Zinc Supplementation Saves the Lives of Children Living in Poverty

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Pediatrics 2001;108;1366-
DOI: 10.1542/peds.108.6.1366

5. Centers for Disease Control and Prevention. *Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials*. Atlanta, GA: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention; 1997
6. US General Accounting Office. *Medicaid: Elevated Blood Lead Levels in Children*. Washington, DC: US General Accounting Office, 1998. GAO Publ. No. GAO/HEHS-98-78
7. Geltman PL, Brown MJ, Cochran J. Lead poisoning among refugee children resettled in Massachusetts, 1995 to 1999. *Pediatrics*. 2001;108: 158–162
8. Centers for Disease Control and Prevention. Elevated blood lead levels among internationally adopted children—United States, 1998. *MMWR Morb Mortal Wkly Rep*. 2000;49:97–100
9. Miller LC, Hendrie NW. Health of children adopted from China. *Pediatrics*. 2000;105(6). Available at: http://www.pediatrics.org/cgi/content/full/105/6/e76
10. American Academy of Pediatrics, Committee on Environmental Health. Screening for elevated blood lead levels. *Pediatrics*. 1998;101:1072–1078
11. 45 CFR §200.107
12. Centers for Disease Control and Prevention. Recommendations for blood lead screening of young children enrolled in Medicaid: targeting a group at high risk. Advisory Committee on Childhood Lead Poisoning (ACCLPP). *MMWR Morb Mortal Wkly Rep*. 2000;49(No. RR-14):1–13

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ABBREVIATIONS. SGA, small for gestational age; IUGR, intrauterine growth retardation.

The study by Sazawal et al[1] analyzes the effect of zinc supplementation, during the first 9 months of life, in preventing death in infants born small for gestational age (SGA) in slum areas of India. The study was randomized and controlled for most relevant confounding variables. The main finding is that supplemental zinc in conjunction with 1 or more of other micronutrients—riboflavin, folate, calcium, phosphorus, or iron—decreases the risk of death by two thirds during the supplementation period. The risk reduction was significant and of similar magnitude independent of whether the infant was breastfed or received artificial feeding. Unfortunately this analysis was not performed for the exclusively breastfed infant who had the lowest risk of dying (relative risk: 0.03; 95% confidence interval: 0.003–0.29). Zinc supplementation may in fact have benefited only those who were either artificially fed or partially breastfed.[2] Zinc prevented deaths mainly from diarrheal disease and sepsis, but differential mortality by cause of death could not be fully assessed because the number of deaths was 20 out of 1154 SGA infants enrolled. The study was performed in SGA infants consuming breast milk or artificial feeding in an environment where infection, especially diarrhea, may be highly prevalent and complementary foods do not contain meat or other zinc-rich foods. Children living in poverty, particularly SGA infants, are at risk of severe zinc deficiency, which leads to repeated infections and growth failure. Stunting, the most prevalent manifestation of malnutrition, has been demonstrated to increase the risk of death.[3] This study, and the existing body of literature of increased infant mortality in malnourished children, suggests that zinc deficiency may be an underlying cause in a large proportion of infant death in developing countries. The message is that malnutrition, whether in utero or after birth, is an important risk factor for dying early in life. Preventive strategies should include optimizing fetal as well as postnatal growth.

Countries where prevalence of low birth weight is high have a large proportion of low birth weight attributable to intrauterine growth retardation (IUGR). In communities where low birth weight rates are >30%, infant mortality is usually over 50 per 1000 live births. Global data analyzed by de Onis et al[4] suggests that nearly 75% of all IUGR infants are born in Asia, mainly in south-central Asia, and 20% in Africa. Most of them are at higher risk of early protein-energy malnutrition, infections, early weaning, and death. Few studies demonstrate a beneficial effect of maternal nutritional interventions to prevent IUGR. A review by de Onis et al[5] in 1998 found only 12 randomized, controlled trials, including protein-energy, vitamins (vitamin D, folate), minerals (calcium, magnesium, zinc, iron) and fish oil supplementation. A beneficial effect of marginal significance was found only with balanced protein-energy supplementation (odds ratio: 0.77; 95% confidence interval: 0.58–1.01). Studies on zinc supplementation during pregnancy failed to demonstrate an effect on prevention of IUGR.

This study demonstrates the importance of micronutrient malnutrition in determining high infant mortality in developing countries and the fact that this is further aggravated by fetal growth retardation. What this study fails to highlight is that exclusive breastfeeding provides greater protection from death than zinc supplementation.

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REFERENCES

1. Sazawal S, Black RE, Menon VP, et al. Zinc supplementation in infants born small for gestational age reduces mortality: a prospective randomized, controlled trial. *Pediatrics*. 2001;108:1280–1286
2. Castillo-Durán C, Rodríguez A, Venegas G, Alvarez P, Icaza G. Zinc supplementation and growth of infants born small for gestational age. *J Pediatr*. 1995;127:206–211
3. Pelletier DL. The relationship between child anthropometry and mortality in developing countries: implications for policies, programs and future research [review]. *J Nutr*. 1994;124(10 suppl):2047S–2081S
4. de Onis M, Blössner M, Villar J. Levels and patterns of intrauterine growth retardation in developing countries. *Eur J Clin Nutr*. 1998; 52(suppl 1):S5–S15
5. de Onis M, Villar J, Gülmezoglu M. Nutritional interventions to prevent intrauterine growth retardation: evidence from randomized controlled trials [review]. *Eur J Clin Nutr*. 1998;52(suppl 1):S83–S93

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