

Influence of inhibitors and enhancers in diet on hair zinc*M Soekatri¹, G Marks¹ and GM Williams²*¹Nutrition Program, ACITHN, The University of Queensland, QLD 4029²Tropical Health Program, ACITHN, The University of Queensland, QLD 4029

Inadequate zinc intake is a major problem in developing countries especially at the age when complementary feeding is introduced and breast feeding may be decreased (1). In countries in which the diet is low in animal protein and high in phytate, zinc deficiency has been assumed to be common in children (2). A previous study in Indonesia showed that fifty one percent of infants received soft/solid foods or liquid other than breast milk in the first month of life (3). The objective of the present study is to assess the effect of available iron, zinc, phytate, fibre and calcium in the diet of young infants on zinc status two months later.

The study was conducted in Indramayu-West Java as a nested study in conjunction with a UNICEF and University of Indonesia randomised double-blind controlled trial. Two hundred of 800 healthy infants aged 4-7 months were allocated randomly for a supplementation 5 days a week for 6 months with 4 treatments: zinc 10 mg/day; iron 10 mg/day; zinc and iron (10 mg :10 mg) and placebo, all given in syrup with 30 mg vitamin C by health cadres. Before supplementation, infants were given a 100,000 IU dose of vitamin A. At the end of the supplementation period, 24 hour-dietary intake was measured by trained nutritionists using photos to assist identification and weighed food portions. Nutrient intake was estimated using the Indonesia Food Composition Table except for phytate, zinc, and fibre which used the World Food database. Breast milk intake was estimated based on the infant's age and estimated breast milk volume. The available zinc and iron were calculated based on Murphy's model (5). The ratio of phytate over zinc, fibre and calcium were also calculated. Two months later, a hair sample was taken using standard procedures and zinc content analysed. Hair zinc reflects the zinc availability to the hair during the previous 1 or 2 months (4). All data were checked for normality, and transformed if necessary. The Influence of dietary intake on hair zinc was assessed using The General Linear Model Procedure in SPSS version 10.

Available dietary zinc and iron had a significant positive effect on hair zinc with $P < 0.01$ and $P < 0.05$, respectively. The molar ratio phytate/zinc had negative effect on hair zinc ($P < 0.05$). Fibre and calcium/1000 kilocalories in the diet had no effect on hair zinc in this study.

1. Allen LH. Zinc and micronutrient supplements for children. *Am J Clin Nutr* 1998;68(2 Suppl):495s-498s.
2. WHO, Complementary feeding of young children in developing countries : a review of current scientific knowledge. 1998:81.
3. Utomo B, Fitria L, Sulaeha, E, Dachlia D, Supeni K. A Study Report : feeding pattern, nutrient Intake, and nutritional Status among children 0-23 months in Indramayu, West Java, 1997. Jakarta: Center for Health Research University of Indonesia, The Ministry of Health Directorate of Community Nutrition, Unicef, and University of California at Davis, 1998:17.
4. Gibson RS. Principles of Nutritional Assessment. New York: Oxford University Press, Inc, 1990:549.
5. Gibson RS, Ferguson EL. An Interactive 24-hour recall for assessing the adequacy of iron and zinc intakes in developing countries. Washington, D.C.: ILSI Press, 1999 :