

Abstract

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Zinc deficiency in Mexican American children: influence of zinc and other micronutrients on T cells, cytokines, and antiinflammatory plasma proteins.

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BACKGROUND: The Third National Health and Nutrition Examination Survey suggested some Mexican American children are at risk of zinc deficiency.

OBJECTIVE: We measured the effects of zinc and micronutrients or of micronutrients alone on indexes of cell-mediated immunity and antiinflammatory plasma proteins.

DESIGN: Subjects (n = 54) aged 6-7 y were randomly assigned and treated in double-blind fashion in equal numbers with 20 mg Zn (as sulfate) and micronutrients or with micronutrients alone 5 d/wk for 10 wk.

RESULTS: Before treatment the mean +/- SD plasma zinc was 14.9 +/- 1.7 micromol/dL and the range was within the reference; hair zinc was 1.78 +/- 0.52 micromol/g and 41.6% were < or =1.68 micromol/g; serum ferritin was 25.7 +/- 18.6 microg/L and 50.0% were < or =20 microg/L. The zinc and micronutrients treatment increased the lymphocyte ratios of CD4(+) to CD8(+) and of CD4(+)CD45RA(+) to CD4(+)CD45RO(+), increased the ex vivo generation of interleukin-2 (IL-2) and interferon-gamma (IFN-gamma), decreased the generation of interleukin-10 (IL-10), and increased plasma interleukin-1 receptor antagonist (sIL-1ra) and soluble tumor necrosis factor receptor 1 (sTNF-R1). Micronutrients alone increased the ratio of CD4(+) to CD8(+) but not of CD4(+)CD45RA(+) to CD4(+)CD45RO(+), increased IFN-gamma but had no effect on IL-2 or IL-10, and increased sIL-1ra but not sTNF-R1. Efficacy of zinc and micronutrients was greater than micronutrients alone for all indexes except the ratio of CD4(+) to CD8(+), which was affected similarly.

CONCLUSIONS: Before treatment, concentrations of hair zinc in 41.6% of subjects and serum ferritin in 50% were consistent with the presence of zinc deficiency. The greater efficacy of the zinc and micronutrients treatment compared with micronutrients alone supports this interpretation.

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