

Air Pollution: The World's Leading Environmental Health Threat

Preeti Prasun Barua^{1*}

Air is an essential element for all living bodies to survive, whatever it may be terrestrial or aquatic. Not only human death, air pollution may cause devastating effects on crops production, result climate changes and damage properties. Air pollution and water pollution is the by product of the industrial revolution which started in the middle of 19th century along with the advancement of technology. Ambient air as well as indoor air may become polluted due to natural as well as human activities.

Around the world, nine out of ten people breathe unhealthy air that exceeds WHO guideline limits containing high levels of pollutants¹. The middle and low income countries of the world are suffering from the highest exposure. An estimate shows that about seven million premature deaths occurs worldwide due to adverse effect of air pollution specially in South East Asia, middle east, sub-Saharan Africa and north Africa region². According to the State of Global Air 2019 report, air pollution was the 5th highest mortality risk factor in 2017 globally². Participants in the first "World Health Organization Global Conference on Air Pollution and Health" acknowledged the urgent need to scale up the global response to prevent disease and death from air pollution which claims not only millions of lives a year but also accelerates climate change³.

Bangladesh is one of the most densely populated countries of the world. It has been struggling with all types of environmental pollution related issues for decades together. According to World Air Quality report 2018 and 2019, Bangladesh was labeled as the most polluted country and Dhaka has been ranked second most polluted city in the world based on the concentration of Particulate Matter that

have diameter less than 2.5 micrometres (PM_{2.5}) in the ambient air⁴. The annual average PM_{2.5} concentration of Bangladesh in 2019 was 83.3 microgram per cubic meter where WHO approved 24 hour and annual average of PM_{2.5} is 25µg/m³ and 10µg/m³ respectively⁵. Not only PM_{2.5} concentration, the average Air Quality Index (AQI) of Bangladesh was 165 in the same year which was the highest among the 98 countries which were considered unhealthy⁴.

Air pollutants are air borne substances that are present in a concentration high enough to threaten human and animal health or result detrimental effect on crops and vegetation or other substances or result damage to property. The pollutants can be categorized into gaseous pollutants, persistent organic pollutants, toxic heavy metals and particulate matters. Gaseous pollutants include SO₂, NO₂, CO ground level ozone and volatile organic compounds. Persistent organic pollutants are pesticides, as well as dioxins, furans and polychlorinated biphenyls. Toxic heavy metals include lead, Mercury, chromium, nickel etc. The last category is particulate matter which is a complex mixture of extremely small particles and liquid droplets that are suspended in air. Depending on the diameter of particles, particulate matters can be classified into fine (PM_{2.5}) and coarse (PM₁₀) particulate matter⁶.

Lots of sources of pollutants in Bangladesh have been identified so far. The number one source of air pollutants in Bangladesh are brick kilns. There are about 8000 brick kilns in the country⁷. Ninety percent of them are using ancient technologies for brick manufacturing that are contributing tons of PM_{2.5}, sulfur dioxide, carbon monoxide, carbon dioxide and black carbon in the ambient air. Presently Sulfur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and Suspended Particulate Matter (SPM) are the main issues pertaining to air pollution problems in developing countries⁸. Another important source of air pollution in urban area is vehicular emission. There are lots of vehicles which run on fossil fuels. Among them, motor cycles and vehicles run by diesel are the worst polluters⁷. Besides these, coal fired power plants, industries, construction of mega structures, pesticides and biomass combustion are responsible for emitting large amount of toxicants.

1. Professor of Community Medicine
Rangamati Medical College, Rangamati, Bangladesh.

*Correspondence to:

Professor (Dr) Preeti Prasun Barua

Mobile : +88 01713 12 09 51

Email: preeti_prasun@yahoo.com

Date of Submission : 02-07-2020

Date of Acceptance : 15-07-2020

Short term impacts of exposure to air pollution are burning eyes, cough, wheezing, shortness of breath, chest pain, headache, upper respiratory infections. It also triggers onset of some pre-existing illnesses like asthma, COPD, allergic rhinitis etc. Long term exposure may be associated with heart disease, stroke, lung cancer and chronic respiratory illness. Recent studies suggest that ambient air pollution may increase the risk of type 2 Diabetes which are supposed to be the result of particle mediated alterations in glucose homeostasis⁹. Air pollution is considered as the major environmental risk factor in the incidence and progression of some diseases such as ventricular hypertrophy, Alzheimer's and Parkinson's diseases, psychological complications, autism, retinopathy, poor fetal growth and low birth weight¹⁰. At present air pollution is a global problem but the people of poor and developing countries of Asia and Africa are suffering the most. The process of industrialization must go on for economic development but at the same time we have to take utmost care of human life and wellbeing. Modern technology and new eco-friendly alternatives can no doubt provide solutions to environmental problems but, we also have to take into account the social and cultural factors which also significantly contribute to the progression of this major global issue. Therefore, we must recognize the reasons and the implications of environmental problems and re-establish the complex relationship between the environment and lifestyle of people by abiding a holistic approach. Raising mass awareness and providing Environmental Education (EE) can be effective in increasing the knowledge, acquiring skills and modifying attitudes to improve the current situation.

References

1. WHO. Air Pollution. [Online]. Available from: https://www.who.int/health-topics/air-pollution#tab=tab_1 [Accessed 25 June 2020].
2. The World Bank, Pirlea F, Huang W V D, The global distribution of air pollution. [Online]. Available from: <https://datatopics.worldbank.org/world-development-indicators/stories/the-global-distribution-of-air-pollution.html> [Accessed 25 June 2020].
3. IISD/SDG KNOWLEDGE HUB. WHO Global Conference Recommends Reducing Deaths from Air Pollution by Two-Thirds by 2030. [Online]. Available from: <https://sdg.iisd.org/news/who-global-conference-recommends-reducing-deaths-from-air-pollution-by-two-thirds-by-2030/> [Accessed 24 June 2020].
4. IQAir. Explore the air quality anywhere in the world. [Online]. Available from: <https://www.iqair.com/> [Accessed 24 June 2020].
5. WHO. Ambient (Outdoor) air pollution. [Online]. Available from: [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health) [Accessed 28 June 2020].
6. A. Fino. Air Quality Legislation. Editors: Jerome Nriagu. Encyclopedia of Environmental Health (2nd Edition) Amsterdam: Elsevier; 2019. p 61-70, ISBN 9780444639523. Available from: (<http://www.sciencedirect.com/science/article/pii/B9780124095489110450>) [Accessed on 28 June 2020].
7. The World Bank. Clean Air and Sustainable Environment Project.[Online]. Available from: <https://projects.worldbank.org/en/projects-operations/project-detail/P098151?lang=en> [Accessed 28 June 2020].
8. Skinder BM, Sheikh AQ, Pandit AK, Ganai BA. Brick kiln emissions and its environmental impact: A Review. Journal of Ecology and the Natural Environment. 2014;6(1):1-1.
9. Park SK. Ambient air pollution and type 2 diabetes: Do the metabolic effects of air pollution start early in life?. Diabetes. 2017;66(7):1755-1757.
10. Ghorani-Azam A, Riahi-Zanjani B, Balali-Mood M. Effects of air pollution on human health and practical measures for prevention in Iran. Journal of research in medical sciences: The official journal of Isfahan University of Medical Sciences. 2016; 21.