Exposure to certain insecticides linked to childhood behavioral difficulties

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Exposure to a particular group of chemicals widely used in pest control for people, pets, and crops, may be linked to behavioural difficulties in 6 year olds, suggests research published online in *Occupational & Environmental Medicine*.

Pyrethroids are synthetic chemicals which are found in a range of products, including treatments for head lice, scabies, and fleas, and some mosquito repellants.

They are a safer alternative to organophosphates. But like many classes of insecticides, they work by damaging nerves, and concerns have recently been raised about the potential impact of children's exposure to them.

So the researchers measured levels of five pyrethroid metabolites in the urine of women between 6 and 19 weeks of pregnancy, and subsequently their 6 year olds, to see if there was any link between prenatal and childhood exposures and behaviour that might be indicative of neurodevelopmental damage.

From among 3421 pregnant women enrolled in the study between 2002 and 2006, some 571 were randomly selected to take part in the assessments of their children when they reached the age of 6: 287 of these women agreed to do so.

The mothers filled in a detailed questionnaire on socioeconomic factors,

lifestyle, their child's behaviour, and various environmental exposures.

Psychologists then visited them and their children at home to carry out behavioural assessments, and to collect dust and urine samples for analysis.

The children's behaviour was assessed using the validated Strengths and Difficulties Questionnaire (SDQ), with a particular focus on altruism (pro-social behaviour); internalising disorders (inability to share problems and ask for help) and externalising disorders (defiant and disruptive behaviours).

Three metabolites (trans-DCCA, cis-DBCA, and cis-DCCA) showed up the most frequently in the urine samples of both the mothers (100%, 68%, and 65%, respectively) and their children (96.5%, 85%, and just under 65%, respectively).

After taking account of potentially influential factors, higher levels of cis-DCCA in the urine of the mums-to-be was associated with a heightened risk of internalising behaviours in their 6 year olds.

Levels of another metabolite (3-PBA) in the children's urine samples were associated with a heightened risk of externalising behaviours. However, high levels of trans-DCCA were associated with a lowered risk of externalising behaviours.

But children with the highest levels of metabolites in their urine were around three times as likely to display abnormal behaviour.

By way of an explanation for these associations, the researchers suggest that pyrethroids might alter neurochemical signalling in the brain.

This is an observational study so no firm conclusions can be drawn about

cause and effect, added to which accurately assessing pyrethroid exposures using urine samples is notoriously difficult because metabolites are cleared from the body in just a few days.

Nevertheless, the researchers conclude: "The current study suggests that exposure to certain pyrethroids at the low environmental doses encountered by the general public may be associated with behavioural disorders in children."

More information: Behavioural disorders in 6-year-old children and pyrethroid insecticide exposure: the PELAGIE mother-child cohort, *Occupational & Environmental Medicine*, oem.bmj.com/lookup/doi/10.1136/oemed-2016-104035

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