TECHNICAL REPORT

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FOOD AND NUTRITION TECHNICAL ASSISTANCE

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Acceptability of a Lipid-Based Nutrient Supplement among Guatemalan Infants and Young Children

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August 2011

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THE SCIENCE OF IMPROVING LIVES

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List of Acronyms and Abbreviations

CI	confidence interval
DHA	docosahexaenoic acid
EPA	eicosapentaenoic acid
FA	fatty acid(s)
FANTA-2	Food and Nutrition Technical Assistance II Project
FGD	focus group discussion
Funcafé	Fundación de la Caficultura para el Desarrollo Rural
g	gram(s)
g/d	gram(s) per day
iLiNS	International Lipid-based Nutrient Supplements
IRB	Institutional Review Board
kcal	kilocalorie(s)
LNS	lipid-based nutrient supplement(s)
mg	milligram(s)
MOH	Ministry of Health
MSPAS	Ministerio de Salud Pública y Asistencia Social
MUAC	mid-upper arm circumference
µg	microgram(s)
NGO	nongovernmental organization
PEC	Programa de Extensión de Cobertura
SD	standard deviation
USAID	United States Agency for International Development
WFP	World Food Programme

Abstract

This study assessed the acceptability of lipid-based nutrient supplements (LNS) among children 6–18 months of age in Suchitepéquez, Guatemala. A new flavor (cinnamon) was developed and tested alongside the "regular" peanut LNS flavor. A 2-day test-feeding trial using a cross-over design was carried out to test both LNS flavors, followed by a 2-week home-use trial. LNS (20 g/d), provided in two 10 g sachets, was mixed with a small quantity of home-prepared complementary food. We measured the proportion of LNS consumed by the children and the caregivers' organoleptic preferences and perceptions of product use. At the exit interview, caregivers' perceptions about malnutrition and nutrition supplements were explored.

Forty-two children and their caregivers completed both trials. On Test Day 1, children consumed 71.8% ± 25.5% of the LNS-regular + food mixture and 73.6% ± 21.1 percent of the LNS-cinnamon + food mixture. On Test Day 2, they consumed 79.9% ± 18.8% of the LNS-regular + food mixture and 77.0% ± 21.4% of the LNS-cinnamon + food mixture. Consumption did not differ by LNS flavor ($p = 0.35$), but it did by day ($p = 0.002$). Most caregivers liked the LNS (79% LNS-regular, 74% LNS-cinnamon); perceived that the child liked it (96% LNS-regular, 90% LNS-cinnamon); and liked its taste (92% LNS-regular, 84% LNS-cinnamon), texture (87% LNS-regular, 95% LNS-cinnamon), smell (92% LNS-regular, 83% LNS-cinnamon), and color (100% LNS-regular, 79% LNS-cinnamon, $p = 0.007$).

The average percentage of sachets consumed during the 2-week home-use trial was 74.6% ± 20.0% in the LNS-regular group and 67.6% ± 29.2% in the LNS-cinnamon group ($p = 0.64$). The study was conducted during a season of high morbidity (children were ill an average of 25% of the days during the home-use trial), and mothers tended not to feed the LNS when children were ill, which may explain the somewhat lower adherence in this acceptability trial than in previous trials conducted elsewhere. Most caregivers (93%) gave the LNS mixed with food, 90% gave it twice a day as instructed, 98% considered it beneficial for the child, and all caregivers were willing to continue feeding LNS to the child if they were asked to do so.

We conclude that these LNS products were acceptable in this population, with a tendency towards a higher acceptability for the peanut flavor. Our findings suggest that evaluation of the impact of LNS will not be impeded by poor acceptance of these supplements.

Introduction

The term “lipid-based nutrient supplements” (LNS) refers to a range of products in which vitamins and minerals are embedded in a fat-based food product (generally composed of vegetable fat, peanut paste, milk powder, and sugar), including highly concentrated nutrient supplements (1–4 teaspoons/day, providing < 100 kcal/day) suitable for “point-of-use“ fortification (Chaparro and Dewey 2010). Embedding the vitamins and minerals in fat protects vitamins from oxidation, increases the shelf life of the product, and masks the unpleasant taste of certain micronutrients. Because LNS do not contain water, they do not support microbial growth and can be safely stored and used in the home, even under poor hygienic conditions in tropical climates.

Different LNS products have been developed to prevent chronic malnutrition (i.e., stunting, < −2 height-for-age z-score) and to treat severe acute malnutrition (i.e., severe wasting, < −3 weight-for-height z-score). In efficacy trials in Ghana and Malawi, LNS developed for prevention of chronic malnutrition provided to children for 6 or 12 months, starting at 6 months of age, improved linear growth of children, prevented severe stunting, reduced iron deficiency anemia, and enhanced motor development (Adu-Afarwuah, Lartey, et al. 2007; Adu-Afarwuah, Lartey, et al. 2008; Phuka, Maleta, et al. 2008). Recent evidence suggests that these LNS may be more efficacious than fortified cereal-legume blends or micronutrient supplements alone for the prevention of stunting (Adu-Afarwuah, Lartey et al. 2007; Phuka, Maleta et al. 2008). To date, evidence on the impact of LNS as compared to other approaches has been confined to Africa, and data from different contexts, such as Latin America, are needed.

Guatemala, located in Central America, has the highest prevalence of chronic malnutrition in Latin America and among the highest in the world. Results from the last national survey indicated that 50% of Guatemalan children between the ages of 3 months and 5 years are stunted and 21% are severely stunted. These rates are even higher among indigenous children: 66% of them are estimated to be stunted and 31% severely stunted (MSPAS 2010).

Information on dietary intake in Guatemalan young children is scarce. Enneman and collaborators reported results from a study with rural and urban Guatemalan 6- to 12-month-old infants (Enneman, Hernández, et al. 2009). They found that although the infants’ diets were diverse in complementary food (especially for 9- to 12-month-old infants), they lacked animal source foods. We found no data on fatty acid (FA) intake of children under 2 in Guatemala, but in school-aged children there is evidence of low intake of n-3 FA, with Bermudez reporting that > 97% of children consumed < 1% of energy from these fats (Bermudez, Toher, et al. 2010). Whole milk, sweet bread, and fried plantain were the main sources of n-3 FA; fried fish, seafood soup, and shrimp, consumed in low amounts and only by boys, were the main sources of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). The authors concluded that α-linolenic acid, EPA, and DHA were the most limiting FA in diets of Guatemalan schoolchildren (Bermudez, Toher, et al. 2010).

Because LNS have the potential for preventing malnutrition and micronutrient deficiencies among infants and young children, we were planning to implement an effectiveness trial using LNS to prevent stunting in Guatemalan children 6–18 months of age. Since acceptability and regular consumption of a supplement are necessary for this to be effective (Young, Blanco, et al. 2010), we first wanted to assess the acceptability of LNS in this target population. Therefore, we conducted a randomized cross-over acceptability trial of LNS in Suchitepéquez, Guatemala, within the context of a community-based health and nutrition program delivered by Fundación de la Caficultura para el Desarrollo Rural (Funcafé), a Guatemalan nongovernmental organization (NGO).

The Suchitepéquez Department is located in the southwest of the country, with a coastline along the Pacific Ocean. It has a population of approximately 400,000. Its stunting rates are somewhat lower than the national average (44% of children under 5 years of age are stunted and 13% are severely stunted). Based on positive findings of a small pilot acceptability trial undertaken in Guatemala with a product similar in both taste and consistency (Plumpy’nut®) (MSPAS/WFP/ USAID 2008), we expected a high acceptability of the LNS.

Another objective of this work was to explore other aspects of programmatic implementation of an LNS intervention, which has not previously been done in many settings, including Guatemala. Via focus groups and interviews with caregivers, we aimed to identify ways to minimize intra-household sharing of LNS (special package labeling or naming) and strategies for "positioning" the product. We also wanted to explore concepts related to malnutrition in the study communities to develop simple, key messages on appropriate use of LNS for young children that could be feasibly integrated into the Funcafé program delivery mechanism, which included home visits provided by health volunteers and monthly medical team visits at community health centers called *centros de convergencia* (convergence centers). This report describes the findings from the LNS acceptability trial and focus group discussions (FGDs).

Materials and Methods

Study Design

The study was conducted in three phases:

- A 3-day test-feeding trial with children and their primary caregivers in which the organoleptic characteristics of the product were evaluated by the caregiver and the proportion of LNS consumed by the child from a test dose was recorded. For this phase, a randomized cross-over design was used because two different flavors of LNS were tested.
- A 2-week home-use trial to conduct qualitative assessments of product use (asking caregivers) and a quantitative assessment of the amount of product consumed by the child. For this phase, each participant received only one randomly determined flavor of LNS.
- FGDs with primary caregivers of children who participated in the previous phases and with program staff.

LNS Products

The LNS formulation used in this study was developed by Nutriset (Malaunay, France), originally for use in several efficacy trials conducted concurrently to this study by the International Lipid-Based Nutrient Supplements (iLiNS) Project (iLiNS). The iLiNS Project is a consortium of academic and research institutions committed to accelerating progress in preventing malnutrition. The LNS formulation is similar in ingredients and micronutrient profile to the commercially available Nutributter®, with a few changes in raw ingredients and vitamin/mineral content. A modification to the LNS formulation used in this study (but not in the iLiNS Project trials) was to increase the levels of the B vitamins (folate, niacin, riboflavin, thiamine, pantothenic acid, B6, and B12) to meet the levels provided in the standard micronutrient powder formulations.[1]

The standard ingredients of the LNS products are vegetable oil (including soybean oil to maximize the content of both alpha linolenic acid and linoleic acid per daily dose), dried skim milk powder, peanut paste, sugar, maltodextrin (starch), and vitamin and mineral premix.

To date most of the LNS products have had a peanut flavor (since a main ingredient is usually peanut paste). For the context of Guatemala, where peanut may not be as common a flavor as in African countries where LNS have been predominantly tested, we tested the acceptability of a cinnamon flavor in addition to the regular peanut flavor. Both LNS flavors had the same macro- and micro-nutrient content (Table 1, page 18). The LNS-cinnamon replaced some peanut content with soy to reduce the peanut flavor and was flavored with cinnamon. The cinnamon flavor was selected because it was thought to be more familiar than the peanut flavor to the Guatemalan population. The LNS, packed in 10 g sachets, was formulated, developed, and manufactured by Nutriset, and delivered in coded packages labeled specifically for this study (code E for LNS-regular and code P for LNS-cinnamon) with no other descriptive markings to keep data collectors and participants blind to the flavor tested.

Study Setting and Subjects

The study was carried out in two communities in the Suchitepéquez Department. The first two phases (test-feeding trial and home-use trial) were conducted in the households of the study participants, and the third phase (FGDs) was conducted either at the *centro de convergencia* (FGDs with caregivers) or at the Funcafé office in Mazatenango (FGDs with program staff). Funcafé was contracted by the Ministry of Health (MOH) to implement the Programa de Extensión de Cobertura (PEC) in Suchitepéquez. PEC provides basic medical care in remote communities that have limited access to the MOH's health centers. This acceptability study was conducted in communities where PEC was implemented by Funcafé.

[1] The work that was to be performed in Guatemala was in parallel to other effectiveness studies in which a comparison to micronutrient powders would be made; thus, we increased the levels of certain nutrients in the LNS that were already higher in the standard micronutrient powder formulations to make these comparisons as similar as possible and to ensure a standard formulation across the effectiveness studies.

We calculated the sample size needed to determine acceptability based on the proportion of the test dose consumed. The following assumptions were used: The mean intake of the offered dose of LNS would be ≥ 75% with a standard deviation (SD) of ≤ 30%, and the lower bound of the 95% confidence interval (CI) would be ≥ 50% of the offered dose. Thus, for the product to be considered "acceptable," the lower end of the 95% CI of the proportion of the test dose consumed had to be at least 50%. With a power level of 80% and estimating that attrition would not exceed 10%, we estimated that a sample size of 18 per group (LNS flavor) was required; we rounded up to 20 per group (LNS flavor). The same sample size was used for the 2-week home-use trial.

The children were randomly selected from a list of beneficiaries of PEC served by Funcafé and invited to participate. Eligibility for participation in the study was determined at the time of recruitment in the homes of potential participants using a screening questionnaire that was administered by study staff. Eligibility criteria for children included: a) 6–18 months of age; b) consumed solid or semi-solid foods for at least the past 30 days; c) apparently healthy and not suffering from an acute illness (e.g., fever, diarrhea, acute respiratory tract infection); d) no known allergy to peanuts or other food products (by maternal/caregiver report during screening); e) not severely malnourished (mid-upper arm circumference [MUAC] ≥ 115 mm); f) caregiver willing to feed the infant with LNS over a maximum of 3 test days and over the 2-week home-use period, to report on his/her consumption and reactions and practices for daily use, and to participate in discussion groups; and g) planned to remain in study area for at least the following 3 weeks.

All caregivers who completed the home-use trial were invited to participate in the FGD. Funcafé staff members (i.e., institutional facilitators, community facilitators, and community monitors) were randomly selected from the employee roster, and potential participants were invited to participate in FGDs using a standard recruitment script.

Recruitment

Potential participants were contacted by study staff either at their homes or at community centers and were invited to participate in the study using a standard recruitment script in which they consented to undergo screening procedures. The procedures, risks, and benefits were explained to the primary caregiver of eligible children who provided written informed consent to participate in the study. The study was approved by the Institutional Review Board (IRB) of the University of California at Davis.

To confirm that a child was healthy, his/her oral temperature was measured using an electronic thermometer. MUAC was measured using an arm tape following standard procedures (de Onis, Onyango, et al. 2004). The only child with fever was referred for appropriate care at the community health center. No child was classified as severely malnourished. Lack of awareness of whether a child was intolerant of peanut or milk products did not prevent his/her participation, but the child was initially provided with a small dose of LNS (~5 g) and asked to remain under observation by study staff for at least 1 hour. After this test, caregivers were also given the project's mobile phone number to call in case there were any symptoms during the next few hours. No allergic reactions or other adverse effects were observed or reported in any subject.

Recruitment took place during May and June 2010. Once enrolled, caregivers were informed of the day and time of the subsequent home visits by study staff.

Test-Feeding Trial

The order of the versions of LNS tested was randomly determined for each subject. Briefly, there were four events (Orientation Day 0, Test Day 1, Test Day 2, and home-use trial) for which an LNS flavor needed to be randomly selected; since the flavors in Test Days 1 and 2 had to be different (for the infant to try both flavors), six different sequences of LNS flavors (i.e., EEPE, EPEE, EPEP, PPEP, PEPP, PEPE) were randomized. A list of random numbers was generated using Excel, and ID numbers were also listed. The random numbers were ordered from lowest to highest and then divided into six groups (one group for each flavor sequence).

At the first home visit after recruitment (Day 0), the children's primary caregivers were given an orientation about LNS. During the orientation, background data (e.g., socioeconomic and demographic information) were collected using a structured questionnaire and the experimental procedures were practiced, including initial tasting of the LNS mixed with food and completion of the tasting questionnaire, but no data on amount consumed or organoleptic preferences were recorded.

The second home visit was Test Day 1, during which the tasting data were recorded. All children were apparently healthy and had not eaten any food (including breast milk) during the previous hour, but during that time water was allowed. Caregivers were asked to provide 40 g (~3 tablespoons) of the complementary food they usually give to their children that was available at home, into which 10 g (~2 teaspoons) of LNS were mixed. The mother/caregiver of the child was asked to consume 1 teaspoon of the LNS + food mixture (~5 g), and then to feed the rest (~45 g) to the child after the mixture was re-weighed. During this time, the child had to be awake and alert, and either calm or fussy but not drowsy or crying. The actual time taken to feed the child the remaining portion, or until the child refused further food, was recorded. The mother or caretaker rated the mixture's color, aroma, flavor, and consistency based on her own opinion and her perception of the infant's degree of liking using a 5-point pictorial hedonic scale (i.e., dislike it a lot, dislike it a little, neither like nor dislike, like it a little, like it a lot; see Appendix 1). Caregivers were asked to report to study staff if the child vomited within the next hour or developed any new symptoms, such as rash or wheezing.

To test the different flavored LNS, a third home visit was conducted (Test Day 2). The same procedures described above for Test Day 1 were followed on Test Day 2, but each child tasted the other LNS flavor. No overall or organoleptic (i.e., color, odor, taste, and consistency) preferences were assessed on Test Day 2. Thus, total participation in this phase lasted 3 days, including the initial Orientation Day.

At each test-feeding day, we collected data on infant's health (i.e., nasal discharge, cough, difficulty breathing, fever, diarrhea, vomit/nausea, ear infection, and any other symptom) and any possible reaction to the test meal.

Home-Use Trial

Primary caregivers of children who participated in the test-feeding trial received a 2-week supply of LNS, which they were asked to add to their infants' prepared food each day. The daily ration of LNS was 20 g/day, provided in two 10 g sachets. To avoid bias, the LNS flavor to be distributed during the home-use trial was randomly assigned without taking into account the child's preference (if any) as explained above. To ensure that subjects consumed the entire daily ration, caregivers were instructed, as was done previously in a study conducted in Ghana (Adu-Afarwuah, Lartey, et al. 2007), to mix each sachet with 2–3 tablespoons of the home-prepared food, to be fed to the child before the rest of the food was offered.

Dosage and directions for use were as follows: The two sachets of LNS should be consumed at two different times of the day (total of 2 x 10 g sachets, or 20 g). The 10 g (~2 teaspoons) of the LNS in the sachet should be mixed with 2–3 tablespoons of the already prepared and cooked food, and the mixture eaten before eating the rest of the food. Do not cook the food any further after adding the supplement. Store supplement at room temperature. There is no need for refrigeration.

After the end of the first week of supplementation, a field worker visited the household of each participant to count the empty (used) sachets and ask questions about any child illness. At the end of 2 weeks, a field worker visited each participant in his/her home to repeat the morbidity questionnaire and conduct an exit interview with the mother/caregiver to assess her perceptions, use, and possible intra-household distribution of the product; ease/difficulty of providing the supplement two times per day; and foods used to mix with the supplement.

In addition, open-ended questions were asked at the exit interview to explore the caregivers' views about important characteristics of foods appropriate for infants and young children, opportunities and barriers to using a nutrient supplement "just for children of a certain age" in the family, perceptions of the use of LNS for children, and recognition of the problem of malnutrition in their communities.

Focus Group Discussions

The FGDs were led by an experienced focus group facilitator, assisted by a note-taker who audio-recorded the discussions and took notes on group dynamics and non-verbal interactions between participants. Each focus group included 8–10 participants, and lasted for approximately 60–90 minutes.

Four FGDs (two per community) were conducted with primary caregivers of the children who had consumed LNS during the test-feeding and home-use trials. The main purpose of the FGDs was to get input on appropriate supplement names and packaging designs for the LNS product in Guatemala, flavors appropriate for infants and young children, and appropriate messages for promotion of LNS for children. A brainstorming approach was used to explore possible names for the supplement, followed by secret vote to short-list the names based on participants' preferences. Exploration of ideas about packaging designs started with drawings, which were then organized by theme. A discussion to generate consensus on the key elements that the label should include was facilitated. A group design for the packaging was the final product of the FGDs.

Personnel from Funcafé, including community health volunteers and program staff, were also invited to participate in FGDs (separate from those with caregivers). The objective of the discussions with Funcafé personnel was to elicit their opinions on how the LNS could be incorporated into Funcafé's program operation. As the Funcafé personnel (based at the headquarters office in Mazatenango) did not have previous experience with LNS, LNS was provided to them during the session along with an explanation of how it was supposed to be used; feedback was obtained. The FGDs also provided input on appropriate supplement names and packaging designs (applying the same methodology described above) for the LNS product in Guatemala, flavors appropriate for infants and young children, and appropriate messages for promotion of LNS for children.

Statistical Analysis

Data from the acceptability trials were double entered into an Access database and analyzed using SAS System for Windows release 9.2 (SAS Institute, Inc., Cary, NC). Descriptive statistics were calculated for main study outcomes and for demographic variables (e.g., child and maternal age, maternal education, etc.). Continuous variables were tested for normality, and, if necessary, non-parametric tests were used. The mean proportion of the test dose consumed and the associated SD and CIs were calculated. The mean percent of LNS consumed during the 2-week home-use trial and the corresponding SD and CIs were calculated based on the information collected on sachet consumption and, to the extent possible, information collected on sharing of the supplement. Mixed linear modeling (PROC MIXED in SAS) was used for analysis of continuous variables (e.g., amount of LNS-food mixture consumed) in the cross-over test-feeding and home-use trials. Categorical data were analyzed using non-parametric tests, such as the chi-square test or Fisher's exact test when the chi-square test was not suitable. A p-value < 0.05 was considered significant.

Results

Participants

Details about recruitment, allocation, and follow-up of the participants are presented in Figure 1 (page 26). A total of 87 infant-caregiver dyads were screened, of whom 54 were eligible and agreed to participate. A larger-than-needed sample was enrolled in anticipation of a large number of children becoming sick during the time of the study (rainy season). Forty-eight infants and their primary caregivers started the test-feeding trial. Of those, 42 dyads completed the test-feeding and 2-week home-use trials. Characteristics of the infants and primary caregivers who participated in the study are shown in Table 2 (page 19).

Average caregiver age was 26.7 ± 8.0 years. Most caregivers identified themselves as indigenous (88%) and some of them spoke an indigenous language besides Spanish (33% spoke Tzutujil and 7% Quiche). Caregiver education level was low: Only 5% of primary caregivers completed high school. The mean age of infants was 12.0 ± 3.2 months, and they were equally distributed by sex (49% males and 51% females). Most infants (91%) were being breastfed at the time of the study.

Forty primary caregivers participated in four FGDs (23 from one of two communities where the test-feeding and home-use trials were conducted, and 17 from the other community where the trials took place). In addition, 44 Funcafé staff participated in five FGDs.

Test-Feeding Trial

Tables 3 and 4 (pages 20 and 21) show results from the test-feeding trial. Infants who tasted LNS-regular on Test Day 1 received LNS-cinnamon on Test Day 2, and vice versa. However, five infants received the same LNS flavor during both test-feeding days due to an error by the research assistant (two infants tasted only LNS-regular and three tasted only LNS-cinnamon), and one infant participated only on Test Day 1. The following results are based on the whole sample (n = 43); we conducted further analyses with the subset of infants who received the correct cross-over design (n = 37) and obtained similar results.

On Test Day 1, infants consumed 71.8% ± 25.5% (95% CI: 61.0–82.5) of the LNS-regular + food mixture and 73.6% ± 21.1% (95% CI: 63.4–83.8) of the LNS-cinnamon + food mixture. On Test Day 2, percent consumed was 79.9% ± 18.8% (95% CI: 70.6–89.3) for the LNS-regular + food mixture and 77.0% ± 21.4% (95% CI: 68.0–86.1) for the LNS-cinnamon + food mixture. On each testing day, the minimum consumption (i.e., the lower limit of 95% CI) of the LNS + food mixture was higher than 50% for each LNS flavor. Thus, based on our original definition of acceptability, both LNS flavors were acceptable. Results from mixed linear modeling indicated that consumption of the LNS + food mixture did not differ by LNS flavor ($p = 0.35$). Consumption differed by testing day ($p = 0.02$), but no order effect was observed (p-value for interaction term testing day * LNS flavor = 0.85).

Duration of feedings was also recorded on each test-feeding day. Feeding duration did not differ by LNS flavor ($p = 1.00$). Thus, on Test Day 1, the average feeding duration of the LNS + food mixture was 16.9 ± 7.7 minutes for the LNS-regular + food mixture and 16.5 ± 6.9 minutes for the LNS-cinnamon + food mixture; on Test Day 2, the average feeding duration was 12.1 ± 7.1 minutes for the LNS-regular + food mixture and 13.6 ± 6.6 minutes for the LNS-cinnamon + food mixture (feeding duration differed by day, $p = 0.0001$).

The degree of liking and organoleptic preferences of the LNS supplement was assessed on Test Day 1; results are presented in Table 4 (page 21). Most caregivers liked (either a little or a lot) the LNS (79% in the LNS-regular group and 74% in the LNS-cinnamon group; p-value for flavor = 0.155). Similarly, the majority of primary caregivers perceived that the child liked the supplement (96% in the LNS-regular group and 90% in the LNS-cinnamon group; p-value for flavor = 0.340). Caregiver's organoleptic preferences did not differ significantly by LNS flavor, except for their preferences about the color of the supplement. Thus, while 100% of caregivers in the LNS-regular group liked the supplement's color, 21% of those in the LNS-cinnamon group disliked it (p-value for flavor = 0.039). (The color of the LNS-

cinnamon product was slightly paler than the LNS-regular). For each LNS flavor, most caregivers liked the texture (87% in the LNS-regular group and 95% in the LNS-cinnamon group, p-value = 0.954), and the smell (92% in the LNS-regular group and 83% in the LNS-cinnamon group, p-value = 0.603) of the supplement. Although not significantly different, perceptions about the LNS taste tended to be more favorable for the regular flavor as compared to the cinnamon flavor (92% in the LNS-regular group liked its taste versus 84% in the LNS-cinnamon group, p-value = 0.071).

The majority of infants were healthy during the test-feeding trial. On Test Day 1, caregivers reported that two infants had nasal discharge, two had cough, one had fever, one had ear infection, and one had another symptom (not otherwise identified) during the previous 24 hours; no infant had diarrhea, vomiting/nausea, or breathing difficulties during the same time frame. On Test Day 2, caregivers reported that three infants had nasal discharge, two had cough, one had breathing difficulty during the previous 24 hours; no infant had fever, vomiting/nausea, diarrhea, ear infection, or other symptom during the same period. Reported health did not differ significantly by testing day (Fisher's exact test p-values for each symptom ranged from 0.49 to 1.0). One possible reaction to the test meal was reported on Test Day 1, and five were reported on Test Day 2 (Fisher's exact test for day p = 0.11).[2]

Home-Use Trial

Table 5 (page 22) shows results from the 2-week home-use trial. Primary caregivers were given a total of 28 LNS sachets and were instructed to give two sachets per day to the child during 2 weeks. Results from mixed linear modeling indicated that consumption of LNS did not differ by flavor (p = 0.367), but it did differ by week (p = 0.027); thus, during Week 1, infants in the LNS-regular group consumed 77.1% ± 22.4% of the recommended dose (based on the number of sachets remaining), while infants in the LNS-cinnamon group consumed 71.4% ± 30.6% of it (p = 0.817 for flavor during that week). During Week 2, the percent consumed was 72.2% ± 30.8% in the LNS-regular group and 63.7% ± 37.7% in the LNS-cinnamon group (p = 0.637 for flavor during that week). The overall percent consumed during the 2-week home-use trial was 74.6% ± 20.0% in the LNS-regular group and 67.6% ± 29.2% in the LNS-cinnamon group (p = 0.639).

Morbidity in the children was monitored weekly by maternal report of three symptoms for each day: lack of appetite, diarrhea, and fever. During the 2 weeks of home use, there were 19 reports of lack of appetite (a report indicates that the mother reported that the child had the symptom at least 1 day), 27 reports of diarrhea, and 27 reports of fever in the children. The average percent of days that infants had lack of appetite, diarrhea, and fever was 12% ± 25%, 11% ± 20%, and 12% ± 23%, respectively. Overall, the average percent of days during which the child had any symptom of illness was 25% ± 27%. Neither frequency of reports nor percent of days with any of these symptoms differed significantly by LNS flavor or week. However, the percent of LNS sachets consumed during the home-use trial was negatively associated with percent of days with lack of appetite ($r_s = -0.43$, $p < 0.0001$), diarrhea ($r_s = -0.22$, $p = 0.042$), and fever ($r_s = -0.28$, $p = 0.008$).

Descriptions of caregivers' behaviors and perceptions about the LNS use at home are presented in Table 6 (page 23). Overall, most caregivers (93%) gave the LNS mixed with food; among the foods the LNS was mixed with, the most common were soup (n = 9), beans (n = 5), pasta (n = 5), and juice (n = 4). In agreement with this, 93% of caregivers considered that giving the child the LNS mixed with food was either easy or very easy. The majority of caregivers (90%) gave the LNS to the child twice a day, and of those, 89% indicated to have done so because of the instructions they received about the LNS use for their child. Similarly, most caregivers (95%) thought that it was easy (or very easy) to give the child the supplement twice a day. Ninety-eight percent of caregivers said that the instructions to use the LNS at home were clear. Caregivers' behaviors and opinions did not differ significantly by LNS flavor used in the home (p-values ranged from 0.08 to 1.0).

At the exit interview, caregivers were also asked if the child had any problems after eating the LNS. Most of the responses to that question were stated as positive effects (e.g., my baby is gaining weight), and

[2] No further data on possible reactions to the test meal were collected.

only a few of them were actual health problems. We decided to re-code these responses to reflect only health problems (Table 6). Thus, three caregivers in the LNS-cinnamon group reported health problems after consumption of LNS (two mentioned diarrhea and one reported fever); no caregiver reported health problems in the LNS-regular group ($p = 0.24$). The other effects that were more commonly reported by the caregivers included increased appetite and weight gain (Table 7, page 24).

Almost all caregivers (98%) considered the supplement to be beneficial for their children, and all of them were willing to continue feeding LNS to their child if they were asked to do so, but some of them (23%) thought it could be boring to eat the supplement every day. A few caregivers (n = 6) mentioned something they disliked about the supplement; of those, three referred to its flavor, two mentioned its odor, and one said she didn't like it because it was "pure fat." When caregivers were asked to talk about the most difficult thing regarding using the LNS at home, 17% of them mentioned that it was hard to open and 5% said it was hard to mix. However, the rest of them indicated having no difficulties at all using the LNS. They were also asked about the LNS package: Two caregivers said that the LNS sachet was hard to open, but the rest stated that the LNS sachet was fine.

When caregivers were asked to express their opinion about the supplement, all but one provided positive comments. The following are examples of those comments: "it is good because my baby is eating more," "it is good because it has vitamins," and "my baby likes it." The only negative opinion was mentioned by a caregiver in the LNS-regular group who indicated that she disliked the taste of the supplement. Caregivers' opinions about the LNS as a supplement only for young children and not for older children were mixed. Some of them (n = 20) thought that it was fine or necessary to target young children or to have an age-specific supplement, while others indicated that older children also need supplementation (n = 12). A few of them specifically said that the supplement would benefit the infants' growth and development (n = 4) and another also said that it was fine to target young children because the older ones can eat "everything" (n = 3). Caregivers' ideas to prevent supplement sharing with other members of the family mainly included storing/hiding/keeping the supplement out of reach of other children (n = 29) and not to give it to other children (n = 15).

Almost all caregivers (98%) felt that child nutrition was important, and their reasons related to the children's growth and weight (n = 24) as well as children's health and prevention of disease (n = 19). A few of them also pointed out that good nutrition made children strong (n = 4). Ninety-eight percent of caregivers agreed with the idea of feeding young children differently than older children; the main two reasons they brought up were that infants and young children were more delicate and had to be cared for more carefully (n = 15) and that babies could not chew and thus needed soft foods (n = 11).

Most caregivers (90%) thought that there were nutrition problems in their community. Among the reasons for such problems in their communities, they mentioned: a) lack of proper care (n = 13); b) children not getting vitamins (n = 12); c) lack of money, poverty, or unemployment (n = 11); and d) children not getting food or not eating well (n = 7).

Caregivers were asked if they thought the children in their community were growing well. Thirty-eight percent of them responded "yes," 33% said "no," and 29% answered that they did not know. Among those who responded "yes," their reasons included that the children ate well and had food (n = 6), received their vitamins (n = 4), were properly cared for (n = 3), and were healthy (n = 2). Those who responded "no" mentioned the following reasons: Some children were not growing well (n = 4), poverty or lack of money (n = 3), and some children were skinny or small (n = 3) or were neglected (n = 2). Caregivers also listed signs to identify children who were not growing well: a) physical characteristics, such as being skinny, low in weight, or pale (n = 37); b) getting sick often (n = 12); c) lack of appetite (n = 10); and d) behavior signs, such as too much sleep or not playing (n = 5).

Focus Group Discussions

In total, nine FGDs were conducted, four with primary caregivers (n = 40), and five with Funcafé personnel (n = 44).

The following are the results from the discussions about the appropriate name for the supplement with both caregivers and Funcafé staff. A total of 106 names were mentioned during the nine FGDs; 31 of them received at least one vote and 13 received more than one vote. Table 8 (page 25) lists these 13 names. The most popular names involved a combination of the words *maní* (peanut) + *vitaminas* (vitamins), such as Nutrimaní, Vitamaní, Nutrifort, and Manivit. Of these names, Nutrimaní and Manivit were selected as the favorite names in more than one FGD.

Results from the drawings and discussions about suggested packaging for the supplement indicated a preference for including the image of a child and/or of a peanut. In some cases, the image of the child included only the face, but in other instances it showed the whole body. Images of the peanut tended to be small and, in some cases, anthropomorphic. Regarding the preferred colors for the label, red was the preferred color for the letters and light blue was the favorite color for the background or other details (e.g., the baby's shirt). Examples of the final group designs, as well as individual drawings are presented in Appendix 2 (Focus Group Report, in Spanish).

The participants' opinions regarding the appropriateness of introducing a peanut-based supplement for infants was explored. The positive reception of this kind of supplement for that age was unanimous. They mentioned two main reasons for their responses: 1) the level of trust they had in the institution that provided the LNS (i.e., Funcafé) and 2) that the peanuts in the supplement were already processed and had a creamy texture which made it easy to eat.

The incorporation of the LNS distribution into the Funcafé program operation was also discussed. Community facilitators indicated that they would recommend the use of the LNS in the communities they serve, but to do so they would need to receive more information about the product (e.g., safety, efficacy) and to be trained to answer questions from community members. The hypothetical situation of having to deliver bags with 60 LNS sachets monthly to about 30–35 families in the community was presented to the community facilitators and institutional facilitators (the latter supervised the former group and were based at the Funcafé headquarters in Mazatenango). They proposed a distribution system that started with the institution, Funcafé, providing the supply of LNS to the institutional facilitators, who would take them to the community facilitators for distribution at the monthly growth monitoring and promotion meetings at each community. They added that the LNS could be taken to the families who missed the monthly meeting.

Discussion

The LNS was well accepted in this population of young Guatemalan children and their caregivers, as indicated by the amount of the supplement the children consumed, the rating of its organoleptic properties, and the caregivers' willingness to continue feeding the supplement. Considering our initial definition of acceptability as consumption of more than 50% of the supplement offered, both flavors of the LNS were acceptable during the test-feeding phase.

Caregivers' perceptions of the supplement's taste, odor, and consistency during the test-feeding phase were mostly positive and did not differ significantly by the LNS flavor, but the degree of liking of the supplement's color did. Thus, some caregivers in the LNS-cinnamon group disliked the color, while all caregivers in the LNS-regular group liked it. In addition, there was a tendency towards a more positive perception of the supplement's taste among caregivers in the LNS-regular group as compared to those in the LNS-cinnamon group.

During the test-feeding trial, children's consumption did not differ by LNS flavor, which indicates that both flavors were equally acceptable during this initial phase. However, consumption differed by the testing day; thus, regardless of the LNS flavor, children consumed more of the LNS + food mixture on the second testing day as compared to the first one. Results regarding the time children took to consume the mixture pointed to a similar interpretation: Feeding time did not differ by LNS flavor, but consumption of the LNS + food mixture was faster on the second testing day. These results indicate that children became more familiar with the new product added into their food, which increased consumption.

Consumption of the LNS did not differ significantly by flavor during the home-use phase either. However, the level of adherence to the feeding protocol to consume two sachets per day during home use of the supplement was lower than we anticipated. A possible explanation for these results may relate to the negative association between consumption of LNS and illness during the home-use trial. Anecdotal information from the field workers indicated that illness was prevalent during the season when the study was conducted (children were ill an average of 25% of days during the home-use trial) and that mothers tended to stop giving the supplement to the children when they were ill. These findings could have important implications for the development of educational messages that should accompany LNS distribution for young children in this population.

In addition, and contrary to what we expected, consumption of the supplement was lower during the second week of home use than it was during the first week. Potential explanations for this result are that, as some caregivers (23%) indicated, children may have gotten bored with eating the supplement every day. This could be addressed by alternating the flavors or varying other aspects of the supplement (e.g., packaging). Although consumption did not differ significantly by flavor, lower consumption levels were observed in the LNS-cinnamon group, with the lowest level observed during Week 2 of the take-home phase. Accordingly, a higher percentage of caregivers in this flavor group indicated that the child did not like the supplement (26% as compared to 5% in the LNS-regular group). These observed differences, although not statistically significant, may help explain the lower level of consumption during the second week of home use, which was mainly due to the low consumption observed in the LNS-cinnamon group during that week.

It is important to mention that although a few health problems in the children were reported after consumption of LNS, these perceived health problems were unlikely to be related to the LNS consumption and did not increase with longer use of the supplement. However, these perceptions of side effects may have discouraged regular feeding of the supplement to the children by some caregivers. Educational messages about the safety of the supplement may help maintain adequate adherence to the feeding protocols in the presence of unrelated health problems that are common among children.

Despite the lower-than-expected level of adherence during the home-use trial, at the end of that phase most caregivers had a positive perception about the LNS. The majority of them gave the supplement as they were instructed, considered the supplement to be beneficial for their children, and were willing to

continue feeding it if asked to do so. These findings suggest that the caregivers had a good experience using the supplements at home, and support the idea that providing LNS in a programmatic context may be well received and that mothers will use the product appropriately.

On the other hand, targeting the supplement to younger children may be challenging. Although caregivers feel that they know how to prevent other children from eating the supplement, some of them think the LNS should be available to all children in the home. For targeted supplementation to be successful, caregivers will need to be educated on why such an approach is justified. Such education could be built on caregivers' current understanding that young children have special feeding needs.

In terms of perceptions around nutrition, most caregivers were aware of the importance of proper nutrition for children and considered malnutrition to be a problem in their communities. There is the perception that broad societal problems, such as poverty and unemployment, are part of the causal path, but with similar emphasis put on specific caring behaviors that could lead to nutrition problems.

Results from the FGDs indicated the acceptability of a peanut-based nutrition supplement for young children, as well as a positive disposition on the part of program staff to incorporate the LNS distribution into their regular program activities. Distribution of a new product such as LNS may be better received if it is introduced by a trusted institution that is already serving the community. Furthermore, the program staff emphasized the need for comprehensive training on the supplement's benefits and potential side effects to make sure that they can effectively promote the supplement in their communities.

This acceptability study had some limitations. One of them relates to the incorrect cross-over allocation of the LNS in the test-feeding trial, which meant that some of the participants tasted only one of the flavors. Nevertheless, whenever appropriate, we conducted further analysis using only the sample of subjects who were correctly assigned to the cross-over design, and we observed similar results to those obtained using the whole sample. Another limitation was the lack of open-ended or follow-up questions regarding sensory preferences, feeding practices, and overall acceptability, which could have elicited more varied responses in acceptability preferences (Young, Blanco, et al. 2010) and more information about the reasons behind some of the caregivers' behaviors.

The findings from this acceptability trial indicated that LNS was accepted by the children and mothers. However, consumption of the supplement at home appeared to be affected by child morbidity, and there is some indication that the regular (peanut) flavor was better received than the cinnamon one. Our results also highlight the importance of including an educational component along with LNS distribution for supplementing young children's diets. These findings suggest that evaluation of LNS impact in a programmatic context will not be impeded by poor acceptance of these supplements.

References

Adu-Afarwuah, S., A. Lartey, et al. 2007. “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.* Vol. 86. No. 2, pp. 412–420.

———. 2008. “Home fortification of complementary foods with micronutrient supplements is well accepted and has positive effects on infant iron status in Ghana.” *Am J Clin Nutr.* Vol. 87. No. 4, pp. 929–938.

Bermudez, O., C. Toher, et al. 2010. “Dietary intakes and food sources of fat and fatty acids in Guatemalan schoolchildren: A cross-sectional study.” *Nutrition Journal.* Vol. 9. No. 1, p. 20.

Chaparro, C. M. and K. G. Dewey 2010. “Use of lipid-based nutrient supplements (LNS) to improve the nutrient adequacy of general food distribution rations for vulnerable sub-groups in emergency settings.” *Matern Child Nutr.* Vol. 6. Suppl 1, pp. 1–69.

de Onis, M., A. Onyango, et al. 2004. “Measurement and standardization protocols for anthropometry used in the construction of a new international growth reference.” *Food and Nutrition Bulletin*. Vol. 25. Suppl 1, pp. S27–36.

Enneman, A., L. Hernández, et al. 2009. “Dietary characteristics of complementary foods offered to Guatemalan infants vary between urban and rural settings.” *Nutrition research*. Vol. 29. No. 7, pp. 470–479.

Ministerio de Salud Pública y Asistencia Social (MSPAS). 2010. *Encuesta Nacional de Salud Materno Infantil 2008/2009)*. Guatemala: MSPAS/Instituto Nacional de Estadistica/Centros de Control y Prevencion de Enfermedades.

MSPAS/WFP/USAID. 2008. *Informe preliminar: Prueba de aceptabilidad de Plumpy’Nut en madres, niños y niñas de 6 meses a 5 años en las comunidades de Tecpan, Chimaltenango y Sanarate, El progreso*. Guatemala: MSPAS/World Food Programme (WFP)/Calidad en Salud/USAID.

Phuka, J., K. Maleta, et al. 2008. “Complementary feeding with fortified spread and incidence of severe stunting in 6- to 18-month-old rural Malawians.” *Arch Pediatr Adolesc Med*. Vol. 162. No. 7, pp. 619–626.

Young, S. L., I. Blanco, et al. 2010. “Organoleptic properties, ease of use, and perceived health effects are determinants of acceptability of micronutrient supplements among poor Mexican women.” *J Nutr.* Vol. 140. No.3, pp. 605–611.

Tables and Figures

Table 1. LNS formulation (both flavors)

Nutrient	Unit	LNS
Dose	g	20
Energy	kcal	118
Protein	g	2.6
Fat	g	9.6
Linoleic acid	g	4.46
α-Linolenic acid	g	0.58
Calcium	mg	280
Copper	mg	0.34
Folate	µg	150
Iodine	µg	90
Iron	mg	9
Magnesium	mg	40
Manganese	mg	1.2
Niacin	mg	6
Pantothenic acid (B5)	mg	2
Phosphorous	mg	190
Potassium	mg	200
Riboflavin (B2)	mg	0.5
Selenium	µg	20
Thiamine (B1)	mg	0.5
Vitamin A	µg	400
Vitamin B12	µg	0.9
Vitamin B6	mg	0.5
Vitamin C	mg	30
Vitamin D	µg	5
Vitamin E	mg	6
Vitamin K	µg	30
Zinc	mg	8

Table 2. Sample characteristics (n = 43)

Characteristic	n (%) or Mean ± SD
Infant age, months	12.0 ± 3.2
Infant gender	
Male	21 (49)
Female	22 (51)
Primary caregiver of infant	
Mother	42 (98)
Grandmother	1 (2)
Mother's age, years	26.7 ± 8.0
Ethnicity	
Indigenous	38 (88)
Non-indigenous	5 (12)
Language	
Spanish only	26 (60)
Spanish and Quiche	3 (7)
Spanish and Tzutujil	14 (33)
Education	
None	16 (37)
Alphabetization	2 (5)
Elementary school	23 (53)
High school	2 (5)
Person who generates income in household	
Father	35 (81)
Mother	1 (2)
Other family member	7 (16)
Activity of person who generates income	
Farming (own)	7 (16)
Farming (hired)	19 (44)
Construction	7 (16)
Other	10 (23)

Table 3. Infant consumption of LNS-food mixture during the test-feeding trial

	LNS-regular		LNS-cinnamon	
	Day 1 n = 24	Day 2 n = 18	Day 1 n = 19	Day 2 n = 24
Percentage consumed[1]	71.8 ± 25.5	79.9 ± 18.8	73.6 ± 21.1	77.0 ± 21.4
95% CI of percent consumed	61.0–82.5	70.6–89.3	63.4–83.8	68.0–86.1
Feeding duration, minutes[2]	16.9 ± 7.7	12.1 ± 7.1	16.5 ± 6.9	13.6 ± 6.6

[1] Mean ± SD; p-value for main effect LNS flavor = 0.35; p-value for main effect day = 0.02; p-value for day*LNS flavor = 0.85.
[2] Mean ± SD; p-value for main effect LNS flavor = 1.00; p-value for main effect day = 0.0001; p-value for day*LNS flavor = 0.53.

Table 4. Overall and organoleptic preferences by flavor[1]

	LNS-regular (n = 24) n (%)	LNS-cinnamon (n = 19) n (%)	p-value[2]
Caregiver's overall degree of liking			0.155
Like it a lot	9 (37.5)	2 (10.5)	
Like it a little	10 (41.7)	12 (63.2)	
Neither like nor dislike	1 (4.2)	0 (0)	
Dislike it a little	1 (4.2)	3 (15.8)	
Dislike it a lot	3 (12.5)	2 (10.5)	
Caregiver's perception of child's degree of liking			0.340
Like it a lot	13 (54.2)	11 (57.9)	
Like it a little	10 (41.7)	6 (31.6)	
Neither like nor dislike	0 (0)	0 (0)	
Dislike it a little	0 (0)	2 (10.5)	
Dislike it a lot	1 (4.2)	0 (0)	
Caregiver's degree of liking of color			0.039
Like it a lot	10 (41.7)	3 (15.8)	
Like it a little	14 (58.3)	12 (63.2)	
Neither like nor dislike	0 (0)	0 (0)	
Dislike it a little	0 (0)	3 (15.8)	
Dislike it a lot	0 (0)	1 (5.3)	
Caregiver's degree of liking of taste			0.071
Like it a lot	12 (50.0)	3 (15.8)	
Like it a little	10 (41.7)	13 (68.4)	
Neither like nor dislike	0 (0)	0 (0)	
Dislike it a little	1 (4.2)	2 (10.5)	
Dislike it a lot	1 (4.2)	1 (5.3)	
Caregiver's degree of liking of texture			0.954
Like it a lot	5 (20.1)	3 (15.8)	
Like it a little	16 (66.7)	15 (79.0)	
Neither like nor dislike	1 (4.2)	0 (0)	
Dislike it a little	1 (4.2)	0 (0)	
Dislike it a lot	1 (4.2)	1 (5.3)	
Caregiver's degree of liking of smell			0.603
Like it a lot	12 (50.0)	8 (42.1)	
Like it a little	10 (41.7)	8 (41.1)	
Neither like nor dislike	1 (4.2)	0 (0)	
Dislike it a little	0 (0)	2 (10.5)	
Dislike it a lot	1 (4.2)	1 (5.3)	

[1] Assessed during the test-feeding trial Test Day 1 only, using the 5-unit Hedonic scale.
[2] Fisher's Exact Test.

Table 5. Infant consumption of LNS during the 2-week home-use trial (n = 42)

	LNS-regular (n = 19)	LNS-cinnamon (n = 23)	p-value[1]
Percentage of LNS consumed (Mean ± SD)[2]			
Week 1	77.1 ± 22.4	71.4 ± 30.6	0.817
Week 2	72.2 ± 30.8	63.7 ± 37.7	0.637
Pooled	74.6 ± 20.0	67.6 ± 29.2	0.639
95% CI of percent of LNS consumed			
Week 1	66.3–87.9	58.2–84.7	
Week 2	57.4–87.0	47.4–80.0	
Pooled	65.0–84.2	54.9–80.2	

[1] Mann Whitney Wilcoxon non-parametric tests, used to test differences by LNS flavor.
[2] Mean ± SD. From mixed linear modeling, p-value for main effect LNS flavor = 0.376, p-value for main effect week = 0.027, and p-value for the interaction effect LNS flavor*week = 0.799.

Table 6. Caregivers' perceptions about the use of LNS for their children during the home-use trial

	LNS-regular (n = 19) n (%)	LNS-cinnamon (n = 23) n (%)	p-value[1]
Mode of eating the LNS			1.00
Mixed with foods	18 (95)	21 (91)	
Eaten alone	1 (5)	2 (9)	
Times per day the child was given the LNS			1.00
Once	1 (5)	2 (9)	
Twice	18 (95)	20 (87)	
Three times	0 (0)	1 (4)	
Caregiver's perception of child's liking of the LNS			0.11
Liked	18 (95)	17 (74)	
Disliked	1 (5)	6 (26)	
Perceived health problems after eating LNS			0.24
No	19 (100)	20 (87)	
Yes	0 (0)	3 (13)	
Degree of easiness of adding LNS to the foods usually eaten by the child[2]			0.69
Very easy	13 (68)	17 (77)	
Easy	5 (26)	4 (18)	
Not that easy	0 (0)	0 (0)	
A little hard	0 (0)	1 (5)	
Hard	1 (5)	0 (0)	
Very hard	0 (0)	0 (0)	
Degree of easiness of giving LNS twice a day			0.08
Very easy	9 (47)	17 (74)	
Easy	9 (47)	5 (22)	
Not that easy	0 (0)	1 (4)	
A little hard	0 (0)	0 (0)	
Hard	1 (5)	0 (0)	
Very hard	0 (0)	0 (0)	
Willingness to continue giving LNS to child daily			–
No	0 (0)	0 (0)	
Yes	19 (100)	23 (100)	

[1] Fisher's Exact Test.
[2] One missing value in the LNS-cinnamon group.

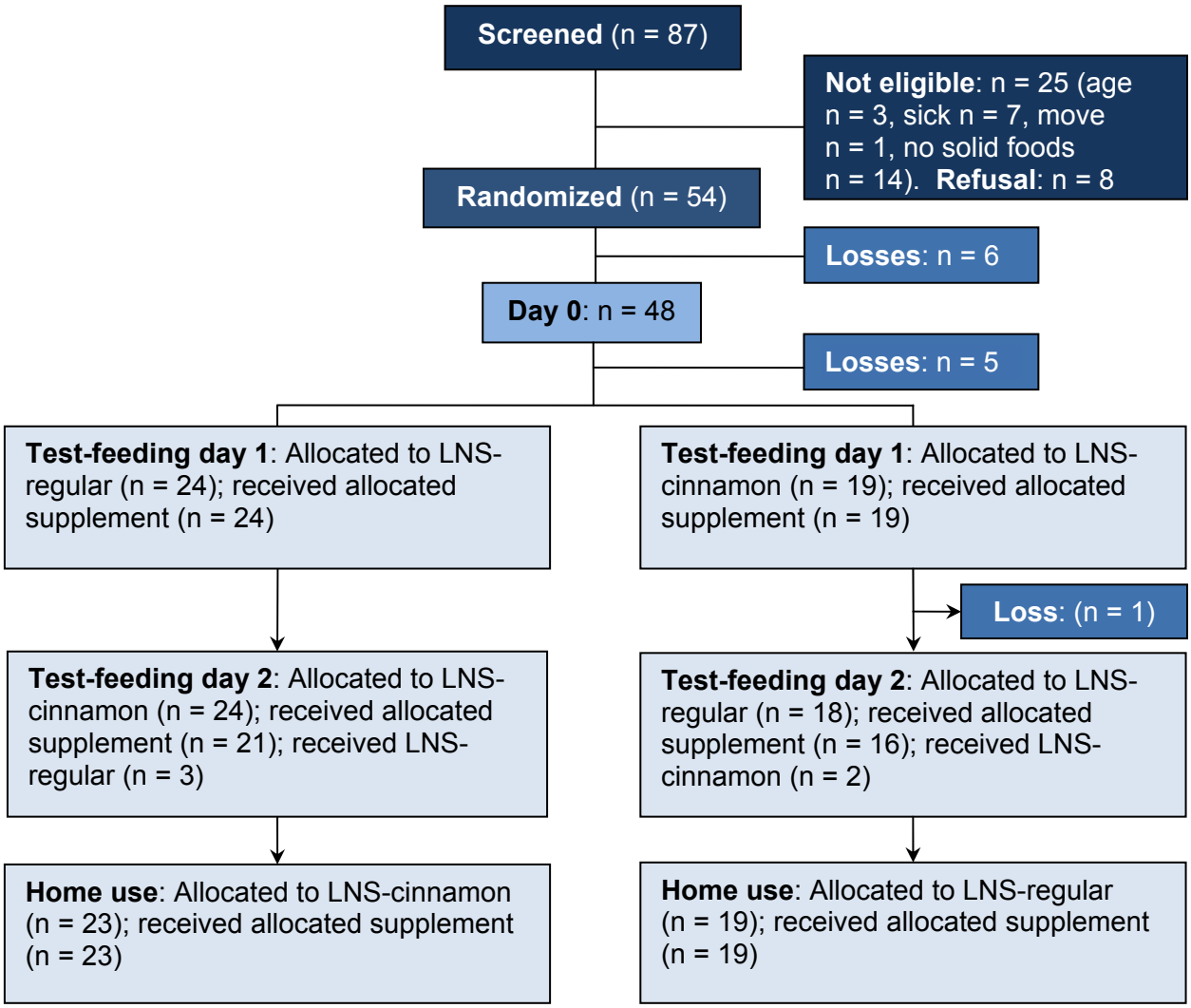
Table 7. List of other perceived effects of LNS consumption mentioned by caregivers

Other perceived effects	LNS-regular (n = 19) n	LNS-cinnamon (n = 23) n
Increased appetite	5	9
Healthier child	1	-
More active child	1	-
Walking/attempting to walk	1	2
Increased weight	1	5

Table 8. List of suggested names for the LNS that received more than vote during the FGDs with caregivers and community and program staff

Suggested name	Number of votes
Manivit	13
Nutrimaní	9
Vitahierro	7
Fort de maní	6
Nutrifuerte	5
Vitafuerte	5
Maniapetil	4
Vitamaní	4
Nutriforte Chapín	3
Supermanía	3
Cremaní	2
Manicrecer	2
Nutrivitaminas	2

Figure 1. Flow diagram showing number of subjects for enrollment, allocation and at each trial



Appendix 1. Hedonic Scale

 Dislike it a lot 1	 Dislike it a little 2	 Neither like nor dislike 3	 Like it a little 4	 Like it a lot 5

Appendix 2. Focus Group Report (Spanish)

SELECCIÓN DE NOMBRE Y DISEÑO DE LA ETIQUETA PARA
EL SUPLEMENTO NUTRICIONAL (LNS)

Sandra Saenz de Tejada, antropóloga
Julio 2010

Informe preparado para FUNCAFE y la Universidad de California, Davis

ANTECEDENTES

La Universidad de California, Davis está realizando un proyecto para la prevención de la desnutrición en Guatemala en colaboración con FUNCAFE. El proyecto ha empezado con una prueba piloto en dos comunidades de Suchitepéquez (San Bartolo Manzanales, Chicacao y Madre Mía, Santo Tomás) para conocer la aceptabilidad del suplemento nutricional (LNS) que será distribuido. La prueba involucró a 40 madres y sus niños menores de 18 meses. Según encuestas realizadas por el equipo de campo, el suplemento gozó de gran aceptabilidad entre madres y niños. Antes de poder realizar una prueba con una muestra mayor se hacía necesario encontrar un nombre al suplemento que respondiera al interés local, así como una etiqueta para los sobres en que se distribuye. Para este fin se realizaron nueve grupos de discusión con las 40 madres que lo había probado, así como con el personal del programa de extensión de cobertura de servicios de salud de la prestadora del PEC, FUNCAFE, con quienes también se discutió posibles maneras de distribuir el suplemento a nivel comunitario.

METODOLOGÍA

Técnicas de recolección de datos

La técnica de recolección de datos fue el grupo de discusión. En este se inició con una breve discusión sobre el suplemento (opinión, efecto observado), para luego generar una lluvia de ideas sobre un posible nombre. Los 10–15 nombres así generados fueron anotados en un papelógrafo y luego se eligió, por votación secreta, el nombre más atractivo. En tres grupos, por haber algunas participantes analfabetas, se procedió a hacer la votación en forma oral.

Una vez elegido el nombre se procedió a diseñar la etiqueta. Se le solicitó a cada participante que dibujara una. Los dibujos fueron después ordenados temáticamente (por ejemplo, los que incluían dibujos de manías, los que tenían dibujos de niños, los que incluían manías y niños, los que sólo diseños geométricos y los que mostraban otros diseños [flores]). Se procedió a generar una discusión para generar consensos sobre qué elementos debería llevar la etiqueta. En la mayoría de grupos uno de los participantes fue el encargado de realizar el diseño final; en algunos grupos de madres la facilitadora hizo el dibujo final, ante la dificultad de las participantes para expresar gráficamente sus ideas.

Las reuniones con el personal se llevaron a cabo en las oficinas de FUNCAFE de Mazatenango; las reuniones en Madre Mía con madres y vigilantes se llevaron a cabo en el centro comunitario, y las reuniones con las madres de San Bartolo Manzanales la casa de la facilitadora comunitaria.

Las discusiones duraron entre 60 y 90 minutos, al final de la cual se ofreció una merienda. El contenido de todos los grupos focales fue el mismo, con ligeras variantes en las preguntas introductorias (ver Anexo 1: Guía de entrevista). Con la debida autorización de los participantes se grabó la discusión de todos los grupos. Las grabaciones fueron luego transcritas y analizadas.

PARTICIPANTES

Se realizó cuatro grupos con madres, dos con vigilantes comunitarios del PEC, uno con facilitadores comunitarios, uno con facilitadores institucionales y uno con el personal de campo del proyecto (ver Cuadro 1).

Cuadro 1: Participantes en los grupos focales

Sujetos	Número sesiones	Número participantes
Madres de Madre Mía, S P Jocopilas	2	23
Madres de S B Manzanales, Chicacao	2	17
Personal de salud Funcafé		
• Vigilantes de jurisdicciones donde se probó el suplemento	1	10
• Vigilantes de 5 jurisdicciones donde NO se probó el suplemento	1	7
• Facilitadores comunitarios	1	12
• Facilitadores institucionales	1	10
• Personal de campo del proyecto	1	5
T O T A L	9	84

RESULTADOS

Nombres sugeridos para el suplemento

En los nueve grupos de discusión surgieron 106 nombres (ver Anexo 2), pero muchos de ellos no recibieron ningún voto al momento de la elección. Solamente 31 nombres recibieron al menos un voto y únicamente 13 recibieron más de un voto (ver Cuadro 2).

Cuadro 2: Nombres con al menos dos votos

Manivit	13
Nutrimaní	9
Vitahierro	7
Fort de maní	6
Nutrifuerte	5
Vitafuerte	5
Maniapetil	4
Vitamaní	4
Nutriforte Chapín	3
Supermanía	3
Cremaní	2
Manicrecer	2
Nutrivitaminas	2

Varios de estos nombres, independientemente de su número de votos, fueron mencionados en más de un grupo (ver Cuadro 3). La combinación más exitosa es la que combina los términos maní + vitaminas (Mani vitaminado, Manivit y Vitamaní), la cual fue mencionada 11 veces y en cada uno de los nueve grupos de discusión. Le sigue en popularidad Nutrimaní y Nutrifort, cada uno mencionado cinco veces.

Cuadro 3: **Nombres mencionados en más de un grupo**

Calciomaní (2)	Nutrimaní (5)
Maní vitaminado (2)	Nutriniño (2)
Manicrece (2)	Nutrisano (2)
Manifuerte (2)	Nutrivitaminas (2)
Manirrico (3)	Pastamaní (2)
Manivit (4)	Vitafuerte (2)
Nutrifort (5)	Vitamaní (5)

Los nombres elegidos como favoritos en los nueve grupos fueron los siguientes (entre paréntesis el número de grupos en que fue seleccionado):

Fort de maní
Maniapetil
Manivit (2)
Nutrimaní (2)
Vitafuerte
Vitahierro
Vitamaní

Etiqueta

a) Diseño
En la mayoría de grupos (n = 7) se incluyó el dibujo de un niño, fuera de cuerpo entero (n = 2), medio cuerpo (n = 3, todos con camisa celeste), o solamente el rostro (n = 2). Otro diseño frecuente fueron las manías, incluidas en seis etiquetas. Las manías tienden a ser pequeñas, pero en tres diseños las manías son grandes (en dos de ellas las manías son personajes antropomorfizados).

b) Colores
Hay una preferencia marcada por el celeste: sea para el fondo de la etiqueta o para la camisita del bebé.

c) Letras
Las letras tienden a ser principalmente rojas, pero también las hay azules.

DISEÑO FINAL DE CADA UNO DE LOS GRUPOS: DISEÑO CONSENSUADO ENTRE LOS PARTICIPANTES

.

Diseño del equipo de campo

Diseño Vigilantes 1

Diseño vigilantes 2

Diseño facilitadores comunitarios 1

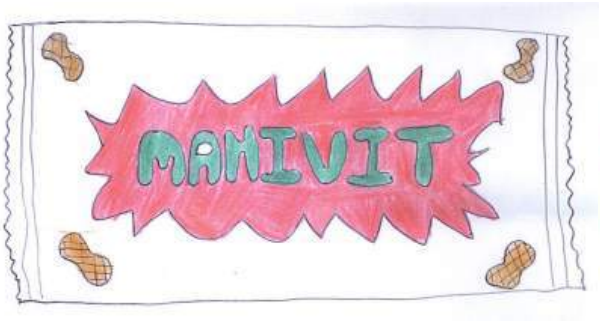
Diseño facilitadores institucionales

Diseño madres de San Bartolo

Diseño madres San Bartolo

Diseños madres de Madre Mía

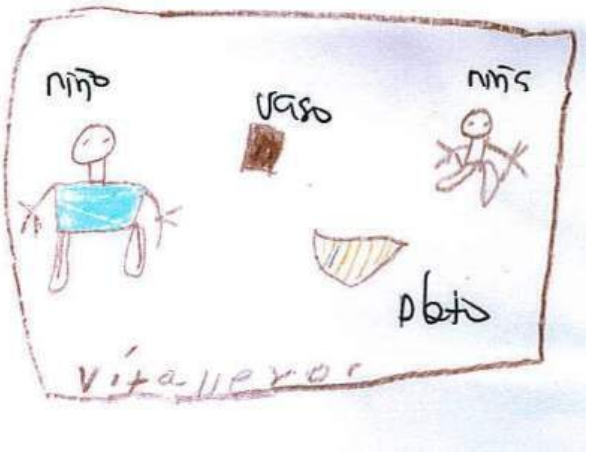
DISEÑOS INDIVIDUALES DE ALGUNOS PARTICIPANTES



Vigilante comunitaria

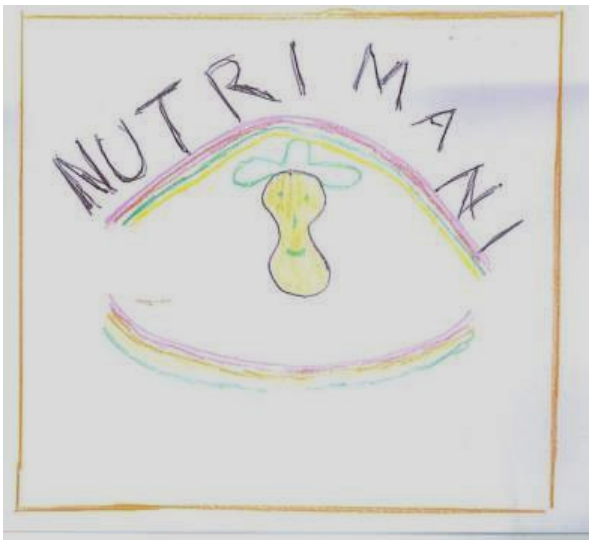
Facilitadora comunitaria

Madre: niño y plato con cuchara



Madre

Vigilante



Facilitador institucional

Niños comiendo bajo un árbol, madre

3. Forma de distribución

En los tres grupos de facilitadores comunitarios e institucionales (FC y FI) se hizo la consulta sobre la mejor manera de distribuir el suplemento entre la población. Ante una situación hipotética de tener que entregar una bolsa de 60 sobres a unas 30 ó 35 familias al mes en cada comunidad, los facilitadores propusieron una cadena: la institución, Funcafé, la entrega al FI, quien las entrega al FC. Este las distribuye durante la sesión mensual de monitoreo y promoción del crecimiento. Las familias que no asistan al control serían posteriormente visitadas y se les entregaría el suplemento a domicilio.

4. Otros comentarios

a) **Nombre**. Cuando las madres utilizaron el suplemento, la mayoría se referían a este como ***vitaminas.*** Otros nombres que recibió el suplemento fueron *crema y jalea.*

b) **Edad de introducción de la manía.** El margen de edad mencionado es amplio: hubo quienes aseguraron que era oportuno darlas hasta que los niños tuvieran toda su dentadura y habían aprendido bien a deglutir: alrededor de los cuatro años. Otras contaron de casos de niños menores de un año, quienes mascaban las manías sin ningún problema.

Al plantear si sería adecuado dar a un niño de seis meses un suplemento a base de manía, la opinión unánime fue afirmativa. Las razones fueron dos: una fue la confianza que la institución llevara este tipo de suplemento: asumían que si la institución lo respaldaba era porque era un buen suplemento para los niños. La otra razón fue que aunque el suplemento fuera a base de manía, "*ya era otra cosa"*, por el hecho de haber sido procesado y tener una textura cremosa, de fácil deglución. Aunque no lo mencionaron, la situación parece ser similar a la percepción sobre la introducción de frijoles negros: si están enteros muchos no lo hacen antes del año, pero colados los introducen alrededor de los siete meses.

Si bien los facilitadores no tenían reparo en recomendar el suplemento consideraban que ellos no estaban preparados para recomendarlo y que necesitaban conocer el producto y ser capacitados para poder responder a las preguntas de la población:

Pues es en mi caso la gente es muy pobre, muy humilde. Pero en lo que va a pensar es que si verdaderamente yo se lo he dado a algún mi hijo para que yo le diga: sí, es bueno. Porque la gente así

va a decir, ¿usted ya hizo la prueba o ya se lo dio a algún su hijo para que usted va a ver que si está bien? Eso es lo primero que la gente le dicen a uno [Grupo de facilitadores comunitarios].

c) Dar el suplemento a los hijos propios

Al personalizar la situación hipotética y preguntar si le darían el suplemento a sus propios hijos, los facilitadores se mostraron más inquisitivos: querían tener certeza sobre la efectividad del suplemento (*que sea bueno de verdad*) y sobre su inocuidad (*que no le vaya a hacer mal*). Este punto subraya la necesidad de informar debidamente a los potenciales usuarios del suplemento.

d) Atributos del suplemento

En tanto en los grupos con facilitadores y vigilantes la lluvia de ideas sobre posibles nombres marchó sin ningún problema, la situación con las madres fue otra. Se hizo entonces necesario promover con ellas una discusión sobre las características y atributos del suplemento, a modo que a partir de las palabras utilizadas para describirlo se pudiera construir un nombre (ver Cuadro 4).

Cuadro 4: Características y atributos del suplemento

Características: sabor y textura	*Atributos*
Manía, mantequilla de maní	Da apetito
Hierro	Da fuerza, fortalece
Chocolate	Los niños empiezan a moverse más
Saladito	Crecen
Dulce	Están más listos
Rico	Están más sanos
Leche	Nutre, es alimento
Cremoso	Mejora la digestión
Vainilla	El calcio les protege los huesos
Canela	Están contentos

DISCUSIÓN

Los nombres elegidos por los participantes subrayan que el suplemento está hecho a partir de manías, que tiene vitaminas y que nutre y fortalece. Los siete nombres finalistas hacen referencia a al menos una de estas partículas. Los sufijos o prefijos son los siguientes:

De los siete nombres finalistas hay cuatro nombres que parecen más promisorios: **Manivit, Vitamaní, Nutrimaní** y **Maniapetil**. El último es atractivo pues hace hincapié en el aumento de apetito, importante beneficio percibido por varias madres (en el Anexo 2 pueden encontrarse también varios nombres que hacen referencia al crecimiento).

Las etiquetas propuestas también tienen varios elementos en común, como se resume en el Cuadro 5. Hay dos diseños fundamentales: el niño y la manía. Las letras son predominantemente rojas y los fondos, y en ocasiones los detalles, son celestes.

Cuadro 5: Características de los diseños consensuados

Nombre	Figuras		Colores principales	Color de las letras
	Niño	Manía		
Vitahierro	Cuerpo entero, camisa celeste	Grande	Blanco, Café	Rojo, Celeste
Maniapetil	Medio cuerpo, camisa celeste	No	Verde, Azul	Azul
Fort de manía	No	Franja de manías	Celeste	Rojo
Vitafuerte	Solo el rostro	No	Celeste	Rojo
Nutrimaní	Cuerpo entero, con pañal	Grande, con sombrero	Azul, Blanco, Azul	Negro
	Medio cuerpo, camisa celeste	Varias, pequeñas	Celeste	Azul
Manivit	Solo el rostro, con mejillas sonrosadas	No	Celeste	Blanco
	No	Grande, antropomorfa	Celeste, Amarillo	Rojo
Vitamaní	Medio cuerpo, camisa celeste, comiendo	No	Rojo, Verde, Celeste	Rojo
T O T A L	Rostro = 2 Medio cuerpo= 3 Cuerpo entero= 2 Sin niño = 2	Grande = 3 Pequeña = 2 Ninguna = 4	Celeste predomina	Rojo predomina

CONCLUSIONES

1. Las madres tuvieron una buena aceptación del suplemento (al cual llamaban *vitaminas*) por su buen sabor y porque percibían que los niños comían y se desarrollaban más rápidamente. Estas percepciones influyeron en la elección de los nombres.

2. Los facilitadores comunitarios e institucionales no tuvieron ningún reparo en recomendar un suplemento a base de manía en niños menores de un año. No obstante, cuando el niño en cuestión era el propio, los facilitadores pidieron mayor información. Necesitaban saber de la inocuidad y probada eficacia del producto.

3. La forma más fácil de llevar a cabo la distribución mensual del suplemento, según los facilitadores, es durante el monitoreo mensual de peso. Las madres ya están acostumbradas a reunirse para estas ocasiones y distribuir el producto sería relativamente fácil. Las madres que no se presentaran al control de crecimiento habría que visitarlas en su domicilio.

4. Tanto madres como facilitadores coinciden en la selección de palabras para formar el nombre: MANI, VITA/VIT, NUTRI, FORTE/FORT. Estas cuatro partículas están presenten en todos los nombres elegidos en cada uno de los nueve grupos de discusión.

5. Las etiquetas consensuadas en cada grupo constan de dos diseños básicos: un niño (a veces solo el rostro, en otras medio cuerpo, en otras cuerpo entero) y una manía (tres etiquetas combinan niños y manías).

6. Los participantes se inclinaron por dos colores: el rojo y el celeste. Las letras del nombre fueron dibujadas usualmente en rojo, en tanto el fondo de la etiqueta o la camisita del niño era de color celeste.

RECOMENDACIONES

De esta pequeña prueba surgieron siete nombres y nueve diseños. Se recomienda hacer una revisión técnica para reducir el número a tres y llevar a cabo otra ronda de grupos focales, a modo que la selección final del nombre del suplemento y su diseño sean validados por personal local.

Posiblemente el personal idóneo para esta validación sean los facilitadores comunitarios, los vigilantes y las propias madres. Los facilitadores institucionales no han sido incluidos, pues ellos tienen una estética un tanto divergente a la de las madres. En esta ronda inicial de grupos focales muchas madres tuvieron dificultad en ofrecer nombres o diseños, probablemente por su nivel tan bajo de escolaridad. No obstante, es muy posible que si solamente se les pide que escojan entre tres nombres y tres diseños la dificultad sea mucho menor.

Una vez seleccionado el nombre habría que validar el diseño: los elementos ya han sido identificados: letras en rojo, dibujos de niños, dibujos de manía y uso del color celeste. Lo ideal sería llevar ciertos prototipos a los cuales se les puede quitar y agregar elementos. También sería importante que estos prototipos estuvieran impresos en dos tamaños: una ampliado (ca. 12 x 4 cm) y otro del tamaño del sobre del suplemento.

Anexo 1. Guía para los grupos focales con madres y personal de servicios de salud

N.	Explicación a participantes	Actividades	Materiales
	Presentación (Lorena) A los trabajadores de salud: presentación del suplemento		
	Antropólogas explican metodología Bautizar el suplemento Ponerle la ropita: tipo de empaque que sería bonito que tuviera Vamos a hablar un poco: una a la ve Confidencialidad Permiso para la grabación		Muestra de empaque (L) Grabadora (S) Baterías (S) Cintas (S) Bombones (S)
	Rompehielo	Madres: Jirafas y elefantes Hombres: jugador de fútbol y porra	Carteles de jirafas y elefantes (S)
	Presentación de participantes	**Madres**: Presentarse con nombres propios, número de hijos y edad del niño que probó suplemento **Trabajadores de salud**: comunidad y años de servicio	Etiquetas autoadheribles (S)
2A	SOLO PARA PERSONAL DE SALUD (FC Y FI) ¿Qué les pareció el suplemento? EXPLORAR SABOR Y TEXTURA Si un niño no come todavía a los 6m, ¿Ud le recomendaría el suplemento? EXPLORAR RAZONES ¿A qué edad creen Uds que los niños pueden comer manías? ¿Qué piensan ustedes de darle a los niños una pasta hecha a base de manías antes de que el niño cumpla un año? EXPLORAR PERCEPCION DE RIESGO Si ustedes tuvieran que repartir cada mes el suplemento a unos 35 niños de su comunidad, ¿cuál cree que sería la mejor forma de hacerlo?	Se entregan muestras del suplemento, para que las saboreen.	Muestras (L)
2B	SOLO PARA VIGILANTES ¿Qué les pareció el suplemento? EXPLORAR SABOR Y TEXTURA Si ustedes tuvieran un hijo de 6m que todavía no come, ¿Uds se animarían a darle el suplemento? EXPLORAR RAZONES ¿A qué edad creen Uds que los niños pueden comer manías? ¿Qué piensan ustedes de darle a los niños una pasta hecha a base de manías antes de que el niño cumpla un año? EXPLORAR PERCEPCION DE RIESGO	Se entregan muestras del suplemento, para que las saboreen.	Muestras (L)

N.	Explicación a participantes	Actividades	Materiales
2C	Introducción: SOLO PARA MADRES Quisiera pedirles que piensen en los momentos en que sus hijos probaron el suplemento: qué decían, qué caras hacían, si se lo comían con gusto. También que recuerdos qué pensaron ustedes cuando sus hijos se los estaban comiendo. ¿Quién quisiera contarnos su experiencia?		
3.	Nombre El suplemento ha sido probado en otros países y tiene nombre en inglés En Guatemala solo ellas han probado el suplemento Necesitamos nombre en español Quisiera que hiciéramos una lista de nombres para el producto. Los nombres pueden ser en español o en t'zutujil.	*Hacer lista en papelógrafo sin limitar número de propuestas. Si salen más de cinco, promover discusión, juntar similares y dejar unos cinco nombres. A cada nombre darle un número y marcarlo en otro color. *Con los nombres finalistas, explicar a los participantes que habrá que votar en secreto por el nombre que más les guste. *Recoja los votos, cuéntelos y anuncie el nombre ganador	Papelógrafo (L) Masking tape (L), marcadores gruesos (L) Papelitos cortados y urna (S)
4.	Empaque Ahora pensemos en cómo lo vamos a vestir. Pensemos que la hoja que les estamos repartiendo es el empaque del suplemento, el cual dijimos que se llama XX. Recuerden que el suplemento es solo para niños chiquitos, niñitos de menos de dos años.	*Reparta a las madres una hoja y ponga en la mesa los lápices de colores *Ya que cada madre tenga su dibujo, colóquelos todos juntos en el papelógrafo enfrente del grupo.	Mesas o tablas (L) Crayones (L)
	Ahora que tenemos todos estos dibujos trataremos de hacer uno solo, un empaque que pensemos que le llamaría la atención a los niños chiquitos que todavía no pueden hablar.	*Acordar colores *Acordar lugar y tamaño del nombre *Acordar diseño/dibujo	
5.	Para cerrar ¿Creen que algo más que deberíamos agregarle al empaque? ¿Alguien tiene algún comentario que quisiera compartir?		
6.	Refacción		

Anexo 2: Nombres Propuestos

Facilitadores comunitarios 1

Manivit	9
Nutrimanía	1
Vitamaní	1
Manibebé	1
Manileche	0
Manisoya	0
Crecimanía	0
Nutrifer	0
Manicanelavit	0
Manihierro	0
Nutrivitaminas	0

Facilitadores institucionales

Nutrimaní	5
Supermanía	3
Nutriforte Chapín	3
La Chapinita	0
Nutrichapinita	0
Sobremanía	0
Nutritodo	0
Nutridesarrollo	0
Nutrichispa	0
Vitamaní	0
Nutrimaya	0
Nutriforte	0
Nutriniño	0
Nutriforte La Chapinita	0

Vigilantes 1

Manivit	4
Puré vitaminado	1
Cremivit	1
Nutrimaní	0
Puré de manía	0
Pastamanía	0
Multivitmaní	0
Nutrimás	0
Purevit	0
Funcanutre	0

Vigilantes 2

Nutrimaní	4
Cremaní	2
Maní de leche	1
Maní ABC	1
Maní Complejo B	1
Manísabroso	1
Cremarico	1
Margarita	0
Manívitamínico	0
Manillita	0
Crema de maní	0
Manicrece	0
Manifuerte	0
Manirrico	0
Maní Vitamina A	0

Madre Mía 1

Vitahierro	7
Manicrecer	2
Manifuerte	1
Vitacalcio	1
Hierromaní	0
Vitaapetit	0
Manidulce	0
Vitacrece	0
Manirrico	0
Manilisto	0
Vitamaní	0
Vitafuerte	0

Madre Mía 2

Maniapetil	4
Nutrivitaminas	2
Leche fortalecer	1
Nutrisano	1
Leche nutriente	0
Maní cremoso	0
Maní vitaminado	0
Manirrico	0

San Bartolo 1

Fort de maní	6
Nutrifuerte	5
Nutriden	0
Manifort	0
Nutrición	0
Nutriniño	0
Nutrisano	0
Vitamanía	0
Vitasano	0
Calciomanía	0
Nutriforte	0
Calciomaní	0

San Bartolo 2

Vitafuerte	5
Lechevital	1
Manía con leche	0
Lechemanía	0
Leche con azúcar	0
Soya manía	0
Nutrifort	0
Sanolasalud	0
Buena vitamina	0

Equipo de campo

Vitamaní	4
Crecimax	1
Nutribebé	0
Nutrimaní	0
Crecibebé	0
Pastavit	0
Vitacreci	0
Crecivita	0
Manivit	0
Pastamaní	0
Pasta nutricional	0
Nutrivit	0
Suplenuli	0
Vitabebé	0
Manípast	0