

Invited Commentary

Invited commentary in response to: usual nutrient intake adequacy among young, rural Zambian children

Despite the importance of nutrition in childhood health, growth, and development, relatively few high-quality data on usual nutrient intakes among children are collected in sub-Saharan Africa^(1,2). Such data are important for informing researchers and policy makers on areas requiring targeted investigation and public health intervention. When large investments by funders, researchers and participants alike have been made in the collection of dietary data as part of an intervention trial, it is therefore logical and beneficial to analyse all available data and to make the results accessible. A limitation in the use of such data is that convenience samples commonly used in randomised trials are unlikely to be truly representative of the underlying population.

In this issue of the *British Journal of Nutrition*, Casswell *et al.*⁽³⁾ report on the usual nutrient intake adequacies of 202 apparently healthy 4–8 year-old rural Zambian children who participated in the non-intervention arm of a provitamin A maize biofortification trial. Over a 6-month period during 2012–2013, 24-h diet recalls were taken at baseline and repeated at monthly intervals in all children, as available. Observed nutrient intakes over the six-month period were adjusted appropriately to usual nutrient intake distributions using the National Cancer Institute method⁽⁴⁾, and for most micronutrients, the probability of inadequacy was calculated using Institute of Medicine (IOM) estimated average requirements (EAR) and CV⁽⁵⁾.

Although the trial design excluded unhealthy children and those from areas of very low population density, this study contributes important information on the usual nutrient intakes of rural Zambian children. The risk of inadequate intakes of energy and macronutrients appeared low, and children were at highest risk of inadequate intakes of calcium (prevalence of inadequacy 100%), vitamin B₁₂ (76%), folate (57%) and Fe (25%). Estimates of micronutrient intake adequacy among sub-Saharan children frequently highlight these problem nutrients, in addition to Zn and vitamin A^(2,6–8). Although Fe and Zn are obtained from similar food sources, Zn intakes were largely adequate, whereas Fe intakes were not. This may be explained by requirements for Fe being set much higher than those for Zn, and the differing reference sources and assumptions used in determining their bioavailability in this study. For Zn, International Zinc Nutrition Consultative Group EAR for unrefined, cereal-based diets were used⁽⁹⁾, whereas for Fe, WHO 10% bioavailability reference values⁽¹⁰⁾ were applied to the IOM Fe requirement distribution⁽⁵⁾. Vitamin A-fortified sugar contributed one-fifth of children's vitamin A intakes, demonstrating the potential of fortification as a means to improve micronutrient intakes. It should be noted that

in a survey conducted in 2009 in the same district, 41% of household sugar samples did not contain the minimum statutory amount of vitamin A; therefore, vitamin A intake may have been overestimated in the current study⁽¹¹⁾.

Implementation of a national maize fortification programme was postponed in 2008 as small-scale mills often used in rural Zambian areas were judged to be technically and logistically unamenable to fortification efforts^(12,13). This study by Casswell *et al.*⁽³⁾ demonstrates that usual intakes of several micronutrients included in the postponed fortification programme remain at high risk of inadequacy among rural Zambian children. In Malawi, medium-scale mill fortification initiatives have successfully been used to subsidise small-scale mill and point-of-use fortification⁽¹⁴⁾. Biofortification may also improve the reach and sustainability of community-based micronutrient initiatives in rural sub-Saharan Africa^(15,16). However, it is likely that a combination of strategies, including dietary diversification, may be necessary to meaningfully improve micronutrient intakes in vulnerable rural populations consuming largely plant-based diets.

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