

Organophosphate insecticide exposure and general intelligence of primary school children in Tanjung Karang, Selangor, Malaysia

ABSTRACT

Organophosphate insecticide (OPs), that is used extensively in agriculture throughout the world has been linked to neurodevelopmental deficit specifically the cognitive effect. The aim of the study was to determine the relationship between organophosphates insecticide exposure with the general intelligence of the study group. A comparative cross-sectional study was conducted on 227 of primary school children, selected as study group as their school and homes were located less than 100 m from the paddy fields and 162 of primary school children located further away at more than 1 km from agriculture site served as the comparative group. Their parents completed the questionnaire used to collect their background information. The children's capillary blood were collected using the finger prick technique. The blood cholinesterase levels were determined using the cholinesterase test kit LOVIBOND 412870 AF287. The McCarthy Scales of Children's Abilities (MSCA) general cognitive scale was used to determine the general intelligence of these children. Results showed that there were significant difference ($p < 0.05$) in blood cholinesterase and general intelligence between the 2 groups. There were significant relationships between blood cholinesterase levels with the general intelligence scales ($p < 0.001$). The distance from the house to paddy field ($p < 0.001$) as well as gender (male) ($p = 0.004$) significantly influenced with blood cholinesterase levels of the study group. The general intelligence of the study group was lower than the comparative group. The boys were frequent exposure to pesticides due to their home proximity and more frequent outdoor activities near the paddy fields which contributed to the low blood cholinesterase. These then resulted in impaired general intelligence.

Keyword: Organophosphate; Intelligence; Cholinesterase