



Factoring socioeconomic: informatics, pregnancy and pollution

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Socioeconomic pollutants

How much socioeconomic factors affect exposure to persistent organic pollutants, especially during vulnerable periods of life such as pregnancy and childhood, is not yet well understood. A new study has investigated the relationship between maternal social class, based on occupation type, and placental concentrations of organochlorine pesticides (OCPs) and the combined estrogenic activity of analytes as revealed by a biomarker for exposure.

Persistent organic pollutants (POPs) are commonly fat soluble, or highly lipophilic, and do not degrade readily neither in the environment nor the body. As such, they can accumulate to putatively harmful levels in both the environment and living tissues. Countless researchers across the globe have investigated the effects of exposure to POPs. They have also studied the adverse clinical effects seen even at concentrations for certain compounds that were previously thought to be safe at those levels. POPs that have estrogenic or anti-androgenic properties have been of particular interest. Such compounds can have marked effects on some ecosystems in which hormonal disturbance may have a severely detrimental effect on populations as they distort the normal male-female population balance or otherwise cause sexual deformities to arise in offspring making them reproductively unviable. Perhaps given most attention, particularly by the media and activist groups has been the effects on fish, reptiles and amphibians.

According to researchers in Spain, much research has been done to understand the effects of pollutants on people too. However, little evidence has been made available regarding the effects of pesticide exposure and the health of the unborn child as it correlates or not with socioeconomic status.

Now, Carmen Freire of the Laboratory of Medical Investigations, at the San Cecilio University Hospital, at the University of Granada, and colleagues there and at the Centre for Public Health Research (CSISP), in Valencia and the Centre for Research in Occupational Health (CiSAL) in Barcelona, have investigated the issue in detail. They have look at the placental concentrations of organochlorine pesticides and their relationship to maternal social class.

Mixed pesticides

The Spanish team looked at exposure to 16 OCPs (DDTs, endosulfans, and seven other compounds) and the total effective xenoestrogenic burden (TEXB) for 257 subjects in Southern Spain. In this part of the world, intensive greenhouse-based agriculture is the norm and represents one of the biggest users of this approach in Europe. As such, very large quantities of pesticides are used here and so their is potential for agricultural workers and the local population to constitute a special case of exposure to these chemical compounds.

The team determined OCP using gas chromatography (GC) and mass spectrometry (MS), and they assessed estrogenic loading, TEXB, using the E-Screen bioassay. They classified the mothers' class by occupation manual to non-manual by degrees. By applying a multivariate regression analysis to the data they were able to show that placental levels of certain pesticides were indeed higher in mothers in less affluent social classes. But, the results were not entirely clear cut with social class associated with 10% of the variability in total endosulfan concentration but HCB and DDT levels were markedly

higher in the class groups associated with manual work.

The researchers explain how their work corroborates assumptions that socioeconomic status, as determined by education level, occupation or financial standing is not only associated with inequalities in overall hygiene and nutritional conditions but could be an indicator of exposure to persistent organic pollutants.

Pregnant pause for thought

The specific physical and chemical factors that influence exposure and absorption to POPs in humans are poorly understood. For chlorine-containing pesticides, which although banned widely are still in use in many parts of the world, exposure can derive largely from ingestion of contaminated food, although environmental, occupational and other sources might be involved. The researchers add that chronic accumulation of POPs in women's fatty tissues is also a source of exposure for their children during gestation and while breastfeeding. The team suggests that, "There is a need to explore whether more disadvantaged populations suffer higher levels of exposure to pesticides or other environmental chemicals and how different social processes contribute to this exposure."

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