Micronutrient supplementation in children and adults with HIV infection

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In six trials, Vitamin A supplementation in adults did not affect the progression of HIV disease, but in a meta-analysis of three trials in African children it halved all-cause mortality. No significant adverse effects of vitamin A were reported. In one trial, Zinc supplements reduced diarrhoeal morbidity in children without any adverse effects. Vitamin D supplementation was safe, but without clinical benefits. In one large trial in Africa, multiple micronutrient supplementation yielded many clinical benefits for pregnant women and their offspring, with no significant adverse effects. Further research is needed on the benefits of both multiple micronutrient and vitamin A supplementation.

Cochrane review


Abstract

Micronutrient deficiencies are widespread and compound the effects of HIV disease; micronutrient supplements may be effective and safe in reducing this burden.

To assess whether micronutrient supplements are effective and safe in reducing mortality and morbidity in adults and children with HIV infection.

The CENTRAL, EMBASE, PubMed, and GATEWAY databases were searched for randomised controlled trials of micronutrient supplements using the search methods of the Cochrane HIV/AIDS Group.

Randomised controlled trials were selected that compared the effects of micronutrient supplements (vitamins, trace elements, and combinations of these) with other supplements, placebo or no treatment on mortality, morbidity, pregnancy outcomes, immunologic indicators, and anthropometric measures in HIV-infected adults and children. Any adverse effects of supplementation were recorded.

Two reviewers independently selected trials, appraised trial quality for risk of bias using standardised criteria, and extracted data using standardised forms.
Sixteen additional trials are included in this update to the original Cochrane review (Irlam 2005). Overall, 30 trials involving 22,120 participants are reviewed: 20 trials of single supplements (vitamin A, vitamin D, zinc, selenium) and 10 of multiple micronutrients. Eight trials were undertaken in child populations.

None of the six trials of vitamin A or beta-carotene supplementation in adults demonstrated any significant reduction in HIV disease progression. Vitamin A halved all-cause mortality in a meta-analysis of three trials in African children, had inconsistent impacts on diarrhoeal and respiratory morbidity, and improved short-term growth in one trial. No significant adverse effects of vitamin A in adults or children have been reported.

Zinc supplements reduced diarrhoeal morbidity and had no adverse effects on disease progression in a single safety trial in South African children. No significant clinical benefits were found from zinc supplementation of pregnant Tanzanian women or Peruvian adults with persistent diarrhoea.

Selenium reduced diarrhoeal morbidity in pregnant women in Tanzania, and reduced viral load in two separate small trials in American adults.

Single trials of vitamin D supplements in adults, and in adolescents and children, demonstrated safety but no clinical benefits.

Multiple micronutrient supplements conferred multiple clinical benefits to pregnant women and their offspring in a large Tanzanian trial. Supplementation in another Tanzanian trial reduced the recurrence of pulmonary TB and increased weight gain in co-infected patients. No significant adverse effects were reported.

Multiple micronutrient supplements reduced morbidity and mortality in HIV-infected pregnant women and their offspring and also improved early child growth in one large randomised controlled trial in Africa. Additional research is needed to determine if these are generalisable findings. Vitamin A supplementation is beneficial and safe in HIV-infected children, but further evidence is needed to establish if supplementation confers similar benefits in HIV-infected adults. Zinc is safe in HIV-infected adults and children. It may have similar benefits in HIV-infected children and adults, and uninfected children with diarrhoea, as it does in HIV-uninfected children.

Further trials of single supplements (vitamin D, zinc, and selenium) are required to build the evidence base. The long-term clinical benefits, adverse effects, and optimal formulation of multiple micronutrient supplements require further investigation in individuals with diverse disease status.