IN-UTERO EXPOSURE TO PM 2.5: ENVIRONMENT

NEWS: India's pollution crisis linked to pre-term births and low birth weight, study warns

WHAT'S IN THE NEWS?

Recent research highlights that worsening air pollution, especially PM2.5, is significantly increasing risks of preterm birth and low birth weight in India, particularly in heavily polluted northern states. The impact is more severe among poor and rural women due to indoor air pollution from solid fuels and climate stressors.

Air Pollution and Its Impact on Unborn Children: Key Findings from PLoS Global Public Health

1. Alarming New Health Threats: In-Utero Impact of Air Pollution

- Air pollution, already linked to respiratory and cardiovascular diseases, now shows strong evidence of fetal harm due to in-utero exposure.
- Exposure during pregnancy significantly affects fetal growth, increasing the risk of complications and developmental issues.

2. Major Health Consequences Identified

- **Preterm Birth Risk**: Women exposed to high PM2.5 levels were **70% more likely** to deliver babies before full term.
- **Low Birth Weight (LBW)**: Exposure to PM2.5 raised the **likelihood of LBW by 40%**, which can lead to higher infant mortality and long-term health issues.
- These risks are compounded for women living in northern India, where exposure levels are consistently high.

3. India's Vulnerability to the Crisis

- A large section of India's population, especially pregnant women in regions like **Delhi, Punjab, Haryana, Uttar Pradesh, and Bihar**, face high air pollution levels year-round.
- Women from lower socio-economic groups, particularly those using solid fuels indoors, are at heightened risk.

4. Pollutants Identified as Fetal Hazards

- **PM2.5 (Fine Particulate Matter)**:
    - Can penetrate deep into the lungs and bloodstream, reaching the placenta.
    - Causes inflammation and oxidative stress that affect fetal growth.
- **Other harmful pollutants**:

- **Nitrogen Dioxide (NO_2)** – from vehicle exhaust and industrial activities.
- **Sulphur Dioxide (SO_2)** – emitted by coal-based power plants.
- **Carbon Monoxide (CO)** – from household biomass and fossil fuel use.

- These pollutants impair placental function, restrict oxygen delivery, and disrupt fetal development.

5. Indoor Air Pollution: A Hidden but Pervasive Threat

- Major source: burning of **wood, dung cakes, and crop residues** for cooking in poorly ventilated kitchens.
- Particularly impacts **poorer, rural, and illiterate women**, leading to higher rates of low birth weight among female babies.
- Indoor pollution remains under-monitored and under-regulated in India.

6. Broader Environmental Stressors: Climate Change Impact on Maternal Health

- **High Heat Exposure**:
  - Dehydrates the mother
  - Reduces placental blood flow, endangering fetal oxygen supply
- **Monsoon Flooding and Rainfall Surges**:
  - Increase exposure to water-borne infections
  - Damage or disrupt health infrastructure, delaying prenatal and emergency care
- **Displacement during floods** reduces access to health services.

7. Scientific Insight: About Particulate Matter (PM)

- **PM stands for Particulate Matter**, a mix of solid particles and liquid droplets suspended in air.
- **PM10**: Coarse particles with diameter ≤ 10 micrometers; inhalable.
- **PM2.5**: Fine particles ≤ 2.5 micrometers; more dangerous as they reach deep into lungs and bloodstream.
- Sources: combustion engines, dust, smoke, industrial emissions.

Policy Measures and Solutions to Safeguard Maternal and Fetal Health

8. Promoting Clean Energy Access in Households

- **Accelerate LPG and electric stove adoption**, especially in rural areas.

- **Expand coverage of Ujjwala Yojana** and provide behavioral training on clean fuel use.
- Subsidize **clean cooking technologies** to reduce dependency on solid fuels.

9. Air Quality Surveillance and Maternal Health Integration

- **Link air pollution data with maternal healthcare systems** to monitor vulnerable populations.
- Develop **region-specific air pollution early warning systems**.
- Real-time air quality apps can aid pregnant women in risk avoidance.

10. Building Climate-Resilient Health Infrastructure

- Prepare for **heat waves** with maternal-specific health protocols (cooling shelters, hydration access).
- Implement **flood-resilient health systems** to ensure uninterrupted prenatal and emergency services.
- Strengthen **primary health centres** with better ventilation and pollution-mitigating design.

11. Strengthening Policy and Inter-Sectoral Coordination

- Enforce and monitor compliance under the **National Clean Air Programme (NCAP)**.
- Improve coordination among **health, environment, rural development, and urban affairs ministries**.
- Encourage city and district-level clean air action plans with health-focused targets.

12. Raising Public Awareness and Community Engagement

- Educate pregnant women about the **risks of air pollution** through frontline workers like ASHAs.
- Promote **awareness campaigns** on air purifier use, mask wearing, and avoiding peak pollution hours.
- Encourage community participation in **monitoring and reporting indoor pollution hazards**.

Source: **https://www.independent.co.uk/news/science/india-air-pollution-birth-complications-b2783780.html**