

The great smog of Delhi

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The March-April issue of Lung India includes an article entitled “Poison in the air: Declining air quality in India.”^[1] The authors have reported air pollution of Indian Capital, Delhi, during the last winter (November 2017), its magnitude, health and environmental hazards, various reasons, severity of the situation, Air Quality Index (AQI), and how it can be reduced.

Air quality is indicated by daily or mean annual concentration of fine particulate matter (PM₁₀ and PM_{2.5}, i.e., particles smaller than 10 or 2.5 μ, respectively).^[2] The safe limits for annual and 24-h PM_{2.5} and PM₁₀ particles are 40 and 60 and 60 and 100, respectively, in India by the Central Pollution Control Board and anything over 150 is unhealthy and more than 300 is considered as hazardous.^[3]

Statistics revealed the true picture that PM_{2.5} levels in Delhi on November 7, 2017, were 710 μg/m³ and the smog reached its peak on November 8, 2017, which was a red-letter day in the history of Delhi as the AQI was 999, above the upper limit of worst category.^[4] This value dropped down to 300 after 2 days, and in spite of hazardous AQI category, people were relieved.

According to public health experts, this was equivalent of smoking of 50 cigarettes/day and a public health emergency has been declared by the Indian Medical Association. Chief Minister of Delhi compared the condition with a gas chamber.

Why Delhi at that time gasp for air every year?^[5] Root cause is smog: burning coal, petrol, diesel, gas, biomass in industries, and power plants. Then came smoke from rural kitchens, traffic pollution, increase vehicle numbers, increase price of Compressed Natural Gas (CNG), vehicular emissions, car growth, low cost of parking, dieselization of cars, jeopardization of nonpolluting modes of public transports, overpopulation, low investment in public transport and lack of public infrastructure, large-scale construction activity, burning of residual crop in neighboring states such as Punjab, Haryana and Uttar Pradesh. A study by Sharma *et al.*^[6] revealed that during autumn and winter months, about 500 million tons of crop residues burn in Indo-Gangetic plains. According to another study by Sindhwani and Goyal, vehicular emission alone contributes about 72% of the total air pollution load in Delhi as estimated using emission factor and activity-based approach recommended by Intergovernmental Panel on

Climate Change (IPCC).^[7] Moreover, in winter months, slow winds and cool temperatures trap dust and pollutants closer to the ground forming smog. It takes alarming levels after the Diwali in autumn due to release of firecrackers. Odd-even number plates on alternate days did create some awareness, but it was halfhearted.

There is a spectrum of health problems related to this pollution, stating from allergies and respiratory conditions, including asthma, reduced lung function, and increased incidence of cancers. Children have long-term effects – 4.4 million of whom are already suffering from irreversible lung damage.

Nonrespiratory effects of air pollution are also seen more in Delhi such as hypertension, chronic headache, eye irritation, sore throat, and skin irritation. Many studies on air pollution and mortality from Delhi found that all-natural-cause mortality and morbidity increased with increased air pollution.^[8]

OTHER PROBLEMS

Many trains passing through Delhi were canceled/diverted by Indian Railways. Furthermore, due to poor visibility conditions, many flights were canceled/delayed. Moreover, abandonment of a cricket test match due to pollution as both the Indian and the Sri Lankan cricket teams found it was difficult for playing.

WHAT CAN BE DONE

Guidelines issued by the National Disaster Management Authority include avoid outdoor activities during early morning and evening, stay indoors as much as one can and do work from home, keep children in homes as much as possible, in case of breathing difficulty avoid stepping out, go out during bright and sunny times, avoid smoking, not to burn garbage, drink more amount of water to flush toxins from the body, not to do strenuous activity, eat Vitamin C-rich fruits, use air purifiers/nasal filters, keep air-purifying plants such as *Aloe vera* in homes/offices, use lanes instead of main roads, and avoid areas with heavy dust/smoke.

Other measures use public transports, find ride-sharing partners, sign up for carpooling, enhancement of parking fee, closure of some thermal power plants, and hundreds

of brick kilns, buy green electricity, use indoor plants and restore the green, and use environmentally friendly fuels for vehicles as well as for cooking. Like China, a Smog Free Tower^[9] can also make at government level. This largest air purifier of the world is made by a Dutch artist Daan Roosegaarde, and it is powered by solar energy, situated at Rotterdam, Beijing, Tianjin, and Dalian, takes 30,000 m³ of polluted air/hour, cleans its PM₁₀ and PM_{2.5} particles, and releases the clean air back; the smog particles filtered by this tower are turned into diamonds after compressing for 30 min.

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