Selling Sprinkles micronutrient powder reduces anemia, iron deficiency, and vitamin A deficiency in young children in Western Kenya: a cluster-randomized controlled trial.

Suchdev PS, Ruth LJ, Woodruff BA, Mbakay C, Mandava U, Flores-Ayala R, Jefferds MED, Quick R. Am J Clin Nutr 95: 1223-30, 2012.

Introduction

Micronutrient powders (MNP), such as Sprinkles and other similar products, can be added directly to complementary foods to prevent and treat anemia among infants and young children. These products are packaged in single-dose sachets that contain microencapsulated iron and other nutrients involved in erythropoiesis, and studies show that children who use these products have lower anemia prevalence (1). However, expansion of MNP programs has been hampered by the challenges of developing and financing effective distribution systems, as well as continuing concerns about the safety of iron-containing products for non-iron-depleted individuals. The authors of the present study assessed a novel approach in which community-based sales agents were trained to promote and sell MNPs along with several other health products, in rural communities of Western Kenya, as part of the Safe Water and AIDS Project (SWAP).

Methods

The study was designed as a cluster-randomized trial of the effectiveness of marketing of Sprinkles MNP by SWAP village vendors on the prevalence of anemia, iron deficiency and vitamin A deficiency among children 6-35 months of age. As many as 25 children were recruited in each of 60 randomly selected intervention and control communities in the Nyando Division. The SWAP vendors in both sets of communities sold health-related products like water disinfectant, soap, insecticide-treated bednets and condoms. In the intervention communities, the vendors also promoted and sold the MNP, which the vendors could purchase wholesale at a cost of 1.3 US cents/sachet and resell for 2.7 US cents each.

Baseline and post-intervention surveys were conducted one year apart to measure the children's height, weight, biochemical indicators of MN status and biomarkers of infection. Fieldworkers also visited the homes of the study children every two weeks to assess their use of MNP and health status. Intake of MNP was estimated as the number of sachets reportedly acquired by the household during each two-week period, divided by the number of children 6-59 months of age residing in the household.

Results and Conclusions

A total of 561 children in the intervention communities and 502 children in the control communities were enrolled in the study. On 33% of the home visits, MNP had reportedly been purchased during the previous two weeks. Nearly 93% of the children in the intervention communities had received MNP on at least one occasion during the year, but most consumed fewer than three sachets/week. Notably, 40% of children in the control villages also used MNP – although less frequently than children in the intervention communities – because some of the vendors sold the product outside of their own communities. There were no differences between MNP users and non-users in baseline demographic characteristics, socioeconomic status or nutritional status.

The mean hemoglobin concentration increased by 0.9 g/dL in the intervention group and 0.6 g/dL in the control group (p = 0.02), and the prevalence of anemia decreased from 66.5% to 39.3% in the intervention group compared with a change from 67.3% to 47.2% in the control group (p for group-wise difference in change in prevalence = 0.10). There was a significant group-wise difference in the anemia recovery rate among those who were anemic at baseline (53 % versus 42%, p=0.006). The prevalence of iron deficiency, defined as serum ferritin concentration <12 µg/L, decreased by 19.3% in the intervention group compared with 5.3% in the control group (p=0.001); but there were no group-wise differences in the change in serum transferrin receptors. The prevalence of vitamin A deficiency, defined as retinol binding protein <0.70 µmol/L, decreased by 7.5% in the intervention communities compared with a 2.5% increase in the control group (p=0.01). After adjusting for child age, sex, socioeconomic status and maternal education, the frequency of use of MNP was positively associated with final hemoglobin, serum ferritin and RBP concentrations.

Policy and Program Implications

These results indicate that MNP can be successfully marketed through a novel community-based social marketing system carried out by local vendors trained to promote and sell low-cost products already proven to have positive health effects. The availability of MNP through this distribution system was not only associated with more children using the product, but also with a slightly greater rate of recovery from anemia and reduction in the prevalence of iron deficiency and in the prevalence of vitamin A deficiency, than occurred in the control communities, despite some "leakage" of the product in the control communities. Thus, development of community-based social marketing systems for nutrition-related products, including MNP, can contribute to the reduction of MN deficiencies.

NNA Editors' comments*

The present study demonstrates a small, but significant, positive nutritional impact of direct sale of MN supplements for young children, which shows that community-based social marketing interventions can be a useful strategy for enhancing nutrition. Nevertheless, nearly 40% of the children were still anemic at the end of the year of observation, in part because of their infrequent use of the product. The present paper does not provide information on the reasons that households did or did not obtain MNP from the vendors, so it is unclear how this distribution system could be improved. If the cost of the product was the major limiting factor, perhaps government or donor agency subsidies could be used to increase product usage.

Regrettably, the present paper did not address the issue of potential adverse effects of iron supplements, even though morbidity data were collected during the biweekly home visits. A WHO consultation convened in 2006 concluded that further research is needed on the safety of alternative methods of iron administration, such as MNP, because these products are as efficacious as iron supplements for treating and preventing iron deficiency and therefore could be an option for intervention (2). However, the safety of these products has not been fully evaluated in studies with adequate statistical power to assess potential adverse effects. Thus, it would be of interest for the authors of the present study to explore for the occurrence of excess morbidity among those children who consumed more of the MNP.

* These comments have been added by the editorial team and are not part of the cited publications.

References

1. De-Regil LM, Suchdev PS, Pena-Rosas JP. Home fortification of foods with multiple micronutrient powders for health and nutrition in children under two years of age. Cochrane Database Syst Rev 9:CD008959, 2011.

2. World Health Organization. Conclusions and recommendations of the WHO Consultation on prevention and control of iron deficiency in infants and young children in malaria endemic areas. Food Nutr Bull 28:S621-S631, 2007.

Notifications of new information resources:

1. SecureNutrition – a new World Bank-sponsored web site,which provides information to bridge knowledge gaps between agriculture, food security, and nutrition (https://www.securenutritionplatform.org/Pages/Home.aspx).

2. World Health Organization. Draft Report on Micronutrients 2010-2011. WHO Geneva (WHO/NMH/NHD/EPG/12.1), 2012. This report summarizes the accomplishments of WHO in the area of micronutrients, with attention to the progress achieved in upgrading and expanding the Vitamin and Mineral Nutrition Information System (VMNIS) and preparation of new evidence-informed guidelines for micronutrient interventions.

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