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Contribution of food sources to the vitamin B12 status of South Indian children

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There is evidence that sub-clinical vitamin B12 deficiency is common in India[(1)]. For religious and economic reasons meat consumption is infrequent in a large proportion of the population, meaning that dietary vitamin B12 intakes are low. We used dietary data from a cohort of South Indian children to explore the contribution of vitamin B12 source foods to B12 status.

Dietary data, collected by interviewer-administered food frequency questionnaire, and plasma B12 concentrations were measured for 527 children (47.1% male) in the Mysore Parthenon Birth Cohort at age 9.5 years. Vitamin B12 and total energy intakes were calculated using published food composition databases. Estimates for cooked/prepared foods were based on weighed raw ingredients, adjusted for water and nutrient losses. Maternal plasma vitamin B12 concentrations were available from the pregnancy of the child. We used linear regression models to examine the relationships of intakes of vitamin B12 and foods with plasma vitamin B12 concentrations.

Approximately 3% of children were B12 deficient (<150 pmol/l) and a further 15% had 'marginal' B12 status (150–221 pmol/l). Total estimated daily B12 intake and frequency of intake of flesh foods (meat and fish) were positively associated with plasma B12 concentrations (both, $p < 0.05$). Median (25th, 27th percentiles) plasma B12 concentrations in children grouped by relative levels of flesh food intake (low, medium, high) were 286 (239, 392), 314 (256, 374) and 331 (275, 428), respectively. The associations were independent of socio-economic indicators and maternal B12 status. Maternal plasma B12 during pregnancy was itself a predictor of children's plasma B12 concentrations at age 9.5 years, independent of current vitamin B12 intakes ($p < 0.001$). Micronutrient-enriched beverage consumption level was also related to children's plasma B12 concentrations after adjustment for maternal B12 ($p = 0.042$). Intakes of milk and 'curd' (yoghurt) were unrelated to B12 status.

Flesh foods are important sources of vitamin B12 in this population of South Indian children. New approaches are needed to develop appropriate dietary B12 sources for Indian vegetarians. Micronutrient-enriched beverages appear to be an important source of vitamin B12 for our cohort, but their high sugar content limits their recommendation. Maternal B12 concentrations during pregnancy remain strongly associated with children's B12 concentrations well into childhood; improving maternal B12 status in pregnancy may improve B12 status in Indian children[(2)].

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