

Nutrition News for Africa

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A Ranz Prize Lecture by Rosalind S. Gibson entitled “Zinc: the missing link in combating micronutrient malnutrition in developing countries” was published in the Proceedings of the Nutrition Society (2006), 65, 51-60.

Although zinc deficiency in humans was first described in the 1960s, it is only in 2002 that it was included as a major risk factor to the global and regional burden of disease, when its numerous adverse consequences on human health were recognized. In 2004, the World Health Organization(WHO)/UNICEF included zinc supplements in their recommended treatment regimen for acute diarrhea. However, there is still a lack of awareness of the importance of zinc in human nutrition and there is a lack of food composition values for zinc for local staple foods from developing countries.

Importance of zinc for human health: Multiple functions in the body are affected by zinc deficiency, including physical growth, immune competence, reproductive function and neuro-behavioral development. Randomized controlled trials (RCT) have shown that a positive growth response to zinc supplementation is more likely to be apparent among children with pre-existing growth failure. In the last decade, several RCT among high-risk groups such as infants, young children and pregnant women have examined preventive effects of zinc supplements on several other important health outcomes. For example, a pooled analysis of zinc supplementation trials confirmed a preventive effect of zinc in reducing the incidence of diarrheal infection and of acute lower respiratory infection, with reductions in diarrhea and pneumonia in infants and young children in developing countries. Efficacy trials on the therapeutic effects of zinc supplements on children in developing countries have shown dramatic reductions in the duration of acute and persistent diarrhea and severe acute lower respiratory infection, but no therapeutic effects were noted with daily zinc supplements for measles or malaria therapy. Results of the RCT on maternal health and pregnancy outcomes have been inconsistent.

Etiology of zinc deficiency: Three major factors are responsible for the development of zinc deficiency in developing countries; Inadequate intakes of dietary zinc, excessive losses, high physiological requirements.

Identifying the risk of zinc deficiency: The WHO cut-off value that indicates when childhood growth stunting is a public health problem can be used to indicate a high risk of zinc deficiency at a national level. Use of this indicator has been adopted by the International Zinc Nutrition Consultative Group (IZiNCG). In addition, IZiNCG has developed a composite index of the national risk of zinc deficiency based on combined information on stunting rates and the adequacy of zinc in the national food supply. Countries can apply this composite index to establish the likely risk of zinc deficiency and respond accordingly.

Intervention strategies: Ideally zinc should be incorporated into pre-existing intervention programs designed to combat vitamin A, iron, and iodine deficiencies. The cost of adding zinc to a preexisting micronutrient supplement will range from about US\$0.05-0.19 per capita per year depending on the age-group. To date, no routine, large-scale targeted zinc supplementation program exists. Fortification is a cost-effective method that can be used at the national level to prevent deficiency of both zinc and other micronutrients. The additional cost of adding zinc to a national iron fortification program at a level ranging from 30mg zinc/kg flour to 70mg zinc/kg flour is US\$0.03-0.04 per capita per year. National fortification of maize and/or wheat flour with zinc and other micronutrients have already been implemented in Mexico, Indonesia and South Africa.

Dietary modification or diversification is a more sustainable long-term, economically-feasible and culturally acceptable strategy that can be used to alleviate several micronutrient deficiencies simultaneously. A combination of dietary strategies involving increased consumption of animal-source foods and phytate reduction is the preferred approach to enhance both the content and bioavailability of zinc in the diets of rural households in developing countries.

Future intervention strategies at the crop production level include biofortification to increase the content and /or bioavailability of zinc in staple food crops.

Moving from science to programs: Ultimately the success of any approach for combating zinc deficiency depends on political and policy leadership in countries and a strong commitment to developing an acceptable equitable and sustainable solution.