

Blood cholinesterase level and learning ability of primary school children in an agricultural village, Tanjung Karang, Malaysia

ABSTRACT

Objective: The widespread use of organophosphate (OP) insecticides in paddy fields has led to human exposure. The aim of this study was to determine the relationship between blood cholinesterase concentrations with the children's learning ability in the agricultural village of Tanjung Karang, Selangor.

Methods: Seventy-seven primary school children who live less than approximately 1km from paddy fields were selected as the exposed group, while another 62 primary schoolchildren who live more than 1 km away from the agriculture site served as the unexposed group. The questionnaires were completed by the parents. The children's capillary blood was collected using the finger prick technique to determine the blood cholinesterase concentrations using a cholinesterase test kit (Lovibond, AF267, Tintometer Ltd., UK). The McCarthy Scales of Children's Abilities (MSCA) were used to determine the learning ability of these children.

Results: There were significant differences ($p < 0.05$) in blood cholinesterase and all scales in the MSCA between the exposed and the unexposed group. There were significant associations between the blood cholinesterase concentrations and learning ability by all scales in the MSCA ($p < 0.05$). The variable that significantly influenced the blood cholinesterase was gender ($p = 0.008$). Blood cholinesterase was the most significant influencing factor on the learning ability, especially on the motor scale ($p = 0.002$).

Conclusion: Blood cholinesterase concentrations were significantly higher and had a significant relationship with the learning ability of the exposed group, especially the motor performance.

Keyword: Blood cholinesterase; Learning ability; Schoolchildren