

Abstract

Eur J Clin Nutr. 2009 Jul;63(7):842-9.

Hemoglobin concentration is inversely associated with erythrocyte folate concentrations in Colombian school-age children, especially among children with low vitamin B12 status.

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BACKGROUND: While the majority of cases of nutritional anemia in developing countries are caused by iron deficiency, other micronutrient deficiencies may also be involved. In Colombia, it was recently reported that 38% of school children were anemic; yet, the rate of iron deficiency was only 3.6%.

OBJECTIVE: To determine if micronutrients other than iron were responsible for low hemoglobin concentrations in Colombian school children.

METHODS: We examined hemoglobin concentrations in relation to plasma ferritin, vitamin A, vitamin B12, and erythrocyte folate levels in a representative sample of 2812 low- and middle-income children (5-12 years) from Bogotá, Colombia.

RESULTS: In multivariate analysis, hemoglobin concentration was positively associated with child's age, mother's age, household's socioeconomic stratum, and family income. Low ferritin was related to 3.6 g/l lower hemoglobin concentration (95% confidence interval=-6.0, -1.3).

Unexpectedly, we found an inverse trend in hemoglobin concentration by quartiles of erythrocyte folate; the adjusted hemoglobin concentration difference between the highest and lowest folate quartiles was -6.0 g/l (95% confidence interval=-7.2, -4.9; P for trend <0.0001). This difference was greatest among children with vitamin B12 concentration <148 pmol/l (-11.5 g/l), followed by children with vitamin B12 concentration 148-221 pmol/l (-7.7 g/l), and smallest in children with vitamin B12 concentration >221 pmol/l (-5.7 g/l); P for interaction=0.04.

CONCLUSIONS: Hemoglobin concentration is inversely related to erythrocyte folate concentrations in a setting where folate fortification was adopted more than a decade ago. The impact of improving vitamin B12 status on this inverse relationship should be examined.

PMID: 18957973