Black Carbon Particles Affecting Unborn Babies

According to a study published in 'Nature Communications', the black carbon particles emitted by the vehicular exhaust and coal-fired power plants, have been detected on the fetus-facing side of the placenta, which possibly is expected to affect the overall development of the unborn baby.

Key Findings

- **90% of the world's population** lives in places where air pollution is above the World Health Organization (WHO) guidelines.
- The concentration of black carbon particles was **highest in the placentas of women who are most exposed to airborne pollutants** in their daily life.
- Inhalation of these particles by the mother gets **translocated from the mothers' lungs to the placenta,** resulting in life-long changes to the development of the baby along with permanently damaging the lung tissues.
- The link between exposure to dirty air and increased cases of miscarriages, premature births, and low birth weights which in turn increases the chances for **diabetes, asthma, stroke, heart disease** and a lot of other conditions, has been established in this study.
    - This opens future avenues for new fields of research that demand focused attention on the direct role of particles getting to the tissues, rather than particles getting into the lungs.
- A comprehensive global review also concluded that the air pollution may be damaging every organ and virtually every cell in the human body. Nanoparticles have been found crossing the blood-brain barrier in humans.

Way Forward

- According to the WHO standards, the black carbon particles in the air are not considered as a major pollutant. The need is to identify and aptly list all possible pollutants affecting crucial stages of the development.

- The nascent stage of development is the most vulnerable period of life. All the organ systems are in the phases of development. For the protection of future generations, we have to reduce the exposure to such pollutants.

Black Carbon Particles

- Black carbon is a **short-lived** climate pollutant with a lifetime of only a few days to weeks after release in the atmosphere.
- Black carbon particle is a **potent climate-warming component** of particulate matter formed by the incomplete combustion of fossil fuels, wood, and other fuels.
    - Incomplete combustion releases CO_2, carbon monoxide, volatile organic compounds, and organic carbon and black carbon particles in the atmosphere.
- Black carbon and its co-pollutants are key components of fine particulate matter (PM2.5) air pollution that is one of the leading environmental causes of **poor health and premature deaths.**

Source: TOI