

Prenatal Exposure to Pesticides Increases the Risk of Obesity in Adolescence

First study to analyse the long-term effects of persistent organic pollutants on cardiometabolic risk in adolescents

Barcelona, 29 April, 2021.- Exposure before birth to persistent organic pollutants (POPs)— organochlorine pesticides, industrial chemicals, etc.— may increase the risk in adolescence of metabolic disorders, such as obesity and high blood pressure. This was the main conclusion of a study by the Barcelona Institute for Global Health ([ISGlobal](#)), a research centre supported by the "la Caixa" Foundation. The study was based on data from nearly 400 children living in Menorca, who were followed from before birth until they reached 18 years of age.

POPs are toxic, degradation-resistant chemicals that persist in the environment. Examples of such compounds are pesticides and organochlorine insecticides (DDT, etc.). POPs have adverse effects on both human health and the environment and their use is regulated globally.

Prenatal exposure to these substances has been associated with cardiometabolic risk factors in childhood, but there were previously no studies assessing whether such associations continue into adolescence, a developmental stage characterised by significant changes in the endocrine system and rapid increases in body mass.

The aim of this investigation, carried out within the framework of the [INMA Project-Environment and Childhood](#), was to study the associations between prenatal exposure to POPs and body mass index (BMI) as well as other markers of cardiovascular risk in adolescence. Data from 379 children in Menorca was analysed. POP levels were measured in umbilical cord blood samples and the children were then seen periodically between the ages of 4 and 18 years. At these visits, BMI, body fat percentage and blood pressure were recorded as they grew. When the child reached 14 years of age, the scientists measured blood biomarkers of cardiometabolic risk (cholesterol, triglycerides, glucose, etc.).

The results of this study, published in the journal [Environment International](#), suggest an association between prenatal POP exposure and a higher BMI in adolescence, particularly in the case of the fungicide hexachlorobenzene (HCB) and the insecticide compound dichloro-diphenyl-trichloroethane (DDT).

Exposure to these two organochlorides—HCB and DDT—was also associated with higher blood pressure in childhood and adolescence and increased cardiometabolic risk at 14 years of age.

ISGlobal researcher **Núria Güil-Oumrait**, the first author of the study, explains that "this is the first longitudinal study to analyse the relationship between persistent organic pollutants and cardiometabolic risk throughout childhood and adolescence. Our findings show that the association between these substances and infant BMI does persist into adolescence and that prenatal exposures are associated with the main risk

factors for metabolic syndrome in adults, a condition that today affects one in four people worldwide.

With respect to the mechanisms that might explain this association, Güil-Oumrait points out that “it is thought that POPs may **interact with hormone receptors or with the generation of free radicals**, and the chief problem is that these pollutants accumulate in the fatty tissues of living organisms, where they can persist for years, even decades”.

Martine Vrijheid, study coordinator and head of the [Childhood and Environment Programme](#) at ISGlobal, highlights the fact that “some of these substances could be considered [endocrine disruptors](#), that is, chemicals that interfere with hormonal regulation”. In her view “more studies are needed in this field, especially focussing on childhood and adolescence, which are critical developmental stages characterised by particular vulnerability”.

Reference

Nuria Güil-Oumrait, Damaskini Valvi, Raquel Garcia Esteban, Monica Guxens, Jordi Sunyer, Maties Torrent, Maribel Casas, Martine Vrijheid. Prenatal exposure to persistent organic pollutants and markers of obesity and cardiometabolic risk in Spanish adolescents. *Environment International*. March 2021. <https://doi.org/10.1016/j.envint.2021.106469>

About ISGlobal

The Barcelona Institute for Global Health, ISGlobal, is the fruit of an innovative alliance between the “la Caixa” Foundation and academic and government institutions to contribute to the efforts undertaken by the international community to address the challenges in global health. ISGlobal is a consolidated hub of excellence in research that has grown out of work first started in the world of health care by the Hospital Clínic and the Parc de Salut MAR and in the academic sphere by the University of Barcelona and Pompeu Fabra University. The pivotal mechanism of its work model is the transfer of knowledge generated by scientific research to practice, a task undertaken by the institute’s Education and Policy and Global Development departments. ISGlobal has been named a Severo Ochoa Centre of Excellence and is a member of the CERCA system of the Generalitat de Catalunya.

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