Nutritional and socio-economic determinants of cognitive function and educational achievement of Aboriginal schoolchildren in rural Malaysia

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Abstract
A community-based cross-sectional study was carried out among Aboriginal schoolchildren aged 7–12 years living in remote areas in Pos Betau, Pahang, Malaysia to investigate the potential determinants influencing the cognitive function and educational achievement of these children. Cognitive function was measured by intelligence quotient (IQ), while examination scores of selected school subjects were used in assessing educational achievement. Blood samples were collected to assess serum Fe status. All children were screened for soil-transmitted helminthes. Demographic and socio-economic data were collected using pre-tested questionnaires. Almost two-thirds (67.6%) of the subjects had poor IQ and most of them (72.6%) had insufficient educational achievement. Output of the stepwise multiple regression model showed that poor IQ was significantly associated with low household income which contributed the most to the regression variance ($r^2=0.059; P=0.020$). Low maternal education was also identified as a significant predictor of low IQ scores ($r^2=0.042; P=0.043$). With educational achievement, Fe-deficiency anaemia (IDA) was the only variable to show significant association ($r^2=0.025; P=0.015$). In conclusion, the cognitive function and educational achievement of Aboriginal schoolchildren are poor and influenced by household income, maternal education and IDA. Thus, effective and integrated measures to improve the nutritional and socio-economic status of rural children would have a pronounced positive effect on their education.

Key words: Cognitive function; Educational achievement; Nutrition; Socio-economic status; Aboriginal schoolchildren

Numerous factors are known to affect cognitive function (the mental processes by which knowledge is acquired including perception, reasoning, creativity, problem-solving and possible intuition measured by intelligence quotient (IQ)) and educational achievement of children (the progress of individuals in school measured by the results of examinations). Poor cognitive and educational performances among children can be attributed to a complex web of causation which involves insufficient infrastructure, health problems, poor socio-economic status and environmental causes. Health problems that may affect children’s cognitive function and educational achievement include childhood infections1,2, malnutrition and micronutrient deficiencies including Fe-deficiency anaemia (IDA)3,4, intestinal parasitic infections, mainly soil-transmitted helminthes (STH)5, visual and hearing impairment6, epilepsy7, and many other problems. Moreover, stimulation-poor environments lead to poor development of the child’s brain, which hinder the child’s cognitive development8,9. Needless to say, poor socio-economic status is a strong inhibitor limiting educational achievement. Such a situation does not motivate children to study and an unsatisfactory home or class environment also does not encourage learning.

Orang Asli (a Malay term transliterated as ‘original people’) are the indigenous minority inhabitants of Peninsular Malaysia. They comprise only 0.6% of the total population in Malaysia (26.6 million in 2006). Despite intensive efforts by government and private sectors to improve the quality of life of Aboriginal communities throughout 53 years of independence (since 1957), little success has been achieved, and these communities are still plagued with poverty and a wide range of health problems. Very little is known about

Abbreviations: IDA, Fe-deficiency anaemia; IQ, intelligence quotient; STH, soil-transmitted helminthes; TS, total scores of the three school subjects.

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