FOOD FOR THOUGHT:
THE EFFECTIVENESS OF INPATIENT MALNUTRITION TREATMENT
IN THE CASE OF NUTRE HOGAR IN PANAMA

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To the children of Nutre Hogar,

who captured my heart

and taught me never to give up.
ACKNOWLEDGEMENTS

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I also owe many thanks to Professor Ken Rogerson, whose unwavering support and ability to make complex quandaries seem easy have helped me through many a dark day.

This research was made possible thanks to the support of Nutre Hogar in Santiago, and I am deeply grateful for the support I received while in Panama. In addition, I am thankful for the gracious financial support of DukeEngage, the Public Policy Summer Research Grant, and the Jacqueline Anne Morris Research Fellowship—all of whom made my trips to Panama a reality.

Finally, many thanks go to my friends and family, who have listened to the many complaints over the past year, stayed up late nights with me, and have steadfastly supported me throughout this entire endeavor.
“Why should there be hunger and privation in any land, in any city, at any table when man has the resources and the scientific know-how to provide all mankind with the basic necessities of life? … There is no deficit in human resources; the deficit is in human will.

The well-off and the secure have too often become indifferent and oblivious to the poverty and deprivation in their midst. The poor in our countries have been shut out of our minds, and driven from the mainstream of our societies, because we have allowed them to become invisible.

Just as nonviolence exposed the ugliness of racial injustice, so must the infection and sickness of poverty be exposed and healed - not only its symptoms but its basic causes. This, too, will be a fierce struggle, but we must not be afraid to pursue the remedy no matter how formidable the task.”

Martin Luther King Jr.
Nobel Lecture
December 11, 1964
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>1</td>
</tr>
<tr>
<td>ACRONYMS</td>
<td>2</td>
</tr>
<tr>
<td>CHAPTER 1: MALNUTRITION EXISTS IN PANAMA?</td>
<td>3</td>
</tr>
<tr>
<td>1.1 A FASCAD ENSCONCES THE POVERTY IN THE INTERIOR</td>
<td>3</td>
</tr>
<tr>
<td>1.2 NUTRE HOGAR: A NUTRITION HOUSE TO FEED THE HUNGRY</td>
<td>4</td>
</tr>
<tr>
<td>1.3 DEFINITIONS AND DETERMINANTS OF NUTRITIONAL HEALTH</td>
<td>5</td>
</tr>
<tr>
<td>1.4 MALNUTRITION TREATMENT MODELS USED AROUND THE WORLD</td>
<td>5</td>
</tr>
<tr>
<td>CHAPTER 2: WHAT WORKS AND WHY?</td>
<td>8</td>
</tr>
<tr>
<td>2.1 THERAPEUTIC FEEDING CENTERS</td>
<td>8</td>
</tr>
<tr>
<td>2.2 COMMUNITY-BASED THERAPEUTIC CARE</td>
<td>9</td>
</tr>
<tr>
<td>2.3 THE HEARTH NUTRITION MODEL BASED ON POSITIVE DEVIANCE</td>
<td>12</td>
</tr>
<tr>
<td>2.4 COMPARISONS AND LIMITATIONS OF MALNUTRITION TREATMENT MODELS</td>
<td>12</td>
</tr>
<tr>
<td>CHAPTER 3: PANAMANIAN CONTEXT &amp; NUTRITIONAL PROGRAMS</td>
<td>15</td>
</tr>
<tr>
<td>3.1 DETERMINANTS OF NUTRITIONAL STATUS IN PANAMA</td>
<td>15</td>
</tr>
<tr>
<td>3.2 SUPPLEMENTARY FOODS IN PANAMA</td>
<td>17</td>
</tr>
<tr>
<td>3.3 NUTRE HOGAR: TREATING MALNUTRITION IN PANAMA</td>
<td>18</td>
</tr>
<tr>
<td>CHAPTER 4: METHODOLOGY</td>
<td>20</td>
</tr>
<tr>
<td>4.1 CASE STUDY JUSTIFICATION</td>
<td>20</td>
</tr>
<tr>
<td>4.2 FRAMEWORK FOR THE EVALUATION OF NUTRITIONAL PROGRAMS &amp; INTERVENTIONS</td>
<td>22</td>
</tr>
<tr>
<td>4.2.1 AGE OF THE CHILDREN</td>
<td>22</td>
</tr>
<tr>
<td>4.2.2 DURATION &amp; COSTS OF TREATMENT</td>
<td>22</td>
</tr>
<tr>
<td>4.2.3 PHYSICAL OUTCOMES OF TREATMENT &amp; RELAPSE RATE</td>
<td>23</td>
</tr>
<tr>
<td>4.2.4 COMMUNITY PERCEPTIONS OF NUTRE HOGAR</td>
<td>23</td>
</tr>
<tr>
<td>4.2.5. GENERAL OBSERVATIONS</td>
<td>24</td>
</tr>
<tr>
<td>4.3 METHODOLOGICAL LIMITATIONS</td>
<td>24</td>
</tr>
<tr>
<td>CHAPTER 5: FINDINGS AND RESULTS</td>
<td>26</td>
</tr>
<tr>
<td>5.1 QUANTITATIVE DATA</td>
<td>26</td>
</tr>
<tr>
<td>5.1.1 AGE OF THE CHILDREN</td>
<td>26</td>
</tr>
</tbody>
</table>
5.1.2 DURATION & COSTS OF TREATMENT 27
5.1.3 PHYSICAL OUTCOMES OF TREATMENT & RELAPSE RATE 29

5.2 QUALITATIVE DATA 33
5.2.1 COMMUNITY PERCEPTIONS OF NUTRE HOGAR 33
5.2.2 GENERAL OBSERVATIONS 35
  5.2.2.1 FOODS AND FORMULAS 35
  5.2.2.2 OTHER SERVICES PROVIDED AT NUTRE HOGAR & FOLLOW UP 36
  5.2.2.3 CULTURE 37

CHAPTER 6: DISCUSSION, ANALYSIS, & RECOMMENDATIONS 38
6.1 DISCUSSION OF RESULTS 38
6.2 FINANCIAL CONSIDERATIONS 39
  6.2.1 GEOGRAPHIC & SEASONAL CONSIDERATIONS 40
  6.2.2 FOOD CONSIDERATIONS 44
6.3 CULTURAL CONSIDERATIONS 45
  6.3.1 CULTURE & FAMILY PLANNING 45
  6.3.2 PSYCHOLOGICAL CONSIDERATIONS 47
6.2 RECOMMENDATIONS AND FUTURE STEPS 50

REFERENCES 53

APPENDICES 56
APPENDIX A: FINANCIAL CALCULATIONS TO FIND THE PER DIEM COST OF TREATMENT 56
APPENDIX B: SAMPLE INTERVIEW QUESTIONS 57
ABSTRACT

A nonprofit nongovernmental organization named Nutre Hogar was founded in 1988 to address the high prevalence of child malnutrition in Panama. Given the context specific nature of malnutrition treatment models, this paper evaluates whether or not Nutre Hogar’s inpatient treatment model is suited to the Panamanian context and whether an alternative model might be more effective. Quantitative data about physical outcomes of treatment were collected from a Nutre Hogar logbook, and interviews with parents of patients and Nutre Hogar staff members were conducted to gather qualitative data on community perceptions of Nutre Hogar. While children gained weight throughout their stay, they left the center still moderately malnourished, raising concerns about the efficacy of treatment. Recommendations include incorporating elements of other malnutrition treatment protocols into Nutre Hogar’s current program, as well as focusing on sustainable solutions for preventing malnutrition in children under five years of age in Panama.
<table>
<thead>
<tr>
<th>ACRONYMS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CTC</strong>: Community-based Therapeutic Care</td>
</tr>
<tr>
<td><strong>HFA</strong>: Height-for-age</td>
</tr>
<tr>
<td><strong>MM</strong>: Moderate Malnutrition</td>
</tr>
<tr>
<td><strong>NGO</strong>: Non-Governmental Organization</td>
</tr>
<tr>
<td><strong>PD</strong>: Positive Deviance (Deviant)</td>
</tr>
<tr>
<td><strong>RUTF</strong>: Ready-to-Use Therapeutic Food</td>
</tr>
<tr>
<td><strong>SAM</strong>: Severe Acute Malnutrition</td>
</tr>
<tr>
<td><strong>TFC</strong>: Therapeutic Feeding Center</td>
</tr>
<tr>
<td><strong>UNICEF</strong>: United Nations Children’s Fund</td>
</tr>
<tr>
<td><strong>WHO</strong>: World Health Organization</td>
</tr>
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<td><strong>WFA</strong>: Weight-for-age</td>
</tr>
<tr>
<td><strong>WFH</strong>: Weight-for-height</td>
</tr>
</tbody>
</table>
CHAPTER 1

MALNUTRITION EXISTS IN PANAMA?

1.1 A facade ensconces the poverty in the interior

Panama, increasingly known as a tourist destination with beautiful beaches and rainforests, is also often thought of as one of the wealthier Central American countries. On aggregate, this is true; Panama has the second highest gross domestic product per capita in Central America (Economist Intelligence Unit, 2008). However, the outward opulence of Panama’s capital city does not trickle down to the rest of Panama, and the average wealth does not reflect the country’s considerable socioeconomic disparities. Panama’s rural interior, in stark contrast to its coastal towns, is heavily populated by extremely poor farmers and indigenous groups. The poverty in this region often translates into decreased access to food, most prominently factoring into a high prevalence of malnutrition in children. However, many Panamanians are so oblivious to the hardships in the interior that they do not believe that there are malnourished children until they personally see it for themselves.

As one of the most socioeconomically unequal countries in the world, Panama’s nutritional situation for children under five years of age has deteriorated rapidly in the past fifteen years, with the prevalence of chronic malnutrition increasing from 9 percent in 1992 to 20.6 percent in 2003 (Atalah S. & Ramos O., 2005). Panama is one of two countries in Central America that has seen an increase in the number of children chronically malnourished in the past

1 In regards to family income distribution, Panama has a GINI index of 56.1, where the GINI index measures inequalities in the distribution of family income (Central Intelligence Agency, 2009). A higher GINI index indicates greater socioeconomic disparities. Panama’s GINI index is among the highest in the world; it is on par with Brazil (56.7) and just a little less than South Africa (65)—two of the most unequal counties in the world (The World Bank, 2000).
decade (UNICEF, 2007). Furthermore, researchers have documented stark health disparities between the Panamanian indigenous population and the non-indigenous population that require both remedial and preventive actions. For example, although the indigenous population only comprises 11.3 percent of the total population, indigenous regions host 39 percent of the chronically malnourished children in the entire country (Rogers, Wirth, Macías, & Wilde, 2007).

1.2 Nutre Hogar: A nutrition house to feed the hungry

To address the high malnutrition prevalence in Panama, a not-for-profit, non-governmental organization called Nutre Hogar was created in 1988 to treat malnourished children from historically indigenous and poor populations. Unsurprisingly, the name “Nutre Hogar” in Spanish directly translates to “Nourishing House.” The Nutre Hogar model of treating malnutrition consists of two main components: community centers and nutritional recuperation centers. While community centers teach classes on topics such as agricultural practices, cooking skills, and basic health lessons, the nutritional recuperation centers are primarily for treating the children. In addition, Nutre Hogar also runs several outpatient programs, such as delivering vitamins, milk, and nutritious cookies to school-aged children.

Malnourished children, ranging from a couple weeks old to around 60 months of age, are brought to Nutre Hogar nutritional recuperation centers in larger Panamanian cities for treatment spanning several weeks to a year. Children are brought to the center in one of three ways: through medical tours that Nutre Hogar conducts in community centers to identify malnourished children, hospital or governmental agency referrals, or parents who bring their children in themselves. Access to the mountains where a large portion of the malnourished kids is located is limited, especially during Panama’s rainy season. Consequently, children are typically separated from their families for the duration of their treatment.
1.3 Definitions and Determinants of Nutritional Health

General metrics for measuring a child’s malnutrition state include weight-for-height (WFH), height-for-age (HFA), and weight-for-age (WFA). Of these three statistics, the former two are more widely used because they are more predictive of the child’s actual malnutrition status. WFH is used to determine wasting, and HFA is used to determine stunting (de Onis, 2000). Nutritional health is determined by many factors, including income, level of education, access to and adequate quantities of food, and an environment free of communicable diseases.

According to the World Health Organization (WHO), severe acute malnutrition (SAM), the worst form of malnutrition, is defined by an extremely low weight-for-height measurement that is under -3 z-scores of the median WHO growth standards. Other indications of SAM include visible severe wasting, the presence of nutritional edema such as kwashiorkor, or an arm circumference fewer than 110 mm in children aged 6 to 59 months (World Health Organization, World Food Programme, United Nations System Standing Committee on Nutrition, & The United Nations Children's Fund, 2007). By contrast, the WHO defines moderate malnutrition (MM) as a weight-for-age between -3 and -2 z-scores below the median of the WHO growth standards. Without sufficient nutritional support, moderately malnourished children run the risk of deteriorating into a state of SAM, as well as becoming more immunocompromised and stunted. Furthermore, children with MM are more likely to suffer nutrition-related deaths (World Health Organization, 2008). In Latin America, stunting is the most common manifestation of malnutrition in children aged 5 or under (Rogers, et al., 2007; UNICEF, 2006).

1.4 Malnutrition Treatment Models Used Around the World

The Nutre Hogar model of malnutrition treatment is most similar to the Therapeutic Feeding Center (TFC) inpatient model that was previously commonly used in other countries
with high rates of malnutrition. The TFC treatment model, found in certain African countries, consists of hospitalizing a child for a few weeks to give them nutritious and high caloric milk formulas, as well as to treat them for opportunistic infections. While this treatment model was very effective in treating severe acute malnutrition, the high costs for the child’s parents, in combination with fixed capacity constraints, led to the underutilization of the TFC treatment model. As a result, many African communities have started to switch to a Community-based Therapeutic Care (CTC) model, which relies on community mobilization and family care for malnutrition treatment. While parents must still bring their children to clinics to be assessed for malnutrition, they are usually able to care for the children themselves by administering packets of Ready-to-Use Therapeutic Foods (RUTFs) at home. This model effectively cuts down on administration and costs, allowing for more children to be treated at a given time.

In addition, the Hearth Nutrition Model based on the Positive Deviance (PD) approach is another malnutrition treatment model that has become more popular among non-governmental organizations (NGOs) in recent years. Positive deviance is defined as “adaptive responses for satisfactory child growth under harsh economic circumstances such as food scarcity. By contrast, negative deviance is defined as “the failure of children to grow satisfactorily, even under good economic conditions” (Zeitlin, Ghassemi, & Mansour, 1990). The premise of the Hearth model is to find solutions that already exist within the local community. In the context of malnutrition, the PD approach identifies poor families who have well-nourished children; these children are called Positive Deviant Children (PD children), and their families are called Positive Deviant Families (PD families). These exceptional PD children and families are evidence that it is possible to be well-nourished within an impoverished setting before other developmental and infrastructural steps are taken. Their behaviors, including feeding, caring, and health-seeking
practices, are then studied to identify which specific behaviors make them PD from others in their community who have the same resource base but malnourished children. These behaviors are then taught to other community members. PD solutions also tend to be sustainable because they are community-based (Sternin, Sternin, & Marsh, 1998).

It is very plausible that an inpatient model better suits the needs of the Panamanian community than CTC, even though CTC traditionally has more benefits than the TFC model. Furthermore, very few RUTFs based on products other than peanuts have been produced, which is problematic if the taste of the RUTF is not palatable to Panamanian children. Differences in community, geography, financial resources, and local food production characteristics may explain why Panama has not adopted the CTC model for treating malnutrition, while logistical difficulties in identifying positive deviant families within the target community may further explain why the Hearth model has not been adopted.

Selection and implementation of malnutrition treatment programs vary depending on a particular location’s context. As a result, which malnutrition treatment model would work best in Panama given its environment, culture, financial situation, and politics? Furthermore, does the current Nutre Hogar inpatient model—closest to the TFC model of treating malnutrition in children younger than five years of age—meet the organization’s goals of treating and preventing relapses into malnutrition within traditionally marginalized communities?
CHAPTER 2
WHAT WORKS AND WHY?
A comparison of malnutrition treatment models

2.1 Therapeutic Feeding Centers

Malnutrition has historically been treated in inpatient Therapeutic Feeding Centers (TFCs) such as hospitals, nutrition rehabilitation units, and community health centers; however, NGOs and malnutrition experts have more recently advocated for a community-based homecare treatment model (Collins, et al., 2006; Grobler-Tanner & Collins, 2004; Manary, Ndekha, Ashorn, Maleta, & Briendl, 2004; Orach & Kolsteren, 2002; World Health Organization, et al., 2007). Proponents of the TFC model cite its important role in treating children with SAM and additional medical complications (Navarro-Colorado, Fournier, Verdenal, & Ververs, 2002), as well as the effectiveness of TFCs in treating individual cases of SAM (Mates, 2004).

Conversely, critics of the TFC model argue that that it is expensive to administer, has a resource-intensive nature, fixed treatment capacity, and a need for highly skilled medical staff and imported therapeutic product. Critics of the TFC model have also pointed out that disease tends to spread quickly in these treatment facilities because of the close proximity of many patients immunocompromised by malnutrition. Furthermore, the costs of bringing in a child for more than 30 days of extensive care are usually too high for the parents. A parent is usually required to stay at the TFC with the malnourished child, causing ramifications such as not being able to work and make money, or having other children at home slide into malnutrition due to a lack of care. The high costs to the parents and other family members often prevent them from bringing their malnourished children for treatment at TFCs (Collins, 2001; Gatchell, Forsythe, & Thomas, 2006; Grobler-Tanner & Collins, 2004).
2.2 Community-Based Therapeutic Care

While the TFC system was the prevalent malnutrition treatment model used prior to the introduction of community-based therapeutic care (CTC) in 1998, the CTC model has been widely supported in the past decade as a new paradigm for treating malnutrition. Pioneered by Valid International, a nongovernmental organization, CTC was largely made possible by the creation of ready-to-use therapeutic food (RUTF), or energy-dense nutritional food that may be given to children once they are six months of age. The CTC model consists of four basic principles: access and high coverage, timeliness of treatment, sectoral integration of multiple disciplines, and local capacity building. The CTC model also utilizes three different types of treatment, depending on the degree of malnutrition. These treatments include: (1) a supplementary feeding program for children with moderate acute malnutrition without complications, (2) an outpatient therapeutic program that utilizes RUTF for patients with SAM, and (3) stabilization centers for those with acute malnutrition and medical complications or no appetite (Grobler-Tanner & Collins, 2004). These treatment mechanisms rely on community mobilization and active screening for malnutrition (Gatchell, et al., 2006).

CTC intends to treat more children at home in a way that is fast, effective, relatively inexpensive, and minimally disruptive to communities (Grobler-Tanner & Collins, 2004). Furthermore, CTC has the potential to build local capacity to prevent and treat malnutrition through locally producing RUTF, as well as to educate the community to encourage the development of longer-term solutions (Collins, 2001). Other benefits of using a CTC approach include a lower chance of becoming sick from close proximity to other malnourished children and a decreased psychological burden of being treated at home instead of in an unfamiliar facility. Furthermore, there are many advantages to using RUTF over other types of treatments
for SAM. RUTFs are digestible among malnourished children, and they have been proven to be effective in quickly promoting weight gain (Grobler-Tanner & Collins, 2004). RUTF can also be locally produced, reducing transportation and importation costs; however, there are other cost and quality concerns, especially regarding RUTFs made from expensive milk powder and peanuts easily contaminated with aflatoxin. Nonetheless, RUTFs are an improvement over other therapeutic foods because they do not require any preparation or refrigeration, have a long shelf life of 18 months, and lower the probability of contracting water-borne diseases since it is oil-based (Collins, 2001; Collins & Henry, 2004; World Health Organization, et al., 2007).

Though CTC was developed for emergency situations such as famines or complex humanitarian emergencies (CHEs), researchers have discussed the sustainability of the CTC program and the need for CTC in nonemergency contexts. As Gatchell, Forsythe, and Thomas (2006) describe, “High levels of severe acute malnutrition have been documented in subpopulations in nonemergency contexts, and the need for an effective outpatient approach to the treatment of severe acute malnutrition in such contexts is now being acknowledged.” Similarly, Gross and Webb (2006) ironically point out that the international aid community is more effective in helping children recover from wasting and malnutrition during natural disasters or CHEs, even though there are more malnourished children found in nonemergency contexts, “…most deaths in children younger than 5 years do not happen in acute emergencies—they happen in relatively stable countries.” From these descriptions, it is apparent that malnutrition must also be treated as a priority within nonemergency circumstances, as is the case in Panama.

Gatchell et al. (2006) also delineate the necessary factors for sustainable CTC practices, including a primary health care system, help from the national, regional, and community policy levels, adequate screening of nutrition levels, local production of RUTF, and training of health
care workers. Furthermore, the capacity of a sustainable CTC program relies on the prevalence of SAM in the region, as well as the preexisting local capacity within a community. In this scenario, sustainability of the CTC program is dependent upon “strengthening the capacity of the health systems to function effectively with minimal external input.” At the same time, however, CTC is unsuitable for areas with low access to outpatient therapeutic programs and supplementary feeding programs because it is a highly decentralized program. CTC is also not cost-effective if the prevalence of SAM is low or if there are highly diffused malnourished populations because these scenarios require more mobile teams to serve lower-density populations (Collins, 2004).

Table 1: Comparison of TFC & CTC Models

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<th></th>
<th>Therapeutic Feeding Centers</th>
<th>Community-based Therapeutic Care</th>
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<tr>
<td><strong>Cost</strong></td>
<td>• Expensive (administrative costs)</td>
<td>• Expensive (RUTF costs)</td>
</tr>
<tr>
<td></td>
<td>• Costs to Parents</td>
<td></td>
</tr>
<tr>
<td><strong>Target Population &amp; Access</strong></td>
<td>• Does not necessarily reach target population because of costs</td>
<td>• Reaches target population</td>
</tr>
<tr>
<td></td>
<td>• Hard to access</td>
<td>• Easier to access</td>
</tr>
<tr>
<td><strong>Effectiveness</strong></td>
<td>• Effective, but not many people use it</td>
<td>• Effective and well-used</td>
</tr>
<tr>
<td><strong>Community Perception &amp; Acceptability</strong></td>
<td>• Not locally accepted because costs are prohibitively high</td>
<td>• RUTF ingredients are suitable for local tastes</td>
</tr>
<tr>
<td></td>
<td>• Home treatment is better accepted</td>
<td>• Home treatment is better accepted</td>
</tr>
<tr>
<td><strong>Sustainability &amp; Scale-Up</strong></td>
<td>• Hard to scale up because of fixed capacity</td>
<td>• Scale up easier and cheaper</td>
</tr>
<tr>
<td></td>
<td>• Sustainability after treatment questionable</td>
<td>• Sustainability after treatment questionable, though RUTF can be produced locally</td>
</tr>
<tr>
<td><strong>Risks &amp; Limitations</strong></td>
<td>• Risk of infections from other sick children in the same center</td>
<td>• Community dependence</td>
</tr>
<tr>
<td></td>
<td>• Lack of healthcare personnel</td>
<td>• No monitoring of treatment</td>
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<td></td>
<td>• Therapeutic milks not as safe to use as RUTFs</td>
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2.3 The Hearth Nutrition Model based on Positive Deviance

The Hearth Nutrition Model based on Positive Deviance, though not as commonly used as the TFC or CTC programs, provides an interesting paradigm by which malnutrition may be treated from a bottom-up approach. Under the Hearth Model, PD families and children are identified to determine what behaviors make them the exception to a generally malnourished, impoverished community. One of the major benefits of the PD program is that the solutions it provides are “likely to be affordable, acceptable, and sustainable because they are already practised [sic] by at risk people, they do not conflict with local culture, and they work” (Marsh, Schroeder, Dearden, Sternin, & Sternin, 2004). Once these PD behaviors are identified and confirmed as accessible to others, behavioral intervention-based activities may be programmed to foster adoption of the behaviors on the community level.

2.4 Comparisons and Limitations of Malnutrition Treatment Models

The TFC and CTC models differ most in their prioritization of resources (see Table 1). TFC treats all children with SAM on an inpatient basis, whereas the CTC model takes into account whether or not children with SAM also have accompanying medical complications. Furthermore, children treated in the stabilization centers of the CTC model—the component of CTC that is most closely related to the TFC model—are discharged once their appetite returns and medical symptoms disappear. By contrast, children are kept in TFCs for longer periods of time and even after their appetite returns. CTC stabilization centers are also much smaller and only require one to two trained staff members because they only treat children presenting with additional medical complications (Collins, 2004). While TFCs cannot exhibit economies of scale because they are based on a fixed capacity model, CTC programs can be easily scaled up to target more children. Furthermore, though the CTC model has high start up costs, the marginal
cost of treating more children generally includes only the costs of additional food and medicine (Collins, 2004). Orach and Kolsteren (2003) also advocate CTC treatment over TFC on the basis that the case fatality rate is much lower than that of hospitalized SAM children (4 percent versus 32-60 percent, respectively).

Advantages of the PD Hearth model include its grassroots approach and its predisposition to sustainable solutions. The solutions come from within the community themselves, and therefore are usually context-specific and more likely to be adopted than a top-down program enforced by those outside of the local community. The Hearth model also increases the local research capacity for decreasing disease prevalence in more affordable ways and allows community members to quickly apply partial solutions to the greater problem of malnutrition. Instead of waiting for the implementation of long-term infrastructural development such as better roads, agricultural capabilities, or access to medical and sanitation services, PD behaviors can be utilized almost immediately (Sternin, et al., 1998).

The Hearth model, however, also has its limitations. For example, the entire model is contingent upon finding unusual PD families and children, and such atypical examples are usually hard and costly to find. The approach also does not work in settings incapable of producing PD behavior as a result of the lack of relevant foods and services. Furthermore, the Hearth model may not work if PD families are outliers, or if the behaviors that create PD families and children are not generalizable, scalable, or culturally acceptable. The model has also been criticized for its inability to incentivize the creation of innovative solutions, since all solutions are taken directly from the local context. The ability of the PD program to be scaled up is also contingent upon many factors, such as having a sufficient and knowledgeable base for community mobilization (Marsh, et al., 2004). In comparison to the TFC and CTC programs, it
seems like the PD Hearth model, if implementable, has a more significant start-up cost. However, if established correctly, the Hearth model is more community-oriented and sustainable than the other two models in that the PD behaviors come from community members and are therefore more likely to be culturally acceptable.
3.1 Determinants of Nutritional Status in Panama

Within Panama, the determinants of children’s nutritional statuses include their parents’ educational attainment, geographic location, access to health services, possession of physical assets, occupation and ownership of land, the child’s age, gender, and birth order in the family, and whether or not the child is exclusively breastfed. The incidence of malnutrition in Panama tends to reflect geographic and ethnic poverty trends because indigenous populations typically live in their own Comarcas, geographically marked administrative regions. As a result, geographic regions are good predictors of nutritional status in Panama. The Ngöbe-Buglé, the largest and poorest indigenous group in Panama, comprise the majority of the children treated in the Santiago Nutre Hogar facility.

The Ngöbe-Buglé live in mountainous regions of the Bocas del Toro, Chiriquí, and Veraguas provinces in Panama, which are generally inhospitable to agricultural practices (Morell, 2006; Wickstrom, 2003). They were driven into these mountains in the sixteenth century after European conquistadors arrived, and evidence suggests that the combination of poor soil quality and the evasion of conquistadors led to the “dispersion of kin-group-based residential units” (Wickstrom, 2003). As a result of this history, the Ngöbe-Buglé today tend to live in dispersed communities of six to eight households on average without a large community focus, hindering the delivery of basic medical care and other services. For example, it takes

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2 The Ngöbe-Buglé are also known as Guaymi Indians.
almost an hour for the Ngöbe-Buglé to reach any medical facility—almost twice the amount of time it takes a non-indigenous person to access care. Ninety-two percent of the Ngöbe-Buglé are poor, and 81 to 82 percent live in extreme poverty\(^3\) (Economist Intelligence Unit, 2008; Vakis & Lindert, 2000). As a whole, Vakis and Lindert (2000) found that “70 percent of indigenous people cannot satisfy their minimum daily caloric food requirements even if they were to dedicate all of their consumption to food.” The inability of the Ngöbe-Buglé poor to afford a healthy diet is corroborated by a recent study by Save the Children, another NGO working with malnutrition, that found that it is impossible for some populations to afford the types of foods that would provide for a balanced diet (Chastre, Duffield, Kindness, LeJeune, & Taylor, 2007).

In addition to being the most impoverished indigenous group, the Ngöbe-Buglé are also the indigenous group with the lowest levels of educational attainment. Low levels of education, especially for mothers, mean that mothers are not knowledgeable about how to properly care for their children and feed them a balanced diet. Thirty-six percent of the Ngöbe-Buglé and almost 50 percent of the women are illiterate. The gender literacy disparity points to larger gender inequalities, and this type of gender gap in education is not observed among non-indigenous or other poor populations. Furthermore, the Ngöbe-Buglé have the lowest access to potable water, increasing the chances that a child will contract the diarrheal diseases and other parasitic infections from ingesting contaminated water that further contribute to malnutrition. Two-thirds of the Ngöbe-Buglé lack potable water and sanitation services. Furthermore, the high incidences of tuberculosis and malaria in Comarca Ngöbe-Buglé also factor into the high incidence of malnutrition. Unsurprisingly, these myriad aspects contribute to the highest incidence of

\(^3\) Households living in extreme poverty are defined as “households unable to cover their basic food needs” (Economist Intelligence Unit, 2008) where the minimum average daily caloric requirement is 2,280 kcal (The World Bank, 2000).
malnutrition among the Ngöbe-Buglè, as compared to other indigenous populations, with half of all children suffering from some form of malnutrition (Vakis & Lindert, 2000).

Birth order is also a good predictor of malnutrition status in Panama. Though it seems like low birth weight is not a problem because malnutrition rates in children under 5 months of age are fairly low, the malnutrition rates significantly increase among children aged 12 to 17 months when they are starting to be weaned from breast milk to solid foods. The Ngöbe-Buglè have the largest household size and highest fertility rate of all other indigenous groups, and older children are also more likely to be malnourished because of poor birth spacing. During the critical weaning period, the younger children crowd out these older children and get more attention and breast milk from the mother.

According to the World Bank (2000), the more siblings under age five, the worse the nutritional status of each sibling. This problem is exacerbated in the typical Ngöbe-Buglè household because a high dependency ratio; on average, there are 3.8 non-working dependents per working member of the household (Vakis & Lindert, 2000). Furthermore, in the absence of gender discrimination, boys are more likely to be malnourished than girls (The World Bank, 2000). Paradoxically, children of farmers and of those who own land are also more likely to be malnourished than households with little or no land (The World Bank, 2000).

3.2 Supplementary Foods in Panama

Panama currently does not use any RUTF to treat malnourished children, though the Panamanian Ministry of Health’s Department of Nutrition provides and distributes a fortified complementary food (FCF) by the name of Nutricereal (Nutricrema). A FCF is defined as “any low cost fortified transitional food (liquid or solid) used to complement the infant and feeding (6-36 months of age)” (UNICEF, 2006). FCF in Panama is given to underweight pregnant and
breastfeeding women, as well as to tuberculosis patients and children under five years of age in risk of malnutrition (Atalah S. & Ramos O., 2005). As compared to other countries in Latin America and the Caribbean that also provide complementary foods, Panama distributes the least amount of complementary foods. Furthermore, Nutricereal is not very cost-effective; it is one of the supplementary foods with the highest cost per unit of energy provided (UNICEF, 2006).

3.3 Nutre Hogar: Treating malnutrition in Panama

Nutre Hogar is the only organization in Panama that truly focuses on malnutrition treatment nationwide. As a non-profit NGO, Nutre Hogar utilizes a malnutrition treatment model that most closely resembles the TFC model formerly used in other parts of the world. There are eight Nutre Hogar treatment facilities in various regions of Panama, and each facility includes child dormitories, a dining room, an exercise stimulation room, a nursery and sick room, a kitchen, a laundry room, a classroom, and a playground. Children receive medical attention, physical therapy if needed, and early education lessons during their stay at a treatment center. Furthermore, the patients’ parents are supposed to take classes at their local community center while their children are being treated to ensure that they know more about how to prevent malnutrition once their child has returned home. Apart from their treatment facilities for children with severe forms of malnutrition, Nutre Hogar also provides two balanced meals per day to over 6,000 Panamanian children, and has previously worked with the Department of Nutrition to provide medication and iron and vitamin A supplements to over 2,500 children in indigenous regions (Atalah S. & Ramos O., 2005).

Malnourished children are identified at different hospitals, community centers, or health centers before they are brought to a Nutre Hogar nutritional recuperation center for further treatment. A doctor must first examine potential patients before they are eligible for treatment.
within a Nutre Hogar facility. Furthermore, the children need to meet a set of criteria before they are admitted: children must be under five years of age, though exceptions are made; children must have third degree malnutrition; the family must willingly participate in the child’s recovery during his or her stay at the Nutre Hogar facility and give written and explicit consent to participate; and the family must submit a report that includes pediatric, nutritional, and socioeconomic information (Nutre Hogar).

Nutrition programs are very context specific; though some programs may be adopted in other regions that have similar characteristics, what works in one place does not necessarily work in another. Therefore, it is extremely important to evaluate nutrition programs based on the local setting. In this case, it is important to determine whether or not the current inpatient malnutrition treatment model is effective and whether Nutre Hogar is able to treat and prevent relapses into malnutrition. Furthermore, is there a malnutrition treatment model that may be better suited to the Panamanian context? Such inquiries must first be answered before the pressing problems of malnutrition in Panama can be ameliorated.

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4 Third degree malnutrition is defined as a physical state where a child’s weight is less than sixty percent of the average for his or her weight (Gómez, et al., 1956). The Gómez classification of malnutrition is outdated and has been replaced by the Z-score system. The two different classifications are not directly comparable.
CHAPTER 4

METHODOLOGY

This research project utilized several different methodological techniques to evaluate whether or not the malnutrition treatment model used at the Nutre Hogar facility in Santiago, Veraguas is able to meet the organization’s goals of treating the children and preventing future relapses into malnutrition. An in-depth case study methodology relied on interviews and document analysis to determine Nutre Hogar’s success in meeting their objectives. Research was conducted at the Nutre Hogar recuperation center in Santiago for twelve weeks.

4.1 Case Study Justification

Case studies have intrinsic value and a heuristic nature, and are used to “discern important new general problems, identify possible theoretical solutions, and formulate potentially generalizable relations that were not previously apparent” (George, 1979). Nutre Hogar in Panama is unique in that there is already an inpatient structure in place that may preclude the need for a system entirely based on CTC or the PD Hearth model. The facility in Santiago, Veraguas is especially interesting because it primarily serves the Ngöbe-Buglé, the largest, poorest, and most malnourished indigenous population in Panama, who live in an isolated, mountainous region in northwest Panama. Furthermore, the Nutre Hogar model treats children for an extended period of time (three to nine months) that is far longer than the two to four weeks of treatment at a traditional TFC. These various factors make the facility in Santiago a prime location to study whether or not the Nutre Hogar treatment model is appropriate for treating MM in remote, dispersed populations, or whether other malnutrition treatment models would be more suitable to this population. Although the results of this study may not be entirely generalizable,
the contextual factors contributing to malnutrition in Panama or to the organizational structure of Nutre Hogar may also apply to other settings.

Both quantitative and qualitative measures were used to assess the appropriateness of TFC within the Panamanian context. Quantitative indicators such as default, cure, relapse, and mortality rates were assessed through capturing data from Nutre Hogar in Santiago’s logbook of entries and exits. Other quantitative statistics gathered included the total admission, exit, and readmission rates; the number and ages of children in the program; the age of the children; information on anthropometric measures such as height and weight gains; and the lengths of stay. These data were also taken from the Nutre Hogar logbook, as well as from other internal documents. Furthermore, these quantitative measures were supplemented with qualitative measures to get a better sense of how the program is perceived at the community level.

4.2 Framework for the Evaluation of Nutritional Programs & Interventions

It was necessary to give Nutre Hogar’s malnutrition treatment model a proper evaluation for a variety of reasons. While evaluations can determine whether scarce resources are spent in the best way possible, they can also assess the impact of the intervention on achieving its goals and provide feedback on how programs can be improved to better attain the desired outcomes (Wynn, Dutta, & Nelson, 2005). The criteria by which the Nutre Hogar nutritional intervention program was evaluated included: (1) the age of the children when admitted, (2) the duration of treatment and the costs of treating a child, (3) the physical outcomes of treatment and the effectiveness of the program in preventing relapses into malnutrition, (4) community perceptions of the organization, and (5) general observations from being a participant observer at Nutre Hogar. These criteria were selected because they would provide both quantitative and qualitative metrics by which physical outcomes could be observed and opinions could be shared.
4.2.1 Age of the children

Malnutrition interventions for children are best implemented for children under five years of age because it targets the critical growth stage that prevents the cumulative effects of growth stunting resulting from malnutrition. Malnutrition tends to increase with age because of the “cumulative ‘memory’ of the HFA [height-for-age] indicator” and deviations from normal skeletal growth; once children are stunted during a critical period, such as between 12 to 17 months of age, they cannot regain the height they would have had under normal feeding conditions (The World Bank, 2000). As a result, it is necessary to evaluate the incoming ages of Nutre Hogar’s patients. Patients who are too young (under 6 to 12 months of age) may benefit more from their mothers’ exclusive breastfeeding than they would from therapeutic milk formulas. However, if malnourished children are not treated early enough (the critical 12 to 17 months of age window), stunting may not be prevented. Age data were captured from entry documents and a Nutre Hogar logbook.

4.2.2 Duration & Costs of Treatment

The duration of treatment helps determine how long the children are away from their parents, as well as whether or not the Nutre Hogar method is able to quickly treat malnutrition as compared to other malnutrition treatment methods. Furthermore, the duration of the treatment factors into the cost of treating a child, another one of the criteria by which Nutre Hogar was evaluated. The longer the child is treated, the more expensive the treatment is overall. It is important to determine the total costs of treating a child for malnutrition because—in comparison to the typical costs of other malnutrition treatment models—it can help identify whether or not the money and resources used to treat the children could potentially be used in a different, more effective way. While the duration of the treatment was identified by going through Nutre Hogar
logbooks, the per diem costs of treating a child were calculated through using costs listed on Nutre Hogar’s financial documents.

Nutre Hogar’s financial documents were also examined to determine the sources of their funding, as well as toward what items or expenses their aid money is spent. The cost-share of funding from different sources gives some insights into why the organization is structured the way it is. Furthermore, the spending breakdowns help illustrate whether or not Nutre Hogar’s spending behaviors are aligned with their priorities as an organization that treats malnutrition.

4.2.3. Physical Outcomes of Treatment & Relapse Rate

The physical outcomes of treatment were evaluated to prove whether or not Nutre Hogar’s method of malnutrition treatment actually works in treating children throughout their stay at the Nutre Hogar facility in Santiago. In particular, the children’s weights were of particular importance so that weight-for-age could be properly assessed. Furthermore, the malnutrition relapse rate of children who had already completed the Nutre Hogar program was collected to determine the sustainability of the Nutre Hogar interventions once the children were returned to their families. Logbook entries yielded data on length of stay, entry and exit weights, and whether or not a child has been readmitted into Nutre Hogar for treatment. These statistics were recorded on the aggregate level to avoid identification issues and to protect the privacy of the patients and their families.

4.2.4 Community Perceptions of Nutre Hogar

In addition, community perceptions of the organization provided some insights into how supportive the community was of the organization, as well as whether the community would be willing to adopt an alternative malnutrition treatment model. Community perceptions also included the perceptions of the parents of Nutre Hogar patients and the indigenous population
outside of Santiago. These interviews gauged the parent’s opinions on being separated from their children for such a long period of time, as well as how they felt about Nutre Hogar. Interviews of Nutre Hogar staff, volunteers, community members, and parents of malnourished children produced both logistical and perceptual data. The children themselves were not interviewed because most of them had not yet learned to speak or articulate themselves properly. Collecting qualitative data from interviews was essential because it revealed how the community perceived the organization, as well as other factors that may not have been implicit from quantitative data.

4.2.5 General Observations

As a participant observer, I was able to partake in Nutre Hogar’s daily activities. In serving as a member of Nutre Hogar’s staff, I observed the daily interactions at Nutre Hogar to better understand the intricacies of how the organization functions. For example, I made observations on the types and quantities of foods eaten, how often parents are able to visit their children, how much attention was given to the children, etc. These observations helped elucidate the minutiae of Nutre Hogar malnutrition treatment.

4.3 Methodological Limitations

The dearth of follow-up information for children who have left Nutre Hogar means that the evaluation of Nutre Hogar’s program is necessarily incomplete. Without more information on what happens to the children post-treatment, any results and analyses are confined to discussions of the immediate results of treatment; evaluation of Nutre Hogar’s treatment program cannot reveal anything about the long-term outcomes of treatment or whether or not children relapse into malnutrition after leaving Nutre Hogar. Furthermore, the data do not capture information for children who were treated at Nutre Hogar for less than one week at the center. The data are also not randomized; the children treated at Nutre Hogar were selected on the basis of treatment need.
Consequently, it would be difficult to generalize findings from this sample to a larger population of Panamanian children.

Information from interviews is also potentially biased, especially because it comes from a smaller sample size whose responses may not necessarily be representative of all opinions. The parents interviewed were all parents of children currently treated at a Nutre Hogar center. Though parents were assured that their answers would remain confidential, their answers may have been colored in favor of Nutre Hogar because they did not want to jeopardize their child’s treatment at the center. Furthermore, the very fact that they allowed their children to be treated at Nutre Hogar may have been a self-selecting factor for more positive opinions of Nutre Hogar; for example, parents probably would not have let their children stay at a Nutre Hogar treatment center if they did not somewhat trust the organization and believe that it would help their children.
CHAPTER 5

FINDINGS & RESULTS

Since the 1991 establishment of the Nutre Hogar center for nutritional recuperation in Santiago, over 1,000 children have been treated at the center. Data for this analysis came from a Nutre Hogar logbook that tracked information such as date of birth, dates of entry and exit, and changes in weight. Though the entries in the logbook began in 1991, only data from January of 1999 onwards were utilized because the logbook entries from the first eight years were mostly incomplete. Children who stayed for fewer than one week at the center were discarded from the data set because they were not at the center long enough to represent any type of significant intervention as a result of the program. The final data set includes 599 children, comprised of 300 girls and 299 boys.

All data were analyzed based on the following criteria previously identified in the methodology: age at entry, duration of treatment, and entry and exit weights. In addition, information about community perceptions was obtained through interviews. Both quantitative and qualitative measures were used to collect information on whether or not Nutre Hogar’s malnutrition treatment model is appropriate given its actual performance and cultural and community considerations.

5.1 Quantitative Data

5.1.1 Age of the Children

Almost half of all children treated at Nutre Hogar (47.4 percent) were admitted before they are 18 months old, and a little over 15 percent of children were admitted between 18 to 24 months of age. After 24 months of age, the proportion of children admitted to Nutre Hogar
diminished for each age group, though there were quite a few exceptions where Nutre Hogar admitted children over 5 years of age (see Figure 1).

**Figure 1: Proportion of Children by Entry Age**

![Graph showing proportion of children by entry age]

5.1.2 *Duration & Costs of Treatment*

Over all age groups and genders, the average length of treatment was 5.38 months. The average length of treatment for females was 5.12 months over all age groups. Treatment lengths were a little longer for males over all age groups, with 5.65 months as the average length of stay. Children 6-12 months of age stayed the longest (6.68 months on average), while children 54-60 months stayed for the least amount of time (2.82 months). However, lengths of stay varied greatly; the average standard deviation for length of stay was 5.42 months. While there were children who stayed for just a couple of weeks, there were 191 kids who stayed for more than 6 months and 26 kids who stayed for more than one year (Figure 2).
From a longitudinal perspective, it seems like the number of children entering Nutre Hogar each year has decreased, especially in the past few years. However, it is hard to judge whether any change has occurred in regards to the overall population’s malnutrition prevalence and severity based on the entry z-scores because they are not representative of the entire population. These numbers are already self-selected because the children in the sample were admitted by Nutre Hogar and were thereby already malnourished to begin with (Table 2).

**Table 2: Number & average z-scores of children entering Nutre Hogar each year**

<table>
<thead>
<tr>
<th>Year</th>
<th># children</th>
<th>Avg. z-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>51</td>
<td>-3.348</td>
</tr>
<tr>
<td>2000</td>
<td>92</td>
<td>-3.339</td>
</tr>
<tr>
<td>2001</td>
<td>79</td>
<td>-3.687</td>
</tr>
<tr>
<td>2002</td>
<td>80</td>
<td>-3.988</td>
</tr>
<tr>
<td>2003</td>
<td>39</td>
<td>-4.039</td>
</tr>
<tr>
<td>2004</td>
<td>59</td>
<td>-4.035</td>
</tr>
<tr>
<td>2005</td>
<td>58</td>
<td>-3.970</td>
</tr>
<tr>
<td>2006</td>
<td>46</td>
<td>-4.211</td>
</tr>
<tr>
<td>2007</td>
<td>44</td>
<td>-3.310</td>
</tr>
<tr>
<td>2008</td>
<td>26</td>
<td>-3.730</td>
</tr>
</tbody>
</table>
Financial information was gathered from 2007 and 2008 financial reports that included Nutre Hogar’s financial breakdowns from 2006 to 2008. Besides indicating how funds at Nutre Hogar were both gathered and spent, financial documents also allowed for a costing out of how much it costs to treat a child for a certain period of time.\(^5\) As indicated from the financial reports, Nutre Hogar is funded by a variety of sources, including donations, fundraising activities, and subsidies from the Panamanian governmental organizations MIDES and IFARHU (the Ministry for Social Development and the Institute for the Formation and Improvement of Human Resources, respectively). On average, donations comprised about 25 percent of Nutre Hogar’s total income and governmental subsides comprised nearly 21 percent. The remaining funds came from fundraising activities and the bank balance for that year.

Nutre Hogar’s operating costs are much more interesting. From 2006 to 2008, the yearly average total operating cost was $70,040.34. Of this total, an overwhelming share (44.2 percent) was spent on salaries. By contrast, only 12.9 percent of all money spent was spent on food. The recorded costs also do not reflect the additional costs of volunteer service from the many people who volunteer their time at Nutre Hogar every day. For the years 2006 to 2008, treatment at Nutre Hogar cost $9.93 per child for every day they stayed at Nutre Hogar (see Appendix A).

\subsection*{5.1.3 Physical Outcomes of Treatment & Relapse Rate}

The children’s weights-for-age (WFA) upon entry and exit were compared to the World Health Organization’s revised child health growth standards for WFA. Though WFA is not as accurate an indicator as other indicators (e.g. WFH, HFA), WFA is the only usable metric in this case because Nutre Hogar only consistently collected data on the children’s weights. On average,

\footnote{Panama uses United States currency; consequently, there is no exchange rate. Financial data were not adjusted for inflation because of their recency.}
children entered Nutre Hogar with a z-score of -3.73, or close to four z-scores below the median (see Figures 3a-b). According to the WHO’s malnutrition classifications, children whose z-scores are 3 or more z-scores below the median have severe acute malnutrition. On average, girls entered with a z-score of -3.58, and boys with -3.87. Sixty-three percent of girls and 73 percent of boys entered with severe acute malnutrition, while 21 percent of girls and 18 percent of boys entered with moderate malnutrition. These findings are consistent with literature stating that boys in Panama are often more malnourished than girls (The World Bank, 2000).

After treatment at Nutre Hogar, children’s malnutrition statuses improved by 1.36 z-scores on average. Girls tended to improve a little more than boys, with girls on average improving by 1.43 z-scores and boys improving by 1.27 z-scores (see Figures 3a-b). If the logbook samples taken from 1999 to 2009 are assumed to be random samples representative of the Nutre Hogar in Santiago program as a whole, a confidence interval may be constructed to show that 95 percent of confidence intervals calculated for the patient population over time falls into the range of a 1.28 to 1.52 improvement in z-scores. Furthermore, a match-paired t-test confirmed that the children’s malnutrition statuses improved after treatment. The p-value derived from this test was 0, proving that the null hypothesis of “no improvement in z-scores” could be rejected and that the children’s malnutrition improved on average.

While on average the children gained weight throughout their stay, they did not gain enough weight to have a normal WFA by the end of their stay. Across all ages and genders, children left Nutre Hogar with an average z-score of -2.37, indicating that they still had moderate malnutrition. Girls left the center with an average of -2.15 z-scores, and boys left with an average of -2.60 z-scores. Though moderate malnutrition is less life threatening than severe acute
malnutrition, children with MM are at greater risk of death, illness, and of sliding into SAM (World Health Organization, 2008).
Figure 3a: Girls’ weight-for-age (z-scores)
Figure 3b: Boys' Weight-for-Age (z-scores)
Seventy-five children, or 12.5 percent of all children treated were re-admitted into Nutre Hogar between 1999 and 2009. This rate, however, does not necessarily accurately reflect the number of relapses into malnutrition because it only measured relapses for those who were re-admitted into the program instead of the population in general. In reality, the malnutrition relapse rate is likely much higher. Furthermore, 6 children died either during or immediately after their stay at Nutre Hogar, usually from a combination of malnutrition and opportunistic infections.

5.2 Qualitative Data

5.2.1 Community Perceptions of Nutre Hogar

Several interviews of parents, volunteers, and community members were conducted to evaluate the community’s perception of Nutre Hogar. Though only 15 interviews were conducted and constitute a small sample size, the information gleaned from these interviews are largely representative of many sentiments I informally heard throughout the summer. Interviews with parents frequently revealed that they thought that Nutre Hogar was doing a good job, though they wished that they did not have to be separated from their children for such a long period of time. Along similar lines, interviews with community workers at a Nutre Hogar community center revealed that while Nutre Hogar was initially regarded with suspicion, members of the indigenous community were currently more trusting of the organization. When Nutre Hogar first started taking children to recuperation centers in the cities, parents were afraid that Nutre Hogar would never return their children. However, Nutre Hogar’s reputation within the indigenous community has greatly improved, especially as parents and others have seen children returning in a healthier state.

When asked why infants under 6 months of age were frequently brought to Nutre Hogar for treatment, many doctors and Nutre Hogar volunteers replied that it was because the mothers
themselves were malnourished and were therefore unable to produce enough breast milk to adequately feed their child. Several people also cited examples where the only food a mother would consume for an entire day was a single cup of coffee. All mothers stated that they breastfed (or attempted to breastfeed) their children, though some mothers directly said that they were unable to produce enough breast milk to adequately feed their nursing infant.

Furthermore, when asked whether or not Nutre Hogar had provided any of the parents interviewed with some sort of education involving how to care for or properly feed their children, all of the parents said that they had not received any education from Nutre Hogar. By contrast, Nutre Hogar volunteers and staff members were all very adamant in stating that the organization focuses on prevention-based efforts by making parents take classes at the community centers while their children are cared for in Nutre Hogar. A few staff members even said that parents are required to take such classes before their children can be released from Nutre Hogar’s care; however, this statement is not tenable because, for the most part, parents can take their children out of Nutre Hogar on a voluntary basis. It is possible that the interviewed parents did not properly understand the question or that they did not recognize that they had received education if they had actually received it. It is also possible that Nutre Hogar has no way of enforcing whether or not these parents received any education. Either way, there seems to be a disjunct between what actually happens and what Nutre Hogar claims to happen.

After preliminarily examining the data in Panama, it became evident that some children were released from Nutre Hogar’s treatment facility before they were fully recuperated. After interviewing Nutre Hogar doctors and nurses about why children were prematurely released, they responded that it was oftentimes because the children had stayed at the center for such an extended period of time that they had to consider the “familial unit” that they were disrupting by
keeping the child at the recuperation center. Furthermore, they said that children were sometimes prematurely removed from the program by their parents because, for whatever reasons, their parents did not want their children to stay at the center. Nutre Hogar has no legal power over keeping the children at the center; parents must voluntarily consent to their children being treated.

Doctors and nurses were also asked why Nutre Hogar nutritional recuperation centers are located in cities instead of closer to the populations most affected by malnutrition. They responded that it was primarily because Nutre Hogar has better access to resources (e.g. food, staff members, medicine, hospitals, etc.) in the cities and that if centers were located in remote locations, they would have limited access to resources and encounter staffing problems. A Nutre Hogar volunteer also justified the location of Nutre Hogar’s nutritional recuperation centers by stating that it allowed Nutre Hogar to control more of the treatment; for example, if foods were distributed to families in a decentralized manner, then Nutre Hogar would have no control over who eats or sells the food. By making children come to the treatment center, they can directly ensure that the children are ingesting the food, instead of other family members who may not necessarily need it as much or who may sell it instead of giving it to their children.

5.2.2 General Observations

5.2.2.1 Foods and Formulas

The children treated at Nutre Hogar are fed several times throughout the day. No RUTFs or therapeutic milks are used; instead, diets are based on the degree of malnutrition, medical complications, and age. Infants (and some children up to 2 years old) are fed normal infant formula milk several times a day. In extreme cases (usually when visible wasting is present), a few milliliters of vegetable oil are added to the milk formulas to provide an additional source of
fats. Breast milk banks are not used, though breast milk would be considerably more nutritious and beneficial than formula milk. Once children are able to drink from a cup, they transition to Nutricrema, which is prepared on a daily basis. Nutricrema is provided free of charge by the government, and is mixed with canned milk. The children drink Nutricrema four times a day.

For children who are able to eat solids, breakfast usually consists of a cup of Nutricrema and bread or corn tortillas around 6:30 am. At 9:00 am, the children are given another cup of Nutricrema. Lunch begins around 11:30 am, and the children are given either rice porridge or a different dish comprised of more solid food. The rice porridge contains carrots for vitamin A, as well as little bits of chicken or beef for protein. Upon arriving at Nutre Hogar, all kids are given rice porridge because, according to the nurse and nutritionist, it is “easier for them to digest.” Eventually, the children may transition to more solid foods, usually including some combination of the following foods: yams, beans and rice, taro, fried plantains, chicken, beef, etc. Lunch is followed by another snack of Nutricrema in the afternoon, and dinner is usually similar to what is served during lunchtime. Given that the children eat copious quantities of food every day, it is peculiar that it still takes them such a long time to gain weight.

5.2.2.2 Other Services Provided at Nutre Hogar & Follow-Up

In addition to being provided food, the children at Nutre Hogar receive weekly checkups, physical therapy if needed, and preschool lessons. Volunteer doctors administer the medical care provided at the center, while the government provides nurses and pre-school teachers as a form of support. After being discharged from Nutre Hogar, the parents are supposed to bring their children back to a recuperation center for a check up every three months for the first year following their treatment. As an incentive to bring their children to a Nutre Hogar center for these check ups, Nutre Hogar reimburses any transportation costs and provides parents with
food, medicine, and clothing to bring home. However, follow-up information on what happens to the children post-treatment at Nutre Hogar is fairly limited. Not all parents bring their children back for check-ups, and there is no information on what happens to the children after they have been treated. There is no follow-up for children who have left Nutre Hogar for more than a year.

5.2.2.3 Culture

According to the medical staff at Nutre Hogar, it seems that one of the primary causes of malnutrition in the Ngöbe-Buglé population results from cultural beliefs and a lack of family planning. When asked why there were so many malnourished children in the indigenous population, Nutre Hogar doctors and other staff members stated that it was partially due to the predominant culture of machismo, the belief that men are superior over women. As a result of this cultural belief, the status of men in this indigenous group is linked to the number of children they have. The prevailing notion of fertility as a sign of status has led to a culture of excessive childbearing where the parents do not have the economic means of taking care of so many children. Furthermore, the doctors said that as an organization funded by a Catholic priest, Nutre Hogar is unable to promote family planning practices.
CHAPTER 6
DISCUSSION, ANALYSIS, & RECOMMENDATIONS

6.1 Discussion of Results

The data gathered reveal whether or not Nutre Hogar’s inpatient malnutrition treatment model treats and prevents relapses within marginalized communities. The results from the data analysis indicate that Nutre Hogar helps children predominantly presenting with SAM recuperate from malnutrition by an average of 1.36 $z$-scores. It is encouraging that the majority of the children they treat are treated between 12 and 18 months of age, before the stunting from malnutrition becomes permanent. However, it is curious that Nutre Hogar seems to disproportionately treat a large number of children under one year old, especially because literature on malnutrition in Panama suggests that children frequently do not become malnourished until they are weaned off of breast milk (The World Bank, 2000). While Nutre Hogar rarely takes in children over 5 years of age (only 5 percent of all of Nutre Hogar’s children are over 60 months of age), they are admitted not because being fed food will entirely reverse their malnutrition, but rather because it would be inhumane not to give them food simply because they are past the age for fully recuperating from malnutrition.

The frequency of severely acutely malnourished children entering Nutre Hogar (on average -3.73 $z$-scores below the median WHO WFA growth curves) is extremely alarming. It is interesting that it takes such a long time for the children to be treated; almost a third of all children (32 percent) stayed for more than six months of treatment. By contrast, a study of treatment using RUTF in Malawi found that kids completely recovered in six weeks on average (Manary & Sandige, 2004)—a much shorter time period. Furthermore, it is alarming that, on
average, the children leave the center still moderately malnourished. As interviews of Nutre Hogar’s doctors and nurses disclosed, children are frequently discharged from the program before they are fully recovered because they do not want to separate the children from their families for such extended periods of time. Furthermore, parents may voluntarily decide to take their children out of the program. The fact that children leave before fully recovering, in conjunction with the tensions between treating the children and keeping them with their families, suggests that the Nutre Hogar model may not be the ideal treatment mechanism.

Besides evaluating the physical outcomes of treatment and other treatment-related factors, all other considerations regarding Nutre Hogar’s malnutrition treatment program may be dichotomized into one of two categories: (1) financial and (2) cultural and psychological. As a nonprofit organization with limited financial resources, monetary expenditures and the effectiveness of the money spent are extremely salient criteria by which Nutre Hogar’s program should be evaluated. Furthermore, it is important to take cultural and psychological considerations into account to holistically analyze the program and factor in valued criteria such as prevention-based practices and culturally sensitive interventions.

6.2 Financial Considerations

The majority of Nutre Hogar’s operating budget goes toward administrative expenses, instead of toward purchases that would directly improve the children’s malnutrition statuses. This finding is consistent with the experiences of TFCs, where the majority of costs go toward administrative overhead (Gatchell, et al., 2006). Treating a child at Nutre Hogar costs $9.93 per child for every day of treatment, or $1,811 for the entire recovery period of six months. These costs are much higher than what it costs to treat children under a CTC program; for example, researchers found that a complete recovery from SAM could be achieved for simply $10 per
child (Manary & Sandige, 2004) in Malawi or $19 for a month in Niger (Drouhin, 2006). In these cases, an entire course of treatment costs the same—or close to—the amount it costs to treat a child at Nutre Hogar for only a day or two. The CTC programs that cite these low costs are located in African communities that are not directly comparable to Nutre Hogar’s program; however, such low cost, effective programs suggest that Nutre Hogar might be able to find a cheaper way to treat more children for shorter periods of time. Even if other cost-increasing factors such as price fluctuations and other manufacturing costs are taken into consideration, it still seems like it might be cheaper and faster to treat children with RUTF than with the current Nutre Hogar diet.

### 6.2.1 Geographic & Seasonal Considerations

Each Nutre Hogar nutritional recuperation center conducts one to three medical trips every year to marginalized and usually indigenous populations to provide foods and medicines, give checkups, and identify and pick up malnourished children for treatment in the cities. However, these children are not necessarily transported to the city closest to their hometown. If the number of children picked up at a medical trip exceeds the number of children that the Nutre Hogar conducting the medical visit can host, then some of the children are sent to different Nutre Hogar centers all over Panama. What ensues may become a logistical nightmare, especially when Nutre Hogar is supposed to be able to communicate to the children’s parents where they are located during their stay in a treatment center. This situation is further exacerbated by the fact that many of the parents do not have access to good communication channels. To give an illustrative example, Nutre Hogar recently brought a few of the kids who were sufficiently recovered to a community center located in Comarca Ngöbe-Buglé so that their parents would not have to travel to Santiago to pick them up. However, poor communication between Nutre
Hogar and some of the parents of the recovered children meant that the parents were unaware that Nutre Hogar was coming and consequently did not come to the community center to pick up their children.

The children’s treatment in cities is already very geographically distant from where the majority of these children live (see Figure 4). Given the limited amount of disposable income each family has and their difficulty in scrounging together enough money to pay for transportation costs to visit their children, it seems strange that a fixed capacity model may force parents to travel even further to visit their children. This additional cost represents another barrier to treatment at Nutre Hogar; parents do not get to see their children as often, and are therefore sometimes more reluctant to give them to Nutre Hogar for treatment. Furthermore, Nutre Hogar spends close to $4,000 a year on average for gas and other costs associated with transportation. Perhaps these costs could be reduced if Nutre Hogar shifted their primary recuperation care away from the cities and focused on providing care and obtaining resources closer to where the indigenous population lives.

Seasonal characteristics also play into geographic distances, especially because the season affects access to and from Comarca Ngöbe-Buglé. Panama has two seasons: rainy and dry. Due to a lack of infrastructure, and especially a lack of usable roads, it is both difficult and dangerous to drive through the mountains of Comarca Ngöbe-Buglé during the rainy season. Consequently, medical trips to find malnourished children are usually conducted in the dry season when the trip is less precarious. The changes between seasons may also help explain why children are kept at Nutre Hogar for such extended periods of time; for example, children may be kept at the center past the time of their recovery because of difficult access to their homes.
One of the most salient arguments for Nutre Hogar inpatient care is that staff members can supervise the children’s food intake. Experiences with decentralized food distribution, as in the case of CTC, have exemplified the problems that may come with limited control over what happens in the household. For example, there have been several cases where families give the RUTF to all family members instead of to the child for whom it was prescribed. In some extreme cases, families are so poor and desperate that they try to sell any RUTF given to them, instead of giving it to the child in need. To deal with the first problem of distributing the RUTF to all family members, a potential solution was that enough RUTF should be provided such that all family members could share it and the child for whom it was intended could still receive the proper dose. However, this is arguably an inefficient use of resources. Furthermore, while direct supervision is a valid claim for wanting to use an inpatient center, it does not sufficiently justify the location of treatment centers in cities. To reconcile these competing notions, the feasibility of

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a hybrid model where RUTF is administered at a community center located closer to the indigenous population should be explored.

Along similar lines, it was also argued that Nutre Hogar’s inpatient model made sense because it provides a more “holistic approach” to treatment—not only do they give the kids food, but they also provide medical care, a physical therapist, and early education classes. Upon entering Nutre Hogar, the children undergo a barrage of tests, including a full blood workup, urinalysis, and tests for parasitic infections and tuberculosis. Furthermore, vitamins, including vitamins A, C, and other essential minerals, are distributed on a daily basis and volunteer doctors come in several times a week to check up on any kids that may be sick. However, it is unlikely that inpatient treatment is justifiable solely because it is a mechanism for the distribution of medicines; for example, medicines could also be distributed on an outpatient basis. Furthermore, as literature on TFCs and disease contagion has warned (Collins, 2001), it was clear from my stay in Panama that illnesses rapidly spread in Nutre Hogar; once one child caught a cold, it was not uncommon for most of the other children to become sick as well.

One of the largest logistical barriers to running a traditional CTC program in Panama is the lack of central communities within Comarca Ngöbe-Buglé. As literature on CTC program implementation discuss, CTC programs may not necessarily be cost-effective in places where there are highly diffused malnourished populations because they would require more mobile teams to serve such low-density populations (Collins, 2004). However, since Nutre Hogar has already established several community centers and sub-centers, perhaps those centers could serve as the basis for RUTF or other food distribution.
6.2.2 Food Considerations

Based on observations, it does not seem like the food Nutre Hogar provides is necessarily of the best nutritious value. For example, the rice porridge in particular does not seem to have many nutrients, especially because the children are often given measly portions of protein. Furthermore, the children sometimes bore of eating the same meal on a daily basis and then refuse to eat. Observations such as these may help explain why it takes such a long time for kids to recover while being treated at Nutre Hogar. An alternative model to consider is that Nutre Hogar could start a program that combines RUTF treatment with inpatient care. For example, Nutre Hogar could treat children at the inpatient treatment centers with some foods similar to RUTF in caloric density and nutritional composition in an effort to hasten recovery times.

The prevalence of peanut allergies in Panama is not well documented; however, the high prevalence of peanut allergies would preclude the widespread use of peanut-based RUTF. Furthermore, the palatability of peanuts in Panama is questionable; unlike African countries, peanuts are not a staple crop of Panama and are not frequently used in local cuisine; however, if peanuts are not acceptable, other types of legumes may be substituted in the recipe. Alternative formulations of RUTF using other legumes are possible, but more research would have to be conducted to determine whether or not children would even want to eat the RUTF. In addition, it is likely that any additional costs associated with providing more protein-rich foods would be offset by a faster recovery time.

As some of the qualitative data from interviews suggest, it is possible that there are so many malnourished infants because their mothers are also malnourished and consequently do not produce enough breast milk to adequately meet their infant’s caloric needs. Very few mothers are able to come to Nutre Hogar with their nursing infants, calling into question whether or not it
would be more useful to feed breastfeeding mothers so that they are able to produce breast milk, instead of feeding the child formula milks at Nutre Hogar. As research has well documented, breast milk is preferred over formula milks for children under one year of age because of its nutrients and immunity-boosting mechanisms. Exclusive breastfeeding greatly improves a child’s nutritional status—not only is it nutritious and safe to drink (unlike mixing a formula with potentially unsafe water that may cause diarrheal and other diseases), but it also provides passive immunity to children (Hanson, et al., 2003). Conversely, babies without access to breast milk have a greater risk of mortality (Yoon, Black, Moulton, & Becker, 1996). Though mothers who come to Nutre Hogar to stay with their infant babies receive nutritious meals as well, the costs of coming to the center (e.g. leaving other children at home, not working, etc.) are often too high to bear. Instead, Nutre Hogar should consider sending supplementary foods with mothers so they are able to produce breast milk themselves and keep their children at home.

6.3 Cultural & Psychological Considerations

6.3.1 Culture & Family Planning

Any sustainable malnutrition treatment intervention must address the root causes of malnutrition. In Panama, the absence of family planning—combined with the culture of machismo—has led to large numbers of children that parents cannot economically sustain. Furthermore, studies have shown that families facing great economic uncertainties tend to have larger numbers of children because children serve as “the best insurance against risk” (Warwick, 1988). The issue of family planning is also difficult to implement in Panama because as a predominantly Catholic country, the majority of Panamanians do not believe in the use of contraceptives. Furthermore, Nutre Hogar doctors stated that many men do not want their wives to have access to contraceptives because they believe it will promote promiscuity and
philandering. However, the Nutre Hogar doctors also believe that the promotion of family planning practices is essential to any malnutrition prevention strategy.

Forging a culturally sensitive and acceptable family planning program in Panama requires the support of key stakeholders, including religious and community leaders. The challenges of including a family planning program in Nutre Hogar’s overall programming are two-fold: (1) changing indigenous cultural beliefs regarding children and status, and (2) convincing Nutre Hogar that certain aspects of family planning align with religious teachings. In regards to changing cultural beliefs that link the number of children to a man’s status, Nutre Hogar could advocate for a view that plays off the meaning of machismo to connect it to other culturally relevant meanings, such as the ability to take care of children and family. Similarly, it could be argued that being macho means being someone with a successful family, rather than a large family. A campaign for increased birth control use could also frame contraceptives as something a man can be proud of because it symbolizes his confidence in his wife’s faithfulness. Such techniques have proven to be successful in other parts of the world, such as in Indonesia (Warwick, 1988), and Nutre Hogar’s existing community center structure could provide ideal meeting places for such family planning classes to be taught.

In order for such a program to be successful, it will likely need the aid of Nutre Hogar and other religious or community organizations. Though Nutre Hogar itself may be against the promotion of contraceptive use for religious reasons, there are many other religious values that may be aligned with family planning practices. For example, the issue could be framed as an emphasis on caring for family and birth spacing. Religious imagery of a strong god as a caring god could also be used to promote the image of a strong man as a caring man. Furthermore, Nutre Hogar could encourage breastfeeding until the age of two, which not only improves the
health of the child, but also reduces a woman’s fertility (Labbok, et al., 1997). Through promoting culturally and religiously appropriate family planning messages, as well as promoting birth spacing, it is possible that Nutre Hogar could create lasting decreases in the prevalence of malnourished children.

### 6.3.2 Psychological Considerations

One of the largest concerns with the current Nutre Hogar treatment model involves the separation of the child from his or her parents and family during treatment. While mothers sometimes come to the center with their child (especially if their infant is still breastfeeding), this happens very infrequently. Parents are seldom able to visit their children for the duration of their treatment. As a result, there is reason to be concerned about the psychological effects of removing and returning a child from his or her home environment, as well as the effects of separation from the parents or family for such an extended period of time.

In considering the psychological consequences of temporary separation from parents, there are a number of competing factors to weigh. Age, the resilience of the child, the care given at Nutre Hogar, the home environment, and the duration of the stay all factor into any potential psychological consequences of separation. The younger the child is, the more attention he or she requires. As a result, in an understaffed and overworked environment, young children (and especially babies) are not necessarily given as much social interaction as they would have been given at home. Though older children around four to five years old still require attention, they are more resilient in that they can seek out attention by finding friends or engaging others in ways that younger children cannot.

The differences between the level of attention given to kids at Nutre Hogar and the home environment are also salient. If the child is neglected and abused at home, then being placed in
Nutre Hogar would provide a more positive experience. For example, there were several cases where children would come in with burn marks or other signs of neglect or abuse. In this case, being placed into Nutre Hogar where the children are given care, food, and shelter would clearly be better than their home environments. There have also been cases where children have been abandoned at Nutre Hogar. If children are abandoned after treatment, then Nutre Hogar often coordinates with federal agencies and courts to find a more suitable home for the children. In one extreme case, Nutre Hogar agreed to take care of a boy with Down Syndrome for thirteen years before finding an uncle who would care for him.

Early childhood development depends on children’s access to close and dependable relationships; the absence of this type of relationship can disrupt development and have great repercussions (National Research Council and Institute of Medicine, 2000). However, while separation from parents may cause distress, separation anxiety could be alleviated if someone else at Nutre Hogar was able to provide the attention a child would normally receive from parents. Conversely, if the child received more attention at home than in Nutre Hogar, then the reduction in social interactions could work against the child’s development. Overall, depending on how Nutre Hogar compares to the home environment, the duration of stay at Nutre Hogar can have either a positive or a negative effect on the child’s development.

Based on my personal observations, infants did not receive enough attention from Nutre Hogar’s caretakers. Babies were frequently left in their individual cribs and were only picked up when it was time to be fed or if they needed to have their diapers changed. If I picked up an infant and held it for an extended period of time, it was not uncommon to be reprimanded by the nannies at the center who would say that I was spoiling the babies and conditioning them to cry for attention more often.
Another salient observation was that the children rarely spoke while at the center. The older children around 4 to 5 years old who had stayed at the center for an extended period of time (at least six months) were able to start stringing together sentences in Spanish. However, it seemed like the majority of the children’s speech development was delayed. The lack of verbal communication could result from being in Nutre Hogar, where children would not necessarily get as much verbal communication as they would at home. For example, a study on parental language and verbal responsiveness to children found that parents in crowded homes with lots of children spoke in simpler constructs and were less verbally responsive to children (Evans, Maxwell, & Hart, 1999), potentially explaining why children in crowded environments have delayed cognitive development. The other explanation for why children in Nutre Hogar did not speak is because they grew up speaking their own indigenous language and are unfamiliar with Spanish. It is also possible that the switch from their indigenous language to Spanish confuses the children at Nutre Hogar, especially when they are beginning to speak, and causes cognitive developmental delays.

The removal of the child from their home environment to Nutre Hogar presents another psychological concern. For example, a Danish study showed that frequent changes of environment in early childhood can greatly influence children’s emotional development (Rothe, 1985). As applied to Nutre Hogar, what happens when children are removed from an unhealthy, foodless environment (but with family) and placed into a center that provides food, shelter, and toys (but no family)? What happens when they are returned to their families but live in the same squalid environment back home? A physical therapist at Nutre Hogar said that it was very rare for children to be depressed, though there tends to be a period of adjustment when the children miss their family. Furthermore, she claimed that the presence of food, other children to play
with, and toys made up for their parents’ absence. It is unclear how these competing factors weigh against each other; however, it is clear that psychological consequences must be further evaluated.

6.4 Recommendations & Future Steps

The data collected from Nutre Hogar revealed that while Nutre Hogar helps improve the nutritional status of the children that pass through its treatment centers, the children they treat do not fully recuperate from malnutrition. Furthermore, in comparison to other malnutrition treatment options, Nutre Hogar’s method is much more expensive and without as effective treatment outcomes. However, it is uncertain whether or not a CTC program would be implementable in Panama, especially given the diffuse nature of the indigenous population that Nutre Hogar primarily serves.

Nutre Hogar already has a well-established reputation, and its system of health care delivery (e.g. treatment centers, community centers and sub-centers; agreements with hospitals and organizations like the Smile Train, etc.) that should be utilized to its full potential. As mentioned supra, a hybrid model involving the distribution of RUTF at community centers and the use of locally produced RUTF at nutritional recuperation centers could also prove to be a more effective way to shorten the treatment time and potentially lower costs. Nutre Hogar could also do more to ensure that the children’s parents are educated so that they know more about how to prevent their children from becoming malnourished or relapsing into malnutrition.

As a NGO with finite resources, Nutre Hogar cannot be expected to solve Panama’s child malnutrition problem overnight. However, they should look into options that could extend the value of their money. For example, Nutre Hogar might want to consider the Hearth Nutrition Model based on PD. Although finding a PD family with PD children could be difficult and
potentially costly, identifying the behaviors that allow poor families to still nourish their children could prove to be a critical step in helping other families feed their kids in the absence of larger, systemic development. Furthermore, Nutre Hogar already has a system in place that may quickly allow for the identification of such children; for example, well-nourished children could be identified during the medical trips Nutre Hogar conducts in the indigenous communities. Along with identifying behaviors that lead to well-nourished children, other investments into sustainable practices are crucial to fostering tangible decreases in the prevalence of child malnutrition.

A curriculum on family planning should be added to the activities Nutre Hogar currently undertakes at the community centers (e.g. agricultural practices, health classes, etc.). It is the work of the community centers—instead of that which is done at the treatment centers—that truly target the root causes of malnutrition within these populations. It seems like more money should be funneled into the community centers and agricultural sustainability programs, which generally appear to be underfunded and understaffed despite their more ideal location to the target population. These community-building and sustainable practice teachings should be further promoted, and Nutre Hogar should ensure that parents actually receive education or training prior to having their child returned from a treatment center. Other methods of alleviating general poverty, such as instituting a microfinance program for women, should also be considered to provide more holistic support.

No malnutrition treatment model is perfect, especially because its successful implementation is highly dependent on the local context. However, the shift of the international aid community toward using community-based care in lieu of the traditional therapeutic feeding centers is reason to question its continued use in Panama. While Nutre Hogar has done a
commendable job in attempting to alleviate the child malnutrition situation in Panama, there are always ways to improve. In particular, Nutre Hogar should consider adopting a hybrid model involving elements of CTC and the Hearth Model based on positive deviance to improve the effectiveness of treatment and reduce barriers to access. Additionally, Nutre Hogar should focus more on prevention-based activities to proactively reduce the prevalence of malnutrition in Panama. Only through such efforts can we truly make “Cada Día Mejor,” Nutre Hogar’s slogan meaning “Better Every Day,” a reality for Panama’s children.
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APPENDIX A
Financial Calculations to Find the Per Diem Cost of Treatment

116 kids were treated between 2006-2008. On average, 38.667 kids were treated per year and 19.33 kids were treated every six months.\(^7\) Given that Nutre Hogar has a $70,040.34 average annual operating budget, operating costs are $35,020.17 for a six month period.

To calculate the cost of treatment for one child, the operating costs for a six-month period were divided by the number of kids treated in a six-month period:

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\frac{35,020.17}{19.33 \text{ kids}} = \$1811.39 \text{ per child treated for six months}
\]

To find the per diem costs of treatment for each child, the costs for six months of treatment were divided by the number of days in 6 months (182.5 days) to get $9.93 for every day of treatment.

\(^7\) For simplicity, the average number of kids who entered per year (38.667) was halved because the average length of stay for the years 2006-2008 was six months.
APPENDIX B
Sample Interview Questions

Staff Members
- **Personal Information**
  - How long have you worked at Nutre Hogar?
  - How did you get interested in working or volunteering here?
- **Organizational Structure**
  - What are Nutre Hogar’s goals?
  - What criteria does the Nutre Hogar staff use to determine whether children are malnourished or not?
    - Who diagnoses the children?
    - How much time on average does it take for a child, once diagnosed with malnutrition, to be brought down to a Nutre Hogar facility for care?
  - Is the maximum capacity of 50 beds ever completely filled?
  - What type of malnutrition treatment do they use now? (e.g. RUTFs, complementary foods, unfortified foods, etc.)
  - Who decides whether or not children under 6 months of age need to be treated in Nutre Hogar?
    - What are these children fed? Why are they not breastfed?
  - Why are the children being exported from to the cities? Would it be possible to distribute nutritional supplements in the mountains?
  - What kind of maternal or parental educational programs does Nutre Hogar implement?
- **Treatment Efficacy**
  - Is the current capacity of 50 beds sufficient for the number of malnourished children in la Comarca Ngöbe-Buglé?
  - What is the relapse rate of malnutrition after children are treated? How effective is the treatment?
  - How much does it cost to treat a malnourished child per day, week, or month? Does Nutre Hogar have enough money to finance the treatment of all children who present with malnutrition?
  - Given the capacity of Nutre Hogar to treat malnourished indigenous children in a TFC, are there other treatment models (e.g. CTC) that may be better suited to the setting?
    - When are particular programs used in certain circumstances over others?

Parents of Children Patients
- **Personal Information**
  - How long has your child been at the Nutre Hogar facility?
  - How many children do you have? How many boys and girls?
    - Please describe the birth order
  - Are you married?
  - Who do you live with? How many households do you live with?
  - Do you have a job?
○ What do you think your child will do when he or she grows up?

• Feeding Practices
  ○ What do you usually feed your children?
    ▪ What have they been fed in the past 3 days?
    ▪ Where do you get food? (e.g. grocery store, home-grown, etc.)
  ○ Do you breastfeed your younger children? (Under 1 year of age)
  ○ From what source do you get your water? Do you boil the water?
  ○ How often do your children get sick? Do you know what causes the sickness?
  ○ Have multiple children been treated at Nutre Hogar?
  ○ Do you wash your hands and your children’s hands before preparing food and before eating?

• Perceptions of Nutre Hogar
  ○ How did you feel when someone told you that your child needed to be cared for in Santiago?
  ○ How often are you able to visit your child at Nutre Hogar?
    ▪ When you visit, what forms of transportation do you take to get here?
  ○ Would you prefer to treat your child at home, or do you prefer to treat him or her at Nutre Hogar?
  ○ Has Nutre Hogar taught you anything about how to prevent your child from becoming malnourished?