Helen Keller INTERNATIONAL

Nutrition News for Africa

Nutrition News for Africa

Abstract - April 2009

Complementary feeding with fortified spread and incidence of severe stunting in 6- to 18-month-old rural Malawians.

Phuka JC, Maleta K, Thakwalakwa C, Cheung YB, Briend A, Manary MJ, Ashorn P. Arch Pediatr Adolesc Med 162:619-26, 2008.

Postintervention growth of Malawian children who received 12-mo dietary complementation with a lipid-based nutrient supplement or maize-soy flour.

Phuka JC, Maleta K, Thakwalakwa C, Cheung YB, Briend A, Manary MJ, Ashorn P. Am J Clin Nutr 89:382-90, 2009.

Introduction

Restricted linear growth and subsequent low height-for-age, or stunting, is a major health problem affecting children in developing countries. In sub-Saharan Africa, for example, the prevalence of childhood stunting is 38% (UNICEF, 2009). Stunting is associated with an increased risk and severity of infections and impaired neurobehavioral development. The principal causes of stunting are intrauterine growth restriction and poor postnatal child feeding practices and related infections, all of which are conditioned by underlying poverty.

The most critical period for ensuring adequate growth and development is from conception through 24 months of age, the period when most stunting occurs. Beginning at 6 months of age, complementary foods should be provided along with breast milk to meet the nutritional needs of growing infants. However, in resource-poor countries locally-produced complementary foods are frequently inadequate with regard to several key nutrients due to limited accessibility of nutrient-rich foods, such as animal source foods or fortified, processed complementary foods. For infants residing in such areas, the shortfall in nutrients required from complementary foods could be provided as supplements or point-of-use fortificants; and recent studies in sub-Saharan Africa suggest that small amounts of lipid-based nutrient supplements (LNS) can promote linear growth among 6- to 18-month-old infants (Adu-Afarwuah, 2007).

In this month's NNA, we present two publications that evaluated the growth of non-acutely malnourished Malawian children who received LNS in addition to their usual complementary foods. The intervention study tested the effects of LNS on the children's growth from 6 to 18 months of age. The follow-up study assessed their subsequent growth and incidence of stunting during the two years after the dietary intervention was terminated.

Methods

The study was a randomized, single-blind, controlled effectiveness trial among 182 six-month-old infants in rural Malawi. The infants were randomly assigned to one of three intervention groups. Infants in the control group received 71 g/day (dry weight, equivalent to 282 kcal/d) of micronutrient-fortified maize-soy flour (likuni phala [LP]) for home preparation of porridge. Infants in the other two groups received either 50 g/day of a micronutrient-fortified LNS (FS-50, providing 256 kcal/d) or 25 g/day of a micronutrient-fortified LNS (FS-25, providing 127 kcal/d), produced locally from peanut paste, milk powder, vegetable oil, sugar, and a commercially prepared micronutrient mixture (CMV; Nutriset, Malaunay, France). Children in both LNS groups received similar daily micronutrient doses. The supplements were delivered to the participants' homes at three-week intervals for a period of 12 months. All children underwent a physical examination, anthropometric assessment, and laboratory tests at enrollment and during follow-up; and their mothers were encouraged to continue breastfeeding on demand. Of the 182 infants enrolled in the complementary feeding trial, 168 participated in the two-year, post-intervention follow-up study of growth and incidence of severe stunting.

Results and Conclusions

There were no significant group-wise differences in the children's mean weight or length gain from 6-18 months of age. However, severe stunting occurred significantly less frequently in the FS-50 and FS-25 groups than in the LP group (P=0.01). The 12-month cumulative incidence of severe stunting (HAZ <-3) was 13.3% (N=7) in the LP group, 0.0% (N=0) in the FS-50 group, and 3.5% (N=2) in the FS-25 groups. There was a significant interaction between baseline height-for-age Z-score (HAZ) and response to treatment. In particular, among children whose initial HAZ was less than the population median (HAZ <-1), those who received FS-50 had significantly greater linear growth (p = 0.04) and weight gain (p = 0.002) than those who received LP. The differences in stunting rates persisted during the follow-up period. Specifically, the three-year cumulative incidence of severe stunting was 19.6% (N=11) in the LP group, 3.6% (N=2) in the FS-50 group, and 10.3% (N=6) in the FS-25 group (P=0.03, overall).

Program and Policy Implications

The results of the complementary feeding trial indicated that LNS had a greater impact on the incidence of severe stunting than a fortified cereal-legume blend. The growth impact of LNS was greater among children who were more stunted initially. However, the true overall effects of each supplement on linear growth cannot be determined from the present study design because there was no unsupplemented control group. Thus, it is conceivable that children in all three intervention groups had greater rates of growth and a lower incidence of stunting than might have occurred if no supplements had been provided.

Because LNS costs more than the cereal-legume blend, the authors also evaluated whether 25 g of LNS would produce the same growth outcomes as 50 g of LNS, but at lower cost. However, children who received the lower dose of LNS (FS-25) actually had lower mean weight and height gains than those who received the cereal-legume blend, although the differences were not statistically significant. These results differ from a previous study in Ghana in which the provision of just 20 g/day of a similar LNS product increased both weight and length gains of healthy 6- to 12-month-old infants compared with groups that received either a multiple micronutrient tablet or powder (Adu-Afarwuah, 2007). Because the overall prevalence of stunting was considerably less in the Ghanaian population, the inconsistent growth effects produced by the relatively small amounts of LNS (20-25 g/day) provided in these two studies may be due to differences in the underlying severity of stunting or nutrient deficiencies in the two populations or to the different comparison groups that were considered. Collectively, these two sets of results highlight the potential effectiveness of LNS in preventing stunting and the need for further assessments of the optimal amounts and formulations of LNS in populations with different degrees of undernutrition.

NNA Editors' comments

Results from the foregoing complementary feeding trial and post-intervention follow-up study demonstrate the potential role of LNS in preventing nutritional stunting. Integrated interventions to improve infant and young child feeding practices are urgently needed in countries with high rates of stunting. Point-of-use fortification of home-prepared complementary foods may be an efficient approach to promote normal growth during the period of complementary feeding in situations where locally available foods that are accessible to high risk segments of the population do not provide the full range of young children's nutrient needs (Dewey and Brown, 2003; Bhutta, 2008).

References

Adu-Afarwuah S, Lartey A, Brown KH, Zlotkin S, Briend A, Dewey KG. Randomized comparison of 3 types of micronutrient supplements for home fortification of complementary foods in Ghana: effects on growth and motor development. Am J Clin Nutr 86: 412-20, 2007.

Bhutta ZA, Ahmed T, Black RE, Cousens S, Dewey K, Giugliani E, Haider BA, Kirkwood B, Morris SS, Sachdev HP, Shekar M. Maternal and Child Undernutrition Study Group. What works? Interventions for maternal and child undernutrition and survival. Lancet 371: 417-40, 2008.

Dewey KG, Brown KH. Update on technical issues concerning complementary feeding of young children in developing countries and implications for intervention programs. Food Nutr Bull 24: 5-28, 2003.

United Nations Children's Fund (UNICEF). The State of the World's Children 2009: Maternal and Newborn Health. UNICEF, New York, 2009.