Low blood lead concentrations and cognitive development of primary school children from three areas in Malaysia

Abstract

A study on to identify the relationship between blood lead and cognitive development was conducted on primary school children in Malaysia. About 413 children aged 6½ - 8½ years from urban (236), rural (80) and industrial areas (97) were studied. Blood lead was analyzed using the Atomic Absorption Spectrophotometer (GFAAS). Cognitive development was measured by the 'McCarthy Scales of Children's Abilities Test' (MSCA). Significant differences found in the mean cognitive scores between the urban (94.40), industrial (102.90) and suburban children (101.24) ($p = 0.001$), with the blood lead between the urban (3.66 µg/dL), industrial (3.54 µg/dL) and suburban children (3.04 µg/dL) ($p = 0.022$). Significant inverse correlations between blood lead and cognitive scores found for all groups ($p = 0.001$), urban ($p = 0.001$) and suburban children ($p < 0.001$). Low blood lead significantly influenced the cognitive development for all children after adjusting for confounders ($p = 0.001$). The urban children's cognitive scores were significantly influenced by blood lead levels and household income ($p = 0.001$). However, for the suburban children, the cognitive score were significantly influenced by the blood lead levels, the mothers' education, number of siblings, sequence in the family and the household income ($p < 0.001$). Blood lead below 10 µg/dL influenced the cognitive development. Urban children had higher blood lead but suburban children with lower blood lead were also vulnerable to the effect of lead on their cognitive development.