

Air pollution and preterm birth: a recommendation for further study in Greece

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Dear Editor,

Preterm birth is defined as childbirth performed before the 37th week of pregnancy and is the leading cause (75-90 %) of neonatal deaths that are not caused due to congenital anatomical or chromosomal abnormalities. Preterm delivery can fluctuate from 3.6 % to 14 % based on the country of origin. The most important and serious complications are directly related to prematurity (respiratory distress syndrome, necrotizing enterocolitis, bronchopulmonary dysplasia, patent ductus arteriosus, hyperbilirubinemia, apnea, kidney disease, brain hemorrhage, and sepsis). Their frequency is inversely proportional to gestational age. Preterm birth affects approximately 11 % of births worldwide, and it has been shown that it continues to affect adults' health and welfare. The exact reasons that cause it are not precisely known. It seems like it results from genetic, medical, environmental factors and is directly related to lower socioeconomic living conditions. The frequency of preterm birth amounts globally to 10% of total pregnancies. This percentage remains unchanged over the last 20 years, mainly due to the lack of understanding of the pathophysiological disruptions that cause it¹.

Air pollution has also been associated with complications during pregnancy and harmful perinatal effects. The main culprits seem to be nitrogen dioxide (NO₂) and benzene, mainly during the first and third trimesters of pregnancy, which are products generated due to industrial combustion and cars². Additional ambient pollutants potentially harmful for the fetus are SO₂ and O₃. The toxic effect of environmental factors on the fetus is correlated with the fact that an extremely large cellular differentiation volume characterizes intrauterine embryonic development. Moreover, reduced ability to repair DNA damages and greater absorption of xenobiotic agents are also significant factors that play a crucial role in the interplay of air pollution on the fetus. The literature describes the correlation between toxic environmental pollution and intrauterine developmental delay, preterm birth, congenital abnormalities, and increased neonatal mortality extensively. According to several analyses from different countries, air pollution with particulate matter of a minimum diameter of 2.5 µm can trigger preterm birth. It is worth mentioning that NO₂ exposure leads to a significantly reduced birth weight, especially for exposures during the first trimester³, posing a question on how safe the atmosphere is nowadays. The mechanisms through which the reported complications during pregnancy are caused are not yet fully understood.

In Greece, 4.7 % of births that occurred from 1980 to 2008 were premature. This arouses suspicion about the implication of environmental pollution on this percentage. In an attempt to verify the impact of air pollutants on preterm birth and other complications, international literature from 2009 to 2019 was reviewed electronically. More than 50 sources were found from PubMed and Google Scholar, supporting this correlation (few are cited¹⁻³). Surprisingly, the ongoing socioeconomic crisis in Greece triggered an unexpected positive environmental result; satellite observations of tropospheric NO₂ showed a declining level not only of NO₂ concentration but of other ambient pollutants as well. It seems that the economic recession has resulted in proportionally lower levels of pollutants (particularly in Athens). A multidisciplinary study based on health specialists and environmentalists' collaboration is needed to evaluate the relation of preterm birth and air pollutants in Greece.

Keywords: Preterm birth, pregnancy, complications, air pollution, environment, Greece

Conflict of interest

Non declared.

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