Chronic Malnutrition, Breastfeeding, and Ready To Use Supplementary Food in a Guatemalan Maya Town

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Ready To Use Therapeutic Food (RUTF) and Ready To Use Supplementary Food (RUSF) have proliferated in recent years to treat acute and chronic malnutrition. Biomedical research has established the efficacy of these products, yet little is known about their actual effectiveness in real world settings. This article reports on an ethnographic study of the acceptance and use of RUSF within households in a rural Maya community in Guatemala (a country with the world’s third highest rate of chronic malnutrition). We find a number of surprising obstacles to RUSF effectiveness. There is a strong commitment to breastfeeding (supported by public health messages of local NGOs as well as culturally perceived benefits) that leads to sub-optimal complementary feeding after six months. We also found instances of off-label sharing and confusion over relative nutritional values. We present a framework for maximizing RUSF effectiveness that involves nutritional education, positive peer support, and the framing of the product as a medicine.

Key words: Guatemala, malnutrition, breastfeeding, Maya, complementary feeding, RUSF

Introduction

Guatemala suffers from one of the worst rates of chronic malnutrition in the world; UNICEF’s (2009) latest rankings place it third, just below Afghanistan and Yemen. According to the Guatemalan National Institute of Statistics, 43.4 percent of children under five years of age suffer from chronic malnutrition (Ministerio de Salud Pública y Asistencia Social 2009; UNICEF (2009) puts the figure at 54 percent. Not coincidentally, Guatemala has high rates of poverty and inequality. Guatemala ranks second to last, after Haiti, in Latin America on the Human Development Index (UNDP 2012), and income inequality is the 11th highest in the world (World Bank 2012). By any measure (income, education, health), rural, Maya peoples (who make up over half of the population) have the highest rates of deprivation. For example, Maya adults attend school for less than half the number of years as non-indigenous (ladino) adults (Halls and Patrinos 2005). Similarly, the prevalence of stunting, which is used to measure chronic malnutrition, is 69.3 percent among the Maya, nearly double that seen among ladinos (Delgado 2010).

Maya peoples in Guatemala are noticeably shorter than average; Guatemalan Maya males average 158 cm, while the comparable figure from the United States is 178 cm and in the Netherlands 185 cm. Conventional wisdom long held that the Maya were genetically predisposed to short stature. The work of Barry Bogin has shown that height differences are largely due to environmental factors during growth years. Comparing Maya children born in Guatemala with the children of Maya immigrants born in the United States, Bogin and his colleagues (2002) found that Maya American children were on average 11.54 cm taller than their counterparts in Guatemala. This suggests a much stronger environmental influence (marked by malnutrition) on stunting than the previously held belief that stature was genetically determined. Indeed, emerging work shows that periconceptional malnutrition can act as an important epigenetic trigger for many adult diseases, further implicating the contribution of environmental factors (Heijmans et al. 2008; Painter et al. 2006; Susser et al. 1996).

Solving the problem of malnutrition ultimately involves alleviating poverty and providing access to health care,
education, and other services. Important stopgap interventions focus on nutritional education and the distribution of nutritional supplements. In Guatemala, these include fortified milk (such as the Incaparina brand), micronutrient sprinkles ("Chispitas,") and enriched porridges (such as VitaCereal). Evidence suggests that the most effective treatments for acute and chronic malnutrition are Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Food (RUSF), respectively. Both of these therapies generally fall into the broader category of lipid-based nutrient supplements (LNS).

To date, biomedical research has established the clinical efficacy of LNS but has only fleetingly addressed its effectiveness. Efficacy, simply how well a therapy performs relative to a placebo, is the standard for clinical trials of new medical interventions. To increase the probability that a therapy demonstrates a positive effect, clinical trials use a variety of accepted strategies such as a run-in phase to select out poorly adherent patients (Pablos-Méndez, Barr, and Shea 1998; Vera-Badillo et al. 2013). Yet, clinical efficacy may be far removed from actual effectiveness. The relationship between a product and its user, often described by engineers as the "human factors" of product design, can explain the lower effectiveness of a medicine relative to its efficacy. Human factor hindrances to effectiveness are often attributed to a complicated dosing regimen (e.g., insulin for diabetes management) or adverse effects (e.g., interferon for hepatitis B and C treatment). Since the success of chronic malnutrition prevention with RUSF therapy depends on consistent consumption over extended periods of time, there are numerous human and cultural factors influencing the effectiveness that remain unexamined in the biomedical literature.

The current study presents an ethnographic analysis of the effectiveness of complementary feeding and RUSF therapies as practiced in households in the Kaqchikel Maya community of Xejuyu’, Guatemala. Our findings suggest that while health promoters in Xejuyu’ may be achieving one World Health Organization (WHO) goal—exclusive breastfeeding for the first six months of age—they are so successful that it compromises a second WHO (2003) goal—adequate complementary feeding after six months of age. Several local organizations vigorously promote breast milk as the healthiest food for a child, a message convergent with a number of culturally perceived benefits of breastfeeding.1 As a result, mothers continue to breastfeed almost exclusively well beyond six months, when breast milk can no longer provide sufficient nutrients for optimal growth. Many mothers find transitioning to age-appropriate feeding patterns to be inconvenient and unduly harsh on the infants. This is a major obstacle not only to RUSF usage but also to all forms of beneficial complementary feeding.

Following the biomedical usage, we define the effort that a mother needs to invest to successfully transition her child to complementary feeding as "activation energy." In this paper, we describe several strategies to facilitate a successful transition to age-appropriate complementary feeding that bolsters women’s capabilities to exert activation energy. We conclude that in the context of Xejuyu’, the most effective approach is one that (1) empowers women with accurate nutritional information about the foods commonly used in the local diet (as well as the RUSF product in particular), including the importance of complementary feeding after six months; and (2) medicalizes RUSF use (rather than promoting it as a healthy snack) and frames its benefits in terms of short-term health as well as lifetime growth. Our study suggests that the usage of RUSF in Xejuyu’ will increase proportional to the product’s perception as a medicine and women’s knowledge of relative nutritional values.

Background

Compared to traditional inpatient treatment methods, studies have found home-based care for acute malnutrition using Ready-to-Use Therapeutic Food (RUTF) increases treatment capacity, efficacy, and cost-effectiveness (Ashworth 2006; Ciliberto et al. 2005; Gera 2010). Because acute malnutrition is due to a precipitous shortage of food leading to wasting, evaluating successful interventions is also much quicker. This proven effectiveness led to the rapid rise of RUTF treatment for acute malnutrition in African countries.

In Guatemala (and many other places), we find not acute but chronic malnutrition, which is due to inadequate nutrition over a long period of time and which results in stunting, lower academic performance, and lower lifetime earnings (Hoddinott et al. 2008; Stein et al. 2008). Stunting, as measured by height-for-age Z-scores, is a proxy for restricted development of the immune system and restricted neurological development. Following the success of RUTF in combating acute malnutrition, Ready-to-Use Supplementary Food (RUSF) was designed to offer a product more suitable for the prevention of chronic malnutrition (Phuka et al. 2009). The most common RUSF is a paste made from peanuts, powdered milk, vegetable oil, sugar, and a vitamin/mineral mix. RUSF is manufactured as a nutritionally balanced complementary food that can support breastfeeding during children’s critical growth phase beginning at six months of age following the WHO’s (2009b) recommendations as seen in Figure 1.

Studies of home-based LNS treatments have generally found the complementary foods to be highly acceptable and to have high rates of adherence (Adu-Afarwuah et al. 2011; Flax et al. 2009; Lin et al. 2008). These studies commonly assess acceptability and usage through structured questionnaires and by measuring the amount of LNS remaining in the original packages at set intervals during home trial phases. While these studies provide quantitative data for statistical analysis, their methods may overstate actual consumption patterns of LNS. In contrast, ethnographic methods involving direct observation highlight unique barriers to optimal usage of LNS, such as product waste,2 which cannot be easily identified from strictly quantitative methods (Flax et al. 2008, 2010). Findings from qualitative studies are more consistent with informal findings shared among organizations implementing LNS programs.
To date, most studies that have assessed actual usage of LNS have focused on the organoleptic properties of LNS and the method of preparing LNS (Flax et al. 2008, 2009; Hess et al. 2011). More recently, a broader conceptual framework describing barriers and motivators associated with LNS complementary feeding in Uganda analyzed a spectrum of social ecological parameters (Ickes et al. 2012). While some of the individually identified factors are likely generalizable beyond Uganda, there is a need to identify barriers and motivators that are specific to the context of each LNS intervention program.

In Guatemala, we elected to use a variety of qualitative ethnographic methods to examine how RUSF has integrated into local cultural understanding of a child nutrition program in one rural, majority Kaqchikel Maya Guatemalan town. The goal of the study was to identify barriers and motivators at the interface of local cultural norms and RUSF intervention. Based on our results, we propose a preliminary framework to guide future evaluation of how to optimize the effectiveness of RUSF interventions.

Xejuyu’

Xejuyu’ is a small town in the western highlands of Guatemala within the department of Chimaltenango. Nearly all of the approximately 1,300 residents identify as Kaqchikel Maya, and Kaqchikel is the predominant language in town (Rohloff, Cali, and Cali 2011). Though located just 30 km from the municipal center of Tecpán, Xejuyu’ is tucked away in the mountains and connected to other communities only by a rocky and narrow road that hugs a mountainside susceptible to being washed away from heavy rains. Over 80 percent of the population lives in extreme poverty; maize and beans subsistence agriculture is the basis of the local economy (and the local diet) (Fischer 2001).

The more successful local farmers sell crops in nearby cities and the national capital, and since the mid-1990s, a growing number have started growing broccoli, snow peas, cauliflower, and other high-value crops for export to the United States. Located on a fertile and temperate plain (elevation approximately 2,500 meters) traversed by the Pan-American Highway and only 80 km from Guatemala City’s international airport, the area is ideally suited for the year-round export production of nontraditional vegetables (Fischer and Benson 2006).

The need for men to travel outside of Xejuyu’ to sell produce in more populated areas where Spanish is the language of business transactions creates a noticeable material incentive for the men’s frequent completion of básico (the approximate American equivalent of middle school). Women, on the other hand, generally only study until third grade and have a weak command of the Spanish language. Since local education is conducted exclusively in Spanish, each year of education increases Spanish fluency. (Xejuyu’ has two public schools, elementary and básico. The few students who attend high school must travel to neighboring Tecpán.)

Xejuyu’, like many rural areas of Guatemala, was severely affected by Guatemala’s violence of the 1970s and 1980s. Residents report that several families fled during this time to the relative anonymity of Guatemala City but lost their family’s land in the search for increased safety. While several families have moved back to town, many have had to purchase land, while others own a home with no farm land due to financial constraints. Residents explain that this shift in land ownership has caused many individuals to work exclusively as farm hands, greatly reducing their families’ income earning potential.

A number of both governmental and non-governmental organizations operate community assistance programs in Xejuyu’. These organizations include Wuqu’ Kawoq, SHARE, Kajih Jel, and various governmental programs including the municipal health center and the bolsa solidaria, a conditional cash transfer program. Through funding provided by SHARE, Kajih Jel regularly delivers a monthly supply of US-grown food (rice, beans, sugar, oil, and a corn-soy blend used to make a local drink, atol). One house from each of Xejuyu’s seven sectors serves as a distribution center where mothers meet to receive their monthly supply of food and to attend a monthly lesson on nutrition and child-rearing. Additionally, SHARE’s programming includes a school feeding program with daily atol as well as a family garden initiative, in which
individual families receive a supply of vegetable seeds and chickens with the goal of improving child nutrition within the homes.

At the end of May 2010, Tropical Storm Agatha dumped nearly 30 inches of rain in one day in highland Guatemala. Xejuyu’ was particularly affected by mudslides that destroyed local buildings and closed the roads to Tecpán. Stores quickly ran out of supplies, and in response, several aid organizations emerged to alleviate the situation in Xejuyu’. Many other organizations arrived to offer housing and food supplies. Unfortunately, many locals reported that these resources were inequitably distributed by those in power who kept a disproportionate amount of the supplies for their own families.

Whereas many organizations came and left as quickly as the rains, Wuqu’ Kawiq has remained a consistent presence in the community since 2010. An NGO led by Peter Rohloff, Wuqu’ Kawiq began in 2006 with the aim of providing medical care in local languages and, as its mission states, “to build programs at the intersection of indigenous language rights, literacy, and medicine.” After the Agatha tragedy, Wuqu’ Kawiq helped build a wash in Xejuyu’ to channel heavy rainfall coming down the mountainside to prevent homes from being damaged by mudslides. Additionally, the group began to complement its general health screenings and as-needed medical visits by formally initiating a child nutrition program. During the period of study in 2011, Wuqu’ Kawiq was distributing the RUSF Plumpy’Doz® manufactured by Edesia (of Providence, Rhode Island) under license from Nutriset, S.A. (a for-profit and privately held French company) to every qualifying family. As part of its evaluation plan, Wuqu’ Kawiq surveyed every home in the town and determined a 57 percent stunting rate and a 32 percent severe stunting rate among children less than five years of age (Rohloff, Cali, and Cali 2011).

The Study

This study is based on ethnographic research carried out in Xejuyu’ in 2011 focusing on in-home use of RUSFs distributed by Wuqu’ Kawiq. Wuqu’ Kawiq’s RUSF program began in Xejuyu’ in May of 2011, and research was carried out in June and July of that same year. The research design was developed in collaboration with Wuqu’ Kawiq with the aim of producing results that would help inform improvements in the program.

The Wuqu’ Kawiq program targeted the entire population of children between six months and five years of age. Tubs (325g) of RUSF were distributed to all targeted families, and parents were instructed to administer one tablespoon to children (aged six months to five years) three times daily. In addition, pregnant mothers and children less than six months of age began receiving the Plumpy’Doz® RUSF and were instructed to consume the product themselves using the same dosing size and frequency.

The principal investigator (Davis) and two community health workers in Xejuyu’ recruited five mothers to participate in this study. The PI and a female community health worker visited each family weekly, observing household behavior, food preparation, and RUSF usage. The five families completed a total of 22 in-depth home visits, each lasting three to four hours at different times in the morning and afternoon. The home visits started approximately two weeks after families began receiving RUSF. This allowed time for families to settle into a routine without observation.

In addition, four focus groups were conducted, two for mothers (including some of those participating in the home visits) and two for their husbands. The focus groups were used to validate the ethnographic observations made in home visits across a broader cross section of the community. Each focus group had between 8 and 12 participants. A survey questionnaire was administered to all participants to record the age complementary feeding began and the age breastfeeding ended for each child. Additionally, mothers were asked whether they perceived RUSF to be a medicine or food. The focus groups took place before the final set of home visits so that new themes and different perspectives could be considered in the final set of home visits.

Our study focused on three key issues. First, we considered whether target children were consuming RUSF regularly without marked parental coercion, which we defined as acceptance (a binary variable). Second, we considered how well each family was adhering to the dosing instructions for RUSF, a qualitatively continuous variable that we defined as usage. Finally, we assessed why or why not RUSF was being used as indicated. While we expected acceptability of RUSF to be high, usage was observed to be consistently suboptimal.

The resulting thematic patterns were organized to create a framework of RUSF usage patterns in Xejuyu’. This conceptual framework was used, in turn, to develop brief, targeted survey questions as well as discussion points for the focus groups. These data are presented as a quantitative complement to the qualitative interview and observational findings. Together, the methods facilitate the organization of ethnographic data to extract meaningful information on the barriers and motivators associated with optimal RUSF usage.

Results

The peanut paste form of RUSF distributed in Xejuyu’ is foreign to local diets. Still, children seem to accept it fairly readily, although parents are often put off by the texture and consistency. Only among a very few families is the product rejected outright. In our sample, only one family and its two children did not consume the product in any meaningful amount. Both children were unusually selective eaters, and the parents were not able to incentivize consumption of the RUSF (or of other home prepared foods). No other observations among the families studied (including target children, older siblings, and parents) suggested organoleptic properties (i.e., taste, sight, smell, and touch) that compromised the acceptability of RUSF.
Among the four families observed who did accept the product, the children in three of the families were still actively breastfeeding. In each family, the mothers were consistently observed breastfeeding their children more than once an hour. Mothers would generally not offer any complementary foods (RUSF or traditionally prepared food). When complementary food was offered around mealtimes, it was only after children had finished breastfeeding. The general pattern was that mothers would breastfeed while they ate their own meals. After the mothers had eaten the majority of their meal, they would offer a small portion of their food to their breastfeeding children. When offered complementary food, the children often showed limited interest in feeding beyond breast milk, presumably because the children were already satisfied from the prior feeding of breast milk. At times, however, after the children refused complementary feeding, mothers would offer additional breast milk, and the children would often accept. Sometimes mothers would cycle between offering breast milk followed by brief attempts at offering complementary food. In any given observational period lasting three to four hours, a child was never observed eating more than approximately one to two teaspoons of complementary food, a quantity that appeared independent of the child’s age.

During these observed periods of reluctant complementary feeding, the mothers appeared to become quickly frustrated with their children’s refusal and returned to breastfeeding. In fact, when mothers were asked about their preferences between breastfeeding and complementary feeding, they consistently reported preferring breastfeeding because it was more convenient, more economical, and the healthier choice for their children. They cited tradition as well as public health announcements to bolster their position.

One lactating mother consumed RUSF herself because she believed the product helped her produce sufficient breast milk and that RUSF would be too thick for her six month old child. At one point during the study, however, that mother began feeding a mashed fruit medley to her child in addition to continuing breastfeeding. She reported that she began complementary feeding only after her child demonstrated a readiness to eat, which the mother identified by her child’s showing interest in food by actively reaching for it. Additionally, the mother reported that her child no longer spat up food, a further sign that confirmed her child was ready for complementary feeding. Throughout the first three weeks of complementary feeding for that child, the child’s consumption of complementary food remained at two teaspoons for the entire day.

When RUSF was offered as a complementary food to the breastfeeding children, two of the mothers always offered the product mixed with atol, a traditional drink prepared by mixing hot water (or sometimes milk) with rice, oats, or corn and seasoned with salt or sugar. One mother initially reported that her 17 month old and six year old did not care for the product unless it was mixed in atol. Although aware of how to get her children to consume RUSF, albeit inappropriately for the six year old, she reported not using atol regularly because she was nearing the end of the corn-soy blend ration provided by a separate local NGO. The NGO was running out of funding for Xejuyu and would no longer be providing families food rations to which they had grown accustomed. While the limited supply of atol caused this mother not to use RUSF with the preferred frequency, she responded to a perceived pressure to return empty RUSF containers to Wuq’i Kawoq at the upcoming monthly distribution by demanding that her two oldest children (six years and 17 months) consume a 3.5 week supply of RUSF in just one afternoon while she tended her cattle. After requiring her children to consume RUSF with nothing more than a spoon, the mother reported that her children began to love the pure product, even without atol. In fact, the children had never been observed consuming RUSF prior to that afternoon, but during subsequent home visits, they were regularly seen happily eating RUSF with a spoon or, more frequently, with their hands digging into the container. While frequency of RUSF usage increased in this family, the change also resulted in the family’s completing the second monthly supply too quickly since both the 17 months old and six year old shared a monthly supply intended only for the younger of the two children.

One mother fed her target children the RUSF unaccompanied by breastfeeding. The mother explained that her four-year-old son stopped breastfeeding when he became pregnant with her currently two-year-old son. The two-year-old son had recently stopped breastfeeding when the mother became sick, which she believed made her milk unhealthy for her child. Both of these children regularly consumed RUSF of approximately the appropriate dosage. Although both of the targeted children found RUSF to be acceptable, two older siblings in the household also enjoyed eating RUSF directly out of the container and, therefore, caused the monthly RUSF rations to run out significantly ahead of schedule.

**Breastfeeding and Medicalizing RUSF**

Since the home observations suggested a strong relationship between breastfeeding practices and usage of RUSF, we used the focus groups to better understand attitudes and practices surrounding breastfeeding among community members in Xejuyu.

Mothers participating in the focus groups indicated that 95.2 percent of their 62 children who are currently complementary feeding began eating complementary foods only after turning six months of age (Figure 2). The reported initiation of complementary feeding in Xejuyu indicates strong adherence to the WHO’s (2009b) goal of exclusive breastfeeding for the first six months of a child’s life. Moreover, among the 50 children who no longer breastfed, no children were reported to have discontinued breastfeeding before reaching six months of age (Figure 3). At 18 months of age, 66 percent of those children were reported to still breastfeed (Figure 3).

Throughout the five weeks of home visits, the participating mothers indicated a strong preference for breastfeeding over complementary feeding as long as there was no perceived
contraindication to breastfeeding (see Table 1). Additionally, observations also suggested that mothers were reluctant to discontinue breastfeeding unless key events occurred that necessitated the change. The focus groups confirmed these observations and also enabled the development of a list of motivators and barriers associated with breastfeeding. During the focus groups, the mothers agreed that in their experiences, breastfeeding continued due to the benefits listed on the left side of Table 1 until one of the key events listed on the right indicated that a child should no longer continue receiving breast milk.

Mothers were also asked to document an initial opinion on whether they believed RUSF was a food or medicine. Among the participating mothers (n=18), half believed the product was more like a food while the other half believed the product was more like a medicine. During the focus group conversations, the mothers who earlier indicated their belief that RUSF is a food substantiated their case by defining a medicine as something that eliminates sickness. Some mothers responded that after two months of RUSF consumption, their children became sick less often. Still, a couple of mothers indicated that their children got diarrhea shortly after consuming RUSF, which they attributed to the product.

The discussion of RUSF being a food or medicine led to the mothers discussing the importance of preventive medicines, such as vaccines for which they were willing to wait in long lines to preserve the health of their children. This high tolerance for enduring the inconvenience of receiving vaccines was consistent with observations during the home visits of mothers who administered liquid acetaminophen on a fixed schedule while their children were sick, even though their children were often screaming and resistant to swallow

Table 1. Representative Mothers’ Responses to Questions on Their Breastfeeding Practices

| "Why do you still breastfeed?" | "Why did you stop breastfeeding your child?"
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<tbody>
<tr>
<td>&quot;Breastfeeding is more convenient.&quot;</td>
<td>&quot;I got pregnant. It makes my milk change taste and color, so he doesn’t like it anymore.&quot;</td>
</tr>
<tr>
<td>&quot;It is hard to get him to stop breastfeeding.&quot;</td>
<td>&quot;I got pregnant. It makes my milk change taste and color, and it will make him get sick because of it.&quot;</td>
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<tr>
<td>&quot;If he does not ask for a food, it will cause ‘impaction.’&quot;</td>
<td>&quot;I got sick, which makes my milk unhealthy for the child. I had to stop.&quot;</td>
</tr>
<tr>
<td>&quot;Breast milk is the best food.&quot;</td>
<td>&quot;One time, I accidentally scared my child as I was about to breastfeed him. Ever since then, he no longer wanted to breastfeed.&quot;</td>
</tr>
<tr>
<td>&quot;Breastfeeding is more economical.&quot;</td>
<td>&quot;He started to bite. It hurt.&quot;</td>
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<tr>
<td></td>
<td>&quot;He lost interest.&quot; (speaking about her four year-old child)</td>
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the medicine. From these discussions emerged the idea that as mothers increasingly perceive RUSF as medicine, adherence to RUSF is likely to increase as well.

Discussion

The initial aim of the study was to assess adherence to RUSF using ethnographic methods given the published discrepancies in the biomedical literature cited above. Despite a limited sample size, our home visits permitted an intimate perspective that revealed considerable underuse and misuse of RUSF. Other studies in Central America have demonstrated mixed results. Matias et al. (2011) present a technical report that evaluated the acceptability of RUSF in Guatemala. The authors concluded that RUSF was well accepted with 74.6 percent of RUSF being consumed after a two week home use trial, a model that is commonly used in much of the literature evaluating RUSF. Estrada et al. (2011) use dietary recall to determine a dose adherence rate of 23-38 percent. Moreover, home visits found “evidence of substantial sharing of the LNS product, which may explain the lack of improvement for growth outcomes.” Given the results of this study and the ones done in Africa, there is strong evidence to conclude a meaningful difference between LNS efficacy and effectiveness.

In looking at the cultural perceptions of RUSF in Xejuyu’, we found an apparent, albeit unnecessary, antagonistic relationship between breastfeeding and complementary feeding. The WHO (2009b) has established a goal of promoting exclusive breastfeeding through the first six months of age worldwide. Congruent with this standardized goal, many NGOs and governmental agencies in Xejuyu’ have promoted a strong message of breastfeeding, which was confirmed by participants in this study. Furthermore, these participants frequently cited the messages disseminated by NGOs that “breast milk is best” as reasoning for their preference of breastfeeding over complementary feeding. In addition, products in local stores are labeled with a required message reminding parents that breast milk is the best food for a child under six months. That message is ubiquitous and salient for most residents in Xejuyu’ (and elsewhere in Guatemala).

In fact, the findings of our study suggest that the widespread public campaigns are achieving their intended aim as mothers reported that less than 5 percent of their children began complementary feeding before reaching six months of age. Unfortunately, we have no access to baseline data in Xejuyu’ prior to the initiation of the local organizations’ interventions. Therefore, it is difficult to conclusively differentiate the preference for breast milk as a cultural tradition from the messages of public health campaigns. In any case, NGOs and government programs need to be cautious of how their message is delivered and perceived, as that same message can reinforce a suboptimal model of health.

Evidence from this study suggests that organizations may be achieving the WHO breastfeeding goal. However, the focus on achieving high rates of exclusive breastfeeding during the first six months of age may be so successful that this compromises a second WHO (2009b) goal—adequate complementary feeding after six months of age. While the quantitative data collected during the focus groups did not suggest any issues with complementary feeding, ethnographic methods enabled us to describe the realities of complementary feeding within the home. For example, even though children generally initiated complementary feeding and terminated breastfeeding within appropriate age ranges, home observations revealed that complementary feeding remained nominal until breastfeeding was terminated altogether. Between the perceived benefits of breastfeeding and the strong message from NGOs promoting breast milk as the unquestionable healthiest food for a child, mothers continued to breastfeed and were reluctant to encourage their children to transition to age-appropriate feeding patterns. In fact, many mothers reported that they found incorporating complementary feeding to be a significant inconvenience. In struggling to adopt appropriate complementary feeding routines, most mothers in Xejuyu’ continued to breastfeed, as it was the path of least resistance. Only after one of the key events listed in Table 1 signaled the necessity to terminate breastfeeding altogether would mothers invest the energy needed to adopt meaningful levels of complementary feeding.

However, as was observed in the case of one family, the mother and children eventually adopted improved usage of RUSF consumption without ostensibly compromising breastfeeding when the perceived pressure of returning empty containers to Wuq’ Kawqow served as the source of activation energy—the effort a mother needs to invest to overcome her child’s initial reluctance to complementary feeding. Once this barrier was overcome, the mother found RUSF to provide many of the same benefits as breastfeeding: it was convenient, inexpensive, and healthy for her child. Therefore, it seems that successful usage of RUSF itself is not as much of a challenge as successful transition to RUSF. In Figure 4, we have synthesized observations from our sample on overcoming the activation energy hurdle in RUSF adoption. This conceptual framework organizes strategies that may help mothers invest the needed effort to integrate RUSF within their daily routines.

The first strategy is to ensure that recipient families have a consistent and accurate understanding of basic nutritional values of the foods in their house as well as of the RUSF and how it should be used. Throughout the study, several different understandings of the product were conveyed to the fieldworker. These misunderstandings likely led to less frequent usage and explicitly contributed to the mother in one family consuming the product herself instead of giving it to her child. Additionally, encouraging mothers to offer complementary food before breastfeeding should be considered to improve adoption of complementary feeding.

Second, in framing the benefits of product usage, advantages should be pulled forward in time and should promote values that are meaningful to parents. In a community in which the average person is stunted and consequently the reference height is lower, mothers are likely to perceive a smaller height deficit, if any, among those in their community.
compared to that perceived by intervening organizations. Moreover, encouraging the mothers to regularly use the product because their children will be noticeably taller several years later requires a mother to appreciate a significant delayed gratification. This is especially challenging when she already believes breast milk is independently and completely nutritionally adequate for a child who is currently struggling with complementary feeding. Although noticing a change in height is susceptible to significant discounting among mothers, some mothers reported noticing that after consuming RUSF for almost two months, their children became ill less frequently. Because a nutritionally complete diet is known to improve a child’s immune system (Roth et al. 2008; WHO 2009a), aid organizations could consider promoting this benefit that is temporally much closer to the parents’ immediate concerns, thereby reducing future discounting.

Third, emphasizing that the product may reduce sickness fits much more neatly within the community’s preexisting definition of a medicine, which they see as something that either eliminates sickness (such as antibiotics) or something that prevents sickness (e.g., vaccines). By shifting the perception of RUSF closer towards a “medicine” and away from “food,” mothers may be more likely to invest extra energy in product adoption. By analogy, parents were observed to be insistent on administering Western medicines to their visibly unhappy children who were reluctant to take any medicines at all.

Finally, positive peer support is highly effective in overcoming psycho-social barriers to activation energy. This should be empowering rather than coercive, building on information sharing and cultural norms to promote good usage. Behavioral economics experiments have demonstrated the effects of channel factors and tension systems that promote behavior change (Bertrand, Mullainathan, and Shafir 2006). For example, Ross and Nisbett (1991) find that when nutritionists individually consulted with rural mothers in a maternity ward advising them to administer cod-liver oil to their infants, 20 percent adhered to the recommendation. However, when the same information was presented in six-person discussion groups, adherence rose to 45 percent. Similarly, organizations in Guatemala could espouse related strategies to promote improved usage of RUSF.

While observations and conclusions drawn from this study suggest that the conceptual framework may improve usage of RUSF in Xejuyu’ and similar communities in Guatemala, further investigation is needed to evaluate the effectiveness of implementing the framework. Evaluation of long-term acceptance and usage of RUSF is needed to identify taste fatigue or other phenomena that would compromise its effectiveness. Although improving long-term usage patterns will be important for further optimizing the effectiveness of RUSF programs, improving usage upon initiation of RUSF interventions should be a priority. Otherwise, without strong initial usage of RUSF, long-term usage becomes less relevant.

Our findings show that it is particularly important to support mothers and their children through strategies that promote optimal age-appropriate breastfeeding and complementary feeding. Unfortunately, the public health message in Xejuyu’ has been so focused on promoting exclusive breastfeeding that mothers in the community may not be getting full information on the importance of complementary feeding after six months. In fact, the WHO (2003:9) is well aware of this threat to its child health development goals:

Infants are particularly vulnerable during this transition period when complementary feeding begins. Appropriate complementary feeding depends on accurate information and skilled support from the family, community, and health care system. Inadequate knowledge about appropriate foods and feeding practices is often a greater determinant of malnutrition than the lack of food.

Given our findings, we agree with the assessment of the WHO and propose that organizations treating chronic malnutrition include a rigorously designed and evidence-based curriculum. Furthermore, intervening organizations should assess the effects of their communications along with that of other organizations to ensure a consistent, accurate message.

We have documented barriers and motivators associated with RUSF usage in order to assess the effectiveness of the product. While the therapeutic efficacy of RUSF has been established in Malawi and continues to be more thoroughly investigated, there may be differences in the culture-product interface that determine variations in usage and, consequently, effectiveness (Phuka et al. 2009). In fact, the study in Malawi reported that exclusive breastfeeding for babies was almost nonexistent, and the infant diet was typically complemented with thin maize porridge from two to six months of age which is in stark contrast to the feeding patterns observed in Xejuyu’ (Phuka et al. 2009).

While the results from this study cannot be generalized given the risk of selection bias, the in-depth results from this
ethnographic study will help orient researchers to future work at a larger scale using different instruments, such as surveys or shorter interviews, that are guided by these ethnographic observations. Through an improved understanding of human and cultural factors, the clinical- and cost-effectiveness of RUSF therapy can be optimized, allowing aid organizations to maximize their impact on communities threatened by chronic malnutrition. We encourage researchers to devote more time to studying and improving the products' effectiveness and not just efficacy. After all, the clinical and social impacts of RUSF are determined by how well real consumers interact with the product in their daily context, not in optimized and strategic studies reminiscent of clinical trials.

Notes

1In the 1970s, Nestlé, Bristol-Myers, and others aggressively marketed infant formula in Guatemala (and elsewhere in Latin America) that was strongly implied to be as good or better than breast milk. Their success in getting mothers to switch from breast milk to formula led to a wave of criticism from public health and human rights organizations, and in the early 1980s, Guatemala began regulating their marketing and promoting breastfeeding through public service programs. A 1983 law prohibited images of idealized babies on formula labels and required a statement that breast milk is superior for children.

2One mother in Xejuyu' made sure her monthly ration of containers was empty on time by feeding RUSF to her cats.

3The children's method of eating RUSF packaged in 325g pots prompts the need for meaningful consideration of whether single serve sachets would be significantly more sanitary than the pots intended for weekly consumption.

References Cited


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