Triggered by bad air: on pollution-linked diabetes

Preventive steps: A file photo of tourists wearing masks to protect themselves from smog in New Delhi. PTI PTI

Particulate matter that exists as fine dust in the air can lead to an increased risk of diabetes, particularly in low-income countries such as India.

Analysis of the burden of pollution-linked diabetes (in the journal, *Lancet Planetary Health*) estimates that in 2016, air pollution resulted in as many as 3.2 million new cases of diabetes. This is 14% of all new diabetes cases for that year, and India's share was 20% of new cases. Annually, the researchers estimated that pollution-linked diabetes caused more than 2 lakh deaths in 2016.

Even though previous studies had shown a significant impact of air pollution on diabetes, the burden of the disease had yet to be quantified. After studying over 17 lakh American veterans for around nine years, researchers at Washington University School of Medicine and VA St. Louis Health Care System in the U.S., showed that the risk of incident diabetes increased with rising concentrations of PM2.5 (fine dust less than 2.5 microns in diameter), even reaching significant impact at concentrations of 12 micrograms per cubic meter (m3).

This level is considered "safe" by Indian standards which sets a limit of 40 micrograms per m3) and is far below what is experienced in cities. In Delhi, for instance, PM2.5 can touch nearly 100 micrograms per m3.

Studies have shown that this fine dust enters the bloodstream through the lungs, reducing insulin production and triggering inflammation. This factor adds to the diabetes burden which affects more than 420 million people globally.

Statistical models developed from U.S. veteran study were fine-tuned to more polluted environs by studying those with passive smoking risks (pegged at exposures of 35 micrograms per m3) and active smoking (667 micrograms per m3 per cigarette). Researchers then undertook a global estimate extrapolating national annual PM2.5 exposure estimates and using data points from the Global Burden of Disease study.

India tops the list in terms of 'Disability-Adjusted Life Years', which measures years of healthy life lost due to pollution-linked diabetes. Researchers estimate that nearly 8.2 million years of healthy life were lost globally in 2016, and India lost 1.625 million healthy years.

Where high economic growth has lead to higher pollution burdens, lower-income countries such as India are affected the most. After all, while the global PM2.5 average was 42.3 micrograms per c3, in India, it was 72.6 per m3. The study finds that a modest reduction in PM2.5 levels may lead to a reduction in diabetes cases in India.

This refers to the tendency to form friendships and other forms of interpersonal relationships with people we come across often in our daily lives.

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