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Pesticides linked to reduced cognitive function among children living in agricultural areas

Children living in agricultural areas may experience headaches and reduced cognitive performance due to the exposure to various pesticides in their daily lives.

This is according to the study conducted by scientists at the Centre for Environmental and Occupational Health Research in the School of Public Health and Family Medicine at the University of Cape Town (UCT) and Swiss Tropical and Public Health Institute, University of Basel. The study is also part of the South African-Swiss Bilateral SARChI Chair in Global Environmental Health of Professors Aqiel Dalvie and Martin Röösli.

The study was recently published in the journal Environment International.

The study reports the results from the baseline survey of an ongoing cohort investigation of 1001 schoolchildren aged 9 to 16 from seven schools in three agriculture areas in the Western Cape. The areas include the Hex River Valley (mainly table grapes), Grabouw (mainly stone fruits) and Piketberg (mainly cereals).

Dalvie commented: "About 50% of the children reported ever having been engaged in activities exposing them to pesticides including farm activities, eating crops directly from the field and leisure activities. Headache severity score was consistently increased with pesticide exposure including farm activities such as eating crops and leisure activities such as playing, swimming or bathing in nearby water."

For cognitive performance, an overall negative trend with pesticide exposure-related activities was observed. "Among other finding, involvement in pesticide-related farm activities was associated with a lower multi-tasking accuracy score, while lower strategy in spatial working memory and lower paired associated learning was observed for those who pick crops off the field compared to those who do not pick crops off the field. Eating fruits directly from the vineyard or orchard was associated with a lower motor screening speed and lower rapid visual processing accuracy score," Dalvie said.

"These results are suggestive of long-term adverse health effects among children exposed to pesticides which is being investigated by the cohort study."

He pointed out that children are expected to be more vulnerable to environmental exposures than adults due to their still developing organs and higher dermal contact including: hand-to-mouth activities, larger food intake per unit height and body weight, breathing in relatively

larger volumes of air, and playing in more hazardous zones for example in outdoor activities with closer contact to the ground.

"Neurodevelopmental disorders linked to early exposures to pesticides include autism, attention deficit hyperactivity disorder, poorer social behaviour, lower Intelligence and worse behavioural regulation," he said.

Application rates of pesticides in South Africa are the highest in Sub-Saharan Africa. Over 3000 different types of pesticide product formulations are registered, including the possible neurotoxic and endocrine disrupting chemicals such as bifenthrin, chlorpyrifos, cypermethrin and mancozeb.

In the Western Cape, a wide range of pesticides have been detected in the environment and in exposed persons, whose modes of uptake and level of toxicity are very different. A recent study in the Western Cape in 2017, showed that stone fruit, grapes and wheat farms used up to 96 active ingredients (47 fungicides, 31 insecticides and 18 herbicides).

The scientists are calling for a stricter control on the registration, sale, management, storage, packaging and several processes after sales of pesticides. "Given that these participants are not in occupation, a recommendation is to implement an educational program on pesticide related activities in schools and to learn from current interventions and their effectiveness," Dalvie added.

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