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Air Pollution: An overview

Author(s):

Shoaib Naeemi[(a)]

a. Lecturer, Medical Faculty, Cheraq University

Abstract

Air pollution accounts for many complex ecological, social, economical, agricultural and health problems globally. As industrialization evolves, the issues related with air pollution increase proportionally. Major health problems such as respiratory disorders, neurological problems and learning disabilities could be a few examples of this global problem. Although, countries around the world are trying to settle this problem, many countries specially developing countries such as Afghanistan and India still suffer severely from this phenomenon. Increasing global awareness by conducting seminars, restricting policies of using heating devices and automobiles and increasing the rate of plantation and decreasing forest ceasing would make this chaotic situation far better than now.

Keywords: Air pollution, public health, environment, policy

Introduction

Industrial revolution in the mid-18th century introduced new machinery system with special features. Compensating fuel as the main source of energy increased the working capacity eventually leading to increased product rate and lowering mankind effort. However, this revolution had many negative consequences such as dramatic decrease in workforce, lower employment rate and producing toxic chemical during the working times of the machines.

A major point of concern about modern society is the ecological side effects implicated by it. Air pollution is absolutely no exception from this phenomenon. Taking it transliterally, Air is referred to gaseous substances surrounding the earth while the word Pollution is referred as introduction of harmful and exogenic material into an environment. Air pollution is defined as an abnormal condition in which there is the presence of special substances called pollutants in high quantities leading to health related and non-health related complications (Manisalidis et al, 2020).

From public health perspective, air pollution is one of the major concerns and an absolute obstacle to overcome. By paying more attention to this phenomenon, a wide array of researches have been conducted by governmental and non-governmental organizations worldwide. These researches lead to conclusion that air pollution could have a major role in decreasing life expectancy rate in different countries and increases mortality rates. As the first line in-risk organs, lungs and respiratory tract organs are in more danger than other major organs. Chronic Obstructive Pulmonary Diseases (COPD), bronchiolitis, bronchospasms, mucous secretion and increased risk of lung cancer are projecting the researches results. Countries with bad air quality (e.g. India, China) showed a high rate of respiratory tract disorders due to presence of air pollution than any other countries (Kloog I et al, 2013).

Beside health-related consequences, air pollution affected ecology in a dangerous manner as the world temperature showed significant rise compared to the last century. Icebergs melting, disruption of ozone layer, accumulation of Carbon monoxide and many other factors included in this phenomenon lead to a series of agricultural and water pollution which again affect mankind health indirectly (Zuhara & Isaifan, 2018).

Sources

According to World Health Organization (WHO), air pollutants could be classified into the following six types:

1. Particulate Matter (PM): Particulate matters are the result of chemical reaction between chemical pollutant with different sizes. PMs with a diameter of 10 micrometer or smaller is called PM10 while fine particles with even smaller diameter (about 2.5 micrometer) is called PM2.5. The PMs penetrability is dependent on its' size; PM2.5 is more hazardous than the previous one due to its' small size. Their long half-life makes them even more complex problem specially if the case is for fine particles where they can penetrate and stabilize in deepest parts of an organ.
2. Ground Level Ozone (GLO): Is mainly generated via chemical reactions between oxides of nitrogen and volatile compounds. Due to its' low solubility in water, ozone has the ability to penetrate deeply into the lungs. GLO has been associated with depletion of Vitamin C and E from skin and enhancing the formation and production of malondialdehyde.
3. Carbon Monoxide (CO): Is generated through incomplete combustion of fossil fuel and leads to severe toxicity due to its' high binding affinity to hemoglobin. One of the major reasons for climate change is actually CO generated from greenhouses.
4. Nitrogen Oxide (NO): Is traffic-related pollutant and generated from automobiles. Coughing, wheezing, dyspnea, pulmonary edema, nose irritation and reduced plants growth have been associated with increased levels of NO.
5. Sulfur dioxide (SO2): Is sensory irritant resulted from fossil fuel consumption or industrial activities. Respiratory irritation, bronchospasm, bronchoconstriction, mucus production and bronchitis have been related with SO2.
6. Lead: Is a heavy metal generated from petrol motor engines, batteries, radiators, inclinators and waste waters. Lead is eventually accumulated in blood, soft tissues, liver, lung, bones and reproductive system and its' severely teratogenic (WHO, 2019).

The aforementioned air pollutants could be generated from four sources including major sources (power stations, petrochemicals and industrials), indoor area sources (dry cleanings, printing shops, public showers), mobile sources (automobiles, cars and railways) and natural sources (forest fires, volcanic erosions) (Manisalidis et al, 2020).

Recommendations

There are plenty of approaches to tackle the ongoing situation with an effective outcome. For developing countries implanting an idea of using sustainable energy resources could be the major cornerstone. Preparing seminars and campaigns to make people familiar with the concept of air pollution and its' negative consequences could direct the situation in a fine manner. Allocating budgets for researches about air pollution will have even more positive impact as these researches would make the pollutants crystal clear to control.

Conclusion

During the era of improved technology and high dependency to machineries, mankind is suffering from air pollutants which changed the climate and affected the human health in a very dramatic manner. Different air pollutants have been reported by WHO and the rate of occurrence may differ based on different regions depending on social and economical situations. To tackle these disastrous situation countries around the world should stand together, provide an opportunity for researchers and innovative talents and allocate more resources on sustainable energy.

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