Validation of Food-Based Recommendations Developed using Optifood for Groups at Nutritional Risk in the Western Highlands of Guatemala

Maggie Fischer, MPH[1]; Luisa Samayoa, MS[1]; Manolo Mazariegos, MD[2]; Vivian Tomás, BS RD[2]; Frances Knight, MPH[3]; Claudia Nieves, MS[4]; Gaby Salazar, BS RD[4]; Judith Lopez, BS RD[4]; Kali Erickson, MPH MS[5]; Monica Woldt, MPH MS[5]; Kavita Sethuraman, PhD[5]

[1] Food and Nutrition Technical Assistance III Project (FANTA)/FHI 360, Guatemala; [2] Instituto de Nutrición de Centro América y Panamá (INCAP), Guatemala; [3] FANTA Consultant; [4] Nutri-Salud/University Research Co., LLC (URC), Guatemala; [5] FANTA/FHI 360, Washington, DC

USAID FROM THE AMERICAN PEOPLE

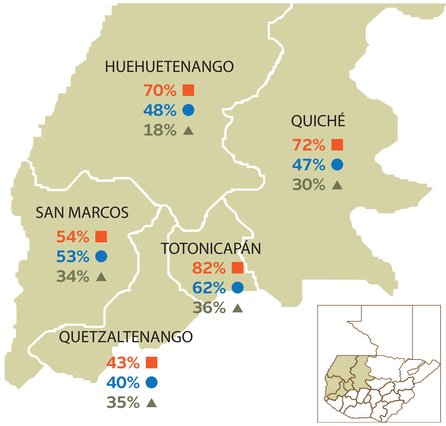
FANTA III FOOD AND NUTRITION TECHNICAL ASSISTANCE

fhi360 THE SCIENCE OF IMPROVING LIVES

INTRODUCTION

Stunting affects up to 82% of children under 5 years of age in some areas of the Western Highlands in Guatemala, and anemia is also high among women and children, putting Guatemalan children at increased risk of mortality and infections, as well as long-term decreased earnings and productivity. Malnourished children may also be more likely to develop chronic diseases in adulthood. Many factors contribute to chronic malnutrition in Guatemala, including suboptimal infant and young child feeding practices, low dietary diversity, food insecurity, lack of clean water and sanitation, poor hygiene, and poor access to health services, as well as poor maternal nutrition.[i] The promotion of appropriate complementary feeding has been identified as one of the most effective strategies for reducing stunting.[ii]

Along with optimal infant and young child feeding practices, the World Health Organization recommends that food-based recommendations (FBRs) be used in social and behavior change communication to promote the consumption of nutrient-dense, diverse locally-available foods to the extent possible, and promote the use of micronutrient supplements only when necessary to address critical nutrient gaps.[iii]



■ Stunting, children 3 to 59 months of age
● Anemia, children 6 to 59 months of age
▲ Anemia, pregnant women

Data source: Ministerio de Salud Pública y Asistencia Social et al. 2010. *Encuesta Nacional de Salud Materno Infantil 2008 (ENSMI-2008/09)*. Guatemala.

OBJECTIVE

To better understand how the diets of pregnant and lactating women (PLW) and children 6–23 months can be optimized using locally-available, affordable, high-nutrient density foods.

[i] Chaparro, C. 2012. "Household Food Insecurity and Nutritional Status of Women of Reproductive Age and Children under 5 Years of Age in Five Departments of the Western Highlands of Guatemala: An Analysis of Data from the National Maternal-Infant Health Survey 2008–09 of Guatemala." Washington, DC: FHI 360/FANTA-2 Bridge; and De Pee, S. and Bloem, M.W. 2009. "Current and Potential Role of Specially Formulated Foods and Food Supplements for Preventing Malnutrition among 6 to 23 Month-Old Children and for Treating Moderate Malnutrition among 6 to 59 Month-Old Children." *Food and Nutrition Bulletin*. Vol. 30(3 Suppl), pp. S434–63.

[ii] Bhutta, Z.; et al. 2008. "What works? Interventions for maternal and child undernutrition and survival." *The Lancet*. Vol. 371(9610), pp. 417–40.

[iii] WHO. 2008. *Strengthening action to improve feeding of infants and young children 6-23 month of age in nutrition and child health programmes: Report of proceedings, Geneva, 6-9 October 2008.* Geneva: WHO.

[iv] Knight, F. 2013. *Development of a set of population specific food based recommendations for 6–11 month old children in the Western Highlands of Guatemala*. London School of Hygiene and Tropical Medicine.

METHODS

FANTA collaborated with INCAP to develop and validate a set of evidence-based and population-specific FBRs specifically targeted for PLW and children 6–23 months in the Western Highlands of Guatemala. Development and validation of the FBRs was undertaken in three phases, each based in Quiché and Huehuetenango.

Phase 1: Developing the FBRs using Optifood. In the first phase of the study, the Optifood software was used to determine which combination of local foods would provide the best diets for the target groups, which nutrients were likely to remain low in diets based on locally available foods and socio-cultural preferences, and how much these diets would cost. Dietary data was collected in 2012–2013 from a cross-sectional dietary survey of 381 children 6–23 months of age and 154 PLW. A market survey provided information on locally-available foods and their prices. Dietary data were then analyzed using Optifood to pinpoint nutrients that were inadequate in the local diet and identify the best local food sources of micronutrients to optimize the diet for each target group. From this analysis, preliminary FBRs were developed.

Phase 2: Pilot trial. In 2013, a pilot activity was undertaken in Huehuetenango by the London School of Hygiene and Tropical Medicine, INCAP, and Nutri-Salud to test the feasibility and acceptability of the preliminary FBRs for children 6–11 months.[iv] Initial insights were useful, particularly regarding women's unfamiliarity with some of the recommended foods and willingness to try the recipes. Further validation with these and additional target groups was essential to provide more information about whether the FBRs needed to be modified to increase the likelihood that they would be accepted and put into practice.

Phase 3: Validating the FBRs. In 2014, the "trials of improved practices" methodology was used to test the feasibility and acceptability of the FBRs (listed in Table 1) with each of the target groups. The trials were conducted in six communities among 10 mothers of children 6–11 months, 17 mothers of children 12–23 months, and 21 PLW in the same area of the Western Highlands where the original dietary data was collected. Participants were asked to practice the set of FBRs during a 3-week period and participate in a 24-hour dietary recall, food frequency questionnaire, and three interviews about the FBRs including their intentions to put them into practice, perceived difficulties or barriers, and any changes and substitutes introduced. Cards depicting each FBR food, serving size, and frequency were left with the families during the trial period to help them remember the FBRs, as well as a weekly calendar with examples of how the foods could be consumed. In addition to the trials, 7 key informant interviews, 8 focus group discussions, 5 agriculture and livestock observations, and a market survey were conducted to examine availability and access to foods, seasonality, agricultural practices, time available for women to try the FBRs, and the existing enabling environment to support the implementation of the proposed FBRs.

TABLE 1. SUMMARY OF FBRS TESTED FOR PLW AND CHILDREN 6–23 MONTHS IN THE WESTERN HIGHLANDS

Pregnant and Lactating Women	Children 6–11 Months	Children 12–23 Months
• Drink a cup of thick fortified drink (*atole espeso*) made with Incaparina, Vitacereal, or fortified oatmeal every day. • Eat 4 servings of vegetables every day of the week. • Eat a large potato every day. • Eat beef liver or chicken liver once a week. • Eat an orange 3 times a week.	• Give your child a medium-sized potato 3 times a week. • Give your child beans 3 times a week. • Give your child half a medium-sized egg at least 3 times a week. • Give your child Incaparina or Vitacereal as porridge 5 times a week.	• Give your child a medium-sized potato 4 times a week. • Give your child beans 4 times a week. • Give your child a medium-sized egg at least 4 times a week. • Give your child green leafy vegetables 4 times a week. • Give your child Incaparina or Vitacereal as porridge 4 times a week.

Note: The FBRs are intended to complement existing diets.

FINDINGS

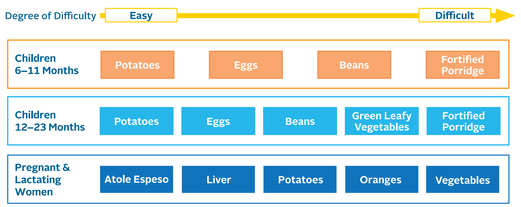
Quality of the diet. The initial dietary survey found that the respondents' diets were largely plant-based, low in animal-source and fortified foods (such as fortified blended flour [FBF]), and lacking in overall dietary diversity, including fruits and vegetables. The most commonly consumed foods included tortillas, onions, and tomatoes, consumed by over half of children and almost three-quarters of PLW. For target groups, the Optifood analysis found that the nutrients that the local food supply is unlikely to provide in adequate amounts were iron, zinc, calcium, and folate.

The FBRs developed using Optifood filled most nutrient gaps in the diet, except iron and zinc for children 6–8 months of age and iron for pregnant women, suggesting the need for micronutrient supplements to fill these nutrient gaps. Some of the recommended foods, such as FBF, were critical for meeting specific nutrient needs. The Government of Guatemala distributes FBF for mothers and children and micronutrient supplements in powder form (*Chispitas*) for children, but distribution is not consistent.

FBR trials. Feedback from mothers and other community members revealed that the recommended foods themselves were generally considered acceptable by the families who tried them. Beliefs and preferences did not deter most women from trying the FBRs—mothers and PLW felt motivated to try them since they perceived them as a benefit to their own and their child's well-being.

However, putting the FBRs into practice with the recommended frequency and quantity was difficult. Figure 1 shows the degree of difficulty in adopting the FBRs. PLW faced challenges with the recommendation to consume 4 servings of vegetables daily, but reported that daily consumption of the thick fortified drink (*atole espeso*) and weekly liver consumption were both feasible. For children, fortified porridge was by far the most challenging FBR, due to the perceived high cost of purchasing an FBF, as well as reports that some children had rejected the fortified porridge preparation. In contrast, the potato and egg FBRs were considerably easier for families and acceptable to children, despite some mothers' reluctance to give egg to children under 1 year. The trials also showed that children were often provided with bean or vegetable broth, rather than the foods themselves, resulting in low nutrient density of foods.

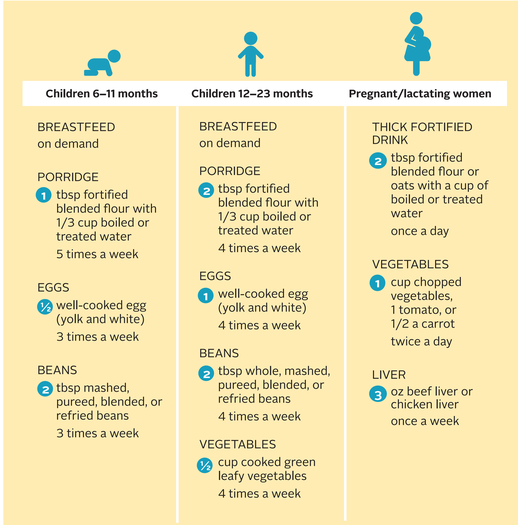
FIGURE 1. SCALE OF DIFFICULTY OF FBR IMPLEMENTATION



Challenges to implementing the FBRs included financial limitations, seasonal price variation, difficulties in accessing and storing fresh foods, and the cost and time associated with transport to markets. Due to a culture of sharing food equally among all family members, young children and PLW are not given priority over others in the household and most interviewees said they would need to buy the recommended food for the whole family, increasing the cost. Women found that the lack of physical and economic access to nutrient-dense food was an important barrier, demonstrating that improvements must come from strengthening access to nutritious food; strengthening family support to select, purchase, and prepare nutritious foods; and prioritizing women and children's dietary needs in the household. The lack of government provision of FBF (such as Vitacereal) and supplements (such as the multiple micronutrient powder Chispitas) were additional barriers to implementing the FBRs and meeting nutrient needs.

Recognizing the difficulties that some families faced trying the FBRs, further Optifood testing was carried out to examine the impact of adjusting the FBRs to make their adoption more feasible and, in some cases, combining the FBRs with different scenarios of micronutrient supplementation or FBF. Due to the relatively low nutrient density of potatoes and difficulty of access in Quiché, the new set of FBRs omitted the potato recommendation for children and PLW. Oranges were omitted for PLW due to reported difficulty with access during the rainy season. Additionally, the modified FBRs limited the vegetable servings for PLW from 28 to 14 per week, given a variety of challenges reported accessing and consuming multiple portions on a daily basis (see Figure 2). The analysis showed that when micronutrient supplements are consumed along with a feasible set of FBRs, this combination is capable of supplying most required nutrients for PLW and children 6–23 months, provided the supplements are consistently available and consumed with the recommended frequency.

FIGURE 2. FBRS FOR WOMEN AND CHILDREN IN THE WESTERN HIGHLANDS OF GUATEMALA



DISCUSSION

The findings from the study indicate it is possible to improve the quality of the diet of vulnerable women and children by developing and promoting a set of FBRs based on an optimal set of nutrient-dense local foods that meet most nutrient needs. However, the results also indicate that affordability and accessibility of micronutrient-rich foods present significant hurdles. In the study communities, local foods are not sufficient to close the nutrient gap and achieve diet adequacy. Other strategies, such as fortified foods or micronutrient supplements are also needed. By strengthening nutrition practices, household food production, economic and market access, and national programs, children's and PLW's nutritional status could be improved leading to a healthier and more productive population. Some of the study recommendations include prioritizing nutrient-dense FBRs and promoting their economic access, supporting access to local markets or mobile vendors, assuring the procurement and distribution of micronutrient supplements/fortified foods and reviewing/improving their formulations, improving storage options for perishable foods, identifying and promoting other local foods with similar nutrient profiles for seasonal accommodations, and targeting social and behavior change efforts toward particular challenges in food consumption. Such programmatic and policy approaches, while complex to design and implement, are fundamental steps to address the intractable problem of stunting in Guatemala.

Learn more about Optifood in Guatemala at www.fantaproject.org.