Polluted air can raise Type 2 diabetes risk, say studies

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Mumbai: Breathing polluted air could increase one’s risk of getting Type 2 diabetes. While exposure to air pollutants, especially the microscopic PM2.5, is known to trigger a slew of health problems such as chronic lung diseases, heart attack, stroke and cancer, the diabetes theory is slowly gaining ground.

While a few studies from the US, Europe and China have shown the correlation, a recent two-city study from India has quantified that even a tiny increase (of 10 µg/m³) in the exposure to PM2.5 results in a corresponding rise in blood sugar levels.

Earlier this month, JAPI (Journal of Association of Physicians of India), a leading medical journal in the country brought out of Mumbai, carried an editorial titled, ‘Air Pollution: A New Cause of Type 2 Diabetes?’ One of the authors of the editorial, diabetologist Dr V Mohan from Chennai said, “We now know that PM2.5 is an endocrine disruptor that affects insulin secretion and also leads to...”

PARTICULATE MATTER IS BIGGEST GUILPIT

AIR POLLUTION

- Globally, 9 out of 10 people breathe unhealthy air
- This leads to more than 4 million premature deaths annually around the world
- Air pollutants carry short-term and long-term risks, mainly for hearts and lungs
- Air pollution is known to mainly cause asthma, chronic obstructive pulmonary disease, bronchitis, and types of cancer
- It is increasingly being linked to stroke and hearing impairment as well
- The biggest culprit is air-borne particulate matter (PM), which comes in different sizes and chemical and biological compositions

AIR POLLUTION & DEATHS

A study by Greenpeace Southeast Asia in 2020 found

54,000
40,000
39,000
34,000
25,000

Delhi recorded the highest number of deaths due to air pollution in the world annually

Evidence from other countries

- A fifth of the burden of Type 2 diabetes worldwide has been attributed to air pollution
- A meta analysis of 13 studies from the US and European countries showed the risk of diabetes rose by

WHAT’S NEW

Air pollution acts as an endocrine disruptor by affecting:
- Pancreas, leading
- Liver, adipose tissues, muscles, adversely

AIR POLLUTION LINKED TO DIABETES

First Study in India

- A study, published in ‘BMJ Open Diabetes Research & Care’, followed 12,064 adults residing in Delhi & Chennai over 7 yrs
- Daily average PM2.5 concentrations noted via a hybrid satellite-based exposure model as well as ground monitoring
- Individuals with...
TRANSFORMATION

AIR
Commitment to Clean Air

ENERGY
Solutions to reduce energy

ENVIRONMENT
Aligned with carbon-neutral goals
SHOPPING MALL, DELHI INDIA

Existing Public Building

10,000+ Footfall Daily

2.1 Million Cubic Feet Of Clean Air
100% DISCOUNT*

ON CLEAN AIR

*No conditions apply on breathing fresh at

Nexus Select CITYWALK

Indoor Air Quality

Outdoor Air Quality

AQI – Air Quality Index | PM - Particulate Matter
OFFICE IN GURUGRAM - INDIA
1.8 Million Cubic Feet Of Clean Air
4,400+ Occupants at 4 Floors
Ventilation as per ASHRAE 62.1
IAQ as per WHO 2021 Guidelines

WELL-BEING
HEALTHY BUILDING
SUSTAINABILITY
Indoor Air Quality

Ambient

<table>
<thead>
<tr>
<th>AQI</th>
<th>748</th>
</tr>
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<tbody>
<tr>
<td>PM$_{2.5}$</td>
<td>452 µg/m$^3$</td>
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</table>

4 November 2023

Indoor Air Quality

<table>
<thead>
<tr>
<th>AQI</th>
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<tbody>
<tr>
<td>PM$_{2.5}$</td>
<td>8 µg/m$^3$</td>
</tr>
<tr>
<td>TVOC</td>
<td>430 ppb</td>
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<tr>
<td>CO$_2$</td>
<td>680 ppm</td>
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</tbody>
</table>

4 November 2023

AQI – Air Quality Index | PM - Particulate Matter | TVOC – Total Volatile Organic Compounds | CO$_2$ – Carbon Dioxide
5,88,000 Cubic Feet Of Clean Air
4 Buildings Each Having 3 levels
Classrooms, Fitness Centre, Cafeteria, Library, Faculty Rooms
Ventilation as per ASHRAE 62.1
IAQ as per WHO 2021 Guidelines

Advanced filtration & Ventilation
Real-time IAQ Metrics
Energy Efficient Solution
Indoor Air Quality

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>AQI</td>
<td>33</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>6 µg/m$^3$</td>
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<tr>
<td>TVOC</td>
<td>240 ppb</td>
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<tr>
<td>CO$_2$</td>
<td>570 ppm</td>
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13 December 2023

Ambient

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>AQI</td>
<td>427</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>289 µg/m$^3$</td>
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</table>

13 December 2023

AQI – Air Quality Index | PM - Particulate Matter | TVOC – Total Volatile Organic Compounds | CO$_2$ – Carbon Dioxide
Clima-SAFE
(Smart Air-conditioning with Disinfection, Filtration & Energy Efficiency)
Pre-Pilot In India

Disease Resilient & Energy-Efficient Centralized Air Conditioning Systems

Composite Climate Zone - India

Reuse Building’s Existing Structure

Office Area of 2,700 Sq.ft

No. of Occupants = 50

Low-cost Flexible solution

Less Maintenance

Well-being of occupants

Ambient

AQI 342

PM$_{2.5}$ 240 µg/m$^3$

Indoor Air Quality

AQI 9

PM$_{2.5}$ 2 µg/m$^3$

32% Energy Efficient HVAC
Pilot Project Funded by

in collaboration with the Government of Sri Lanka
### Pilot

<table>
<thead>
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<th></th>
<th>SPMC</th>
<th>SLSI</th>
<th>SLPG</th>
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<tbody>
<tr>
<td><strong>Expected Energy Savings Per Annum</strong></td>
<td>42%</td>
<td>46%</td>
<td>46%</td>
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*Final M&V in progress*
<table>
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<tr>
<th>Parameter</th>
<th>Target Value</th>
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<tbody>
<tr>
<td>AQI</td>
<td>&lt; 50</td>
</tr>
<tr>
<td>PM_{2.5}</td>
<td>&lt; 15 ( \mu g/m^3 )</td>
</tr>
<tr>
<td>TVOC</td>
<td>&lt; 200 ( \mu g/m^3 )</td>
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<tr>
<td>CO_{2}</td>
<td>&lt; 700 ppm</td>
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<tr>
<td>Temperature</td>
<td>24 ± 1 deg C</td>
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<tr>
<td>Relative Humidity</td>
<td>55 ± 5%</td>
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<tr>
<td>Viral Protection Index</td>
<td>&gt; 85%</td>
</tr>
</tbody>
</table>

AQI – Air Quality Index | PM – Particulate Matter | TVOC – Total Volatile Organic Compounds | CO_{2} – Carbon Dioxide
✓ Annual Average Energy Cost Saving for 01 Project = $ 3,400

✓ Annual Average Energy Cost Saving for 100 Projects = $3,40,000

✓ Annual Average Energy Cost Saving for 1000 Projects = $34,00,000

Easy Retrofit

Easy to Operate

Decarbonize Built Environment
There is no Planet B

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