Effects of particulate matter (PM2.5)

Why in News?

A new study reveals the damaging effects of air pollution extend far beyond the lungs and heart, affecting people before they are even born.

- **Published in** - PLoS Global Public Health.
- **Carried out by -** Researchers from institutions in India, Thailand, Ireland, and the UK.
    - Data collected from the National Family Health Survey (NFHS), along with satellite data.
- **Assessment criteria -** The team assessed the influence of ambient air quality on birth outcomes, specifically ***Preterm births (PTB)*** and low birth weight (LBW).
- The dataset included children ***aged 0 to 5 years***; 52% were female and 48% male.

Findings of the study

- **Particulate Matter (PM2.5)** - The results suggest that exposure to fine particulate matter (PM2.5) during pregnancy significantly increases the likelihood of these adverse outcomes.

PM2.5 consists of airborne particles less than 2.5 micrometres in diameter.

- **Regional disparity** - Specifically, Delhi, Punjab, Haryana, Uttar Pradesh, and Bihar bear the brunt of the consequences of air pollution.
    - **Reasons** - Heavily industrialised with high vehicular emissions and the widespread use of solid fuels for cooking.
- **Pre-Term Births (PTB)** - Prevalent in Himachal Pradesh (39%) and Delhi (17%).
- **Low Birth Weight (LBW)** - Common in Punjab (22%) and Delhi (19%).
- Female children were more likely to be born with LBW compared to males (17%), although both conditions were found to be more frequent among children of illiterate and poorer mothers.
    - **Contributing Factors -** Households that used solid fuel to cook also reported higher rates of both LBW and PTB.
    - Higher levels of PM2.5 during pregnancy significantly increased the likelihood of both LBW and PTB.
- **Higher temperatures -** Linked to maternal dehydration, heat stress, and increased cardiovascular strain, all of which impair placental function and disrupt foetal growth.
- **Excessive Rainfall -** Especially during the monsoon, raises the risk of waterborne infections, which can further hinder foetal growth.
- Flooding and displacement associated with heavy rains can also disrupt healthcare access, leading to delayed medical interventions and increasing the likelihood of pregnancy complications.

National Air Quality Index (AQI)
• The Air Quality Index (AQI) is a measurement of air pollutant concentrations in ambient air and their associated health risks. • **Launched in-** 2014. • **Categories** -There are 6 AQI categories, namely Good, Satisfactory, Moderately Polluted, Poor, Very Poor, and Severe. • **Included pollutants-** Particulate matter (PM2.5 and PM10), Ozone (O3), Carbon Monoxide (CO), Nitrogen Dioxide (NO2), Sulphur Dioxide (SO2), Lead (Pb) and Ammonia (NH3)

Reference

The Hindu| Air pollution and effects of birth