

Ref: 12/2.

**IODINE NUTRITION, COGNITION & SCHOOL ACHIEVEMENT
OF BANGLADESHI SCHOOL CHILDREN**

by

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**A thesis submitted for the degree of Doctor of Philosophy
in the Faculty of Medicine
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February, 1998

ABSTRACT

Two studies were conducted concerning the association between iodine deficiency and levels of school achievement, cognition and motor skills in Bangladeshi school children. In 3 rural, severely iodine-deficient areas, 2003 children were screened for T_4 and TSH. 170 children with $T_4 \leq 45$ nmol/L (hypothyroid) were identified and compared with 170 children with $T_4 \geq 70$ nmol/L (euthyroid), matched for school and grade on the following: Wide Range Achievement Test, 8 cognitive function and 3 fine motor function tests, anthropometry and social background.

The hypothyroid children performed worse than the euthyroid children on reading and spelling and in one cognitive function test. A factor analysis of cognitive and motor function tests yielded 2 factors, a general cognitive and a fine motor one. There was a significant difference between the groups in the general cognitive factor, after controlling for socio-cultural and biological variables. Parental education, food deprivation, household possessions and home stimulation made significant independent contributions to the children's development.

An unplanned increase in T_4 levels occurred in all groups between the time of screening and enrolment, though urinary iodine measures remained moderately deficient. A double-blind placebo-controlled trial was conducted with 305 hypothyroid children (screening $T_4 < 51$ nmol/L) and 304 euthyroid children ($T_4 > 60$ nmol/L). Four months after treatment, urinary iodine levels improved in the iodine-treated group, but there was no effect on T_4 or TSH. No benefit was observed on any cognitive function test. Post-hoc analyses showed that change in T_4 levels was significantly associated with changes in two cognitive function tests and one fine motor function test.

The results of the case-control study suggest that iodine deficiency associated with hypothyroidism detrimentally affects school achievement and cognition. However, the treatment trial indicates that children with moderate iodine deficiency in the presence of normal T_4 may not benefit in these functions from IPSO treatment.