

ORIGINAL RESEARCH COMMUNICATION

# Supplementation with iron and riboflavin enhances dark adaptation response to vitamin A–fortified rice in iron-deficient, pregnant, nightblind Nepali women<sup>1, 2, 3</sup>

Joanne M Graham, Marjorie J Haskell, Pooja Pandey, Ram K Shrestha, Kenneth H Brown and Lindsay H Allen

<sup>1</sup> From the Program in International Nutrition, Department of Nutritional Biology, University of California, Davis, Davis, CA (JMG, MJH, KHB, and LHA); the Nepali Technical Assistance Group (NTAG), Maitighar, Kathmandu, Nepal (PP and RKS); and the US Department of Agriculture, Agriculture Research Service, Western Human Nutrition Research Center, University of California, Davis, Davis, CA (JMG and LHA)

**Background:** Nightblindness affects 16–52% of pregnant women in areas of Nepal and in some cases persists after vitamin A treatment. Iron and riboflavin affect vitamin A utilization and photoreceptor function, respectively, and pilot data in the study population showed a high prevalence of iron and riboflavin deficiencies.

**Objective:** The objective was to assess the effect of supplemental iron and riboflavin on pupillary threshold (PT) and plasma retinol in nightblind, pregnant Nepali women given vitamin A–fortified rice.

**Design:** Nightblind pregnant women were randomly assigned to receive, 6 d/wk under supervision for 6 wk, a vitamin A–fortified rice curry dish providing 850 µg retinal activity equivalents/d with either a 30-mg Fe and 6-mg riboflavin (FeR + VA) capsule or a placebo control (VA only) capsule. Hemoglobin, erythrocyte riboflavin, and plasma ferritin and retinol were measured before and after the intervention. Dark adaptation was assessed by PT score.

**Results:** Women who were iron deficient at baseline ( $n = 38$ ) had significantly greater improvement in PT score with iron and riboflavin supplementation than without ( $P = 0.05$ ). Iron and riboflavin supplements significantly reduced the prevalences of riboflavin deficiency (from 60% to 6%;  $P < 0.0001$ ), iron deficiency anemia (from 35% to 15%;  $P < 0.007$ ), and abnormal PT (from 87% to 30%;  $P < 0.05$ ) from baseline. Mean increases in erythrocyte riboflavin ( $P < 0.0001$ ) and plasma ferritin ( $P = 0.01$ ) were greater in the FeR + VA group than in the VA only group.

**Conclusions:** Iron deficiency may limit the efficacy of vitamin A to normalize dark adaptation in pregnant Nepali women. Further studies are needed to assess the effect of simultaneous delivery of iron and vitamin A for the treatment of nightblindness.

**Key Words:** Pregnancy • impaired pupillary threshold • nightblindness • iron deficiency • riboflavin • women • Nepal

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