

## Micronutrients

### Effects of Vitamin A and $\beta$ -carotene Supplementation to Lactating Mothers and Their Infants in Bangladesh

AL Rice<sup>1</sup>, RJ Stoltzfus<sup>1</sup>, A de Francisco<sup>2</sup>, J Chakraborty<sup>2</sup>, CL Kjolhede<sup>1</sup>, and MA Wahed<sup>2</sup>

**Objective:** Assess the efficacy of vitamin A and  $\beta$ -carotene supplementation for the improvement of vitamin A status of women and their breastfed infants.

**Methodology:** Women delivering live infants in Matlab were randomized to receive either single-dose 200,000 IU of vitamin A at 2 weeks postpartum and daily placebos (n=74), daily dietary doses (n=73) of  $\beta$ -carotene (7.6 mg=1 RDA) or daily placebos for 9 months postpartum (n=73). Breastmilk vitamin A concentrations were measured at baseline, 3, 6 and 9 months postpartum. Serum retinol concentrations and modified relative-dose response (MRDR) test ratios were measured in infants and a subsample of women.

**Results:** Vitamin A supplementation to lactating mothers improved the maternal vitamin A status and breastmilk concentrations at 3 months, but the effect was not sustained. Dietary  $\beta$ -carotene significantly improved the maternal vitamin A status and breastmilk vitamin A concentrations only at 9 months. At 6 months postpartum, 25% of the women had low liver stores, and over 65% produced breastmilk with low concentrations of vitamin A. The status of 6-month old infants reflected the trend in breastmilk concentrations and was the highest in the vitamin A group, followed by the  $\beta$ -carotene and placebo groups. Of the infants of the supplemented women, over 25% had serum retinol concentrations <0.70 mmol/L, and over 85% had low liver stores of vitamin A.

**Conclusion:** Both the interventions had beneficial effects on the maternal and infant vitamin A status. However, neither was sufficient to completely overcome the subclinical vitamin A status present in these women. Both vitamin A dose and dietary  $\beta$ -carotene failed to build adequate vitamin A stores in their 6-month old infants. Mothers should be supplemented with 200,000 IU of retinol within 8 weeks postpartum, in line with the government recommendations. Additional  $\beta$ -carotene supplementation may improve vitamin A levels in mothers and their infants.

<sup>1</sup>Division of Human Nutrition, The Johns Hopkins University School of Hygiene and Public Health, 615 North Wolfe Street, Baltimore, MD 21205, MD, USAUSA

<sup>2</sup>International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), GPO Box 128, Dhaka 1000, Bangladesh



### Subclinical Vitamin A Deficiency in Pre-school Children Living in Urban Slums of Dhaka City

MA Wahed<sup>1</sup>, Rashidul Haque<sup>1</sup>, ASM Hamidur Rahman<sup>1</sup>, Sadiqur R Talukder<sup>1</sup>, MJ Albert<sup>1</sup>, and JO Alvarez<sup>2</sup>

**Objective:** Assess the biochemical evidence of vitamin A deficiency in pre-school children living in the urban slums of Dhaka.

**Methodology:** To examine the separate and combined effects of low-dose  $\beta$ -carotene supplementation and anti-helminthic therapy, 226 children aged 2-5 years from different slums in Mirpur thana were recruited for this study. All children were free from apparent illness, frank malnutrition, and sign of clinically evident vitamin A deficiency. Their serum  $\beta$ -carotene and retinol levels were measured using high pressure liquid chromatography.

**Results:** The mean (range) serum  $\beta$ -carotene and retinol levels were 5.67 (2.6-21.7) and 18.9 (5.6-37.3) mg/dl respectively. Fifty-seven percent of the children were vitamin A-deficient based on the serum retinol level (<20 mg/dl). About 20% of the children had no measurable  $\beta$ -carotene in their serum. Neither serum retinol nor  $\beta$ -carotene showed any relationship with age or nutritional status.

**Conclusion:** The results of the study indicate a high prevalence of vitamin A deficiency among the pre-school children in urban slums.

<sup>1</sup>International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), GPO Box 128, Dhaka 1000, Bangladesh

<sup>2</sup>Department of International Health, The University of Alabama at Birmingham, Birmingham, AL 35294-0008, USA



### Effect of Iron and Other Micronutrients on Haematological Indices and Nutritional Status of Urban Slum Children

Kazi Selim Anwar, MA Karim, Mahfuzur Rahman, R Hoque, U Habiba, A Hossain, and AK Azad

**Objective:** Compare the effect of iron and a micronutrient package (folic acid + vitamin C) on haematological indices and nutritional status of dewormed and non-dewormed children of Mirpur slum, Dhaka.

**Methodology:** Two hundred thirty-three anaemic (<11 g/dl) children aged 2-12 years were randomly assigned to 6 groups: (dewormed: A1, A2, and A3, and non-dewormed: B1, B2, and B3). A1 and B1 received ferrous fumarate, A2 and B2 micronutrients, and A3 and B3 placebo. Biweekly anthropometry and pre/post-interventional haematological profiles were determined examining 0.5 mL fingerprick blood. Outcome means were compared with the baseline data using the SPSS/PC+/anthropometry software.

**Results:** Children of A1 and B1 groups had an increased RBC count and higher Hb/PCV values [A1>A3 ( $p=0.000$ ); B1>B2 ( $p=0.000$ ), except Hb ( $p=0.07$ )] and B1>B3( $p=0.000$ ). Although no differences existed between A1 and A2 for RBC count ( $p=0.82$ ), it was higher for Hb ( $p=0.000$ ) and PCV ( $p=0.000$ ) level. Children of both A1 and A2 had higher RBC count/Hb/PCV level than that of B2 [( $p=0.000$ , except Hb ( $p=0.01$ )] and B3 [( $p=0.000$  for both)], but it did not differ from B1 [( $p=0.23$  and  $0.27$  for RBC),  $p=0.54$  and  $0.09$  for Hb and  $p=0.26$  and  $0.006$  for PCV respectively]. The RBC count was related with post-interventional weight and height gains ( $p=0.03$  and  $0.02$  respectively). Although higher mid-upper arm circumference (MUAC) value was associated with Hb and PCV level ( $p=0.001$  and  $0.003$  respectively), increased Hb and PCV values were associated with both dewormed ( $p=0.003$  and  $0.000$  respectively) and non-dewormed iron-supplemented children ( $p=0.002$  and  $0.000$  respectively).

**Conclusion:** Iron as supplement was better than micronutrients to boost up haematological indices, but had less impact on the nutritional status. Higher RBC count was associated with weight and height gains among