2020

A Community Service Project: Creating Awareness of Chronic Malnutrition in Guatemalan Children

Mallory A. Beswick
Bethel University

Bree A. Blanchette
Bethel University

Brooke L. Elvehjem
Bethel University

A COMMUNITY SERVICE PROJECT: CREATING AWARENESS OF CHRONIC MALNUTRITION IN GUATEMALAN CHILDREN

A MASTERS THESIS SUBMITTED TO THE GRADUATE FACULTY

GRADUATE SCHOOL BETHEL UNIVERSITY

BY

MALLORY BESWICK, PA-S

BREE BLANCHETTE, PA-S

BROOKE ELVEHJEM, PA-S

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF SCIENCE IN PHYSICIAN ASSISTANT

AUGUST 2021

Abstract

Guatemala City is home to one of Central America's largest garbage dumps. Many individuals living in Guatemala City scavenge the dump for recyclables and other goods, that they can then sell for income. Family earnings vary greatly on a daily basis and can range anywhere from approximately $2.00 to $6.00. Since family income is very low and often unpredictable, many families living in the area struggle to supply not only a sufficient amount of food for their children, but also nutritious food needed for proper growth and development. As a result, many children in Guatemala face chronic malnutrition.

Transforming Futures, a non-profit organization, was created in 2019 with a mission to provide children in the area with physical, emotional, spiritual, and educational support for a healthy and promising future. Specifically, the organization developed a feeding program that serves meals to children to aid in the relief of chronic malnutrition in Guatemala City.

The researchers involved in the community service project partnered with Transforming Futures, with the purpose of enhancing the organization's marketing materials by developing website and brochure content. Testimonials and pictures from families in Guatemala City, who have been positively impacted by the organization, were collected, designed, and displayed on the organization's website. The goal of the marketing materials is to create awareness regarding childhood chronic malnutrition in Guatemala, as well as share personal stories to create empathy among viewers of the

content. The hope is for the organization to gain new and continued support of Transforming Futures' mission.

Acknowledgements

This project and paper would not have been possible without the exceptional support of our committee chair, Alicia Klein, PA-C. Her knowledge and passion for those who are underserved and her precise attention to detail helped develop and fulfill this community service project. We would also like to acknowledge our committee member, Kelsa Hovelson, PA-C, and faculty, Lisa Naser, PA-C, and Dr. Wallace Boeve, EdD, PA-C, for their continuous feedback and contributions. The support and dedication that we received towards this project maximized its impact.

We would also like to thank Cinda Rachor and her husband, James Rachor, for allowing us to work with their non-profit organization, Transforming Futures, throughout the entirety of this project. Their commitment to serving those in need inspired us to help support the organization and its' efforts. Lastly, we would also like to recognize Pablo Villigran, who served as a liaison between us and the community members in Guatemala. He supported all requests that were needed to organize and fulfill this project. His experience with Transforming Futures and the population they serve provided invaluable insight in gathering information and developing materials.

TABLE OF CONTENTS

	PAGE
ABSTRACT	2
ACKNOWLEDGEMENTS	4
TABLE OF CONTENTS	5
CHAPTER 1: INTRODUCTION	8
INTRODUCTION	8
BACKGROUND TO THE PROBLEM	9
PROBLEM STATEMENT	13
NEEDS ASSESSMENT	13
PURPOSE	15
SIGNIFICANCE OF THE PROBLEM	16
POTENTIAL BARRIERS	16
DEFINITION OF TERMS	17
CONCLUSION	19
CHAPTER 2: LITERATURE REVIEW	20
INTRODUCTION	20
BACKGROUND OF GUATEMALA	20
Geographic Location	20
Population and Demographics	21
Government	22
Healthcare System	22

Lifestyle and Diet in Guatemala 24

Poverty and Occupations 25

MALNUTRITION 26

Definition 26

Standard Nutrition and Dietary Guidelines 28

Diminished Access to Food 28

Common Micronutrient Deficiencies Associated with Malnutrition 29

Malnutrition and Micronutrient Deficiencies in Guatemala 33

CONSEQUENCES OF MALNUTRITION 35

Physiology 35

Stunted Growth 35

Diminished Mental Capacity 37

Diminished Mood and Energy Level 38

GUATEMALA CITY 39

GUATEMALA ASSISTANCE PROGRAMS 40

CONCLUSION 42

CHAPTER 3: METHODOLOGY 44

INTRODUCTION 44

RATIONALE FOR PROJECT 45

POPULATION 47

PROJECT PLAN AND IMPLEMENTATION 48

PROJECT TOOLS 51

BARRIERS TO THE PROJECT 54

CONCLUSION 56

CHAPTER 4: DISCUSSION 57

INTRODUCTION 57

SUMMARY OF RESULTS 57

Problem Statement 57

Purpose 57

Implementation 59

Results 61

Literature Review 63

LIMITATIONS 65

FUTURE PROJECTS 66

CONCLUSION 67

REFERENCES 69

APPENDIX A: Consent from Guatemalan Families for Use of Personal Information 80

APPENDIX B: Chronic Malnutrition in Guatemala, Educational Website Content 84

APPENDIX C: Personal Testimonials, Website Content 86

APPENDIX D: Questions for the Testimonials 89

APPENDIX E: Transforming Futures Educational Brochure 91

APPENDIX F: Invitation to Work with Transforming Futures 94

Chapter I: Introduction

Introduction

Guatemala, the most populated country in Central America, is full of citizens facing daily hardships that many Americans would struggle to fathom (Central Intelligence Agency [CIA], n.d.). The country is burdened with approximately two-thirds of its population living on less than two US dollars per day (The World Bank, n.d.). Due to wide scale poverty, many Guatemalans struggle to have enough income to properly feed themselves and their family. As a result, Guatemala ranks sixth worldwide for those suffering from chronic malnutrition, with nearly half of those affected being children under the age of five (Food and Nutrition Technical Assistance [FANTA] Project, 2017).

In response to the prevalence of poverty and chronic malnutrition in Guatemala, a non-profit organization, Transforming Futures, was established in 2019 to "develop solutions for underprivileged children by investing in and providing for their physical, emotional, spiritual and educational needs for healthy development into adulthood" (Transforming Futures, n.d.a). Transforming Futures specifically focuses on providing nutrition to Guatemalan children in the Guatemalan City dump by feeding 350 kids one meal per day, Monday through Friday (Transforming Futures, n.d.b). In total, over 10,000 meals each month are served to children in need, many of whom are suffering from chronic malnutrition (Transforming Futures, n.d.b).

The community outreach project focused on promoting the mission of Transforming Futures to support the non-profit's goal of providing malnourished children with one meal per day, five days a week. Testimonials were collected from families whose lives have been positively impacted by Transforming Futures' feeding program.

The testimonials highlight how children benefit physically and mentally from receiving one free meal per day, five days a week and were developed into marketing materials for Transforming Futures' website. The goal of displaying testimonials on Transforming Futures' website is to provide concrete examples of the positive impact the organization has on the lives of Guatemalans, in hopes of further promoting their mission and sponsorship.

This chapter will discuss the consequences of poverty in Guatemala including the effects on access to healthcare and chronic malnutrition. The impacts of chronic malnutrition on Guatemalan children will be reviewed, as well as the government programs attempting to address the issue. A problem statement will be presented, which addresses the need for the community service project. Transforming Futures needs assessment will be discussed and the goals of the organization will be shared. Finally, the purpose and significance of this community-based project will be discussed, potential barriers will be addressed, and definitions will be provided.

Background to the Problem

Guatemala has a long history of internal conflict, as displayed by a 36-year civil war, where many lives were taken (Taft-Morales, 2019). The Mayan and Ladino mixed indigenous population of Guatemala was particularly targeted during the civil war, which has impacted their lives in terms of repeated discrimination, increased poverty, limited access to goods and services, segregation, and decreased education and healthcare (Jonas, 2013). In 2003, Marini and Gragnolati studied the relationship between socioeconomic status in Guatemalans and found that chronic malnutrition rates are four times higher in

the poorest of the population. Additionally, the highest socioeconomic status made up only five percent of Guatemalan children diagnosed as underweight, whereas 35 percent were in the poorest socioeconomic status (Marini & Gragnolati, 2003). Education also plays a large role in the effects of malnourished children. According to Marini and Gragnolati, if both parents are illiterate and unable to speak Spanish, the prevalence of child stunting, wasting, and becoming underweight drastically increases (2003). Lastly, decreased access to healthcare among the indigenous population of Guatemala is an ongoing problem. Reduced care is particularly concerning as it relates to women and their ability to utilize contraceptives, labor, and delivery services within clinics (Johanson, 2016).

Healthcare across Guatemala is limited, especially to those who are from the indigenous descent and do not speak Spanish, the native language (Pauline, Vazquez, & Bolumar, 2018). Indigenous women in poverty particularly face harsh marginalization in Guatemalan healthcare because they have decreased access to contraceptives, which leads to high fertility rates and diminished growth in their children (Marini & Gragnolati, 2003). Ministry of Public Health and Social Welfare (MSPAS) facilities were created to help combat the discrimination in Guatemalan healthcare, but MSPAS facilities and services are not easily accessible for Guatemalans living in rural areas (Bowser & Mahal, 2011). Overall, healthcare providers are mostly located in the capital, Guatemala City, and the lack of care among rural Guatemalans, especially those of lower socioeconomic statuses, leads to to increased diseases and illnesses (Petrovick, 2016).

Malnutrition, the deficiency or imbalance of energy and nutrients, often presents as undernutrition in poverty-stricken countries such as Guatemala (World Health Organization [WHO], 2018; Goday, 2019). Undernutrition can be acute or chronic, but chronic malnutrition is the disease that plagues Guatemala, ranking the country sixth in the world for highest prevalence (FANTA Project, 2017). Chronic malnutrition presents with growth stunting, a decreased linear height compared to those of the same age, and an overall loss of fat and body mass (Goday, 2019). Unfortunately, the disease does not just affect physical appearance. Growth stunting correlates with increased health complications including premature mortality (Voth-Gaeddert, Stoker, Cornell, & Oerther, 2018). Furthermore, structural and functional changes in the brain including tissue damage and growth retardation are associated with chronic malnutrition (Kar, Rao, & Chandramoili, 2008). Children suffering from chronic malnutrition have also been noted to experience decreased happy moments (Meeks Gardner, Grantham-McGregor, Himes, & Chang, 1999).

Malnutrition in poverty-stricken countries often results from both a lack of food and micronutrient deficiencies (Muller & Krawinkel, 2005). According to the United States Agency of International Development (USAID), several consecutive years of drought in Guatemala has led to poor agricultural production and food insecurity among its people (United States Agency of International Development [USAID], 2019). Food insecurity has driven Guatemalans to use their savings or sell assets in order to meet food needs, increasing concern for chronic malnutrition in the future (USAID, 2019). Along with poor agricultural production, poverty in Guatemala has led to decreased access to

food. Over half of the Guatemalan population fell below the poverty line in 2015, with the indigenous population being most affected (Hamel, 2017). Prices of common, locally produced foods, like beans and corn, increased by 22 percent between 2006 and 2008, leading to a six percent decrease in the amount of food that was consumed over that period of time (Hamel, 2017). Overall, decreased agricultural production and a lack of food affordability among Guatemalan families increases the risk for chronic malnutrition.

Micronutrients are nutrients that are essential to humans in small amounts and are necessary for proper growth and development. Iron deficiency is the most prevalent micronutrient deficiency among Guatemalan children and can lead to childhood anemia (Palacios et al., 2019). Although no data shows the prevalence, evidence suggests that Guatemalans also encounter a deficiency in the micronutrient zinc, which is associated with anemia (Palacios et al., 2019). The most recent measurement of iodine deficiency was in 2006, when the prevalence was 24 percent among the Guatemalan population (WHO, 2006). The current prevalence of iodine deficiency and the level of health concern in Guatemala remains unclear. While Vitamin A deficiency was once a concern in Guatemala, the deficiency has nearly been eradicated due to the fortification of sugar with Vitamin A (Fiedler & Helleranta, 2010). Guatemala is in need of long-term solutions to eradicate current micronutrient deficiencies.

The World Food Programme (WFP) is an international humanitarian organization that recognizes and seeks to support Guatemala's inability to provide food to its population (World Food Programme [WFP], n.d.). The WFP donates meals and financial assistance to help Guatemalans eradicate malnutrition, as well as discrimination and

violence across the country (WFP, n.d.). In addition, Guatemala receives aid from various government programs established by developed countries. For example, the United States (U.S.) has healthy relations with Guatemala and assists the country with hardships they face, including poverty, malnutrition, importing and exporting goods, and discrimination. USAID is an overarching supportive program that the U.S. utilizes to support countries, such as Guatemala (USAID, 2018). Aside from large U.S. programs that support Guatemala, many smaller nonprofit organizations exist throughout the country that use free-will donations to confront the daily problems in Guatemala ("Explore Projects", n.d.).

Problem Statement

Almost fifty percent of Guatemalan children suffer from chronic malnutrition (Lowenberg, 2009). The development of this disease is likely due to limited access to food and micronutrient deficiencies (Muller & Krawinkel, 2005). Chronic malnutrition results in the appearance of growth stunting and leads to negative structural and functional changes in the brain as well as a more apathetic and diminished mood (Kar et al., 2008; Meeks Gardner et al., 1999).

Needs Assessment

Transforming Futures is a non-profit organization located in Fenton, Michigan that was established in 2019. The organization aims to provide physical, emotional, spiritual, and educational needs to Guatemalan children to set kids up for a successful future (Transforming Futures, n.d.a). Specifically, the non-profit seeks to provide support to children living in Guatemala City, home to Central America's largest garbage dump,

which is one of the poorest areas in the country (Grainger, 2008; Liang et al., 2017). Families living in and around the dump often earn an income by scavenging the garbage in search of usable items such as food, clothing, and plastics (Grainger, 2008). Monetary income from the sale of plastics results in a daily accumulation of $2.00 to $6.00 (Transforming Futures, n.d.c). Due to the low and often unpredictable income, many families struggle to afford nutritious food on a daily basis.

Transforming Futures aids in the relief of daily hardships associated with limited access to food by supporting and funding a feeding program that provides 350 children with one meal per day, five days a week (Transforming Futures, n.d.b). The organization specifically supports Pastora Mercedes, a local Guatemalan woman with a heart for helping others. After experiencing the hardships associated with growing up in Guatemala City firsthand, Pastora Mercedes began to use her own home to serve meals to children without access to adequate food (Transforming Futures, n.d.d). Now, Transforming Futures partners with Pastora Mercedes to provide as many as 350 children with one meal per day, Monday through Friday (Transforming Futures, n.d.d).

Transforming Futures has continued to develop over the past year and continues to seek new ways to gain additional support for their mission of providing for children in need. Through conversation with one of the founders of the non-profit, the organization's needs were identified, including ways to display and promote the positive impact of Transforming Futures' feeding program on Guatemalan families. Thus, to serve Transforming Futures, and those impacted by their mission, the project will focus on organizing and presenting testimonials from families whose lives have been positively

impacted by the organization. The goal of obtaining and displaying testimonials is to demonstrate the significance of the impact and ultimately, gain additional support of the organization in order to further the non-profit's mission and outreach.

Purpose

The goal of the community service project is to promote awareness of Transforming Futures' mission and gain financial support for the organization by creating website content and a brochure, highlighting the efforts of the non-profit to minimize chronic malnutrition in Guatemala. Testimonials are featured on both platforms to show current supporters the impact of their donations and encourage others to contribute to the non-profit organization. Information collected from the testimonials included access to food before and after the Transforming Futures feeding program and most importantly, the impact of Transforming Futures' program on local families and children in the community. Additional information was collected regarding homelife, income status, access to clean water, and any other burdens the families currently face.

Transforming Futures has opened a second feeding location to assist more children living near the dump. With enough funding, the organization aims to continue growing and provide support for other surrounding communities in need (Transforming Futures, n.d.f). The purpose of the project is to promote the organization through the development of educational website and brochure content so Transforming Futures can raise funds to continue feeding over 350 children one meal per weekday and enable future expansion to combat chronic malnutrition in Guatemala.

Significance of the Problem

Guatemala faces many disadvantages in healthcare. In particular, Guatemalans living in rural areas face many challenges, including language barriers, poverty, high crime rates, increased infant mortality, and malnutrition (Johanson, 2016). Adams and Hawkins (2007) observed that the shortage of quality healthcare leads to a lack of preventative medicine and therefore, increased deaths from preventable and treatable diseases (as cited in Johanson, 2016). One way to reduce malnutrition within poverty-stricken countries, such as Guatemala, is to develop feeding programs within the country to supply food for the malnourished. For example, a program providing meals to children living in the Guatemala City dump increases access to food in malnourished children and therefore, decreases the negative impact of chronic malnutrition on a child's physical, mental, and emotional health. With decreased risk of developing chronic malnutrition and the implications of the disease, there is hope that the quality of life among Guatemalan children will improve.

Potential Barriers

A potential barrier to the project is the language barrier. Initial communication with Transforming Futures was conducted in English through one of the co-founders of the organization, Cinda Rachor. The goals of the project and the needs assessment was then relayed to the director of Transforming Futures and president of the board, Pablo Villigran, who currently resides in Guatemala City. Testimonial questions were written in English then translated and interpreted to Spanish for communication with members of the community in Guatemala City. The testimonials from community members were then

spoken in Spanish and required further interpretation and translation back to English for the creation of website and brochure content. The communication between the two languages creates potential opportunities for misinterpretation.

Relying on another individual, such as Pablo, to conduct and collect testimonials introduces another potential barrier. Testimonial responses are a critical component of the project for the creation of website and brochure content. In order to represent the community and demonstrate the positive impact of Transforming Futures' feeding program, testimonials from multiple families within the community are needed.

Definition of Terms

The following definitions are relevant to this project:

Acute Malnutrition is divided into two different categories, marasmus and kwashiorkor. Marasmus results from a deficit in total caloric intake (Goday, 2019). Muscle and fat wasting along with a decrease in mid upper arm circumference and weight to height ratio are present in marasmus (Goday, 2019). Kwashiorkor is a deficiency in the amount of protein intake compared to energy requirements of the body and presents with edema (Muller & Krawinkel, 2005; Goday, 2019).

Chronic Malnutrition is defined by the physical appearance of growth stunting, and loss of body mass index and fat (Goody, 2019).

Fortification is "to strengthen or enhance by the addition of some substance or ingredient: such as to enrich (food) by adding ingredients (such as vitamins or minerals) to improve the nutritional value" (Merriam-Webster Incorporated, n.d.a)

Growth Stunting is defined by a decrease in linear height compared to individuals of the same age (Goday, 2019).

Healthcare (in Guatemala) is defined by efforts aimed at maintaining or improving a person's well-being by providing essential resources and fulfilling basic human needs.

Indigenous is defined as "produced, growing, living, or occurring natively or naturally in a particular region or environment" (Merriam-Webster Incorporated, n.d.c).

Interpretation is the oral communication of information from one language to another language.

Micronutrient is "a chemical element or substance that is essential in minute amounts to the growth and health of a living organism" (Merriam-Webster Incorporated, n.d.d).

Malnutrition is defined as "deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients" (WHO, 2018).

Transforming Futures is a non-profit organization established in 2019 that aims to "develop solutions for underprivileged children by investing in and providing for their physical, emotional, spiritual and education needs for healthy development into adulthood" in Guatemala City (Transforming Futures, n.d.a).

Translation is the written communication of information from one language to another language.

Undernutrition is a type of malnutrition that is defined by an imbalance in protein-energy and energy requirements. A diminished amount of proteins taken in by the body that do not meet the energy requirements of the body (Muller & Krawinkel, 2005).

Conclusion

Many Guatemalan children are currently suffering from chronic malnutrition, affecting their ability to grow and learn, which is at the foundation of human life. Various challenges lead to malnutrition among Guatemalan children including limited access to healthcare, lack of government support, and poverty. Limited access to healthcare in Guatemala is primarily due to language barriers as well as inadequate facilities and minimal staff. The lack of preventative medicine in Guatemala exacerbates the need for healthcare facilities. Chronic malnutrition remains an unsolved problem despite established government programs intended to mitigate widespread malnourishment. Poverty restricts access to nutritious food, which further contributes to the malnutrition crisis. Transforming Futures is actively working to combat malnutrition among Guatemalan children living in Guatemala City, in hopes of decreasing the associated risk of physical and mental health conditions and promoting a prosperous future.

Chapter two provides an overview of Guatemala including the geographic location, population and demographics, government system, healthcare system, lifestyle and diet, and finally, poverty status and occupations. The purpose of the overview is to outline the primary demographic affected by chronic malnutrition and to provide background to the problem, as well as an understanding of potential reasons for chronic malnutrition in Guatemala. Later, malnutrition is defined, the components of chronic malnutrition are reviewed, and the consequences of childhood chronic malnutrition are discussed. Finally, government programs working to combat chronic malnutrition in Guatemala are provided.

Chapter II: Literature Review

Introduction

Research has shown that malnutrition in children leads to physiological changes and can affect a child's physical growth as well as mental capacity, energy levels, and overall well-being. The literature review focuses on the prevalence and impacts of malnutrition among Guatemalan children. A background of Guatemala's geographic location and demographics, Guatemala's government system, healthcare system, Guatemalan lifestyle, poverty levels, and occupations are provided. Definitions of malnutrition and micronutrient deficiencies are discussed in addition to the nutrition level within the country. Physiologic consequences of malnutrition are reviewed and finally, current government programs working to address malnutrition are presented.

Background of Guatemala

Geographic Location.

Guatemala is located in Central America, sharing borders with Mexico to the north, Belize and a short coastline of a gulf within the Caribbean Sea to the east, the Pacific Ocean to the west, and El Salvador and Honduras to the south. The capital of Guatemala is Guatemala City, located in the south-central region of the country. Several mountain ranges are found throughout Guatemala, leading to various climates. The lowlands tend to be classified as hot and humid, whereas the mountain ranges have cooler temperatures (CIA, n.d.). Aside from the mountainous regions, Guatemala is also located along the Ring of Fire, which is a volcanic region spanning 25,000 miles, containing 452 volcanoes, and stretching in a horseshoe fashion from southern South America, along

western North America, across the Pacific Ocean, down eastern Japan and into New Zealand (National Geographic, 2015). The diverse climates and terrains influence the locations in which Guatemalans inhabit. The majority of the population occupies the rural valleys and mountains of the southern half of Guatemala, although there is a large number of Guatemalans that live in Guatemala City (CIA, n.d.).

Population and Demographics.

Guatemala is the most populated country in Central America, and as of July 2018, there are approximately 16,600,000 people living in Guatemala (CIA, n.d.). Additionally, Guatemala has the highest growth rate in Latin America. In 2018, the population growth rate in Guatemala was at 1.72 percent and the birth rate was 24.6 births per 1,000 citizens (CIA, n.d.). Over half of Guatemalan citizens are under the age of 19, many of which are of reproductive-age, likely contributing to the high birth rate (CIA, n.d.). Guatemala's birth, death, and infant mortality rates are some of the highest in Central America (Horst, Griffith, Stansifer, & Anderson, 2019), and the life expectancy is fairly low at 71.8 years (CIA, n.d.).

Approximately sixty percent of the population is made up of Ladino, also known as Mestizo ethnicity, which is mixed American-Indian and European-Spanish, while the rest of the population is Mayan or other ethnicities (CIA, n.d.). Guatemala has incredible ethnic diversity that reflects the history of the Mayan descents and the Spanish colonial population. Among 54 living languages in Guatemala, Spanish is the most common spoken language, and about half of the languages are of indigenous descent (Campbell,

2008). Extensive language diversity presents a challenge to those visiting or assisting Guatemala.

Government.

The government within Guatemala is a democratic republic in which the population votes for a president that is the head of the state and the government (Pariona, 2017). The executive branch includes the president and his/her supporting body that governs legislation, the legislative branch contains congress that votes on new laws, and the judicial branch has various courts that hear cases involving the constitution (Pariona, 2017). Guatemala and the United States have close trade relations for imports and exports. As of 2017, Guatemala is the United States 46th biggest trading ally, with approximately $13.7 billion in trades (Office of the United States Trade Representative, n.d.). Guatemala's economy is one of largest in Central America and is a powerful competitor within Latin America (CIA, n.d.).

Healthcare System.

Healthcare in Guatemala revolves around three groupings of providers including government operated facilities, Guatemalan Social Security Institute facilities, and private facilities (Bowser & Mahal, 2011). Public healthcare within Guatemala is often seen as unequal and difficult for the majority to reach, but the government operates the MSPAS facilities—healthcare facilities that are generally free to patients and accessible throughout the country (Browser & Mahal, 2011). MSPAS offers multiple levels of health centers including primary, secondary, and tertiary facilities (Bowser & Mahal, 2011). According to Bowser and Mahal (2011), MSPAS facilities offered 6,030 hospital

beds in 2005 when the population at that time was 13 million. Although healthcare in Guatemala may seem accessible, access often depends on the size and location of the community. Non-governmental facilities dispersed throughout Guatemala provide the country with potential for care, however, many Guatemalans still have limited access to healthcare.

Inability to speak Spanish, the native language, and poverty are two common barriers limiting access to healthcare in Guatemala. The indigenous people of Guatemala suffer from marginalization leading to decreased access to goods and services (Campbell, 2008). According to an article that studied inadequacies within Guatemalan maternal healthcare, indigenous-speaking women are less likely to have access to contraceptive methods, attend more than four prenatal visits, and have a hospitalized delivery (Paulino, Vazquez, & Bolumar, 2018). Decreased access to modern contraception leads to more births among the indigenous populations within Guatemala as well (Paulino et al., 2018). The absence of access to care leads to high mortality rates for both the mother and the baby during pregnancy and labor (Paulino et al., 2018). The baby faces an increased risk of complications when no help is provided before, during, and after labor. Furthermore, public providers in Guatemala usually do not utilize interpreters, so most indigenous people who speak the Mayan language are unable to be seen for healthcare services (Ceron et al., 2016). Other problems within healthcare in Guatemala include negligence, battery, procedures without consent, lack of interest in patients, as well treatment that is verbally and physically abusive (Ceron et al., 2016).

The MSPAS facilities were created to decrease barriers to proper healthcare access, but according to a study that researched healthcare in the highlands of Guatemala, the MSPAS facilities had a strict policy to care for maternal and child health services (Ceron et al., 2016). While MSPAS facilities may be beneficial for indigenous women and children in the highlands, individuals who do not have maternal or child health complaints are often turned away from receiving care (Ceron et al., 2016). For populations who experience decreased access to healthcare services, especially the indigenous people of Guatemala, the government created an Integrated Health Care System, called SIAS, in 1996 that contracts private, non-governmental providers who work in rural settings (Bowser & Mahal, 2011). The SIAS program has been beneficial in some parts of Guatemala but has not been completely effective in allowing Guatemala's entire population to receive whole-person, equal care.

Lifestyle and Diet in Guatemala.

The multitude of environments and climates within Guatemala contribute to the wide variety of agricultural products, which provides employment opportunities for citizens. Many Guatemalans migrate to the Pacific coastal plain to harvest crops. Agriculture accounts for 31% of Guatemala's labor force (CIA, n.d.). Some key export products for Guatemala include coffee, bananas, sugar, and vegetables (CIA, n.d.). More recently, shrimp, tuna, snapper, and mackerel have become exports as commercial fishing has developed in the Pacific (Horst, Griffith, Stansifer, & Anderson, 2019). Unfortunately, many years of drought has led to "poor harvests, lost labor opportunities,

and reduced household incomes, making it more difficult for vulnerable families to access enough nutritious food" (USAID, 2019, Situation section, para. 1).

The indigenous Mayan people and the local Spanish (Mestizo) population have had strong influence over the Guatemalan cuisine. The foundation of the Mayan diet consists of corn, beans, squash and depending on the region, cassava, papaya, plantains, and wild game (Horst et al., 2019). Modern-day Guatemalan cuisine is a combination of both Spanish and Mayan dishes. Other common foods include tomatoes, chiles, tropical fruit, and cocoa. Spanish rice has also become a staple food within the Guatemala diet.

Poverty and Occupations.

As of 2016, approximately 63% of Guatemalans were employed with a wage or salary job, and the majority of those employed worked in services and manual labor (The World Bank, n.d.). Although many Guatemalans are employed, the income distribution is very unequal. According to a 2011 study of violence and poverty in Guatemala, "the wealthiest 20 percent of the population controls 58 percent of the wealth, while the poorest 20 percent controls just over 3 percent of the wealth" (Ogrodnik & Borzutzky, 2011, p. 56). The indigenous population suffers from poverty more than other ethnic backgrounds, and females overall make less than males (CIA, n.d.). Among those who work in Guatemala, the majority of families still suffer from poverty because of the low salaries and wages earned. In 2014, 59.3% of the population fell below the poverty line and 23% of the population was classified as living in extreme poverty (CIA, n.d.). Overall, Guatemala is a fairly poor country, with average salaries incomparable to those in the United States. In 2011, The World Bank established a poverty line and calculated

that a four-person family in Guatemala receives an average of 25 cents each for a day of work (Ogrodnik & Borzutzky, 2011). In 2017, The World Bank (n.d.) reported that nearly 66% of the Guatemalan population was living on under $2 U.S. dollars per day.

Malnutrition

Definition.

Malnutrition is defined as the excess, deficiency, or imbalance of an individual's consumption of energy and/or nutrients (WHO, 2018). Malnutrition can be more specifically divided into three subcategories including undernutrition, micronutrient malnutrition and obesity, and chronic disease related malnutrition (WHO, 2018). Undernutrition, the most prevalent type of malnutrition in poverty-stricken countries such as Guatemala, is further divided into severe acute malnutrition and chronic malnutrition (Goday, 2019).

Severe acute malnutrition consists of two types, marasmus and kwashiorkor. Marasmus and kwashiorkor are both considered protein-energy malnutrition. Protein-energy malnutrition is categorized by a reduction of two standard deviations from normal weight or height for one’s age, and a reduction in one’s weight for height ratio (Muller & Krawinkel, 2005). Reduction in weight compared to age is characterized as underweight, reduction in height compared to age is characterized as stunting, and a reduction in weight for height is characterized as wasting (Muller & Krawinkel, 2005). The two forms of severe malnutrition, marasmus and kwashiorkor, result due to an imbalance between the proteins the body takes in and the energy requirements the body needs, classifying them as types of protein-energy malnutrition (Muller & Krawinkel, 2005). Due to the

imbalance between energy expenditure and protein intake, individuals with these conditions appear wasted (Muller & Krawinkel, 2005).

Marasmus specifically manifests from a diet deficient in total caloric consumption (Goday, 2019). Furthermore, marasmus is based on the wasting of muscle and fat stores measured by a decrease in a weight to height ratio and decreased mid upper arm circumference (Goday, 2019). Kwashiorkor varies from marasmus as it is uniquely characterized by a protein-energy malnutrition with presence of edema. Edema begins in the peripheral, advances to systemic peripheral edema, and moves towards the cranium (Goday, 2019). A combination of these undernutrition subtypes can present together in which case the disease is called marasmic kwashiorkor (Goday, 2019).

Chronic malnutrition, the most advanced form of malnutrition, is subcategorized within undernutrition. Chronic malnutrition is most uniquely defined by the appearance of growth stunting, or a diminished linear height compared to others of the same age (Goday, 2019). In addition, individuals with chronic malnutrition experience loss of overall body mass index and fat (Goday, 2019). Along with growth stunting, or growth failure, chronic malnutrition introduces challenges in gaining cognitive ability (Reinhardt & Fanzo, 2014). According to a 2014 review of chronic malnutrition, more children experience growth stunting due to chronic malnutrition than wasting due to acute malnutrition (Reinhardt & Fanzo). The 2014 review reports that 165 million children suffer from chronic malnutrition (Reinhardt & Fanzo).

Standard Nutrition and Dietary Guidelines.

According to the Centers for Disease Control and Prevention ([CDC], 2019), a healthy diet includes fruits and vegetables, whole grains, fat-free and low-fat dairy products, protein-rich foods, and oils–all of which are essential for proper growth and development. A child's diet should consist of minimal processed foods, simple sugars, solid or trans fats, and sodium. Promoting healthy eating in children and adolescence decreases the risk for developing many health conditions such as hypertension, heart disease, type II diabetes, iron deficiency, cancer, osteoporosis, and dental caries (CDC, 2019). Several government programs have developed various guidelines and educational tools regarding proper diet and nutrition for children. A study performed on 9,280 children, between the ages of 4 to 18 years, reviewed compliance with the Dietary Guidelines for Americans, and it was discovered that the youngest children had the highest diet quality, but also had higher consumption of sodium, refined grains, and other empty calories (Banfield et. al, 2010). Empty calories often come from foods such as soda, pizza, whole milk, dairy desserts, and grain desserts (CDC, 2019). In poverty-stricken countries, the issue may not be compliance with dietary guidelines but instead limited nutritious food intake due to lack of access.

Diminished Access to Food.

Guatemala faces extreme wealth inequality distributions, where the top one-fifth of the population had attained almost three-fifths of the income as of 2014 (Hamel, 2017). In addition, over half of the Guatemalan population fell under the poverty line in 2015, with the indigenous people being most affected (Hamel, 2017). In addition to

increasing poverty rates, food prices have increased adding to families diminished access to food. For example, prices of common, locally produced foods, like beans and corn, have increased in price by 22 percent between 2006 and 2008, and have led to a six percent decrease in the amount of food that was consumed between 2006 and 2008 (Hamel, 2017). In 2007, increasing food basket prices forced approximately 229,000 additional Guatemalans into poverty (Hamel, 2017). With low income and increased food prices, families have difficulty affording adequate amounts of food on a daily basis, increasing the risk of chronic malnutrition.

According to USAID, many consecutive years of drought in Guatemala has led to poor agricultural production and further, food insecurity among its people (USAID, 2019). Predictions estimate that by 2050, temperatures will increase in Guatemala and further threaten agriculture production and thus, employment opportunities for many Guatemalans (Hamel, 2017). Food insecurity has already driven Guatemalans to use savings or sell assets in order to meet food needs, and with diminished agriculture production, there is great concern of increasing chronic malnutrition in the future (USAID, 2019). The decrease in agricultural production further contributes to many Guatemalan's diminished access to food, which can lead to chronic malnutrition.

Common Micronutrient Deficiencies Associated with Malnutrition.

According to the WHO (n.d.a, Micronutrients section, para. 1), micronutrients are "called micronutrients because they are needed only in minuscule amounts, these substances are the 'magic wands' that enable the body to produce enzymes, hormones and other substances essential for proper growth and development." Proper nutrition also

promotes immunity, especially in low income countries (WHO, 2014). Iron, zinc, iodine, and vitamin A are common micronutrient deficiencies associated with malnutrition.

Iron deficiency is the most common nutritional deficiency in the world and accounts for about 50 percent of the world's anemias (WHO, 2004). According to the WHO (n.d.d), more than two billion individuals worldwide suffer from anemia, which can often be attributed to iron deficiency. In poverty ridden areas, iron-deficiency related anemia is exacerbated when individuals also suffer from endemic infectious diseases, such as malaria or HIV/AIDS (WHO, n.d.d). Due to the combination of iron deficiency anemia and endemic disease, there is a higher prevalence of anemia in particular areas with a prevalence of both (WHO, n.d.d). The consequences of iron deficiency in children include impaired physical and cognitive development and an increased risk of morbidity (WHO, n.d.d). Iron deficiency diminishes an individual's ability to work and can affect school performance and productivity. Treatment of iron deficiency consists of increasing iron consumption through iron containing foods, supplementation, and fortification.

In 2007, a systematic review of randomized control trials was conducted, which looked at the effects of iron supplementation on hemoglobin response in children (Gera, Sachdev, Nestel & Sachdev, 2007). The study consisted of 55 trials, with a total of 12,198 children. Of these children, 6,584 received iron, while 5,614 received a placebo. Those whom received iron were given either oral medicinal iron or iron-fortified food. The results showed that iron supplementation in children significantly increased their hemoglobin concentration (Gera, Sachdev, Nestel & Sachdev, 2007). Additionally, iron supplementation improved between 37.9% and 62.3% of anemias in children under 6

years of age (Gera et al., 2007). Iron supplementation may only be a short-term solution. Longer-term, more sustainable solutions for iron deficiency include fortification and dietary changes.

Another common deficiency among malnourished children is zinc deficiency. Zinc has many benefits including the formation of antibodies and lymphocytes to protect the body against pathogens in the intestine ultimately aiding in the prevention of diarrhea (Lazzerini & Wanzira, 2016). According to Pinkerton et al., 2016, diarrhea accounts for 18% of the approximated 10.6 million yearly global deaths in children under 5 years old and 61% of these deaths are associated with malnutrition. According to a series of meta-analyses that included children with a mean initial age greater than 12 months, zinc supplementation reduced the relative risk of diarrhea by 27% (International Nutrition Foundation for the United Nations University, 2009). The same meta-analyses showed a 15% reduction in incidence of acute lower respiratory tract infections and a 6% reduction in childhood mortality among those who received zinc supplementation (International Nutrition Foundation for the United Nations University, 2009). Most of the studies were conducted in lower-income countries where zinc deficiency is most common.

The WHO (n.d.b) states that iodine deficiency is a major cause of impaired cognitive development in children. Iodine deficiency is the most widespread cause of brain damage throughout the world, yet it is the most preventable. A simple solution for preventing iodine deficiency disorders is consumption of iodized salt, which is abundant and cheap (WHO, n.d.b). Iodine deficiency disorders across the globe have become far less prevalent due to an intervention strategy adopted in 1993, which consisted of

universal salt iodization. According to the WHO, the United Nations Children's Fund believes that approximately 66% of households worldwide now have access to iodized salt (WHO, n.d.b). However, 54 countries are currently still iodine deficient (WHO, n.d.b).

Vitamin A is the leading cause of preventable childhood blindness (WHO, n.d.c). Vitamin A helps prevent scarring of the cornea, and a deficiency can lead to xerophthalmia, an eye disorder that causes blindness. According to the WHO (n.d.c), approximately 250,000 to 500,000 children suffering from vitamin A deficiency become blind each year, and half of those who become blind will die within one year of losing their sight. Studies have shown that with continuous vitamin A supplementation, the prevalence of xerophthalmia in children can be reduced by 70% (International Nutrition Foundation for the United Nations University, 2009). Vitamin A deficiency in children also increases the risk of severe illness and death from common childhood infections such as measles (WHO, n.d.c). Breast milk is a natural source of vitamin A and the WHO (n.d.c) states that the best way to prevent babies from developing Vitamin A deficiency is to encourage breastfeeding. For children who have become deficient, the best treatment is a periodic supplementation of high-dose vitamin A. Periodic supplementation is simple, low-cost, and provides substantial benefits including the reduction of overall mortality by 23% and up to 50% for those who suffer from measles (WHO, n.d.c). However, supplementation is only a short-term solution as vitamin A capsules only last approximately 4-6 months. Food fortification, which is the process of adding

micronutrients to a processed food to improve nutritional quality, has become a more sustainable solution (Fiedler & Helleranta, 2010).

Malnutrition and Micronutrient Deficiencies in Guatemala.

According to the Food and Nutrition Technical Assistance (FANTA) Project, in 2017 Guatemala ranked sixth in the world for highest levels of chronic malnutrition with the most prevalence in the Western Hemisphere. Nearly half of Guatemalan children under five suffer from chronic malnutrition, with rural areas such as the mountainous region of Quiché or Totonicapán most affected (FANTA Project, 2017). The indigenous Mayan communities are the largest population affected by malnutrition. In fact, the indigenous Mayan population is twice as likely to have stunting when compared to the non-indigenous population (Lowenberg, 2009). The indigenous populations are often so isolated that they do not realize stunting is even occurring. The prevalence of stunting varies from 25% in Guatemala City to 70% in Totonicapán (FANTA & FHI 360, 2017). In addition to stunting, malnourished children in Guatemala are more susceptible to illnesses and subsequently face a higher risk of death (FANTA & FHI 360, 2017).

Chronic malnutrition in Guatemala is largely due to the inequality within the country, lack of nutritional education, and an increase in the price of protein rich foods such as beans and eggs (Lowenberg, 2009). Additional factors contributing to the malnutrition crisis include absence of electricity and running water due to inadequate or absent infrastructure. Guatemalans have very little access to clean water, which is a major cause of diarrhea and further contributes to malnutrition. According to Lowenberg (2009), Guatemala is one of the most unequal countries in the world. In 2009,

Guatemala's population was at 14 million and approximately 6 million of those individuals lived in poverty, with about half living in extreme poverty (Lowenberg, 2009). Other Latin American countries such as Honduras and Nicaragua, who are even more poverty stricken, have shown improvement in addressing malnutrition, however, Guatemala has not (Lowenberg, 2009).

Malnutrition in Guatemala is due to a combination of an inadequate amount of food to meet caloric needs as well as a deficiency in nutrient-rich food. Iron deficiency is the most prevalent and most concerning deficiency in Guatemala as it can lead to iron-deficiency anemia (Palacios et al., 2019). According to a study published in 2019, anemia (marked by a hemoglobin <11.0 g/dl) affects one in four Guatemalan children under the age of five (Palacios et al., 2019). The study determined the high prevalence of anemia in children by discovering that anemia had been diagnosed in 56% of 182 infants/toddlers (less than 24 months old) and in 12.1% of 207 preschoolers (Palacios et al., 2019). Among the children with anemia, the rate of iron deficiency was 81.1% and the rate of zinc deficiency was 53.7% (Palacios et al., 2019). Although no data has been reported regarding the prevalence of zinc deficiency in Guatemala, these findings suggest that zinc deficiency is currently a health concern due to the association with childhood anemia. The current prevalence of iodine deficiency in Guatemala and whether or not it presents health concern is unclear. The last measurement of iodine deficiency in Guatemala was in 2006 when the prevalence was 24% (WHO, 2006). More data is needed regarding the current iodine deficiency prevalence. Vitamin A deficiency in Guatemala is becoming less prevalent due to the fortification of sugar (Fiedler & Helleranta, 2010). In fact,

Guatemala was the first country to fortify sugar with Vitamin A in 1975 (Fiedler & Helleranta, 2010). As of 2017, the prevalence of vitamin A deficiency in Guatemala was 0.3% and is no longer considered a public health concern (FANTA & FHI 360, 2017).

Consequences of Malnutrition

Physiology.

Malnutrition often begins acutely and results in a wasted or edematous appearance. The longer this malnutrition is sustained, the more likely it is to turn into chronic, growth-stunted malnutrition. Chronic malnutrition, a protein-energy malnutrition, has negative impacts on numerous organ systems, including the heart. Malnutrition can lead to a decreased cardiac output and stroke volume (Goday, 2019). In addition, hepatic metabolism is drastically reduced, including energy production (Goday, 2019). Kidney function is diminished, including lower glomerular filtration rates as well as decreased intestinal motility, stunted gastric acid production, and overgrowth of bacteria in the gut (Goday, 2019). Furthermore, atrophy to the skin and fat results in sunken eyes and loose skin folds (Goday, 2019).

Stunted Growth.

Growth stunting is a diminished linear growth pattern compared to the standard height-for-age. Specifically, growth stunting "is defined as two standard deviations below the mean height-for-age as compared to the World Health Organization (WHO) growth chart" (Voth-Gaeddert, Stoker, Cornell, & Oerther, 2018). Guatemalan children under the age of five years old are considered to have the sixth worst stunting rate nation-wide. Forty-eight percent of children five and under have stunted growth (Voth-Gaeddert et al.,

2018). Western highland communities of Guatemala have seen stunted growth rise to as high as 77% (Voth-Gaeddert et al., 2018). Growth stunting in children is a serious concern as it has been correlated to a variety of short term and long term health complications, leading to childhood death, increased chance of acquiring non-communicable diseases, and premature mortality (Voth-Gaeddert et al., 2018). Undoubtedly, growth stunting is a major issue. Although the causes of growth stunting are numerous, some of the main associated variables include decreased caloric and micronutrient intake, access to water sources, and proper sanitation (Voth-Gaeddert et al., 2018).

The specific detailed pathology leading to growth stunting is not fully understood (Millward, 2017). However, linear growth is impacted by numerous factors including "complex genetic, physiological, and nutrient-sensitive endocrine/paracrine/autocrine mediated molecular signaling mechanisms" (Millward, 2017, p. 50). Specifically, in relation to nutritional intake, linear growth is shown to be directly inhibited by deficiency in nutrients such as protein, zinc, phosphorus, and electrolytes like potassium, sodium, and magnesium (Millward, 2017). These nutrients certainly play a large role in chronic malnutrition leading to growth stunting; however, protein-energy malnutrition seems to be the main source. Adequate energy intake is needed as opposed to solely protein intake (Millward, 2017). In 1969-1977 a study involving Guatemalan children, infants, and mothers showed that energy consumption compared to protein was more accurate to predict birth weight and height at age three (Millward, 2017). Specifically, the incredibly low energy intake observed in Guatemalan children seemed to explain why Guatemalan

children were more growth stunted than other children around the world (Millward, 2017).

Diminished Mental Capacity.

Brain structure and function is negatively affected by malnutrition (Kar et al., 2008). Research notes that malnutrition from protein-energy deficiency "results in smaller brains with reduced RNA and DNA contents, fewer neurons, simpler dendritic and synaptic head architecture, and reduced concentrations of neurotransmitters and growth factors" (Cusick & Georgieff, 2016, p. 27). Furthermore, malnutrition is associated with damage to brain tissue, growth retardation, and unorganized differentiation—all structural brain deficits (Kar et al., 2008). Many of these deficits occur when the brain is malnourished during the first three years of life, when brain structure and capacity are being developed (Cusick & Georgieff, 2016). The impact of these first few years of life can lead to long term cognitive impairments (Kar et al., 2008).

A 2008 study was performed on Indian children to compare a variety of cognitive tests between nourished and malnourished kids (Kar et al., 2008). The research displayed a variety of discrepancies between the children. Malnourished children demonstrated having slower information processing through decreased executive function tests, measured by fluency, selective attention, and working memory (Kar et al., 2008). In addition, visual perception, visual conceptual testing, spoken comprehension, and memory of verbal and visual content was poorer in malnourished children (Kar et al., 2008). Ultimately, malnutrition affects the development of the brain and tends to result in

children having diminished cognitive abilities, IQ levels, academic achievement and more behavioral issues compared to the nourished children (Kar et al., 2008).

Despite the physiological and structural changes that result in the brain due to malnutrition, S. Grantham-McGregor and C. Ani (2001) suggest several potential mechanisms in how malnutrition affects brain cognition. The first mechanism of action is that malnourished children isolate themselves. As a result, fewer skills are acquired because of less exploration, an apathetic effect, and diminished activity levels (Grantham-McGregor & Ani, 2001). With less stimulation, poor cognitive development results. Another possible explanation for diminished brain development is decreased physical stature. Malnourished children are treated as if they are a younger age and as a result, they are less stimulated leading to poor educational development (Grantham-McGregor & Ani, 2001). Regardless of the mechanism, malnutrition can lead to diminished mental capacity in children.

Diminished Mood and Energy Level.

In an observational study focused on exploring the behavior and development of growth stunted children in Jamaica, research noted malnourished children had diminished moods (Meeks Gardner, Grantham-McGregor, Himes, & Chang, 1999). Specifically, observations included stunted children displaying decreased excitement and exploration of environments. The malnourished children also had higher frequencies of crying and fussiness, were more apathetic, and displayed decreased happy moments than non-stunted children (Meeks Gardner et al., 1999). In another study on Barbadian youth, the prevalence of depressive symptoms was seen in higher amounts in young adults who had

experienced childhood malnutrition as opposed to those who had not (Galler et al., 2010). In addition, research by Galler et al. (2010) displayed that individuals aged 11-17 who were malnourished as children, often were more prone to depressive symptoms if their mothers had also experienced depression. Along with depressive symptoms in malnourished children, research showed that young children who are hospitalized due to severe malnutrition were more likely to act with aggression, have difficulty paying attention, and have diminished social relationships once they became school aged (Walker, Chang, Powell, Simonoff, & Grantham-McGregor, 2006). Ultimately, negative psychosocial behaviors and moods seem to be associated with malnourished growth stunted children (Walker et al., 2006).

Guatemala City

Guatemala City, the capital of Guatemala and largest city in Central America, is also home to Central America's largest garbage dump (Grainger, 2008). With as many as 30,000 people living in the Guatemala City dump and its surrounding area, the city is one of the poorest areas of the country (Liang et al., 2017). Many residents of the area, including men, women, and children, wake daily to scavenge through the garbage searching for items such as food and clothing to use, as well as plastics to sell (Grainger, 2008). According to Transforming Futures, these families make anywhere from $2.00 to $6.00 per day through scavenging the dump and selling their findings (Transforming Futures, n.d.c). With minimal income and often a lack of education, many parents, as well as their children, face the daily struggle of having access to food, education, and

adequate living environments (Transforming Futures, n.d.c). With such a high prevalence of poverty, government programs are needed to aid citizens.

Guatemala Assistance Programs

Various worldwide, national, and non-profit organizations exist to assist Guatemala by providing funding, education, and various supplies to improve malnutrition. The World Food Programme (WFP) is an international humanitarian organization that recognizes Guatemala's inability to provide food to its entire population and therefore, provides Guatemala with assistance (World Food Programme [WFP], n.d.). The WFP created strategy plans in August of 2019 with the goals to provide complete access to food, eliminate malnutrition, improve rural food security, create sustainable food plans, and assure that Guatemala has the capacity to apply the support to the population (WFP, n.d.).

According to the World Health Organization, in the spring of 2016, the United Nations General Assembly created a Decade of Action on Nutrition that addressed all forms of malnutrition (WHO, 2018). The Decade of Action on Nutrition created global nutrition standards and included a goal to assist several countries in need of desperate help (WHO, 2018). The Decade of Action on Nutrition, also referred to as Zero Hunger, set a sustainable development objective aimed at eliminating all forms of malnutrition by 2030 (WFP, n.d.). The objective includes distribution of basic food baskets at a low cost, however, roughly half of the Guatemalan population still cannot afford the food baskets (World Food Programme [WFP], n.d.).

In terms of national assistance, the United States and Central America have healthy relations, and the country of Guatemala is the most substantial relation. Healthy relations have allowed some U.S. governmental programs to assist Guatemala with its deficiencies. The United States recognizes the hardships that Guatemala faces, like food insecurity, violence, poverty, and few and unequal support services, such as occupation and access to healthcare (U.S. Department of State, 2019). The United States provided Central America with approximately 2.6 billion dollars between 2015 and 2018 to address these challenges, and Guatemala was funded with more and further given the responsibility to address and work towards solutions for the underlying causes of their challenges (U.S. Department of State, 2019).

The United States has a large over-arching assistance program, called the United States Agency of International Development (USAID), that actively works with countries in need of aid by supporting various branches of international support (United States Agency of International Development [USAID], 2018). USAID has created programs to partner with Guatemala's government to accelerate the progress in nutrition and food security. USAID communicates with Guatemala and receives reports and updates regarding progress. According to a report updated in February 2018, the Guatemalan government is committed to working towards reducing growth stunting as a result of malnutrition (USAID, 2018). A plan crafted by Guatemala's National Secretariat for Food Security and Nutrition aims to strengthen existing programs to fight malnutrition and provide approximately 2.5% more funding to Guatemala for food security and nutrition (USAID, 2018). Specifically, the Guatemalan government implemented the

National Strategy for the Prevention of Chronic Malnutrition from 2016-2020 which involved programs for "primary health care, education for behavior change, water and sanitation, and food availability and access" with an end goal of decreasing stunting by 10% by 2020 (USAID, 2018, p. 4). Guatemala was also a country chosen by the U.S. Government as one of 12, Feed the Future countries, to be focused on in a U.S. Government Global Food Security Strategy (USAID, 2018).

In addition to governmental programs, several non-profit organizations have been created to aid in solving the problem of malnutrition and food insecurity throughout the country. Some of the current non-profit organizations include Transforming Futures, Pueblo a Pueblo, The Education for the Children Foundation, Fly the Phoenix, Wuqu' Kawoq Alliance, The God's Child Project, Seeds for a Future, and more ("Explore Projects", n.d.). In addition to the programs that are dedicated to addressing malnutrition in Guatemala, a wide variety of other programs have been developed to advance equality in healthcare, increase literacy and education among children, and provide safe living environments for families in Guatemala ("Explore Projects", n.d.).

Conclusion

Guatemala ranks sixth worldwide for individuals suffering from chronic malnutrition, with approximately half of those affected being children under the age of five (Food and Nutrition Technical Assistance [FANTA] Project, 2017). Poverty is the major contributor to chronic malnutrition in Guatemala. Chronic malnutrition can result from an insufficient caloric intake or a lack of nutritious food comprised of micronutrients. Chronic malnutrition in children has serious physiologic consequences.

For example, Guatemalan children suffering from chronic malnutrition experience stunted physical growth, a decreased mood, and reduced mental capacity (Kar et al., 2008; Meeks Gardner et al., 1999). Feeding programs in Guatemala, such as Transforming Futures, can help provide local children with additional meals to supplement their daily food intake and ensure micronutrient consumption.

Transforming Futures feeding program supplies food to approximately 350 children. In order to serve more children, the organization is in need of additional financial support. The researchers corresponded with the cofounder of Transforming Futures to determine the need for marketing materials in order to promote the organization and raise financial support. Testimonials were collected from families impacted by Transforming Futures' feeding program. The goal of the testimonials is to display real-life stories demonstrating the positive impact of providing additional meals to Guatemalan children, including the effects on the children's physical growth, mood, and mental capacity. Testimonials from Guatemalan families were then used to develop educational website and brochure content for the promotion of Transforming Futures. Chapter three will discuss in more detail the methods for supporting Transforming Futures in alleviating chronic malnutrition.

Chapter III: Methodology

Introduction

Transforming Futures, a non-profit organization, was developed with the intention of fighting chronic malnutrition in Guatemala, a country that ranks sixth worldwide for those affected by chronic malnutrition (Food and Nutrition Technical Assistance [FANTA] Project, 2017). Literature shows that children who face chronic malnutrition are at higher risk of suffering from physiological changes, consequently affecting their overall health. With the help of funding from donors, Transforming Futures is working towards eradicating childhood chronic malnutrition in Guatemala City by providing children one meal per day, Monday through Friday. The needs assessment of Transforming Futures revealed a need for collection of testimonials from families in Guatemala City affected by the feeding program in order to develop marketing materials, demonstrating the organizations' positive impact. The goal of collecting personal stories from Guatemalan families and developing website and brochure content was to promote the efforts of the organization in order to gain financial supporters and expand the feeding program.

Chapter three describes the methodology used for the development of website and brochure content. The chapter begins with the rationale for the project, which is largely based on the needs and mission of Transforming Futures. Chapter three will then review the target population and participants affected by the project. Finally, the chapter will discuss the project plan and implementation strategies including any tools used to complete the project. Potential barriers to the project will also be addressed.

Rationale for Project

The nonprofit organization, Transforming Futures, was founded in 2019 and is located in Fenton, Michigan. The mission of the organization is to provide physical, emotional, spiritual, and educational needs to Guatemalan children in order to set the children up for a future filled with success (Transforming Futures, n.d.b). Although the organization is newly established, the nonprofit supports a mission that began in 2014. Transforming Futures specifically supports Pastora Mercedes, a local Guatemalan woman, who began serving children in need throughout Guatemala City in 2014 (Transforming Futures, n.d.c). Pastora Mercedes grew up in Guatemala City and had first-hand experience dealing with the hardships that many individuals living in the city face (Transforming Futures, n.d.f). With a passion for serving, Pastora Mercedes began providing homemade meals to local children suffering from chronic malnutrition (Transforming Futures, n.d.f). Currently, Transforming Futures partners with Pastora Mercedes to broaden her reach and help her provide more children in the area with one meal per day, Monday through Friday (Transforming Futures, n.d.f). In addition, the nonprofit provides over 20 children with free supplies for school and offers them adequate space for learning (Transforming Futures, n.d.e).

Meals served by Transforming Futures include combinations of the following: white rice, black beans, beef, chicken, sausage, soy meat, pork cracklings, tortillas, pasta, and mashed potatoes (P. Villagran, personal communication, February 26, 2020). These foods contain essential micronutrients that are often deficient in Guatemalan children. Meats and grains provide a dietary source of iron (Powers, 2018). Additionally, meat

products provide Zinc (Abrams, 2020). Iodine is also supplied in the children's meals through the preparation of the foods with salt (P. Villagran, personal communication, March 25, 2020). The meals provided by Transforming Futures diminish malnutrition as a result of both inadequate food intake as well as micronutrient deficiencies.

Guatemala City, the city Transforming Futures currently serves, is home to Central America's largest garbage dump (Grainger, 2008). The area is one of the poorest regions in the country (Liang et al., 2017). Thus, many families living in the area do not have access to nutritious meals on a daily basis. Transforming Futures assists in relieving the hardships faced by Guatemalan children by supporting and funding the feeding program run by Pastora Mercedes. The feeding program serves over 350 children in need (Transforming Futures, n.d.c).

Transforming Futures has continued to develop over the past year to maintain nutritional food security for children living in Guatemala City. However, the nonprofit is always striving to seek new and unique ways to gain continued support to further their mission. With additional financial support, the organization will be able to widen their scope and meet the nutritional, educational, and personal needs of even more Guatemalan children. After a conversation with one of the founders of the non-profit, Cinda Rachor, various needs of the organization were discussed, which focused on methods to display and promote the positive impact Transforming Futures has had on Guatemalan families. As a way to serve Transforming Futures and those influenced daily by their mission, the project focused on presenting research regarding chronic malnutrition, as well as displaying testimonials from families whose lives have been impacted by the

organization's feeding program. The ultimate goal was to provide Transforming Futures with new and continued support from donors to further the organization's mission.

The efforts made by Transforming Futures to provide physical, emotional, spiritual, and educational needs to Guatemalan children displays the organization's desire to change lives—and the families' testimonials demonstrate the organization's impact. The testimonials provide names and faces of the people that Transforming Futures supports. The testimonials offer real-life examples of the transformation and impact the organization provides to families in Guatemala City. As stated by one of Transforming Futures founders, "Food is just food. Education is just education. But if we can display HOW the food, HOW the education, has affected the LIFE of a child, the LIFE of a family, then I think our purpose and mission statement are kept in alignment" (C. Rachor, personal communication, September 23, 2019). By displaying the impact of Transforming Futures on Guatemalan families through testimonials, the goal of the project was to promote new and continued support of the organization in order to further the nonprofit's mission and outreach.

Population

Transforming Futures was started by Cinda and James Rachor, friends of one of the creators of the project. Cinda and James Rachor have served in Guatemala for many years and have two daughters who were adopted from the country. Transforming Futures specifically targets Guatemalan children growing up in poverty and devotes time and resources into gaining access to adequate nutrition, education, and personal development for the children (Transforming Futures, n.d.a). The current population that Transforming

Futures works with is children living in Guatemala City, where Central America's largest dump is located (Grainger, 2008). As a community of over 30,000 individuals, the city is one of the poorest in the country and families are often seen scavenging the dump for food, clothing, and recyclables (Liang et al., 2017; Grainger, 2008). Due to the minimal income of Guatemalan families, the country ranks sixth worldwide for those suffering from chronic malnutrition (FANTA Project, 2017). Transforming Futures seeks to aid in the resolution of chronic malnutrition affecting so many Guatemalan children.

The community service project specifically focused on a small population of two families living in Guatemala who have been impacted by Transforming Futures' mission. The families have experienced immense benefit from the work of the non-profit and are examples of the organization's positive impact. The families were sought out by Pablo Villagran, the organization's president, who lives in Guatemala. The families volunteered to answer questions from Pablo Villagran about the personal impact Transforming Futures has had on their lives and are the focus of the community service project. The real-life stories that were collected demonstrate the nonprofit's positive effect on Guatemalan children and are displayed to promote the organization and recruit additional donors.

Project Plan and Implementation

The prevalence of chronic malnutrition and the physical, emotional, and educational effects that it has on Guatemalan children, demonstrated within the literature analysis, identifies a need for change in Guatemala. The Guatemala City dump is the largest in Central America and expresses an extreme demand for nutritious food for

children in the area. Through communication with Cinda Rachor, Transforming Futures expressed a desire to demonstrate the impactful work of the organization to current and future supporters. Transforming Futures currently provides approximately 350 children with a single meal, Monday through Friday; however, the goal of the organization is to extend the feeding program to more Guatemalan families (Transforming Futures, n.d.f). Current and potential future supporters of Transforming Futures were in need of educational materials to be informed about the severity of chronic malnutrition in Guatemala and the need for additional financial support to help eradicate the problem. In addition, personal testimonials were needed to demonstrate Transforming Futures' efforts to combat malnutrition in Guatemala City.

For the community service project, several educational materials including a brochure and website content were created in order to meet the needs of Transforming Futures. The material was approved by the founder of Transforming Futures, Cinda Rachor, as a useful and understandable tool for the target population of current and future supporters. Communication between Cinda Rachor, Pablo Villagran, and the researchers was continuous throughout the entirety of the project to discuss details and progress of the project.

Interview questions created by the researchers were provided to Pablo Villagran to obtain information regarding the impact of Transforming Futures' feeding program on families and children in the Guatemala City dump. The questions included information regarding family demographics, homelife, access to food before and after the Transforming Futures' feeding program, and finally, any noticeable changes in the

children's energy levels, physical growth, and educational efforts. Pablo Villagran translated the English written questions and then interpreted the questions to spoken Spanish when he interviewed two families who have utilized the services provided by Transforming Futures. Verbal responses from the interviewed families were then interpreted and translated back into written English by Pablo Villagran and sent to the researchers. The responses to the questions, combined with information from the literature analysis, were used to provide examples of the nonprofits' impact on families in Guatemala. With permission from the interviewees (Appendix A), the testimonial information is now displayed on the organizations' website and as a brochure. The content educates current supporters on the impacts of their donations, as well as raises awareness in hopes of recruiting new supporters to continue funding the program's mission. Through financial support, Transforming Futures has a goal to open additional feeding centers to reach more children suffering from chronic malnutrition.

Prior to the design and implementation of the educational materials, ethical implications were considered. Cultural competence regarding the information that was provided in the educational materials was acknowledged. Many Americans are unaware of the malnutrition crisis that Guatemalans face and therefore, may not understand the need for funding feeding programs, such as Transforming Futures. The goal of providing personal stories from multiple Guatemalan families, who have been impacted by Transforming Futures, was to minimize cultural barriers and promote empathy through human connection. Real-life stories can evoke emotions and strong feelings of empathy, which makes individuals more motivated to take action in helping others (Firth, 2015).

According to Bal and Veltkamp (2013), “there is evidence suggesting that seeing or reading about another person experiencing specific emotions and events activates neural structures as if one was experiencing them oneself, consequently influencing empathy”.

Intelligence and prior knowledge of chronic malnutrition among the current and future supporters who will see the new website content and brochure was a concern. This implication was addressed with an introduction and explanation of chronic malnutrition at a level appropriate for all learners to understand. The material was presented in a clear, concise, and understandable manner, with intention of providing the target population with the ability to recognize the need to prevent chronic malnutrition. By doing so, supporters will better understand the need to reach more Guatemalan families and provide nutritious meals to children.

The last ethical implication considered the privacy and consent of the Guatemalan families that were included in the testimonials**.** The families understood that their statements and photographs would be made available to the public. After Pablo Villagran informed the families, a signed consent form allowing permission to share the content was collected from each family (Appendix A). Pablo Villagran speaks English as a second language and was a reliable source for interpretation and translation to and from Guatemalan families.

Project Tools

An online informational web page titled *Chronic Malnutrition in Guatemala* (Appendix B) was created in English and inserted into Transforming Futures’ website, under the “Our Work” menu heading. The information was implemented on the

Transforming Futures' website for viewers and potential donors to gain knowledge regarding chronic malnutrition. Information about chronic malnutrition, as well as testimonials displaying the organization's efforts to combat chronic malnutrition, were included. In order to adequately organize the information into Transforming Futures' website, a Microsoft Word document was created, which included the testimony content. An online graphic design platform, called Canva, was then used to arrange the information and create a visually appealing design to match the theme and colors of Transforming Futures' current website. The Microsoft Word document and Canva materials were saved as PDF documents and sent to Pablo Villagran. Pablo sent the PDF documents to the website designer who made minor changes to the layout of the PDF. The website designer uploaded the final content onto the Transforming Futures' web page.

The first part of the online educational material, *Chronic Malnutrition in Guatemala*, defined chronic malnutrition and reviewed the prevalence of chronic malnutrition in Guatemala City, the population in which Transforming Futures serves. The section discussed the effects of chronic malnutrition on Guatemalan children, including stunted growth, decreased cognitive development, and diminished mood. The information was taken from the literature analysis in Chapter two and re-written in such a way that is understandable to the general public. Proper American Medical Association (AMA) in-text citations were used and a reference list located at the end of the page was incorporated.

The second part of *Chronic Malnutrition in Guatemala* displayed testimonials from two families in Guatemala City, who have been impacted by Transforming Futures' feeding program (Appendix C). The testimonials displayed the positive impact the organization is making to combat chronic malnutrition among children living in Guatemala City. The information for this page was collected using questions created by the researchers (Appendix D) regarding family demographics, homelife, access to food before and after the Transforming Futures feeding program, and finally, any noticeable changes in the children's energy levels, physical growth, and educational efforts. Along with the testimonials, pictures of the families taken by Pablo Villagran were included to provide supporters with faces to associate with the personal stories. Proper AMA in-text citations were used and a reference list located at the end of the page was included. After the completion of the website content, copies were sent to both Cinda Rachor and Pablo Villigran for the board of Transforming Futures to review and approve.

An informational brochure, *Transforming Futures*, was also created in English to supplement the content on Transforming Futures' website (Appendix E). The brochure will be used for various purposes. For example, it may be handed out at local churches in Fenton, Michigan, brought to possible future fundraisers, sent to current donors, and in any other places the board of Transforming Futures sees fit. Educational content for the brochure was created through Canva. The orientation of the brochure was landscape so that the brochure can be three-fold. The brochure first provided background information about Transforming Futures including their mission and vision and who they serve. Similar to the website, the information in the brochure also includes facts and statistics

pertaining to the prevalence and effects of chronic malnutrition in Guatemala. Testimonials from two families affected by Transforming Futures' feeding program was also included. The brochure was written in terms understood by the general public. Proper AMA citations were used and a reference list was included on the brochure. After completion of the brochure, a copy was emailed to Cinda Rachor and Pablo Villigran to be reviewed and approved by the board of Transforming Futures.

Website and brochure content, containing educational information, as well as testimonials, was desired by Transforming Futures to expand their services to additional Guatemalan children suffering from chronic malnutrition. Transforming Futures' goal is to serve additional families by providing more meals to children in need, as well as providing educational and personal development resources. Gathering information regarding physical, mental, emotional, and educational changes seen in Guatemalan children, as a result of gaining access to adequate food, proves Transforming Futures' charitable work of combating chronic malnutrition. The project promotes the organization's mission in order to maintain and gain financial support.

Barriers to the Project

The language barrier presented a concern for potential misinterpretation. Since the questions were initially created in English, the project relied on Pablo Villagran to deliver accurate Spanish translation and interpretation to the community members. The responses were then recorded by Pablo in Spanish and required further translation back to English for the development of website and brochure content. Additional translation from Spanish to English presented as another opportunity for inaccurate translation. Pablo Villagran

speaks English as a second language and was a reliable source for translation and interpretation among the Guatemalan families and the researchers of the project.

A potential barrier that was identified during the implementation of the project was the researcher's inability to travel to Guatemala to collect responses directly. As a result, there was heavy reliance on Pablo Villagran for the collection of testimonials needed for website and brochure content. Pablo Villagran interviewed two families for the testimony content. The researchers requested additional interviews from more families in order to gain a larger sample size, but the COVID-19 pandemic made this request unattainable. Without collection of responses from a larger sample of families, the project may not be able to accurately represent the positive impact Transforming Futures has had on the local Guatemalan community.

Cultural differences between Americans and Guatemalans presented as another potential barrier. Many Americans do not understand the severity of chronic malnutrition in Guatemala. The goal of providing statistics regarding chronic malnutrition and sharing personal testimonials from Guatemalan families was to demonstrate the severity and prevalence of chronic malnutrition among Guatemalan children. Another goal was to demonstrate the positive impact of Transforming Futures' feeding program to combat chronic malnutrition. Transforming Futures aims to continuously grow and reach more children; however, the organization is limited by support from donors. By creating awareness of the problem and developing empathy for those in need, Americans, as well as other website viewers, may be more likely to contribute support and funding for Transforming Futures.

Conclusion

After completing a literature analysis and corresponding with the founder of Transforming Futures to discuss the organization's needs, educational website content and an informational brochure were created to address the effects of chronic malnutrition on Guatemalan children. The website and brochure content provide a basic introduction to chronic malnutrition and include testimonials from families positively impacted by Transforming Futures. The educational materials were designed to address the population supporting Transforming Futures and support the organization's goal of eradicating chronic malnutrition in Guatemala. Chapter four will discuss the outcomes and impact of the educational materials.

Chapter IV: Discussion

Introduction

In collaboration with Transforming Futures, a non-profit organization fighting chronic malnutrition in Guatemala, this community-based research project was developed to raise awareness of chronic childhood malnutrition in Guatemala. The goal was to assist in gaining additional support for the organization to further their mission. Chapter four will highlight and discuss the outcomes of the project. A summary of the results will be shared describing the implementation of the project as well as feedback received. Limitations for the community-based research project will be recognized and ideas for future projects will be offered, in hopes of continuing support for Transforming Futures.

Summary of Results

Problem Statement.

Almost fifty percent of Guatemalan children suffer from chronic malnutrition (Lowenberg, 2009). The development of this disease is likely due to limited access to food and micronutrient deficiencies (Muller & Krawinkel, 2005). Chronic malnutrition results in the appearance of growth stunting and leads to negative structural and functional changes in the brain as well as a more apathetic and diminished mood (Kar et al., 2008; Meeks Gardner et al., 1999).

Purpose.

Guatemala City is one of the poorest areas in all of Central America (Liang et al., 2017). Transforming Futures is a nonprofit organization that has created a feeding program in Guatemala City, providing 350 children in need with one meal per day, five

days a week (Transforming Futures, n.d.b). The rate of chronic malnutrition in Guatemala is approximately 50%, therefore Transforming Futures is in need of additional support to further their mission and combat the negative physical and emotional impacts of chronic malnutrition on children (Lowenberg, 2009). After communicating with the organization, the participants involved in the community service project identified a need for educational materials, which would serve two purposes. First, the materials would raise awareness of the chronic malnutrition crisis that Guatemalan children face on a daily basis. Secondly, the materials would be used to promote Transforming Futures and their mission.

After researching chronic malnutrition in Guatemala, the researchers determined that the content should include facts regarding the prevalence of chronic malnutrition in Guatemala and its effects on children, as well as a short background of Transforming Futures' and their mission. In addition, testimonials from Guatemalan families, including pictures, of those who have been positively impacted by the organization's feeding program would be provided. The goal of collecting testimonials from Guatemalan families and displaying their pictures, was to develop a sense of empathy from viewers through human connection. After the content was collected, it was organized in an appealing fashion to create a web page, which is now displayed on Transforming Futures' website. A hard copy of the brochure was also created, which can be printed and handed out in various locations. The goal of creating a web page and a brochure was to raise awareness and ultimately, additional financial support for the non-profit organization, in hopes of expanding their mission.

Implementation.

Prior to the implementation of the project, research was conducted regarding the prevalence of chronic malnutrition in Guatemala and its physiologic effects on children. Next, a series of ten questions were created by the developers of the project. The initial questions were designed to help provide background information and gain an understanding of the families' work life, home life, and access to food. Later questions were aimed at eliciting information regarding the impact of Transforming Futures' feeding program on the children's physical and emotional well-being. The questions included:

1. Tell us about your home life, where do you live? What do you (the parents) do for work? Do your children go to school? How many children do you have?
2. Do you have access to clean water? Food?
3. How much money do you make in a day?
4. Aside from the meal that Transforming Futures provides, what else do you eat in a day?
5. What type of foods do you eat that are provided by Transforming Futures?
6. How has Transforming Futures impacted your life?
7. Have you noticed a difference in your child's life since having access to a meal from Transforming Futures? Have you noticed any energy change? Have you noticed any physical growth changes? Have you noticed any educational growth? Have you noticed any mood changes?
8. What other needs does your family have?

9. How has Transforming Futures impacted the community of children in Guatemala City?
10. Is there anything else you would like to tell us?

The questions were sent via email to Pablo Villigran, the president of Transforming Futures. Pablo was responsible for translating and interpreting the questions from English to Spanish to the families living in the Guatemala City dump. After the interviews were conducted, Pablo was once again responsible for interpreting and translating the families' responses in Spanish back to English for the researchers to use. After the collection of content, a webpage and brochure were created using Canva, an online graphic design platform. The materials were sent to the research project chair member and Transforming Futures for feedback. After all edits were completed, the content was finalized and sent as a PDF to Transforming Futures via email. Transforming Futures' website manager utilized the PDF documents for the content and graphic design and after minor visual edits, the website content was posted under the "Our Work" tab of the Transforming Futures website for all viewers to see. After implementation of the content onto the website, Transforming Futures was granted access to Canva. The developers of the project shared the Canva username and password so the organization can continue to utilize the templates for the development of future marketing materials.

Results.

The implementation of the content onto the Transforming Futures' website, https://transformingfutures.org/, occurred smoothly and without major challenges. Under the "Our Work" tab of the Transforming Futures website, two personal testimonials are displayed, followed by statistics regarding chronic malnutrition in Guatemala and its effects. The testimonials include photos of the families interviewed, noticeable physical or emotional changes in their children as a result of access to food, and various other comments about how thankful the families are for Transforming Futures. Although assessing the effectiveness and impact of the testimonials is difficult, there is no doubt that the stories of the Guatemalan families are powerful. A testimony from one of the Guatemalan families states, "God bless all the people that have donated to Transforming Futures because my children have received a lot of benefits from it, especially performing better at school and with more energy. I am so thankful to God for placing such great support of the feeding center in this community and for Pastora Mercedes" (P. Villagran, personal communication, October 9, 2019). When asked about access to food, the mother of one family replied, "this is the only place where we received food" and without the feeding centers, "my daughters wouldn't have lunch". Later in the interview she commented, "thanks to the feeding center my daughters have been able to eat every day and it has allowed them to focus on school" (P. Villagran, personal communication, October 9, 2019). Following the testimonials, sections titled "Chronic Malnutrition Statistics of Guatemala" and "Effects of Chronic Malnutrition" are displayed.

The direct impact and effectiveness of the content remains difficult to assess. However, now that educational information demonstrating the significance of chronic malnutrition in Guatemala is readily available, website viewers will better understand Transforming Futures' need for financial support. The brochure created for the non-profit has not yet been displayed on the website, but the organization is hopeful for future use both digitally and as a hard copy.

Although there is no way to quantify the impact and effectiveness of the website content and brochure, Pablo Villagran, president of the organization, and Cinda Rachor, co-founder of the nonprofit, expressed praise regarding the new marketing materials. Pablo Villagran stated, "I am just smiling as I see the final product and as I read the stories of Andrea and Blanca, I am reminded of the impact of the feeding center" (P. Villagran, personal communication, April 20, 2020). Pablo Villigran personally attested to the impact of the material by sharing, "This material and content will allow us to expand awareness about the support we provide to children in Guatemala" (P. Villagran, personal communication, May 7, 2020). Cinda Rachor expressed a similar opinion on the content by writing, "I would wholeheartedly agree with Pablo--Great Job!" (C. Rachor, personal communication, April 21, 2020).

The website content was created for two main purposes. First, the information regarding chronic malnutrition was developed as a way to educate and inform Transforming Futures' website viewers about the physical and emotional impacts of the disease as well as its prevalence in Guatemala. Secondly, the personal testimonials demonstrated real-life examples of the positive impact Transforming Futures has had on

Guatemalan families by providing food to children affected by chronic malnutrition. Real-life stories help to evoke strong feelings of empathy, promoting human connection and making individuals more motivated and likely to take action to help others (Firth, 2015). The content displayed on the nonprofit's website will help to maintain current supporters of the organization, while encouraging new viewers to provide financial support. With additional support, Transforming Futures hopes to meet the needs of more children by opening additional feeding centers in the future.

Literature Review.

The prevalence of chronic malnutrition among Guatemalan children is almost 50 percent (Lowenberg, 2009). Although the community service project did not assess chronic malnutrition throughout Guatemala, interviews with two families living in Guatemala City demonstrated that chronic malnutrition is in fact a problem among children living in the city (Transforming Future n.d.g). The major contributing factor to chronic malnutrition among children in Guatemala City is lack of food due to low family income. The two families who were interviewed earn anywhere from $1.30 to $10 per day depending on what is found while scavenging the dump. The low and unpredictable income is insufficient to meet the basic needs of the two families, who range in size from five to ten family members. Both families have utilized the Transforming Futures feeding center for seven to eight years. Without the feeding program, the families would not be able to afford a sufficient amount of food for their children on a daily basis, leaving them susceptible to chronic malnutrition.

Research shows that malnutrition in children leads to physiological changes, which can affect a child's physical growth, mental capacity, energy, and overall well-being (Kar et al., 2008; Meeks Gardner et al., 1999). The findings of the research were supported by the responses from the Guatemalan families who were interviewed (Transforming Future n.d.g). The mother of one of the families states that she has noticed that her children have more energy and furthermore, the staff at the children's school reports that her children seem more awake because of the daily food they have received from Transforming Futures. She also commented that the staff has noticed her children have gained weight (P. Villagran, personal communication, October 9, 2019). The second family provided a similar comment, stating that receiving food everyday has allowed her daughters to focus on school.

The display of testimonials from the Guatemalan families who have been impacted by the Transforming Futures feeding program, will allow website viewers to visualize the experiences and emotions endured by the families. According to a study by Bal and Veltkamp (2013), evidence suggests that learning about another person's experiences and emotions stimulates one's neural structures, allowing one to envision those same emotions and experiences; therefore, creating feelings of empathy. Furthermore, research performed by Firth (2015) found that personal stories create strong feelings of empathy, inspiring individuals to take action and help others. The literature validates the display of personal stories to create empathy and the potential for generating monetary support for Transforming Futures.

Limitations

Responses from the interviews of two families impacted by Transforming Futures' feeding program were collected indirectly though Pablo Villigran. Since the two Guatemalan families only spoke Spanish, the testimonials that were collected had to be interpreted and translated between English and Spanish. As a result, the researchers had to rely heavily on Pablo Villigran for accuracy. Although it is difficult to assess the accuracy of translation, Pablo was a reliable source, as he speaks English as a second language. However, we do acknowledge the potential for misinterpretation.

At the beginning of this project, Pablo Villigran interviewed two Guatemalan families for the collection of testimony content. After receiving the testimonials, the researchers suggested interviewing additional families impacted by Transforming Futures in order to have a larger sample size that more accurately represents the population that the organization serves. In addition, interviewing more families would better demonstrate the positive impacts of the Transforming Futures' feeding program within Guatemala City. Pablo Villigran agreed to the request and intended to revisit the Guatemala City dump to interview additional families. However, due to a global pandemic, COVID-19, Pablo was unable to complete the request. Due to safety concerns, feeding centers had been shut down for several months, preventing Pablo from conducting further interviews. The completion of the project occurred during the pandemic, limiting the personal testimonials to two Guatemalan families impacted by Transforming Futures' feeding program.

Another limitation is the researchers' ability to assess the effectiveness of the project since the implementation of the materials. Transforming Futures' goal is to maintain its current donors, while gaining new donors by utilizing the new materials to raise awareness and promote empathy through human connection. Determining the correlation between the marketing materials and the number of donations is impossible without having access to Transforming Futures' website traffic as well as the number of current and new donors. Thus, it is difficult to quantify the success of the materials that were created.

Future Projects

Throughout the community-based research project, a relationship between Bethel University's Physician Assistant Program and Transforming Futures was fostered. With this established relationship, future classes of Bethel Physician Assistant students can continue to collaborate with the nonprofit to provide additional support for Transforming Futures and their mission to aid Guatemalan children in having a successful future. Future projects can continue to expand upon the current project through the collection of testimonials from additional families, creating a larger sample size and allowing for a more accurate representation of Transforming Futures impact on Guatemalan families. The testimonials can then be created into website content using the same graphic design or could be developed and shared through an alternative platform.

The researchers involved in the community-based project were not able to travel to Guatemala to conduct interviews and visit the feeding center; however, future projects could do so, providing for unique opportunities. With personal visits to the feeding center

in Guatemala City, a promotional video could be created for the website displaying what the feeding center looks like, the number of children that access the center on a daily basis, as well as video testimonials from numerous families and the children impacted. Each of these endeavors would work toward educating, raising awareness, and ultimately, gaining support for Transforming Futures. Additionally, future research groups could work to track the physical and emotional changes seen in children as a result of having access to nutritional food provided by the Transforming Futures feeding center. Measurements including the children's height, weight, muscle mass, BMI, fat content with the use of calipers, and other information could be documented throughout a year. Values could then be analyzed to determine the impact Transforming Futures has on children by providing meals. This community-based research project is the first project involving Bethel University and Transforming Futures and therefore, ideas for future projects are numerous.

Conclusion

Evidence shows that chronic malnutrition remains a problem among children living in Guatemala. Many children face long-term deficits that result from lack of access to an adequate amount of food, as well as lack of proper micronutrients. Transforming Futures identified chronic malnutrition in Guatemala City as a problem and started a non-profit organization in 2019 to provide a solution. Transforming Futures now feeds one meal a day to approximately 350 children. Eager to assist Transforming Futures in maintaining and gaining further support for the feeding program, the researchers of this project contacted the founders of Transforming Futures looking for input on how to get

involved. Transforming Futures identified a need for improving marketing materials to promote the organization. Together, the organization's board members and the researchers decided that the most effective way to reach donors was through website content and a brochure. The decision was made that the materials would include educational information regarding the prevalence and negative effects of chronic malnutrition among children. Most importantly, personal testimonials would be collected and displayed to demonstrate the positive impact of Transforming Futures' feeding program on Guatemalan families. Upon completion of the content and layout design, the materials were emailed to the board of Transforming Futures for approval and then integrated into the Transforming Futures' website. Brochures are available and will be printed for future use.

Overall, the community service project discovered that the Transforming Futures' feeding program successfully serves to combat chronic malnutrition in Guatemalan children living near the city dump. The intent of the project was to create awareness on the prevalence of chronic malnutrition in Guatemalan children and to promote empathy. Transforming Futures is hopeful that the materials will impact those who view them and will urge individuals to provide financial support so the organization can continue to combat chronic malnutrition in Guatemalan children.

References

Abrams, S.A., (2020). Zinc deficiency and supplementation in children and adolescents. Retrieved from UpToDate https://www.uptodate.com/contents/zinc-deficiency-and-supplementation-in-children-and-adolescents?search=zinc%20rich%20foods&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

Bal, P., & Veltkamp, M. (2013, January 30) How does fiction reading influence empathy? An experimental investigation on the role of emotional transportation. *PLoS ONE 8*(1), e55341. doi:10.1371/journal.pone.0055341

Banfield, E. C., Liu, Y., Davis, J. S., Chang, S., & Frazier-Wood, A. C. (2016, January). Poor adherence to US dietary guidelines for children and adolescents in the national health and nutrition examination survey population. doi:10.1016/j.jand.2015.08.010

Bowser, D. M., & Mahal, A. (2011, May). Guatemala: The economic burden of illness and health system implications. doi:10.1016/j.healthpol.2010.11.011

Centers for Disease Control and Prevention. (2019, May 29). Childhood nutrition facts. Retrieved from https://www.cdc.gov/healthyschools/nutrition/facts.htm

Central Intelligence Agency. (n.d.).The world factbook: Guatemala. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/print_gt.html

Cerón1, A., Ruano1, A. L., Sánchez1, S., Chew1, A. S., Díaz1, D., Hernández1, A., & Flores1, W. (2016, May 13). Abuse and discrimination towards indigenous people

in public health care facilities: experiences from rural Guatemala. doi:10.1186/s12939-016-0367-z

Cusick, S. E., & Georgieff, M. K. (2016). The role of nutrition in brain development: The golden opportunity of the "First 1000 Days". *Journal of Pediatrics, 175*, 16-21. doi:10.1016/j.jpeds.2016.05.013

Explore Projects. (n.d.). Retrieved from GlobalGiving website: https://www.globalgiving.org/search/?size=25&nextPage=1&sortField=sortorder&selectedCountries=00guatem&loadAllResults=true

FANTA, & FHI 360. (2017). Reducing Malnutrition in Guatemala: Estimates to Support Nutrition Advocacy—Guatemala Profiles 2017 [PDF file]. Retrieved from https://www.fantaproject.org/sites/default/files/resources/Guatemala-PROFILES-Full-Report-ENGLISH-Oct2017_0.pdf

Fiedler, J. L., & Helleranta M. (2010). Recommendations for improving Guatemala's food fortification program based on household income and expenditure survey (HIES) data. *Food and Nutrition Bulletin*, *31*(2), 251-269. doi:10.1177/156482651003100208

Firth, P. (2015, July 23). Wired for empathy: how and why stories cultivate emotions. Retrieved from http://firesteelwa.org/2015/07/wired-for-empathy-how-and-why-stories-cultivate-emotions/

Food and Nutrition Technical Assistance (FANTA) Project. (2017). Malnutrition in Guatemala holding our country back: A call to action for government to invest in nutrition. [PDF file]. Retrieved from

https://www.fantaproject.org/sites/default/files/resources/Guatemala-PROFILES-Govt-ENGLISH-Jul2017.pdf

Galler, J. R., Bryce, C. P., Waber, D., Hock, R. S., Exner, N., Eaglesfield, D., Fitzmaurice, G., & Harrison, R. (2010). Early childhood malnutrition predicts depressive symptoms at ages 11-17. *The Journal of Child Psychology and Psychiatry, 51*(7), 789-798. doi:10.1111/j.1469-7610.2010.02208.x

Gera, T., Sachdev, H. P., Nestel, P., & Sachdev, S. S. (2007, April). Effect of iron supplementation on haemoglobin response in children: systematic review of randomised controlled trials. *Journal of Pediatric Gastroenterology and Nutrition 44*(4), 468-86. doi:10.1097/01.mpg.0000243440.85452.38

Goday, P. G. (2019, September 16). Malnutrition in children in resource-limited countries: Clinical assessment. Retrieved from UpToDate website: https://www.uptodate.com/contents/malnutrition-in-children-in-resource-limited-countries-clinical-assessment?search=malnutrition&source=search_result&selectedTitle=2~150&usage_type=default&display_rank=2

Gordon, R. G. (2008, September). Ethnologue: Languages of the world. *JSTOR, 84*(3), 636-641. Retrieved from https://www.jstor.org/stable/pdf/40071078.pdf?refreqid=excelsior:bc5257999852b7fc97502a7535cb62e5

Grainger, S. (2008, August 20). Eking out life from trash deadly job; Landslides won't keep scavengers away from Guatemala dump. *Tronto Star.* Retrieved from

https://search-proquest-com.ezproxy.bethel.edu/docview/439468869?accountid=8593&rfr_id=info%3Axri%2Fsid%3Aprimo

Grantham-McGregor, S. M., & Ani, C. C. (2001). Undernutrition and mental development. *Nestle Nutrition workshop series. Clinical & Performance Programme, 5*, 1-18. Retrieved from https://pdfs.semanticscholar.org/0dcc/c3236bde53eaa9a985121f090957f091e3b7.pdf

Hamel, R (2017, June 15). Food insecurity in Guatemala reaches crisis levels. Retrieved from https://medium.com/center-for-strategic-and-international-studies/food-insecurity-in-guatemala-reaches-crisis-levels-65b639b950dd

Horst, O., H., Griffith, W. J., Stansifer, C. L., & Anderson, T. P. (2019). Guatemala. *Encyclopædia Britannica online.* Retrieved from https://www.britannica.com/place/Guatemala

International Nutrition Foundation for the United Nations University. (2009). *Food and Nutrition Bulletin, 30*(1). Retrieved from https://static1.squarespace.com/static/56424f6ce4b0552eb7fdc4e8/t/5748ae0f59827e39bd4aa72e/1464380967156/FNB_v30n1_Supplement_izinc.pdf

Johanson, L. (2016, January). Caring for the vulnerable: An exploration of Guatemalan healthcare issues. *Journal of Christian Nursing*. *33*(1) 44-49. doi:10.1097/CNJ.0000000000000232

Jonas, S. (2013, February 4). Guatemalan migration in times of civil war and post-war challenges. *Migration Policy Institute*. Retrieved from https://domide.colmex.mx/Archivos/Doc_5338.pdf

Kar, B. R., Rao, S. L., & Chandramouli, B. A. (2008). Cognitive development in children with chronic protein energy malnutrition. *Behavioral and Brain Functions, 4*(31). doi:10.1186/1744-9081-4-31

Lazzerini, M., & Wanzira, H. (2016). Oral zinc for treating diarrhoea in children. *The Cochrane database of systematic reviews*, *12*(12), CD005436. doi:10.1002/14651858.CD005436.pub5

Liang, B., White, A., Rhodes, H., Strodel, R., Gutowski, E., DeSilva Mousseau, A. M., & Lund, T. J. (2017). Pathways to purpose among impoverished youth from the Guatemala City dump community. *Community Psychology in Global Perspective, 3*(2), 1-21. doi:10.1285/i24212113v3i2p1

Lowenberg, S. (2009). Guatemala's malnutrition crisis. *The Lancet, 374*(9685), 187-189. doi:10.1016/S0140-6736(09)61314-3

Marini, A., & Gragnolati, M. (2003, January). Malnutrition and poverty in Guatemala. *The World Bank*. Retrieved from https://fas.org/sgp/crs/row/R42580.pdf

Meeks Gardner, J. M., Grantham-McGregor, S. M., Himes, J., & Chang, S. (1999). Behavior and development of stunted and nonstunted Jamaican children. *The Journal of Child Psychology and Psychiatry, 40*(5), 819-827. doi:10.1111/1469-7610.00497

Merriam-Webster, Incorporated. (n.d.a) *Fortify [Def d:2]*. Retrieved from October 30, 2019 https://www.merriam-webster.com/dictionary/fortifying

Merriam-Webster, Incorporated. (n.d.b) *Health care [Def 1]*. Retrieved from October 30, 2019 https://www.merriam-webster.com/dictionary/healthcare

Merriam-Webster, Incorporated. (n.d.c) *Indigenous [Def 1]*. Retrieved from October 30, 2019 https://www.merriam-webster.com/dictionary/indigenous

Merriam-Webster, Incorporated. (n.d.d) *Micronutrient*. Retrieved from October 30, 2019 https://www.merriam-webster.com/dictionary/micronutrient

Millward, D. J. (2017). Nutrition, infection and stunting: The roles of deficiencies of individual nutrients and foods, and of inflammation, as determinants of reduced linear growth of children. *Nutrition Research Reviews, 25*, 50-72. doi:10.1017/S0954422416000238

Muller, O., & Krawinkel, M. (2005). Malnutrition and health in developing countries. *Electronic Canadian Medical Association Journal, 173*(3), 279-286. doi:10.1503/cmaj.050342

Nutrition International, Flour Fortification Initiative, Global Alliance for Improved Nutrition, USAID, The World Bank, UNICEF (2009). Investing in the future. A united call to action on vitamin and mineral deficiencies: Global Report 2009. Retrieved from https://www.who.int/vmnis/publications/investing_in_the_future.pdf

National Geographic. (2015, January). Plate tectonics and the Ring of Fire. Retrieved from https://www.nationalgeographic.org/article/plate-tectonics-ring-fire/?utm_source=BibblioRCM_Row

Office of the United States Trade Representative. (n.d.). Guatemala. Retrieved from https://ustr.gov/countries-regions/americas/guatemala

Ogrodnik, C., & Borzutzky, S. (2011, January). Women under attack: Violence and poverty in Guatemala. Retrieved from https://vc.bridgew.edu/cgi/viewcontent.cgi?article=1081&context=jiws

Palacios, A. M., Hurley, K. M., De-Ponce, S., Alfonso, V., Tilton, N., Lambden, K., B., Reinhart, G. A., Freeland-Graves, J. H., Villanueva, L. M., & Black, M. M. (2019). Zinc deficiency associated with anaemia among young children in rural Guatemala. *Maternal & Child Nutrition.* doi: 10.1111/mcn.12885

Pariona, A. (2017, June 1). What type of government does Guatemala have? Retrieved from https://www.worldatlas.com/articles/what-type-of-government-does-guatemala-have.html

Paulino, N. A., Vazquez, M. S., & Bolumar, F. (2018, October 31). Indigenous language and inequitable maternal health care, Guatemala, Mexico, Peru and the Plurinational State of Bolivia. Retrieved from World Health Organization website: https://www.who.int/bulletin/volumes/97/1/18-216184.pdf

Petrovick, Tatiana. (2016, February 2). Five reasons why the Guatemalan health system is in deep crisis. *Mayan Families*. Retrieved from

Pinkerton, R., Oriá, R.B., Lima, A.A., Rogawski, E.T., Oriá, M.O., Patrick, P.D., … Guerrant, R.L. (2016, November). Early childhood diarrhea predicts cognitive delays in later childhood independently of malnutrition. doi:10.4269/ajtmh.16-0150

Powers, J.M., (2018). Iron requirements and iron deficiency in adolescents. Retrieved from UpToDate https://www.uptodate.com/contents/iron-requirements-and-iron-deficiency-in-adolescents?search=iron%20rich%20foods&topicRef=7148&source=see_link

Reinhardt, K., & Fanzo, J. (2014). Addressing chronic malnutrition through multi-sectoral, sustainable approaches: A review of the causes and consequences. *Frontiers in Nutrition*. doi:10.3389/fnut.2014.00013

Taft-Morales, M. (2019, January 29). Guatemala: Political and socioeconomic conditions and U.S. relations. *Congressional Research Service*. Retrieved from https://fas.org/sgp/crs/row/R42580.pdf

The World Bank. (n.d.). Guatemala. Retrieved from http://datatopics.worldbank.org/jobs/country/guatemala

Transforming Futures. (n.d.a). Home page, para. 1. Retrieved from https://transformingfutures.org/

Transforming Futures. (n.d.b). Our work page, Key facts from the city dump and Casa Del Pan section, para. 1 Retrieved from https://transformingfutures.org/front-page/our-work/

Transforming Futures. (n.d.c). Our work page, Casa Del Pan at the city dump section, para. 1 Retrieved from https://transformingfutures.org/front-page/our-work/

Transforming Futures. (n.d.d). Our work page, Pastora Mercedes history section, para. 2-4 Retrieved from https://transformingfutures.org/front-page/our-work/

Transforming Futures. (n.d.e). Our news page, New school supplies, para. 1 Retrieved from http://transformingfutures.org/new-school-supplies/

Transforming Futures. (n.d.f). Our news page, Our second feeding center section, para. 2 Retrieved from https://transformingfutures.org/our-second-feeding-center/

Transforming Future (n.d.g). Our work page, Impact stories section, para 1. Retrieved from https://transformingfutures.org/front-page/our-work/

United States Agency International Development (2018, February). Guatemala: Nutrition profile. Retrieved from https://www.usaid.gov/sites/default/files/documents/1864/Guatemala-Nutrition-Profile-Mar2018-508.pdf

United States Agency International Development. (2019). Food assistance fact sheet - Guatemala. Retrieved from https://www.usaid.gov/guatemala/food-assistance

U.S. Department of State (2019, March 29). U.S. relations with Guatemala - United States department of state. Retrieved from https://www.state.gov/u-s-relations-with-guatemala/

Voth-Gaeddert, L. E., Stoker, M., Cornell, D., & Oerther, D. B. (2018). What causes childhood stunting among children of San Vicente, Guatemala: Employing

complimentary, system-analysis approaches. *International Journal of Hygiene and Environmental Health, 221*(3) 391-399. doi:10.1016/j.ijheh.2018.01.001

Walker, S. P., Chang, S. M., Powell, C. A., Simonoff, E., & Grantham-McGregor, S. M. (2006). Effects of psychosocial stimulation and dietary supplementation in early childhood on psychosocial function in late adolescence: Follow up of randomised controlled trial. *The British Medical Journal.* doi: 10.1136/bmj.38897.555208.2F

World Food Programme (n.d.) Guatemala. Retrieved from https://www.wfp.org/countries/guatemala

World Health Organization (2004). Focusing on anaemia. Retrieved from https://www.who.int/nutrition/publications/micronutrients/WHOandUNICEF_statement_anaemia_en.pdf?ua=1

World Health Organization (2018). Malnutrition. Retrieved from https://www.who.int/news-room/fact-sheets/detail/malnutrition

World Health Organization (2014). Nutrition. Retrieved from https://www.who.int/health-topics/nutrition

World Health Organization (2006, December 28). WHO Global database on iodine deficiency: Guatemala. Retrieved from https://www.who.int/vmnis/iodine/data/database/countries/gtm_idd.pdf?ua=1

World Health Organization (n.d.a). Micronutrients. Retrieved from https://www.who.int/nutrition/topics/micronutrients/en/

World Health Organization (n.d.b). Micronutrient deficiencies: Iodine deficiency disorders. Retrieved from https://www.who.int/nutrition/topics/idd/en/

World Health Organization (n.d.c). Micronutrient deficiencies: Vitamin A deficiency. Retrieved from https://www.who.int/nutrition/topics/vad/en/

World Health Organization (n.d.d). Micronutrient deficiencies: Iron deficiency anemia. Retrieved from https://www.who.int/nutrition/topics/ida/en/

APPENDIX A:

Consent from Guatemalan Families for Use of Personal Information

Consent from Guatemalan Families for Use of Personal Information

I, Pablo Aaron Villagran Castellanos, received verbal consent from Andrea Patricia, in fall of 2019 for the use of her testimony responses and family photographs on public platforms including but not limited to the Transforming Futures Website and a paper brochure. The information collected may be shared with researchers at Bethel University and used to promote the mission and vision of Transforming Futures in whatever ways seem appropriate by the organization.

Notas Explicativas: Formulario de Consentimiento para Fotografías, Imágenes y Entrevista

¿Cómo usaran mi foto, video o entrevista?

1. Transformando Futuros trabajan en Guatemala para ayudar y desarrollar a personas en situaciones de vulnerabilidad. Para hacer esto, trabajamos con personas individuales e instituciones. Usamos sus fotos e historias para comunicar a toda esta gente acerca de las vivencias reales de personas que viven en situación de vulnerabilidad y pobreza para recardar dinero que permita continuar ayudando nuestros programas.

2. Esto significa que su foto, video y/o entrevista puede usarse en internet, en televisión, en reportes, en periódicos, en artículos de revista, en material para recaudar fondos, y en nuestras publicaciones

3. Su historia y fotografía pueden ser vistas en muchos países del mundo.

¿Para qué es este formulario?

(Favor de asegurarse que traductores traduzcan este punto)

Este formulario registra su acuerdo y por lo tanto da autorización legal a Transformando Futuros de usar sus entrevistas, videos y fotografías en cualquier manera que nosotros consideremos adecuada para ayudar a personas ahora y en el futuro.

¿Quién es Transformando Futuros?

Transformando Futuros es una asociación no lucrativa que desarrolla y asiste a niños, niñas y adolecentes en Guatemala por medio de programas o proyectos enfocados en nutrición, educación y desarrollo.

TRANSFORMING FUTURES

Formulario de Consentimiento
Fotografía, Imágenes y Entrevista

1. Persona(s) realizando la entrevista, tomando fotografías e imágenes.

Yo, Pablo A. Villagran (nombre del entrevistador/fotógrafo) confirmo que he discutido a fondo el contenido de este formulario con la persona(s) mencionada abajo, ya sea directamente o mediante un traductor.

Firma [signature] Fecha 25/9/2019

2. Persona(s) en entrevista, fotografías, video e imágenes
Para ser llenada por individuo(s) o padres/tutores si el sujeto es menor de 18 años

Por medio de la presente autorizo a Transformando Futuros a utilizar las fotografías, imágenes y entrevistas que he dado para el uso que mejor les convenga en relación al trabajo que realizan Transformando Futuros incluyendo recaudación de fondos, defensa, publicidad y programación, donde sea y cuando sea que Transformando Futuros decidan hacerlo.

Nombre Blanca Estela López Gomez
Dirección 2.3 5659-1821
Correo electrónico

Firma Blanca Estela L.G Fecha 25/9/2019

3. ¿Podemos contactarlo en el futuro para seguimiento de entrevistas/fotos/video?
Encierre en un círculo su respuesta.

(S) o no? Si es posible, favor de proporcionar un número de contacto o instrucciones de como contactarlo.
Número telefónico/ correo electrónico:

Otros detalles (número de contacto del Albergue o de algún pariente):

APPENDIX B:

Chronic Malnutrition in Guatemala, Educational Website Content

Chronic Malnutrition in Guatemala, Educational Website Content

TRANSFORMING FUTURES

CHRONIC MALNUTRITION STATISTICS

Almost 50% percent of Guatemalan children suffer from chronic malnutrition.

Guatemala ranks 6th worldwide for those suffering from chronic malnutrition, with nearly 1/2 of those affected being children under 5 years old.

Malnutrition in poverty-stricken countries often results from a combination of lack of food and micronutrient deficiencies.

Chronic malnutrition is the most advanced form of malnutrition. It's described by growth stunting, or a decreased height compared to other individuals of the same age, and loss of body mass.

EFFECTS OF CHRONIC MALNUTRITION

Malnourished children have diminished moods and decreased happy moments compared to nourished children.[1]

Chronic malnutrition results in the appearance of growth stunting and leads to negative structural and functional changes in the brain, which can cause diminished cognitive abilities in children.[2]

Growth stunting is correlated to many health complications, including death at a younger age.[3]

Transforming Futures consistently serves over 400 Guatemalan children with one meal per day. Foods served include chicken, pork, beef, white rice, black beans, and more. The food includes essential micronutrients like iron, zinc, and iodine.

1. Meeks Gardner JM, Grantham-McGregor SM, Himes J et al. Behavior and development of stunted and nonstunded Jamaican children. The Journal of Child Psychology and Psychiatry, 40(5), 819-827. doi:10.1111/1469-7610.00497
2. Ker BR, Rao S L, Chandramouli BA. Cognitive development in children with chronic protein energy malnutrition. Behavioral and Brain Functions, 4(31). doi:10.1186/1744-9081-4-31
3. Voth-Gaeddert LE, Stoker M, Cornell D, Oerther DB. What causes childhood stunting among children of San Vicente, Guatemala: Employing complimentary, system-analysis approaches. International Journal of Hygiene and Environmental Health, 221(3) 391-399. doi:10.1016/j.ijheh.2018.01.001

APPENDIX C:

Personal Testimonials, Website Content

Personal Testimonials, Website Content

ANDREA PATRICIA

PERSONAL TESTIMONY

Andrea and her husband have 3 daughters, Tatiana, Elizabeth, and Brenda. Two of them are currently in school.

Andrea and her family used to rent a room somewhere else in Guatemala City. She was informed about a new community that was being established in the garbage dump, moved there, and has lived there for 10 years.

What do you and your husband do for work?
Andrea used to work at the garbage dump with her husband, but suffered an injury that prevents her from working.
"You can make anything from $3 to $10 in one day." Work hours are usually 7am to 5pm.

How is your access to food?
Andrea and her husband utilize one income to provide breakfast and dinner for their family. Transforming Futures' feeding centers has provided a reliable meal for their children every day for the past 7 years. Andrea states, "this is the only place where we received food", and without the feeding centers, "my daughters wouldn't have lunch".

How has the feeding center impacted your daughters' lives?
"Thanks to the feeding center my daughters have been able to eat every day and it has allowed them to focus on school."

What is your hope for your daughters' lives?
"I hope they follow God and place Him as a priority in their lives, and also that they can get a better education than me and my husband so that they can have a better future."

BLANCA LOPEZ

PERSONAL TESTIMONY

Blanca Lopez is a single mother in Guatemala.
She takes care of her 4 children, 2 grandchildren, and 3 other children.

What do you do for work?
Blanca has worked in the garbage dump ever since she was 7 years old, collecting food and recyclable materials, such as aluminum, glass, and paper.
She sells the materials to companies for money, making about $20 every 15 days.

How long have you been going to the feeding center?
Blanca and her family have been utilizing the feeding center for almost 8 years.
"It has been so much help because our incomes vary a lot from one day to another. I think it has been a blessing for our children. I have had so many difficulties that I don't know what I would do if the feeding center wasn't there making sure my family eats every day, thanks to the support of Transforming Futures and Pastora Mercedes".

Have you noticed any change in your children from eating at the feeding center?
Blanca, as well as her kids' teachers have noticed the children have more energy.
She states, "They [the teachers] have also told me that they are gaining weight, and I think that's great."

Is there anything you would like to add?
"God bless all the people that have donated to Transforming Futures because my children have received a lot of benefits from it, especially performing better at school and with more energy. I am also thankful to God for placing such great support of the feeding center in this community and for Pastora Mercedes."

APPENDIX D:

Questions for the Testimonials

Questions for the Testimonials

Research Questions

1. Tell us about your home life, where do you live? What do you (the parents) do for work? Do your children go to school? How many children do you have?
2. Do you have access to clean water? Food?
3. Aside from the meal that Transforming Futures provides, what else do you eat in a day?
4. What type of foods do you eat that are provided by Transforming Futures?
5. How has Transforming Futures impacted your life?
6. How much money do you make in a day?
7. Have you noticed a difference in your child's life since having access to a meal from Transforming Futures? Have you noticed any energy change? Have you noticed any physical growth changes? Have you noticed any educational growth? Have you noticed any mood changes?
8. What other needs does your family have?
9. How has Transforming Futures impacted the community of children in Guatemala city?
10. Is there anything else you would like to tell us?

APPENDIX E:

Transforming Futures Educational Brochure

Transforming Futures Educational Brochure

PERSONAL TESTIMONIES

Blanca Lopez is a Guatemalan woman who lives and takes care of her 4 children, 2 grandchildren, and 3 other children. For work she collects recycling materials and food, which she sells for money, **making about $20.00 every 15 days**.

Blanca says the feeding center, "has been so much help because our income varies a lot from one day to another." When conversing about the Transforming Futures feeding center, Blanca states, "I think it has been a blessing for our children. **I don't know what I would do if the feeding center wasn't there, making sure my family eats every day." Blanca, as well as her kids' teachers have noticed the children have more energy and are gaining weight.** "God bless all the people that have donated to Transforming Futures because my children have received a lot of benefits. I am also thankful to God for placing such great support of the feeding center in this community and for Pastora Mercedes."

Andrea Patricia lives with her husband and 3 daughters, Tatiana, Elizabeth, and Brenda in the Guatemala Garbage Dump community. Ten years ago, when moving to the community, **they had nothing but a "house made out of pieces of plastic."** Now, the family has their own place but struggles with water leaking into their home.

Andrea used to work at the garbage dump with her husband, but suffered an injury that prevents her from working. Now, they have to rely on one income to provide breakfast and dinner for their family. **Transforming Futures' feeding center is the only place where her family has consistently received food**. Without Transforming Futures, her daughters wouldn't have lunch. Andrea says, **"thanks to the feeding center, my daughters have been able to eat every day and it has allowed them to focus on school."** Andrea's dream for her daughters is to "follow God and place Him as a priority in their lives and also, that they can get a better education than me and my husband so that they can have a better future."

TRANSFORMING FUTURES

because we all deserve to have a great future

To learn more and support our mission
visit our website at: https://transformingfutures.org/

Transforming Futures Charitable Foundation
1398 N Leroy Street
Fenton, MI 48340 United States

Email: info@transformingfutures.org

OUR MISSION AND VISION

We are a nonprofit organization with a mission to develop solutions for underprivileged children by investing in and providing for their physical, emotional, spiritual, and education needs fo

We supp
home to
dump, w
country.

We provide one meal per day, Monday through Friday, to approximately 400 Guatemalan children.

We spec
local Gu
home to
unable t

CHRONIC MALNUTRITION STATISTICS

Chronic malnutrition is the most advanced form of malnutrition. It' described by **growth stunting**, or a decreased height compared to other individuals of the same age, and **loss of body mass.**

- Guatemala ranks **6th worldwide** for those suffering from chronic malnutrition.
  - Almost 1/2 of those are children **under 5 years old.**
- Almost **50%** of Guatemalan children suffer from chronic malnutrition.
- Malnutrition is a combination of **lack of food and micronutrient deficiencies.**


Guatemala City Garbage Dump

EFFECTS OF CHRONIC MALNUTRITION

ads to
ges in

ealth
unger

d
ts

ergy malnutrition.

hildren of San Vicente,
ygiene and

nted and nonstunded
111/1469-7610.00497

Foods served by Transforming Futures, including chicken, pork, tortillas, black beans, and more, ensure food security and provide essential micronutrients.

APPENDIX F:

Invitation to Work with Transforming Futures

Invitation to Work with Transforming Futures

Dear Mallory,

Transforming Futures agrees to have Mallory Beswick, Brooke Elvehjem, and Bree Blanchette work with our non-profit organization for a community service project through Bethel University Physician Assistant Program.
We are grateful for this partnership with you. Your interest in helping us promote and encourage children and families living in extreme poverty in Guatemala is already having a lasting impact.

Sincerely,
Cinda Rachor
Transforming Futures Board Member