses air pollution as it is the most prevalent type of pollution spread in almost every country in the world. It becomes necessary to have at least basic knowledge about the pollution which may be caused by you directly or indirectly so that people can get more awareness about the causes, its effects, preventions and controlling measures. It becomes necessary at a higher level as well for the scientists, environmentalists and governments as severe levels of air pollution is just not affecting their particular country but the whole world as air pollution is one of main causes of climate change, ozone depletion and global warming.

A thorough analysis about the air contamination and pollution is studied in this paper finding out the main causes for air pollution, the particular actions of people and government are leading to severe pollution level in the environment like crop husk burning, no strict control on industrial waste, and use of fossil fuels non-renewable sources of energy. Health risk with air pollution is huge and hazardous too Since precautions are better than cure so an great emphasis was on the preventive measure one can take to prevent from the health risks involved in air pollution. A future discussion can be done on the same topic how air pollution is resulting in climate change or global warming problems. What steps are governments taking and trying to control these severe situations?

CONCLUSION

The aim for this paper was to discuss all the aspects related to contamination of air and the air pollution. The smog formation it causes, affects long term and short term both, the precautions and preventive measures a person should follow to prevent from the severe health risk associated with the air pollution. The results of the study show that severe air pollution, the matter pollutants and harmful gases can damage the organs. Even if sometimes the air looks fine it may consist of harmful gases so checking of the air quality index is important in that sense. Control measures like use of alternative energy sources then using the non-renewable natural gas for the high temperature and combination effect, and a significant reduction in coal use and its generated particles, use of environment friendly items only. Natural resources should be considered on high priority. Sustainable development, restriction on industrial use of chemicals and clean energy sources should be the main priority of the governments in a way towards the clean air and environment.

According to the findings of this study, some significantly important and easy precaution and preventive measures can make a huge difference and save the people from the short and long term effects of the exposure of bad quality air. Furthermore, everyone living in the toxic environment has the right to be aware about the risks involved in this kind of living so instead of living like this they should start making changes towards them and the environment directly or indirectly. They need to estimate the quality of the air that they are breathing. Preventive measure for healthy lifestyle and environment. To control the increase in the disease rate in the countries governments need to install air purifiers in the center of the city at least to reduce the severity associated with the air quality. In this general context, it is the requirement of the hour kind situation for the countries the least should be done for the city level in particular is to adopt sustainable development and resource utilization approaches by taking the matter into the main consideration as the total environmental quality development. Finally considering the health issue and its prevention and controlling measure of air pollution a global committee should be created and their decisions should be opted by the different countries based on the severity of the contamination and other environmental factors checked by the committee.

REFERENCES

- [1] www.who.in, "fact-sheets/detail/ambient-(outdoor)-air-quality-and-health." [Online]. Available: [https://www.who.int/en/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health).
- [2] F. Arif, "SMOG: Causes, Effects and Preventions," *Ann. King Edward Med. Univ.*, 2016.
- [3] A. P. Jones, "Indoor air quality and health," *Atmospheric Environment*. 1999.
- [4] J. Ma *et al.*, "Strong air pollution causes widespread haze-clouds over China," *J. Geophys. Res. Atmos.*, 2010.
- [5] URMC, "Encyclopedia / What Are the Health Effects of Air Pollution?" [Online]. Available: <https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=1 &contentid=3066>.
- [6] Wwww.nrdc.org, "air-pollution-everything-you-need-know." [Online]. Available: <https://www.nrdc.org/stories/air-pollution-everything-you-need-know>.
- [7] M. Guarnieri and J. R. Balmes, "Outdoor air pollution and asthma," *The Lancet*. 2014.
- [8] J. A. Bernstein *et al.*, "Health effects of air pollution," *J. Allergy Clin. Immunol.*, 2004.
- [9] P. B. C. Forbes and R. M. Garland, "Outdoor Air Pollution," *Compr. Anal. Chem.*, 2016.
- [10] tunza.eco-generation.or, "[World report] 20 Ways to Prevent Indoor and Outdoor Air Pollution." [Online]. Available: <https://tunza.eco-generation.org/resourcesView.jsp?boardID=worldReport&viewID=47056&searchType=&searchName=&pageNumber=1>.