

## ABSTRACT

### A Case Study of Mission Guatemala's Nutrition Outreach Feeding Programs for Children in Guatemala

Jakalyn Gossett, M.S.

Mentor: Janelle Walter, Ph.D.

Guatemala is a country with the fourth highest rate of chronic undernutrition in the world and the highest rate in Latin America and the Caribbean [1]. Nutrition initiatives with feeding programs have been incorporated into communities to help alleviate childhood undernourishment. In May 2015, a qualitative descriptive study explored various feeding programs offered in elementary schools in communities near Panajachel, Guatemala with a primary objective to provide up-to-date information on nutrition intervention feeding programs and better assess the performance of these programs. The information gathered in this study aims to facilitate future research with more intense investigation of childhood malnutrition and feeding programs offered in Guatemala.

A Case Study of Mission Guatemala's Nutrition Outreach  
Feeding Programs for Children in Guatemala

by

Jakalyn Gossett, B.S.

A Thesis

Approved by the Department of Family and Consumer Sciences

---

Rinn M. Cloud, Ph.D., Chairperson

Submitted to the Graduate Faculty of  
Baylor University in Partial Fulfillment of the  
Requirements for the Degree  
of  
Master of Science

Approved by the Thesis Committee

---

Janelle Walter, Ph.D. Chairperson

---

Suzy Weems, Ph.D.

---

Joyce Nuner, Ph.D.

---

Alan Schultz, Ph.D.

Accepted by the Graduate School  
May 2016

---

J. Larry Lyon, Ph.D., Dean

Copyright © 2016 by Jakalyn Gossett

All rights reserved

## TABLE OF CONTENTS

LIST OF FIGURES .....	v
LIST OF TABLES .....	vi
ACKNOWLEDGMENTS .....	vii
DEDICATION .....	viii
CHAPTER ONE .....	1
Introduction .....	1
<i>Malnutrition and Guatemala</i> .....	1
<i>Kids Against Hunger®</i> .....	7
<i>Chispuditos®</i> .....	10
<i>Objectives</i> .....	15
CHAPTER TWO .....	16
Methods .....	16
<i>Study type, design, and tools</i> .....	16
<i>Inclusion criteria</i> .....	16
<i>Participants</i> .....	17
<i>Data Collection</i> .....	17
CHAPTER THREE .....	19
Results .....	19
<i>Kitchen Volunteer Interviews</i> .....	19
<i>Mission Guatemala Interview</i> .....	21
CHAPTER FOUR .....	27
Discussion .....	27
<i>Limitations</i> .....	27
<i>Future research</i> .....	27
<i>Conclusion</i> .....	30
BIBLIOGRAPHY .....	35

## LIST OF FIGURES

Figure 3.1. Mission Guatemala feeding programs.....	23
---	----

## LIST OF TABLES

Table 1.1. Kids Against Hunger® nutrition information.....	9
Table 1.2. Chispuditos® nutrition information.....	11
Table 2.1. Volunteer interview question guide.....	18
Table 2.2. Mission Guatemala interview question guide.....	18

## ACKNOWLEDGMENTS

Thank you to Dr. Janelle Walter, Dr. Suzy Weems, Mr. Stan Wilfong, Dr. Joyce Nuner, and Dr. Alan Schultz from Baylor University; Tom, Dave, Marily, Gladys, Dieguito, and Daniel from Mission Guatemala; Nick and Sierra from Kids Against Hunger®; Ana from The Mathile Institute, my Baylor team, and most importantly, each and every individual I had the privilege of meeting while in Guatemala. Without each of you, none of this would be possible.

## DEDICATION

To Benny, Mary Ellen, Daniel, Clay, Haley, Tim, Collin, Coleton, Ayden, Maddi, Abbi, Zoie, Summit, and my drag racing family. Thank you for your love, support, faith, and countless memories. Without you, I undoubtedly would not be who I am today. To Kofi Sekyi and others who have suffered from hunger and poverty. You have given me purpose in life.



## CHAPTER ONE

### Introduction

#### *Malnutrition and Guatemala*

##### *Malnutrition*

Malnutrition is defined as a condition that develops when the body does not receive the proper amount of vitamins, minerals, and other nutrients needed to maintain natural body capacities, such as physical and mental development [2,3]. Malnutrition includes both undernutrition and overweight [2]. Undernutrition exists when the caloric intake is below the minimum dietary energy requirement [4]. Malnutrition is closely linked with poverty and is the largest single contributor to disease in the world [2,5]. Malnutrition is a global issue from which one child every six seconds, 16,000 children per day, 3 million children per year die [6,7]. Of all the deaths worldwide in children under the age of five years, 45% are linked to chronic undernutrition [8]. Within these five years, the first two years of life are the most critical for determining survival, proper growth development, and overall long-term health [9]. Therefore, intervention during the first years of life is crucial in preventing irreversible physical and cognitive damage caused from chronic undernutrition [2]. Irreversible damage caused from undernutrition during the first 1,000 days of life includes growth retardation with a height-for-age of two standard deviations below the World Health Organization Child Growth Standards median height of nourished children, also known as stunting [10]. Stunting is associated with the development of chronic diseases in children by decreasing their immune

function, which delays recovery and increases the frequency and severity of infections [10,11]. Children are most susceptible during this time because their immune systems are not yet fully developed [12]. Among the most common morbidities association with this decreased immune function are diarrhea and respiratory infections, and stunting rates are higher among children exposed to these frequently [12]. Diarrhea causes food to pass through the intestine too quickly to be absorbed and the consequences of respiratory infection are unclear [12]. Other than physical impairments, stunting also impacts cognitive development, such as school achievement, intellectual capacity, and overall health and development [11,13]. Children are susceptible to cognitive damage because brain growth is most rapid during the first months of life [12]. Malnutrition and growth retardation can create a cycle that continues to repeat itself when women with lower socioeconomic status, including poverty, poor sanitation, and poor living conditions give birth to an underweight child who could also become stunted in the future [14,15,16,17,18]. However, because stunting seems normal in countries where short stature is common and because most health workers and policy makers do not know the consequences associated with stunting, it is often overlooked [19]. Also, when children come from larger economically disadvantaged families, they are at a higher risk of malnutrition during the weaning period when transitioning from exclusive breastfeeding to a diet with solid and liquid foods because they may not consume adequate nutrients due to lack of food or the food provided is of poor nutritional quality [12]. Approximately 43% of children under the age of five in third-world countries are malnourished and stunted [14].

## *Guatemala*

Guatemala means “land of the forests” and was derived from one of the Mayan dialects spoken by the indigenous people in 1523 [20]. Guatemala is a Latin American country with a population of 14.7 million people, covers 42,042 square miles, and its climate varies throughout the country depending on altitude and rainfall patterns [20]. Guatemala has the fourth highest rate of chronic undernutrition in the world and the highest rate of chronic undernutrition in Latin America and the Caribbean region [1]. The rate of chronic undernutrition for children under the age of five years in Guatemala is 49.8% and reaches as high as 69.5% in indigenous areas with exposure to long periods of droughts, degraded soils, and low agricultural yields [1]. This is especially of interest in Guatemala since 40% of the population is indigenous Maya [1].

Guatemala has sociodemographic, environmental, and food factors which contribute to malnutrition and deficiencies within the population [1,14]. The factors which contribute to malnutrition and deficiencies within the Guatemalan population include recurrent natural disasters such as earthquakes and droughts, economic crises of increased budget deficit and unemployment, and food insecurity from a rise in agricultural inputs [1]. For example, Guatemala City is 5,000 feet above sea level and has a marked dry season between November and April [21]. This dry flat corridor receives less than forty inches of rain per year and is one of the areas most susceptible to long periods of droughts [20]. Another example of a natural disaster that has affected this area occurred in 1976. Within 39 seconds, an earthquake killed more than 22,000 people, injured more than 70,000 people, and caused 1 million people to become homeless in Guatemala City [21]. The region affected most by this earthquake was Chimaltenango,

which lies directly beside Panajachel and has a heavy Mayan population. Because of this heavy hit, government allotted areas of distinct relief groups and established over 126 settlements in May 1976 [21]. Guatemala's most essential resource is its fertile land, but only 12% of the total landmass is arable. Therefore, its most essential resource is only available on a small area of land. [20]. Over 50% of Guatemala's forests have been destroyed since 1890 from soil erosion contributed to the 0.7 million tons of solid waste and thousands of fertilizer used annually [22]. Agriculture employs nearly half of the workforce in Guatemala, but food is still imported to feed its people due to the lack of arable land available [21]. Also, many large plantations in Guatemala are owned by large nonresident landholders and are worked by locals. Therefore, many locals do not own the land they are working. Many land disputes occur in the rural areas because people do not register their property, the population has become more mobile and leave their land, and land is sometimes sold to numerous people without their knowledge [20].

Malnutrition is highest among the poor, less educated, rural populations, and indigenous people [12]. The indigenous Mayan population continues to face difficulties from social, political, and economical exclusion due to language, geographical, and educational barriers [12]. The forty-year Civil War in Guatemala from 1956-1996 caused a long period of social unrest and violence [21]. This guerrilla war between the Maya and government ended the lives of more than 200,000 people through war, terrorism, and political assassinations. Tens of thousands of Mayan Indians were killed while trying to demand equality for the Mayan language and culture. The Guatemalan army defeated the guerrilla movement, but The Commission for Historical Clarification found they did so in committing genocide against the Mayas with the intent to destroy this group of people

through killing their tribes, women, children, and elders [21, 23]. According to the 2016 World Food Programme, 53% of Guatemala's population lives in poverty, and 13% live in extreme poverty with a Gross National Income per capita \$2,740 [1]. For the indigenous population in Guatemala, 76% live in poverty, and 27% live in extreme poverty [12]. Relative poverty is when incomes are below the general standard of living in that country, whereas extreme poverty is when people lack the basic necessities for survival, such as clean water, clothing, medications, and food [24]. In terms of per capita consumption, 62% of the children in the poorest quintile families in Guatemala are chronically malnourished, whereas 16% of children in the richest quintile families in Guatemala are chronically malnourished [12]. The indigenous Maya population has the most concentrated poverty because the wealth distribution in Guatemala is extremely unequal and the guerrilla warfare in the Civil War lasting many years. Also, there was a forced labor system subjugating the Mayans until the 1940's. This unequal distribution of wealth and the labor system both caused landowners to undermine the Mayan peasants [25]. Between the many deaths associated with the Civil War and the separation of Mayan tribes from society, this population has become greatly affected by poverty and malnutrition.

Guatemala is one of the 36 countries accounting for 90% of stunting in the world, along with Burundi, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Uganda, United Republic of Tanzania, Zambia, Angola, Cameroon, Democratic Republic of the Congo, Egypt, Sudan, South Africa, Burkina Faso, Cote d'Ivoire, Ghana, Mali, Niger, Nigeria, Iraq, Turkey, Yemen, Afghanistan, Bangladesh, India, Nepal, Pakistan, Cambodia, Indonesia, Myanmar, Philippines, Vietnam, and Peru [26]. Of these 36

countries, there is only one other country in the Latin American region other than Guatemala: Peru [1,26]. Therefore, Peru and Guatemala are the countries in this region worth examining. Within Guatemala, the prevalence of stunted children is 58% and reaches up to 80% in indigenous areas [8,27,28].

### *Panajachel*

This study was conducted in communities near Panajachel, Guatemala. Panajachel is located on the northeastern shore of Lake Atitlan, is 67.7 miles from Guatemala City, and has an altitude of 5,238 feet [29]. Panajachel has a population of approximately 16,000 people, 70% of whom are indigenous Maya [29]. The traditional clothing for women includes the *corte* skirt and *huipil* blouse [29]. In Panajachel, the typical worker earns half of the Guatemalan minimum wage of 1,800 Quetzales (~\$225) per month because they are typically not legally contracted [29]. The top five causes of mortality in Guatemala for all ages are influenza and pneumonia, intestinal infectious disease, perinatal conditions, events of undetermined intent, and assaults/homicide, respectively [29]. However, the top five causes of mortality in Panajachel for all ages are malnutrition, senility, cerebral vascular accident, drowning, and cirrhosis, respectively [29].

Malnutrition is the number one cause of mortality in Panajachel, whereas it is not ranked in the top five causes nationally. Also, malnutrition can lead to irreversible damage in young children, so special attention should be directed to this specific area. The communities surrounding Panajachel where this research was conducted were built to house families who were displaced and lost their homes to Hurricane Stan in 2005 and Tropical Storm Agatha in May 2010 [30,31]. This area was chosen for research because these communities are populated with indigenous Maya who have faced challenges, such

as losing their homes, are devastated by poverty, have been excluded from society, and are more heavily malnourished.

### *Mission Guatemala and Feeding Programs*

Because chronic undernutrition is an ongoing issue in Guatemala, organizations such as Mission Guatemala have been created to aid those suffering from poverty and malnourishment. Mission Guatemala is a faith-based non-profit organization with “a mission to help meet the basic needs and improve the quality of life of under-served and impoverished Guatemalan peoples through health, education and nutrition initiatives and missionary service” [32]. Mission Guatemala’s nutrition initiatives include various feeding programs in elementary schools in communities near Panajachel, Guatemala heavily populated with indigenous Maya and a high rate of chronic undernutrition. The two fortified foods these programs offer are Kids Against Hunger® and Chispuditos®, both of which will be explained in further detail.

### *Kids Against Hunger®*

#### *Background*

Kids Against Hunger® is a humanitarian food-aid organization that was incorporated in 1999 as a non-profit organization with a goal of eradicating world hunger by partnering and distributing fortified packaged meals to over 60 countries, including Guatemala [33]. The main mission of these meals is to appeal to the diverse tastes of cultures, maintain a long shelf life, require simple preparation, and provide the nutrition lacking in malnourished children [33].

## *Food*

Food scientists from Cargill, General Mills, Archer Daniels Midland, and Pillsbury formulated the Kids Against Hunger® meal composition to meet the needs of children [34]. Not all of the ingredients for this product are provided on the website or the nutrition facts label of the product, so the company was contacted directly for this information. Kids Against Hunger® includes the nine essential amino acids (histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine), white long-grain rice, vitamin-fortified crushed soy, a dehydrated blend of vegetables, and vitamin and mineral powder [34]. The white, long-grain rice is a common food staple with a long shelf life [34]. The crushed soy is a good source of protein (52%) and has been fortified with 9 vitamins [34]. The crushed soy is composed of soy flour, zinc oxide, niacinamide, ferrous sulfate, copper gluconate, vitamin A palmitate, calcium pantotrenate, vitamin B1, vitamin B2, vitamin B6, and vitamin B12 [35]. The dehydrated blend is composed of 6 vegetables (carrots, onions, celery, tomatoes, red bell peppers, and green bell peppers), and is provided by the company Dehydrates; these add color and phytochemicals to the meal [34,35]. The vitamin and mineral powder includes 21 vitamins and minerals [34]. One package of Kids Against Hunger® contains 6 servings and has a shelf life of approximately 3 years [34]. This chicken flavored fortified rice-soy casserole contributes to creating a well-balanced, energy-dense meal containing the daily requirement of all vitamins and minerals [34]. According to Mission Guatemala, Kids Against Hunger® is donated through sponsors located in the United States and provides approximately 75-80% of the total caloric intake that a growing child needs [36]. Nutrition information for Kids Against Hunger® is located in Table 1.1.



Table 1.1. Kids Against Hunger® nutrition information

Nutrient	Amount per serving
Calories	220
Calories from fat	5
Total fat	0.5 g
Saturated fat	0 g
Cholesterol	0 mg
Sodium	840 mg
Potassium	420 mg
Total carbohydrate	43 g
Dietary fiber	1 g
Sugars	3 g
Vitamin A	60% DV
Calcium	15% DV
Vitamin D3	50% DV
Thiamin	70% DV
Niacin	70% DV
Folate	50% DV
Biotin	50% DV
Phosphorous	20% DV
Magnesium	30% DV
Copper	35% DV
Vitamin C	60% DV
Iron	60% DV
Vitamin E	50% DV
Riboflavin	60% DV
Vitamin B6	60% DV
Vitamin B12	90% DV
Pantothenic Acid	50% DV
Iodine	50% DV
Zinc	45% DV
Manganese	50% DV
*Percent Daily Values are based on a 2,000 Calorie diet	

### *Research*

According to the CEO of Kids Against Hunger®, Nick Yaksich, the company is currently conducting research studies in Gaza, Ethiopia, and India [35]. The founder of Kids Against Hunger® conducted studies in the 1990's, but the information is no longer accessible [35]. In Gaza, Kids Against Hunger® has partnered with the United Nations

and Caritas to record growth rates after implementing a feeding program for one year [35]. The study consists of 5,000 subjects between the ages of 5 and 12. Baseline data of height, weight, and blood were collected over a 3-month period in their current living conditions without intervention. At baseline, all subjects were considered undernourished with 25% malnourished. Currently, the feeding program is being implemented with hopes to find significant differences in growth from baseline [35]. In Ethiopia, Kids Against Hunger® is conducting research in a neonatal clinic where historically all newborns are undersized with undernourished mothers unable to produce sufficient milk supply. The study is collecting baseline data of height, weight, and milk supply and will incorporate a feeding program while documenting differences in newborns and their mothers during pregnancy and postpartum [35].

### *Chispuditos®*

#### *Background*

Chispuditos® was developed in 2009 by the Mathile Institute for the Advancement of Human Nutrition with a goal of eradicating world hunger and malnutrition while incorporating culturally-appropriate, evidence-based, and innovative interventions [37].

#### *Food*

Chispuditos® is a packaged nutrient-fortified corn/soy atole (porridge) [38]. Chispuditos® is composed of 21 vitamins and minerals, is easy to prepare and use, is a common local practice for Guatemalans, and is cost-efficient [38]. A child aged 6 to 72 months needs 18.75 grams of dry Chispuditos® per day, which is equivalent to one

teaspoon of product [39]. In 2010, Chispuditos® was implemented in Guatemala nurseries with the goal to be used widespread throughout the country to reduce undernutrition [38]. According to Mission Guatemala, Chispuditos® was developed and manufactured in Guatemala with hopes to increase acceptance of their product, as an atole is a common snack among Guatemalan children [36]. Nutrition information for Chispuditos® is located in Table 1.2.

Table 1.2. Chispuditos® nutrition information

Nutrient	Amount per serving (18.75 g)
Calories	70
Total Fat	1 g
Protein	4 g
Zinc	9 mg
Iron	12 mg
Folic Acid	160 µg
Iodine	90 µg
Vitamin A	250 µg
Vitamin C	40 mg
Vitamin B12	0.9 µg
Thiamin	0.5 mg
Niacin	6 mg
Riboflavin	0.5 mg
Vitamin B6	0.5 mg
Copper	300 µg
Vitamin D3	5 µg
Vitamin E	5 mg
Calcium	200 mg
Phosphorous	150 mg
Magnesium	40 mg
Selenium	17 mg
Manganese	0.17 mg
Biotin	8 µg
Pantothenic Acid	1.8 mg

## *Research*

Three research studies were conducted in Guatemala City, Guatemala in municipal nurseries providing Chispuditos® to children. The first study conducted by the Mathile Institute in municipal nurseries was from 2010-2012 with 1,000 children under the age of 5 years. After the two-year intervention, the nursery children were found to have a 67% decrease in anemia, a 61% decrease in acute diarrhea, a 57% decrease in respiratory infections, a 58-87% growth rate improvement, and a 23% decrease in stunting [38].

The second study conducted by Reinhart and Villanueva in February 2010 provided 18.8 grams of Chispuditos® blended in 227 mL of heated liquid to 1,003 children aged 6-72 months 5 days per week for 10 months. After the 10-month intervention, there was a 61% reduction in acute diarrhea, a 71% reduction in acute respiratory infections, and growth rates increased across all age groups (58% increase for children 6-23 months, 87% increase for children 24-35 months, 69% increase for children 36-59 months, 80% increase for children 60-72 months). Of the subjects, 117 children were anemic with baseline hemoglobin <11.0 mg/dL. The mean hemoglobin for the anemic children increased from 10.89 mg/dL to 12.34 mg/dL at the end of the study. The mean serum iron for all children increased from 87.52 µg/dL to 96.88 µg/dL, the mean serum transferrin increased from 288.4 mg/dL to 295.1 mg/dL, the mean serum folate increased from 16.5 ng/ml to 18.9 ng/ml, and the serum vitamin B12 increased from 507.5 pg/ml to 546.3 pg/ml after 10 months of supplementing Chispuditos® [40]. This study was then analyzed at 28 months post-intervention with the 317 children continuing to receive Chispuditos®. There was a 50.3% decrease in stunting from 16.5% to 8.2% for

the 55 children who entered the study stunted, the children with anemia at baseline increased their mean hemoglobin from 10.44 g/dL to 12.36 g/dL with a 65.4% decrease in incidence from 11.9% to 4.12%, diarrhea decreased by 39.3% from 11.2% to 6.8%, and acute respiratory infections decreased by 57.2% from 37.4% to 16%[41]. Then, four years post-intervention, the 147 children continuing to receive Chispuditos® from 2010 decreased in stunting from 17.7% to 6.1% indicating a long-term decrease in morbidity with the implementation of Chispuditos® [39].

The third study conducted by Villanueva, Palacios, Castellanos, and Reinhart in July 2013 provided 18.75 grams of Chispuditos® to 747 children aged 6-72 months 5 days per week for 12 months. Data were collected at baseline, 6 months, and one year. After one year, there was a 57.1% reduction in respiratory tract infections from 30.9% to 15.8% without much change in the incidence of diarrhea from 9.6% to 9.2% [42].

A community-based feeding study was conducted in 2012 within 18 villages in Southwest Guatemala Retalhuleu where 939 malnourished children aged 6-72 months were randomly assigned to receive either 18.75 g of Chispuditos® or an equivalent portion by weight of lactose-free milk with both diets isocaloric and isonitrogenous. The average height-for-age z-score of the 667 children given Chispuditos® after 12 months of intervention increased 12%, whereas the 272 children given lactose-free milk increased by 7.3%. Chispuditos® was accepted by primary caretakers and children in this area and was 33% the cost of lactose-free milk. Therefore, when compared to the lactose-free milk powder, Chispuditos® was more affordable, culturally acceptable, and produced greater changes in growth and nutrition status of these children [43].

According to the Mathile Institute's summary of research, a study is currently

being conducted in Daniel Comboni Community Clinic in Mixco, Guatemala with 160 children receiving Chispuditos®, showing a decrease in anemia and stunting [39]. Also, according to the Mathile Institute's summary of research, a feeding program implementing Chispuditos® for 100 children and 100 pregnant/lactating women in Tzununá, Sololá to improve micronutrient status and health in indigenous Guatemalan women [39].

A research study was conducted from September 2010 to December 2011 in Intibucá, Honduras where 2,686 children aged 6-60 months received Chispuditos® daily for one year. After 12 months, diarrhea was reduced by 43% (11.3 fewer cases per month), bronchitis reduced by 43% (11.3 fewer cases per month), cough reduced by 61% (32.7 fewer cases per month), and height increased by 0.33 cm for the intervention group when compared to baseline. When compared to children aged 0-84 months in the same region who did not receive Chispuditos®, diarrhea reduced by 50%, bronchitis reduced by 50%, and cough incidence reduced by 49% [44].

According to the Mathile Institute's summary of research, studies are also being conducted in El Salvador and Nicaragua with the implementation of Chispuditos®. In El Salvador, a study began in September 2015 to compare Chispuditos® interventions versus the Ministry of Health standard care in four municipalities. The objective of this study is to determine which of these programs better reduce micronutrient deficiencies, reduce diarrhea and respiratory tract infections, increase growth and hemoglobin levels, and which is more cost efficient. In Nicaragua, approximately 813 preschool children in 35 different schools are currently receiving Chispuditos® to determine micronutrient improvements after intervention [39].

### *Objectives*

Overall, malnutrition is an issue that can affect the health and potential of future generations, so it is essential to develop interventions and treatments to reduce childhood undernourishment. Research has shown feeding programs implementing Kids Against Hunger® and Chispuditos® to be successful in many regions of Guatemala and the world. However, according to the World Bank Policy, few fortification programs are successful longitudinally in Guatemala due to poor targeting, weak regulation, and interruptions in the service [12]. Also, up-to-date information is not available on the outcomes of micronutrient fortification programs adopted in Guatemala, so an in-depth and rigorous nationally representative evaluation of the impact of such programs should be a priority [12]. Programs are without direction, there is no guiding vision on nutrition, and there is a lack of assessments on program performances in Guatemala [12]. The most successful interventions in reducing malnutrition in Guatemala have been shown to be community-based programs and monitoring of the mother's nutritional status and child growth patterns [12]. These interventions target preschool children, pregnant women, and households within the community [12]. Creating awareness and providing information at the household level regarding the importance of a balanced diet and the correct feeding practices for infants and young children under the age of two should provide better results in the Guatemalan communities [12].

Therefore, the primary purpose of this study is to provide up-to-date information on the various nutrition interventions in Mission Guatemala's elementary school feeding programs and better assess the performance of these programs.

## CHAPTER TWO

### Methods

#### *Study Type, Design, and Tools*

This was a qualitative study utilizing a semi-structured interview approach with Mission Guatemala and school kitchen volunteers to explore various elementary school feeding programs offered in communities near Panajachel, Guatemala. The researcher created interview question guides prior to arrival in Guatemala. These question guides were developed to help differentiate between the various feeding programs offered by Mission Guatemala and to better understand the preparation, serving, and acceptance of the meals offered in the elementary schools. The question guides were carefully constructed with open-ended questions, and the researcher used follow-up questions for clarification when necessary and to initiate more in-depth explanations. Approval of the study was received from the Baylor University International Review Board.

#### *Inclusion Criteria*

Eligible kitchen volunteer interview participants included the children's mothers, fathers, and relatives who volunteer to prepare lunch at the elementary schools. Eligible participants for the Mission Guatemala interview included Mission Guatemala staff members involved in the feeding programs offered through their organization.



### *Participants*

This study involved a series of two separate group interview sessions with kitchen volunteers from two community elementary schools, as well as one interview session with Mission Guatemala staff members. The two kitchen volunteer interview sessions were comprised of 15 total participants, 7 volunteer mothers in interview session one and 8 volunteer mothers in interview session two. The Mission Guatemala interview session was comprised of the two staff members most actively involved in the Mission Guatemala feeding programs.

### *Data Collection*

Each kitchen volunteer interview session group participated in a thirty-minute discussion in May 2015. Volunteer interview sessions were conducted in a casual environment on-site in two elementary school kitchens. The researcher led these group interview sessions with the question guide and a translator to help direct the discussion. The researcher documented responses from the mother volunteers with pen and paper during the interview session with the translator present. The question guide utilized in the group kitchen volunteer interview session is located in Table 2.1.

The Mission Guatemala interview session of two staff members actively involved in the organization's feeding programs was a one-hour interview session in May 2015. The Mission Guatemala interview session was conducted in the Mission Guatemala staff office. The one-hour semi-structured interview session was led by the researcher with a specifically formed question guide to help direct the discussion. One of the two staff members translated the questions and responses for the second Mission Guatemala staff member during the interview session, as one staff member was fluent in English. The

researcher documented the responses of the staff members with pen and paper during the interview session. The question guide utilized in the Mission Guatemala staff member interview session is located in Table 2.2.

Table 2.1. Kitchen volunteer interview question guide

Kitchen volunteer interview
How many days do you cook/serve?
What fortified meal is served each day?
How is this fortified meal prepared?
How simple/difficult is the meal preparation?
What age group is served this meal?
What is the serving size for each child?
Does this serving size differ amongst each age group?
Do the children accept this meal?
Do you observe the children eating most of their meal?
Do families know about these meals being provided?
What is the acceptance of these meals from families?

Table 2.2. Mission Guatemala interview question guide

Mission Guatemala interview
How many feeding programs does Mission Guatemala have?
Which schools receive these meals?
How often are these meals provided?
Which fortified meals are offered?
Who prepares and serves the meals?
What is the serving size for each child?
Does this serving size differ amongst each age group?
Are the children and families educated about these programs and meals?
How much do these programs cost?

## CHAPTER THREE

### Results

#### *Kitchen Volunteer Interview Sessions*

The kitchen volunteer interview sessions were located in two elementary schools participating in the Mission Guatemala Como Saludable program.

#### *Kitchen Volunteer Interview 1*

The first volunteer interview group session was conducted in the kitchen of Nueva Victoria elementary school with seven volunteer mothers and a translator. This elementary school participates in the Como Saludable part-time feeding program offered once every two weeks on Wednesday with Kids Against Hunger® fortified packaged meals served for lunch. The mothers believe the preparation of the meal is very simple with boiling the water and adding the fortified meal to cook. These women always add fresh vegetables, such as potatoes, carrots, onions, green beans, red pepper, and herbs to the Kids Against Hunger® meal. Upon availability, chicken is also added to the meal. With these additions, the mothers have witnessed a better acceptance of the meal with children consuming larger portions at lunch. The mothers claim that each child differs on their perceptions and acceptance of the meal, depending on personal preferences. However, the mothers have witnessed an improvement in acceptance of the Kids Against Hunger® with the addition of vegetables and chicken to the product. Children aged 5-13 years attend Nueva Victoria elementary school, and each child is served two scoops of the Kids Against Hunger® meal for lunch. Younger children receive smaller scoops, and

older children receive larger scoops of the meal. However, no specific measurement tool other than a spoon is used to determine the quantity of meal each child receives. Families of the children are informed that Kids Against Hunger® is being served to their children during lunch. The mothers volunteering in the kitchen and most other family members of the children within the community encourage the children to eat Kids Against Hunger® for lunch. If the children do not eat their lunch while in school, they will either have to share meals with their family members at home (typically consisting of seven or more people) or do not eat again for the remainder of the day, depending on what the family has available.

#### *Kitchen Volunteer Interview 2*

The second volunteer interview group session was conducted in the kitchen of Sucún elementary school with eight volunteer mothers and a translator. This elementary school participates in the Como Saludable part-time feeding program offered every two weeks on Wednesday with Kids Against Hunger® fortified packaged meals served for lunch. The mothers claimed the preparation of the Kids Against Hunger® meal was difficult for them initially, but they now feel comfortable in preparing the meals. One reason the preparation was difficult at first was because everything, including the cooking instructions, on the Kids Against Hunger® food package is written in English. Therefore, an instructor was necessary to translate and demonstrate proper preparation of the meal before the volunteers could begin. These volunteer mothers prepare Kids Against Hunger® by boiling water and adding the fortified meal to cook. For each meal, vegetables and tortillas are served separately without mixing them into the Kids Against Hunger® meal. Children aged 6-15 years are served these meals, and the serving size for

each child remains the same, regardless of age. Each child receives one scoop of vegetables, one scoop of Kids Against Hunger®, and as many tortillas as desired. Many of these mothers raise their own corn, making it accessible and affordable to serve tortillas to the children. The volunteers witness children accepting and enjoying Kids Against Hunger® at lunch, frequently eating most if not all of their meal and feeling satisfied afterwards. The mothers serving Kids Against Hunger® in Sucún elementary school claimed to have been educating the children on the importance of eating this meal while serving it to the children at lunch. Also, families have been educated about these meals being served during lunch, and the mother volunteers in the Sucún elementary school kitchen believe families in this area have accepted these meals for their children.

#### *Mission Guatemala Interview*

The Mission Guatemala interview involved two staff members actively involved in their organization's feeding programs. The interview session focused on the total amount of feeding programs offered by Mission Guatemala, the communities involved, and details of each individual program. For example, the total number of volunteers involved, characteristics of volunteers, the location of the feeding programs within each community, the age of children served, the education provided, and the cost of the program were gathered and recorded by the researcher.

#### *Mission Guatemala Staff Interview*

Responses from the Mission Guatemala interview were obtained from two Mission Guatemala staff members. It was found that there are four feeding programs: three full-time and one part-time program.

The food provided within these feeding programs includes packaged fortified meals donated to Mission Guatemala, fresh vegetables purchased from the local market by Mission Guatemala staff, or chicken meat produced in-house by Mission Guatemala.

Kitchen volunteers that prepare and serve the meals at the elementary schools consist of mothers, fathers, or other relatives of the children within the schools. This approach was incorporated with the hopes that the involvement of family members as volunteers would increase acceptance of and strengthen the Mission Guatemala partnership within the community. Typically, there is one volunteer per ten to fifteen children.

Prior to the volunteers beginning their work in the kitchens of each elementary school, Mission Guatemala sends an active staff member within the feeding programs (typically one of the two Mission Guatemala staff members the researcher interviewed) to the elementary school kitchens to demonstrate proper food preparation to the volunteers. The volunteers and children at each school are then taught the importance of the meals provided by Mission Guatemala feeding programs.

A flowchart with the different Mission Guatemala feeding programs is located in Figure 3.1. Information provided in the figure and in the descriptions below was provided by the Mission Guatemala staff members during the interview session.

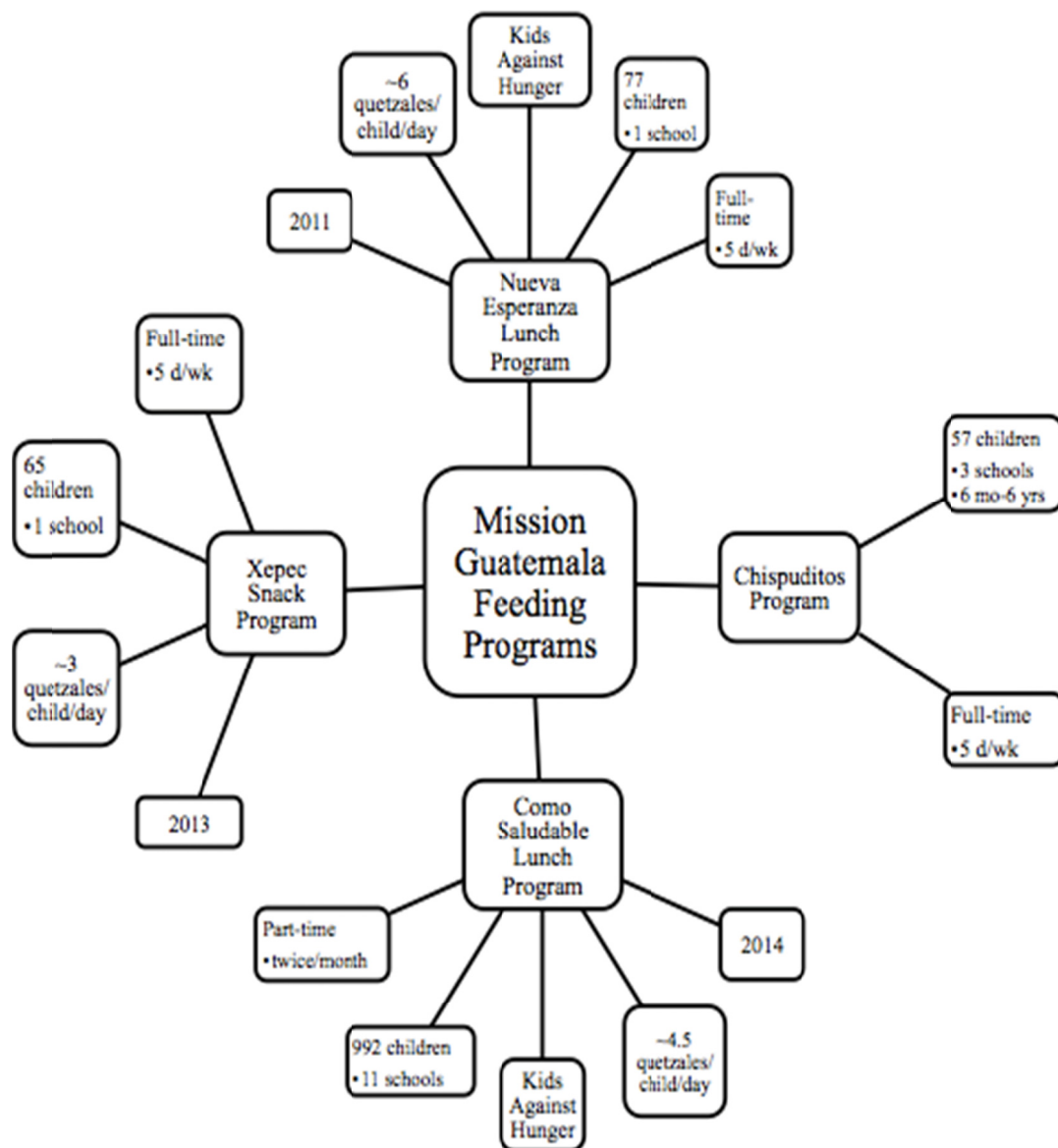


Figure 3.1. Mission Guatemala feeding programs

### *Nueva Esperanza Lunch Program*

The lunch program in Nueva Esperanza elementary school began in 2011 and feeds 77 children lunch five days per week. This program is considered full-time because lunch is prepared for the children each school day. Lunch consists of meat served three times per week, vegetables or eggs served two times per week, and Kids Against Hunger® twice to three times per week in combination with the other meal options. Pre-kindergarteners and first graders are served smaller portion sizes than the older children. A total of 40 mother volunteers help prepare and serve lunch to the children at Nueva Esperanza elementary school. Five volunteers prepare lunch each day for a week, and the following week, five different volunteers prepare lunch. Therefore, each group of five mothers volunteer every 8 weeks. This lunch program costs Mission Guatemala approximately 6 Quetzales (\$0.78) per day per child. Therefore, the program costs approximately 2,310 Quetzales (\$300.88) per week for the children attending Nueva Esperanza elementary school to receive lunch. The cost provided includes the price of food only, not including electricity or staff payment.

### *Xepec Snack Program*

The snack program in Xepec elementary school began in 2013 and feeds 65 children one snack per day, five days per week. This program is considered full-time because a snack is prepared each school day. Snacks served include tostadas, tamales, and bananas with corn flakes. Two volunteer mothers prepare the snacks, and it costs Mission Guatemala approximately 3 Quetzales (\$0.39) per child per day. Therefore, the program costs approximately 975 Quetzales (\$126.99) per week for the children



attending Xepec elementary school to receive snacks. The cost provided includes the price of food only, not including electricity or staff payment.

#### *Como Saludable Lunch Program*

Como Saludable, translated to mean “How Healthy,” began in 2014 and feeds Kids Against Hunger® lunches to 992 children and 129 mothers and teachers once every two weeks. The lunch is served at 11 elementary school programs, including Chuiya, Xejuyu I, Xejuyu II, Los Robles, Godinez, Las Canoas Alta, Choquec, Panimatza, Nueva Victoria, Caliaj, and El Sucún. This program is considered part-time because the Kids Against Hunger® is provided one day every other week at each of these schools. Five different mothers volunteer to serve lunch once every two weeks at each of the 11 elementary schools listed. Therefore, every two weeks, a total of 55 mother volunteers serve lunch. This feeding program costs Mission Guatemala approximately 4.5 Quetzales (\$0.59) per child per day. Therefore, the program costs approximately 4,464 Quetzales (\$581.44) for the children attending these 11 elementary schools to receive one lunch. The cost provided includes the price of food only, not including electricity or staff payment.

#### *Chispuditos® Fortified Atole*

Chispuditos® is a fortified atole served five days per week to 57 children aged 6 months to 6 years in three communities near Panajachel. Chispuditos® is delivered to 23 children in Xepec, 25 children in Xejuyu II, and 9 children in Choquec elementary schools. This feeding program is considered full-time because the atole is served as a snack each school day. Chispuditos® is prepared by boiling water with the atole and

milk, and when available cinnamon, sugar, or salt is added. A Mission Guatemala staff member leads a workshop to demonstrate the preparation of Chispuditos® for mothers volunteering within these three communities.

## CHAPTER FOUR

### Discussion

#### *Limitations*

Limitations of this study include the language barrier and requiring the presence of a translator. With a third party involved and the use of open-ended questions, information could potentially get lost in translation throughout the process of interpreting. Moreover, there was a convenience-sampling group with small sample size, limited interview sessions, and only mother volunteer subjects. Also, research studies and in-depth nutrition information for Kids Against Hunger® was unavailable, so the company was contacted directly to retrieve the data. Therefore, literature information to confirm the information provided was inaccessible. Also, nutrition information for Chispuditos® is unavailable to the public, so the company was contacted directly to retrieve this data. To the author's knowledge, this study is one of the first to release this information. Although this study had limitations, the information gathered and results found create the beginning steps for many other areas of future research.

#### *Future Research*

The areas of future research related to this topic and subject group is unlimited. Future studies can utilize the same study approach of interviewing elementary school kitchen volunteers involved in Mission Guatemala feeding programs, but a greater number of interview sessions can be incorporated. Expansion of this study can be achieved either through multiple interview sessions at a single elementary school to

thoroughly understand their particular feeding program, through multiple interview sessions in all of the Mission Guatemala elementary schools participating in part-time and full-time feeding programs, and through interviews involving relatives and father kitchen volunteers preparing lunch in these elementary schools rather than only mothers of the children.

Also, future research studies can better assess the children's perceptions and acceptance of these feeding programs by observing plate waste in the elementary school cafeterias during lunch and snack time. Also, a taste test can be provided to determine how well the children enjoy the meals, what they dislike about them, and what they would suggest to improve them. Therefore, to better improve the acceptance rates of these meals, the changes can then be implemented and assessed.

Moreover, future studies can be conducted throughout the communities where these feeding programs are offered. Utilizing a community-based interview or survey approach can help provide information regarding what education has been provided to the local family members about the feeding programs offered through Mission Guatemala. This can include the teaching methods used, the person providing the education, and what the family members actually know about the product being served to their children. If proper information has not been provided to the communities, an educational intervention can then be implemented.

Also, community-based studies can also help to better understand the family and community perceptions and acceptance of the feeding programs, as well as compare the differences in perceptions and acceptance between various feeding programs implemented within their community. For example, one can assess if Chispuditos® is

better perceived and accepted within these communities than Kids Against Hunger® because the Chispuditos® product is made in Guatemala and its label is written in Spanish.

Considering Kids Against Hunger® does not have research studies available to show the effectiveness of their product and Mission Guatemala incorporates this product in many school programs, it would be worthwhile to invest in future research studies to assess physical growth, cognitive development, and micronutrient improvements in children being supplemented with this product in this area. Therefore, longitudinal studies can be conducted in this area within these elementary schools to determine if physical and cognitive growth patterns change after implementing these feeding programs when compared to baseline. Also, future research can determine if the serving size of Kids Against Hunger® provided to children within the schools at lunch is the recommended amount via measuring tool comparators, as these are unavailable to the school volunteers serving the meals. Finally, future studies can utilize a control group not served fortified foods in a nearby area compared to the treatment group in Mission Guatemala elementary schools being fed the fortified foods via differences in growth rates, cognitive development, or various micronutrient levels.

However, future research should not only be conducted to determine the short-term success of feeding programs. On a larger scale, one must consider the possibility that long-term feeding programs may not only be unhelpful to developing countries but might even be hurtful to the communities involved. According to Frederic Mousseau, some relief organizations depend heavily on food aid as a resource and do not question the current food system. Food aid can then lead to an increased dependency on food

imports, and the dependency, limited ability to afford imports, and the heavy debt burden faced by many developing countries can then result in increased poverty and hunger. If food aid is used long-term, agricultural development may not take place. These countries depending on imported food will continue to deprioritize domestic food consumption and subsistence agriculture while increasing their debt by importing goods [45]. All of these issues with food aid raise the question to the sustainability of the programs implemented. Therefore, future research should be conducted to develop a long-term solution for undernutrition in Guatemala. However, this feat will be challenging with the shortage of arable land throughout the region with plantations being owned by large nonresident landowners.

### *Conclusion*

The site of this study was located in communities near Panajachel, Guatemala, where homeless refugees surviving natural disasters were relocated. These communities have indigenous Maya with higher rates of chronic undernutrition and stunting. Therefore, investigating the population and interventions implemented within this area of Guatemala is essential, so the primary purpose of this case study was to provide up-to-date information on the various nutrition interventions in Mission Guatemala's elementary school feeding programs and to better assess the performance of these programs within these indigenous Mayan communities.

This observational case study incorporated interviews with Mission Guatemala staff members to gather information regarding what programs are provided for children aged six months through adolescence. This helps provide up-to-date information on adopted feeding programs in Guatemala and the nutrition vision of Mission Guatemala,

for both of which knowledge is lacking. A semi-structured interview approach was chosen for the Mission Guatemala staff members to retrieve information that is not fully accessible to those outside of their organization, as well as fully understand the array of programs offered. Overall, it was found that Mission Guatemala has four main feeding programs being implemented in 14 elementary schools in communities surrounding Panajachel, Guatemala. It was also found that all volunteers preparing and serving the meals provided from Mission Guatemala are relatives of the children attending school, and all volunteers are provided with preparation instruction and education of the product served. Each program was explained with facts regarding the total number of children served within each community, the age of children served, the frequency of meals, the type of meal, the meal portion sizes, the total volunteers within each program, and the cost of each program, as the programs offered through Mission Guatemala differ. Then, a flowchart of the Mission Guatemala feeding programs was created by the researcher to aid in differentiating between the feeding programs, as well as allows one to examine the feeding programs holistically.

This study also incorporated interviews within elementary school kitchens to better assess the perception of these meals from family members in communities near Panajachel. This helped bridge the gap in information regarding feeding program performance within Guatemala regarding the ease of preparation and the acceptance of the product specifically within these indigenous communities. A semi-structured interview approach was chosen for the volunteer groups in hopes to retrieve information from mother volunteers in a relaxed environment. Subjects may be more willing to communicate and share their opinions about the feeding programs to someone

unaffiliated with Mission Guatemala. Also, open-ended questions allowed the subjects to expand on their responses, providing details and explanations. Finally, this environment within the elementary school kitchens prior to the serving of lunch provided the opportunity to observe how volunteers prepare the meal and if the mothers seem to accept the program.

It was found in the group interview sessions that the mothers volunteering at the schools and preparing the fortified meals found the preparation of Kids Against Hunger® to be rather simple. However, this was not always the case for all volunteers, as Mission Guatemala had to provide a translator to demonstrate the proper preparation of this product. Since Kids Against Hunger® meals are provided in English, school volunteers are unable to read the instructions provided on the packaging. It was also found during these interview sessions that the children seem to accept the Kids Against Hunger® meals offered at lunch. However, this also was not always the case, as the mother volunteers found the addition of vegetables, chicken, and tortillas has increased the acceptance and enjoyment of these meals for the children. These changes are incorporated each time the Kids Against Hunger® meal is provided in order to accommodate the taste preferences of the children, which affects the overall cost of the program and success within the communities. It was also found there is inconsistency in the serving of Kids Against Hunger® throughout the elementary schools involved in Mission Guatemala's feeding program, first without the use of measuring tools and inconsistencies in the serving amount provided between schools. It was also found that family members, especially the mothers volunteering, tend to encourage the children to eat the meals provided. Perhaps Mission Guatemala incorporating volunteers from family



members of the children is a household and community targeted approach that not only educates the communities participating in the feeding programs but may also develop a sense of work ethic and pride for family members in knowing they are vital in the preparation of these meals for their children.

Although the schools interviewed in this study did not participate in the Chispuditos® program, it was found the Mission Guatemala staff members believe the program is accepted within the three communities being served. With the aid of Mission Guatemala staff members demonstrating proper food preparation for this fortified *atole* to the mothers within the communities, the packaging written in Spanish, the product being made in Guatemala, and *atole* being a common food served in Guatemala, Mission Guatemala staff members believe this product will become very successful, much like the similar product of Incaparina®. Incaparina® was a product created in the 1959 by the Institute of Nutrition of Central America and Panama to help alleviate malnutrition for Guatemalans over the age of six months [46]. Incaparina® is composed of cornmeal and flour fortified with soy, vitamins, and minerals [46]. Incaparina® also includes local produce, making the product more affordable to the population [46]. Incaparina® has been incorporated throughout Guatemala for many years with research supporting their product [46].

Overall, up-to-date information regarding the nutrition vision of Mission Guatemala, the adopted feeding programs, and the success of these programs was evaluated, all of which are areas lacking research. Also, specific feeding programs as well as preschool and elementary school children were targeted, which include the most successful intervention target populations in reducing malnutrition. This case study

creates the building blocks to further assess the success of such feeding programs. Again, one must not only assess the short-term success but also the long-term impacts of implementing such programs in communities, rather than creating a solution to the problem of undernutrition and hunger. As far as the author knows, this was the first study used to explore what Mission Guatemala provides via feeding programs and the viewpoints of the Guatemalan communities involved in such programs. The author declares that there is no conflict of interest regarding the publication of this paper.

## BIBLIOGRAPHY

1. Anon. Guatemala Current Issues and what the World Food Programme is doing. United Nations World Food Programme - Fighting Hunger Worldwide [Internet]. [cited 2016 Feb 19]. Available from: <https://www.wfp.org/countries/guatemala>
2. Anon. What is malnutrition? United Nations World Food Programme - Fighting Hunger Worldwide [Internet]. [cited 2016 Feb 19]. Available from: <https://www.wfp.org/hunger/malnutrition>
3. Anon. Nutrition. World Health Organization [Internet]. [cited 2016 Feb 28]. Available from: <http://www.who.int/nutrition/en/>
4. Anon. FAQ. Nutrition-Sensitive Agriculture and Food-Based Approaches: [Internet]. [cited 2016 Mar 8]. Available from: <http://www.fao.org/food/nutrition-sensitive-agriculture-and-food-based-approaches/faq/en/>
5. Anon. Global Database on Child Growth and Malnutrition . WHO [Internet]. [cited 2016 Feb 19]. Available from: <http://www.who.int/nutgrowthdb/about/introduction/en/>
6. Anon. Why We Do It. Kids Against Hunger [Internet]. [cited 2016 Feb 19]. Available from: <http://www.kidsagainsthunger.org/who-we-are/why-we-do-it>
7. Anon. Malnutrition Current Status Progress . UNICEF Statistics [Internet]. [cited 2016 Feb 19]. Available from: <http://data.unicef.org/nutrition/malnutrition.html>
8. Nutrition. United Nations World Food Programme – Fighting Hunger Worldwide [Internet].
9. Reurings M, Vossenaar M, Doak CM, Solomons NW. Stunting rates in infants and toddlers born in metropolitan Quetzaltenango, Guatemala. *Nutrition*. 2013;29(4): 655–660.
10. Anon. Nutrition. United Nations World Food Programme - Fighting Hunger Worldwide [Internet]. [cited 2016 Feb 19]. Available from: <http://www.wfp.org/nutrition>
11. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, Onis MD, Ezzati M, Grantham-Mcgregor S, Katz J, Martorell R, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*. 2013;382(9890): 427–451.

12. Marini A, Gragnolati M. Malnutrition and Poverty in Guatemala. World Bank Policy Research Working Paper. 2003 Jan 13;(2967): 1–54.
13. Oddo VM, Rah JH, Semba RD, Sun K, Akhter N, Sari M, Pee SD, Moench-Pfanner R, Bloem M, Kraemer K. Predictors of maternal and child double burden of malnutrition in rural Indonesia and Bangladesh. *American Journal of Clinical Nutrition*. 2012;95(4): 951–958.
14. Sereebutra P, Solomons N, Aliyu MH, Jolly PE. Sociodemographic and environmental predictors of childhood stunting in rural Guatemala. *Nutrition Research*. 2006;26(2): 65–70.
15. Vitolo MR, Gama CM, Bortolini GA, Campagnolo PDB, Drachler MDL. Some risk factors associated with overweight, stunting and wasting among children under 5 years old. *J Pediatr (Rio J) Jornal de Pediatria*. 2008;84(3): 251–257.
16. Sawaya AL, Martins PA, Grillo LP, Florencio TT. Long-term Effects of Early Malnutrition on Body Weight Regulation. *Nutrition Reviews*. 2004;62(7): 127–133.
17. Gibson J. The effect of endogeneity and measurement error bias on models of the risk of child stunting. *Mathematics and Computers in Simulation*. 2002;59(1-3): 179–185.
18. Addo OY, Stein AD, Fall CH, Gigante DP, Guntupalli AM, Horta BL, Kuzawa CW, Lee N, Norris SA, Prabhakaran P, et al. Maternal Height and Child Growth Patterns. *The Journal of Pediatrics*. 2013;163(2): 549–554.
19. Dewey KG, Begum K. Long-term consequences of stunting in early life. *Maternal & Child Nutrition*. 2011;7: 5–18.
20. Ember CR. Guatemala. In: Ember M, editor. *Countries and Their Cultures*. Vol. 2. New York, NY: Macmillan Reference USA; 2001. pp. 928–940.
21. Levenson D. Reactions to Trauma: The 1976 Earthquake in Guatemala. In: *International Labor and Working-Class History*. Vol. 62. Cambridge University Press ; 2002. pp. 60–68.
22. Anon. Guatemala. *Worldmark Encyclopedia of the Nations*. 2004;3: 226–237.
23. Stoll D. Guatemala. *Encyclopedia of Genocide and Crimes Against Humanity*. 2005;1: 419–422.
24. Anon. EAPN. Poverty : what is it? [Internet]. 2013 [cited 2016 Feb 29]. Available from: <http://www.eapn.eu/en/what-is-poverty/poverty-what-is-it>

25. Dodson M. Guatemala. In: Governments of the World: A Global Guide to Citizens' Rights and Responsibilities. Vol. 2. ; 2006. pp. 182–188.
26. Anon. Stunting- 36 High-burdened Countries. World Health Organization [Internet]. Available from: [http://www.who.int/nutrition/topics/map\\_36\\_countries.pdf](http://www.who.int/nutrition/topics/map_36_countries.pdf)
27. Anon. Child growth indicators and their interpretation. WHO [Internet]. [cited 2016 Feb 19]. Available from: <http://www.who.int/nutgrowthdb/about/introduction/en/index2.html>
28. Carletto C, Covarrubias K, Maluccio JA. Migration and child growth in rural Guatemala. Food Policy. 2011;36(1): 16–27.
29. Pezzia C. The sober self: discourse and identity of recovering alcoholics in the western highlands of Guatemala. The University Of Texas at San Antonio; 2013.
30. Anon. Mission Guatemala Breaks Ground on New Feeding Center. Mission Guatemala [Internet]. 2011 [cited 2016 Mar 8]. Available from: <http://missionguatemala.com/2011/03/mission-guatemala-breaks-ground-on-new-feeding-center/>
31. Anon. A Nueva Kitchen in Nueva Victoria. Mission Guatemala [Internet]. 2014 Mar [cited 2016 Mar 8]. Available from: <http://missionguatemala.com/2014/09/a-nueva-kitchen-in-nueva-victoria/>
32. Anon. Mission and Vision. Mission Guatemala [Internet]. [cited 2016 Feb 19]. Available from: <http://missionguatemala.com/about>
33. Anon. Who we are. Kids Against Hunger [Internet]. [cited 2016 Feb 19]. Available from: <http://www.kidsagainsthunger.org/>
34. Anon. Our Food. Kids Against Hunger [Internet]. [cited 2016 Feb 19]. Available from: <http://kidsagainsthunger.org/who-we-are/our-food>
35. Yaksich N, Rose S. Kids Against Hunger Nutrition Research. Kids Against Hunger Nutrition Research. 2016 Feb.
36. Anon. What we do. Mission Guatemala [Internet]. [cited 2016 Feb 19]. Available from: <http://missionguatemala.com/about>
37. Anon. What We Do. The Mathile Institute [Internet]. [cited 2016 Feb 19]. Available from: <http://mathileinstitute.org/>
38. Anon. Chispuditos. The Mathile Institute [Internet]. [cited 2016 Feb 19]. Available from: <http://mathileinstitute.org/tag/chispuditos/>

39. Palacios A. Chispuditos Research Summary. Chispuditos Research Summary. 2016 Feb.
40. Reinhart GA, Villanueva LM. A fortified corn/soy atole increases growth, decreases morbidity and improves nutritional status in urban Guatemalan toddlers and young children. FASEB Journal. 2012;26.
41. Villanueva LM, Reinhart GA. A fortified corn/soy atole increases linear growth and decreases morbidity over a 2.5 year period in urban Guatemalan toddlers and young children. FASEB Journal. 2013;27.
42. Villanueva L, Palacios A, Castellanos D, Reinhart G. An Atole Fortified with 21 Vitamins and Minerals Improves Nutritional Status of 6 to 72 Month-Old Children in 6 Nurseries in Guatemala City. FASEB Journal. 2015 Apr;29(1).
43. Villanueva L, de Ponce S, Alfonso V, Reinhart G. Effect of providing a micronutrient-fortified corn/soy atole or milk powder on linear growth in young Guatemalan children. FASEB Journal. 2014 Apr;28(1).
44. Feeney L, Paxton-Aiken A, Kruse K, Heck JE, Buten R, Reinhart GA. Micronutrient Supplement Decreases Diarrhea and Respiratory Morbidity in Rural Honduran Children.
45. Mousseau F, Mittal A. Food Aid or Food Sovereignty? Ending World Hunger in Our Time. 2005 Oct.
46. Anon. Incaparina es energía, fuerza y salud para toda la familia. Incaparina [Internet]. [cited 2016 Mar 14]. Available from: <http://www.incaparina.com/>