

## Nutrition News for Africa

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An article entitled “Effect of maternal and neonatal vitamin A supplementation and other postnatal factors on anemia in Zimbabwean infants: a prospective, randomized study” was published by Miller et al, in the *American Journal of Clinical Nutrition* 2006;84:212-222.

### Introduction

Anemia is prevalent in infants and young children in developing countries. Vitamin A is known to play a role in hematopoiesis, and anemia is a common consequence of vitamin A deficiency. In developing countries, nearly 20% of postnatal mothers have vitamin A deficiency and inadequate concentrations of breast-milk vitamin A, and breastfeeding infants of deficient mothers are at risk of vitamin A deficiency. This longitudinal cohort study was nested within the Zimbabwe Vitamin A for Mothers and Babies Project (ZVITAMBO), a randomized, double-blind, placebo-controlled clinical trial of mother-infant pairs enrolled between November 1997 and January 2000, that tested the efficacy of immediate post-partum vitamin A supplementation (VAS) of the mother and the child on several infant and maternal health outcomes. The hypothesis in this study was that vitamin A deficiency was part of the etiology of anemia in these infants and that VAS (especially when given to the mother) would improve hemoglobin concentration during the second half of the first year of life. In a secondary analysis the study examined the effect of several factors on anemia at about 1 year of age, including maternal and infant HIV status and sex of the infant.

### Subjects and methods

The study was carried out in Harare, Zimbabwe where malaria is not endemic and where hookworm infections are rare. Mother-infant pairs were randomly assigned to 1 of 4 treatment groups: mothers and infants receiving vitamin A (n=410); mothers receiving vitamin A and infants receiving placebo (n=391); mothers receiving placebo and infants receiving vitamin A (n=399); mothers and infants receiving placebo (n=392). Mothers received 400 000IU of vitamin A (as retinyl palmitate), and infants received 50 000IU. Placebo capsules appeared identical and contained only vitamin E in a soy-oil base. At baseline and each follow-up visits study midwives conducted interviews with the mother and collected maternal and infant blood, and infant anthropometric measures. Hemoglobin was measured using the HemoCue hemoglobinometer and plasma ferritin concentrations were measured by using an enzyme immunoassay. A detailed infant-feeding history was elicited at each visit and a 7-day morbidity history was also obtained. Iron status was assessed by TBI at birth and plasma ferritin concentrations at 6 months. Depleted storage iron was defined as a plasma ferritin concentration <12µg/L.

### Results

Overall, 46.3% of infants were anemic (hemoglobin<105g/L). Neither maternal nor infant VAS administered in the immediate post-partum period had a significant effect on hemoglobin concentration or on the proportion of anemia after adjustment for the sex of the infant. The HIV status of the mother or infant did not modify the association between VAS and hemoglobin concentration or anemia. Mean hemoglobin concentrations were significantly lower and anemia was more common in HIV-positive infants than in HIV-negative infants born to HIV-negative or to HIV-positive mothers. TBI at birth did not differ significantly between groups. The determinants of anemia for HIV-negative infants were male sex, lower TBI at birth, and 6-month plasma ferritin<12µg/L. In HIV-positive infants, risk of anemia increased with male sex, lower TBI, frequent morbidity, early HIV infection, and low maternal CD4+ lymphocyte count at recruitment. Overall the strongest determinants of postnatal hemoglobin concentration and anemia prevalence were TBI at birth, infant HIV infection, and sex of the infant, and their effects appeared to be additive.

### Discussion

The study findings confirm that anemia in late infancy is a public health problem in Zimbabwe. VAS did not significantly improve hemoglobin concentrations and the authors explain that this may largely be attributed to iron deficiency and is consistent with other research in iron-deficient children. Infant HIV infection increased the risk of anemia approximately 6-fold. The authors recommend using the study findings as a guide to develop appropriate interventions to control anemia in Zimbabwean infants, with a focus on improving TBI at birth, promoting EBF in the early months of life, and examining specific interventions to decrease mother-to-child transmission of HIV.