Nutrition Knowledge of Honduran Caretakers and Dietary Change of Their Children

SOFIA E. ABRAHAM-HARDEE D.O

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

In

Education, Curriculum & Instruction

Kerry J. Redican, Chair
Kathy W. Hosig
Richard K. Stratton
H. Dean Sutphin

January 30, 2009
Blacksburg, Virginia

Keywords: Malnutrition, Nutrition, Nutrients, Nutrition Education

Copyright 2009, Sofia E. Abraham-Hardee D.O
Nutrition Knowledge of Honduran caretakers and dietary change of their children

Sofia E. Abraham-Hardee D.O.

(ABSTRACT)

A mixed method study pretest and posttest research design was used in this study similar to those used by the Expanded Food and Nutrition Education Program (EFNEP) and Women, Infants and Children (WIC). An individual interview method was used to gather the qualitative data. The study was conducted using 26 caretakers and 31 children. No significant change in knowledge in the caretakers was observed across all lessons. A significant gain in knowledge was observed only in the nutrition lesson ‘Fruits and Vegetables’. A significant change in household dietary habits was seen when comparing dietary pretest and posttest score in the caretakers. A correlation of 0.33 was observed between dietary posttest scores between caretakers and children. A significant correlation ($r^2 0.50$) was observed between the posttest (1) in caretakers from the nutrition lessons and dietary posttest taken by the caretakers. The need for a social worker, further education and more financial resources were some of the major themes identified by the qualitative component. Self sufficiency, increased evangelism and more trade classes were identified as the future goals of the nutrition program. This study showed that providing nutrition education in the caretakers can have a positive impact on the dietary choices within the household and can be a vital tool to targeting the issues of malnutrition in Tegucigalpa, Honduras.
Dedication

I would like to dedicate this thesis to my Lord and Savior, Jesus Christ for providing me with this opportunity. I would also like to dedicate this thesis to my husband, Abraham Billy Hardee III, for his continued support and encouragement through this process and to my family for instilling in me the morals and values that have made me the woman I am today.
Acknowledgements

First and foremost I would like to acknowledge my committee members, Dr. Kerry Redican (Chair), Dr. Kathy Hosig, Dr. Richard Stratton, Dr. Dean Sutphin for their guidance throughout this project.

Secondly, I would like to acknowledge Baxter Institute and Association Amicus Clinic, Tegucigalpa Honduras for allowing me to conduct my research within their facilities. I would also like to acknowledge Virginia College Of Osteopathic Medicine (VCOM) for the opportunity to be a part of the dual degree program.

Thirdly, I would like acknowledge Dr. Steve White and Dr. Noe Perez for giving us permission to use their facilities and for help with translations respectively.

I would also like to acknowledge Dr. David Ayes, Arelly Amador and the participants for helping me with this study.

I would like to acknowledge Abdel Salaam and Dipayan for their statistical expertise and guidance.

Last but not least, I want to thank my residency program at Geisinger Medical Center for providing me with the opportunity to take time off to complete my dissertation.
Table of Contents:

Abstract ......................................................................................................................... ii

Dedication ..................................................................................................................... iii

Acknowledgements ...................................................................................................... iv

Tables of Contents ...................................................................................................... v

Chapter One

Introduction ................................................................................................................... 1

Background .................................................................................................................. 1

Honduras ....................................................................................................................... 5

Current Nutrition Program at Baxter Institute ......................................................... 7

Statement of the Problem ........................................................................................... 8

Primary Hypothesis ...................................................................................................... 8

Purpose of the Study .................................................................................................... 8

Research Objectives ................................................................................................... 9

Significance of the Study ............................................................................................ 9

Limitations ................................................................................................................... 10

Definition of Terms .................................................................................................... 11

Scope of the Study ..................................................................................................... 11

Chapter Two

Review of Literature .................................................................................................... 13

Introduction .................................................................................................................. 13
Quantitative Objectives.............................................................................................................47

Objective One ..........................................................................................................................48

Objective Two ..........................................................................................................................50

Objective Three ......................................................................................................................50

Objective Four ..........................................................................................................................51

Qualitative Objectives .............................................................................................................51

Summary .....................................................................................................................................54

Chapter Five

Summary, Discussion and Recommendations ...........................................................................56

Summary .....................................................................................................................................56

Conclusions ...............................................................................................................................59

Quantitative ...............................................................................................................................59

Qualitative ..................................................................................................................................64

Recommendations ......................................................................................................................66

Appendices

Appendix A:
Assent Form (English) ..............................................................................................................69

Appendix B:
Assent form (Spanish) .............................................................................................................71

Appendix C:
Informed Consent (English) ....................................................................................................74

Appendix D:
Informed Consent (Spanish) ....................................................................................................77

Appendix E:
Dietary Pretest/Posttest in Children (English) .......................................................................80
<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Dietary Pretest/Posttest in Children (Spanish)</td>
<td>83</td>
</tr>
<tr>
<td>G</td>
<td>Dietary Pretest/Posttest in Adults (English)</td>
<td>86</td>
</tr>
<tr>
<td>H</td>
<td>Dietary Pretest/Posttest in Adults (Spanish)</td>
<td>87</td>
</tr>
<tr>
<td>I</td>
<td>Lesson 1 (English)</td>
<td>88</td>
</tr>
<tr>
<td>J</td>
<td>Lesson 1 (Spanish)</td>
<td>91</td>
</tr>
<tr>
<td>K</td>
<td>Pretest/Posttest Lesson 1 (English)</td>
<td>94</td>
</tr>
<tr>
<td>L</td>
<td>Pretest/Posttest Lesson 1 (Spanish)</td>
<td>98</td>
</tr>
<tr>
<td>M</td>
<td>Lesson 2 (English)</td>
<td>102</td>
</tr>
<tr>
<td>N</td>
<td>Lesson 2 (Spanish)</td>
<td>105</td>
</tr>
<tr>
<td>O</td>
<td>Pretest/Posttest Lesson 2 (English)</td>
<td>107</td>
</tr>
<tr>
<td>P</td>
<td>Pretest/Posttest Lesson 2 (Spanish)</td>
<td>109</td>
</tr>
<tr>
<td>Q</td>
<td>Lesson 3 (English)</td>
<td>111</td>
</tr>
<tr>
<td>R</td>
<td>Lesson 3 (Spanish)</td>
<td>113</td>
</tr>
<tr>
<td>S</td>
<td>Pretest/Posttest Lesson 3 (English)</td>
<td>115</td>
</tr>
<tr>
<td>T</td>
<td>Pretest/Posttest Lesson 3 (Spanish)</td>
<td>118</td>
</tr>
</tbody>
</table>
Appendix U:
Final Review Sheet for caretakers (English) .......................................................... 121

Appendix V:
Final Review Sheet for caretakers (Spanish) .......................................................... 122

Appendix W:
IRB Approval letter .................................................................................................. 123

Appendix X:
Transcriptions .......................................................................................................... 124

References .................................................................................................................. 139
List of Tables.

**Table 1:**
Demographic data of the caretakers and household involved in the Nutrition Program at Baxter Institute, Tegucigalpa, Honduras..................................................34

**Table 2:**
Nutrition Education Program lessons ..........................................................38

**Table 3:**
Interview Questions ..........................................................................................38

**Table 4:**
Timeline of the study ........................................................................................40

**Table 5:**
Calculating dietary pretest and posttest score for caretakers.............................45

**Table 6:**
Calculating dietary pretest posttest score for children.........................................45

**Table 7:**
Gain in knowledge in the caretakers.....................................................................49

**Table 8:**
Correlation Studies data.......................................................................................51

**Table 9:**
Code Mapping.......................................................................................................53
List of Figures

**Figure 1**
The magnitude of the malnutrition problem ........................................2

**Figure 2**
Conceptual framework for malnutrition ...........................................3

**Figure 3**
Map of Central America ...................................................................5

**Figure 4a:**
Food distributed to the women in the nutrition program ..................8

**Figure 4b:**
Women attending devotions. .................................................................8

**Figure 5:**
Observed changes in participants after EFNEP’s education program ........19

**Figure 6:**
Conceptual Framework for Environmental Scanning ..........................23

**Figure 7:**
Key components of the CIPP model ...................................................30

**Figure 8:**
Occupations of the caretakers whose children are enrolled in the Nutrition Program at Baxter Institute .................................................34

**Figure 9:**
Level of Education of women in the Nutrition program at Baxter Institute ..............................................................................35

**Figure 10:**
Bar Graph showing gain in knowledge in caretakers with each lesson .................................................................49

Chapter 1

Introduction

Background

“We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the foundation of life. Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer “Tomorrow”. His name is “Today”.

By Gabriela Mistral, 1948

A release from the State of Food Insecurity stated that 826 million people worldwide are chronically hungry (Burlingame, 2000). Malnutrition is a growing problem in developing countries throughout the world. United Nations International Children’s Emergency Fund (UNICEF) attributes 40% of the 11 million deaths of children under the age of five in developing countries, to malnutrition (UNICEF, Last retrieved July 4th, 2007). The Millennium Development Goals report put forth by the United Nations 2005, identified undernourishment as the leading cause of death in children under the age of five years in greater than half the population worldwide as compared to 19% of the population suffering from acute respiratory infections, and 8% from malaria, and 17% from diarrhea (Figure 1). The Food Research and Action Center, in its 2006 report, stated that 13% of the United States population lives in poverty. It also
identified about 11.4% of the United States households that struggle with food insecurity (Last retrieved July 1, 2007). Thus, the correlation between poverty and food insecurity can be seen globally. The United States society and economic infrastructure masks the issue of malnutrition within the United States. According to the Cooperative for Assistance and Relief Everywhere (CARE), more than 840 million people in the world are malnourished and 799 million of them live in the developing world. More than 153 million of the world’s malnourished people are children under the age of five (CARE, Last retrieved June 24th, 2007). What have we done and what are we willing to do to tackle this issue of malnutrition within our country and our world?

Figure 1: The magnitude of the malnutrition problem. Causes of death in children under the age of five in percentage. Millennium Development Goals report 2005. 

Malnutrition is a broad term used to describe under-nutrition or over-nutrition (obesity). It is commonly used as an alternative to under-nutrition. UNICEF defines malnutrition as inadequate calories and protein for growth and maintenance or an inability to fully utilize the food eaten due to illness (UNICEF, Last retrieved June 24th, 2007). According to the Journal of the American Medical Association, malnutrition is more than feeling hungry or not having enough food to eat; it is also characterized as
inadequate intake of protein, calories and other macro and micro nutrients (JAMA, 2004). Malnutrition is also defined as a condition of the cells not receiving an adequate supply of the essential nutrients because of poor diet or poor utilization of food. Nutrients are also defined as chemical substances found in foods that are essential for life. These can be divided into six categories; carbohydrates, fats, proteins, vitamins, minerals and water. Providing the body with energy and heat, building and repairing body tissue, and regulating body processes are some of the functions of these nutrients (Townsend, 1994).

Malnutrition is a pandemic that many have chosen not to recognize as a major problem globally and within the United States. Several attempts have been made to identify the underlying causes of malnutrition. The conceptual framework developed by the UNICEF in Figure 2, provides an understanding of the causes of malnutrition in developing countries. It recognizes that human and environmental resources, economics, political systems, and ideological factors are the main contributors to malnutrition (Food and Security, Last retrieved June 24th, 2007).

Figure 2: Conceptual framework for malnutrition. Food and Security.

Malnutrition is a financially and economically costly issue. According to the World Bank Report, malnutrition is costing poor countries up to three percent of their Gross Domestic Product (GDP) (March, 2006). McLachlan states that malnourished children tend to start school later, progress less rapidly, have lower attainments, and have a lower performance on cognitive achievement tests, even into adulthood (2006). Thus malnutrition not only is an issue of dying kids, but an economic and financial issue on a global scale.

The conceptual framework (Figure 2) identifies inadequate education as one of the underlying causes of malnutrition. The 2000 World Report put forth by the United Nations, states that 90 million children worldwide are denied primary education and 232 million have no access to secondary education (Rees, 2000). Education brings ideas and knowledge on how to take care of one’s health. It also provides opportunities to seek better employment. Education is a simple, yet time-consuming concept that has been adopted by many organizations to address the issue of malnutrition. The Expanded Food and Nutrition Education Program (EFNEP) is a branch of the United States Department of Agriculture that operates in all 50 states and six other regions. Its main objective is to assist low income families and youth by improving their diet quality and maximizing their resources to help maintain a healthy lifestyle. The World Health Organization (WHO) is responsible for providing leadership on global health matters, setting norms and standards, providing technical support to countries, and assessing health trends around the world. The Institute of Nutrition of Central America and Panama (INCAP) is dedicated and has made great accomplishments in research, technical cooperation, training and distribution of technical and scientific information in the field of
malnutrition. Targeting the issue of nutrition education is only one aspect of malnutrition in the community-based health care delivery model. However, education, in conjunction with the food assistance and other services, can empower the caretakers of these children with the foundation needed to improve the status of their children.

Honduras

Honduras is one of the poorest and least developed countries in Latin America. It has an area of 112,492 sq km (about the size of Louisiana) and a population of 7,028,400 according to the 2004 census and an annual growth rate of 2.5%. Tegucigalpa is the capital with a population of 879,200. The Honduran government is a democratic constitutional republic. Spanish is the official language of Honduras. It has a per capita gross domestic product of $2800. Forestry, fisheries and minerals are the main natural resources of the land. The largest threat to the country comes during the tropical storm season from hurricanes and flooding. Hurricane Mitch in October 1998 had devastating effects to the economy of the country, which are evident even today.

![Map of Central America](www.infoplease.com/atlas/centralamerica.html)
A study published by Barrios, Stansbury, Palencia and Medina in the Pan American Journal of Public Health, showed changes in the anthropometric measurements of 295 children under the age of five in three areas of Honduras that were affected by Hurricane Mitch (2000). The three areas in the study included Tegucigalpa, Choluteca, and Catacamas. Height for age, weight for age, and height for weight were the three anthropometric measurements utilized to assess the level of malnutrition in children. The data were compared to prevalence information conducted in Honduras prior to Hurricane Mitch (1987-1996). A significant difference in stunting and wasting was noticed among the three regions of Honduras (p ≤ 0.01). The aftermath of Hurricane Mitch in 1998 destroyed agricultural land and increased food insecurity which has been thought to contribute to the decline in human health and increase in child malnutrition in Honduras.

In a study published by the Pan American Health Organization (PAHO), the prevalence of malnutrition in children under the age of five in Honduras increased from 48.6% in 1987 to 52.5% in 1991 and 2.1% of deaths were attributed to malnutrition. The main goal of the study was to define the magnitude and distribution of the prevalence of Severe Growth Retardation (SGR) in school children in Central America and to understand the relationship between nutritional status and selected environmental risks. The distribution of the Z-scores and heights by countries showed that SGR was particularly precarious in Honduras. The average sub regional Z-score for height in regard to the standard population was -1.72.
Current Nutrition Program at Baxter Institute

The current nutrition program at Baxter Theological Institute, in Tegucigalpa, Honduras is funded by donations sent from a congregation in Austin, Texas, and is associated with the medical clinic (Association Amicus) which is partially funded by Virginia College of Osteopathic Medicine (VCOM). The three main goals of the nutrition program include: 1) To provide food for the malnourished child in the family, 2) Provide spiritual support and guidance for the caretakers and family, and 3) Provide occupational classes for the caretakers to allow for alternate income sources. Currently 47 children are enrolled in the program. The number of children within the program is limited by the funding available each year. The costs to provide for the nutritional needs for each child in the program is $25.00 a month or $300.0 a year. Children are enrolled either on a six month or one year program based on the growth and development progress made by the child. The children are divided into four groups based on distance from the clinic. Groups 1-3 live in the city and are required to return to the clinic every 10 days to get the food. Group 4 is required to return once a month since they live greater than an hour away from the clinic.

All the caretakers are required to bring the child every three months for a physical evaluation. The mothers and children are provided with free medical care anytime during their enrollment in the nutrition program. Every ten days, the mothers are given rice, sugar and beans, oil, milk, corn flour and other donated foods such as fortified spaghetti and sauce (Figure 4a). The women are also invited to attend a devotional service conducted prior to the food distribution (Figure 4b). The nutrition program also provides the mothers with sewing and hair care classes, which provides them an opportunity to
learn trades in order to earn an income. Nutrition education is currently not a component of the nutrition program that exists at Baxter Institute.

*Figure 4:* a) Food distributed to the women in the nutrition program. b) Women attending devotions. Pictures taken by Sofia Abraham 2007.

**Statement of the problem**

Lack of nutrition education is one of the underlying factors that contribute to malnutrition. The Nutrition program at Baxter, lacks this educational component that can improve the nutritional status of the children enrolled in the program.

**Primary Hypothesis**

Increasing the nutritional knowledge in the caretakers, in addition to providing food assistance, has a positive influence on dietary habits in the household.

**Purpose of the Study**

To identify a sustainable nutrition education program in Tegucigalpa, Honduras in order to:

- Improve the nutrition knowledge of the women in Tegucigalpa.
- Help reduce malnutrition in children in the city of Tegucigalpa, Honduras.
Research Objectives

Quantitative

1. Determine the change in knowledge of the caretakers after implementation of the nutrition education program by comparing the pretest and posttest scores for each lesson.

2. Determine change in dietary habits in the household by comparing dietary pretest and posttest scores in the caretakers.

3. Determine the correlation in dietary habits in the household after the caretakers have been enrolled in the nutrition education program by comparing dietary posttests in the children and adults.

4. Determine the correlation between the nutrition education and dietary habits in the household by comparing posttest scores (1) in the caretakers from the nutrition lessons and dietary posttests taken by the caretakers.

Qualitative

1. To describe the demographic characteristic of Tegucigalpa, Honduras and the benefits of the current nutrition program to the community.

2. To determine the current needs and future of the nutrition program.

Significance of the Study

The importance of this study was to establish an efficient nutrition education program at Baxter Institute in Honduras. The establishment of nutrition education programs in disadvantaged populations is vital due to the mortality and morbidity associated with malnutrition. The conceptual framework for malnutrition (Figure 2)
identified economic structure, political and ideological factors and inadequate education as the basic underlying causes of malnutrition. Based on the United Nations Education, Scientific and Cultural Organization (UNESCO) statistics for 2005, there is a major drop in enrollment between primary enrollment (83%) to secondary enrollment (21%) in both males and females (UNESCO, Last retrieved April 4, 2008). Such a drop in basic education also limits any potential nutritional education knowledge that would be taught at the secondary level. Addition of an education component to the existing nutrition program can be beneficial to the mothers by building awareness and knowledge in basic nutritional concepts and practices.

Limitations

The lack of a random sample was a major limitation in this study. The individuals in the sample were selected based on the criteria set by the nutrition program at Baxter institute. The sample population also included individuals from a lower socioeconomic sector in Honduras than the rest of the general population, which limited the generalization of the study. The internal validity of the study was also compromised due to the small sample size and no test retest validity. A Cronbach alpha was not calculated for the dietary pretest and posttest. Finally, the lack of a control group, due to the timeline settings of the nutrition program and the ethical concerns with providing services to cases but not to controls, was also a major limitation for this study.
Definition of Terms

Nutrition

A function of living plants and animals consisting of the taking in and metabolism of food materials whereby tissue is built up and energy liberated (Stedman’s medical dictionary, 2000).

Malnutrition

A condition that results when the cells do not receive an adequate supply of the essential nutrients, due to poor diet or poor utilization of food (Townsend, 1994). In the nutrition program, a malnourished child was identified as any child who fell below the acceptable growth chart standards for height and weight.

Nutrition Education

Nutrition Education is a process that assists the public in applying knowledge from nutrition science and understanding the relationship between diet, health and food practices. (Gillespie & Shafer, 1990).

Nutrients

Nutrients are chemical substances found in food that are essential to the various processes to sustain life. They are divided into six basic groups; carbohydrates, fats, proteins, vitamins, minerals, and water (Townsend, 1994).

Scope of the Study

The study focused on the implementation of a nutrition education program, offered in the form of three lessons, which was conducted when the participants returned for their scheduled food ration. The study evaluated the correlation between nutrition education of the caretakers and the impact of the education on dietary habits in the
household. The gain in knowledge in the caretakers after the three nutrition lessons was evaluated using a pre-intervention test and a post-intervention test. The tests were designed to evaluate the knowledge of the caretakers relevant to each of the three nutrition lessons. The change in dietary habits was evaluated based on the change in dietary pre-intervention and post-intervention scores taken by the caretakers. The scope of the study was limited to the geographical setting in Honduras and in particular the nutrition program at the JMA Clinic. The data and findings cannot be generalized beyond the scope of the study. Although extrapolation is limited, this study can provide guidelines in formulating an education program in another setting similar to Honduras. This study further emphasizes the importance of nutrition education in targeting malnutrition in developing countries.
Chapter 2

Review of Literature

Introduction

Nutrition research throughout the decades has demonstrated the importance of nutrition for the normal growth and development of infants, and children and protection of individuals from diseases (Whitney & Rolfes, 1993). Lack of adequate nutrition, over the years has been identified as causing retarded growth and development in children, low birth weight babies, increasing in infant mortality, increasing incidence of infections, lowering life expectancy, and lowering cognitive ability. Cognitive ability and IQ was shown to be positively influenced by nutrients such as folate and iron (Arija et al., 2005).

Adequate servings of fruits (2 cups every day) and vegetables (2 ½ cups everyday) have also been shown to be associated with decreased incidence of stroke, coronary artery disease (CAD), and cancers as well as decreased risks of cataracts, hypertension, chronic obstructive pulmonary disease (COPD) and diverticulosis (Van Duyn, & Pivonka, 2000). Just as under-consumption of nutrients has devastating results on the human body, so does an over-consumption of certain nutrients such as fats, sugars, and vitamins. Hypervitaminosis A, a toxic level of Vitamin A has been associated with weight loss, nausea, joint pain, hepatomegaly with parenchymal damage, and fibrosis. It is also identified as a teratogen causing congenital abnormalities (Kumar, Abbas & Fausto, 2005).

Appropriate amounts of nutrients are essential for the proper function of the human body. To maintain such a fine balance, effective nutrition counseling and education programs are needed to educate individuals. Nutrition education in developing
countries follows a didactic approach, focusing on issues such as breast feeding, quantity and quality of food, and weaning foods. A problem solving approach has features that make health education a desirable and an effective tool (Ticao & Aboud, 1998). The nutrition transition seen in developing countries, include under-nutrition and increasing levels of obesity caused by the change in dietary habits from traditional food habits to those of higher energy consumption, which are associated with undesirable health outcomes such as an increase in chronic non-communicable diseases, making the need to implement nutrition preventative measures (Armando Perez Cueto et. al, 2006).

**Nutrition**

Balanced nutrition is a result of consuming the right nutrients in the appropriate amounts. There are six major categories of nutrients; carbohydrates, fats, proteins, vitamins, minerals, and water (Townsend, 1994). There are many types of malnutrition that have devastating consequences on the body. However, only the specific nutrients associated with this study are included in this review of the literature.

The most common types of malnutrition seen in developing countries include protein, iron, zinc, and vitamin A deficiencies (Muller & Krawinkel, 2005). According to the National Nutrition Monitoring Bureau of India, about 50% of healthy looking children in India, have sub-clinical deficiencies of vitamin A, B2, B6, and C. Singh defines “hidden hunger” as the decrease in a child’s full genetic potential due to the presence of micronutrient deficiency (2004). In an article published in JAMA, Vitamin A deficiency was identified as a major cause of blindness in developing countries which has prompted UNICEF and other organizations to distribute about 400 million doses of Vitamin A each year to developing countries (Anonymous, 2004). Vitamin A can be
found in two dietary forms; retinol and carotene. Vitamin A is essential for maintaining healthy eyes and skin, for normal growth, reproduction, and a healthy immune system. Vitamin A can be found in fish oils, butter, cream, whole milk, egg yolk, and green leafy vegetables. Deficiency in vitamin A causes night blindness, dry rough skin, and increased susceptibility to infections (Townsend, 1994).

Various studies have also been conducted to understand the importance of vitamin C to a child’s growth and development. Inadequate consumption of vitamin C has been correlated to an increased rate of infection (Goodman, Correa, Tengana, DeLany and Collazos, 1997). The study showed a 19-fold increase in infections in children who consumed less than two daily servings of fruits and vegetables as compared to three to four daily servings. The study also showed that children with less than 40 mg of vitamin C intake daily had greater odds for contracting infections. Vitamin C is also called ascorbic acid and has antioxidant properties. Vitamin C deficiency presents as bleeding gums, loose teeth, easy bruising, poor wound healing and a disease called scurvy (Townsend, 1994).

Proteins are the basic component of every cell in the human body. Proteins contribute to the building and repair of tissues, regulating body functions and providing energy in the case of inadequate carbohydrates and fats. Proteins can be found in meats, fish, poultry, eggs, milk, cheese, and legumes (Townsend, 1994). Protein energy malnutrition is primarily categorized as kwashiorkor, where there is a greater deficiency in protein than energy intake and Marasmus, where there is an inadequate supply of energy (Pediatric Nutrition Handbook, 1998). A cross sectional study identified that socioeconomic factors, low maternal education, poor nutritional knowledge of the mother
and poor feeding practices for sick children were some of the risk factors for protein energy malnutrition in children under the age of 5 years (Phengxay et al., 2007).

Iron is a trace element that is a major component of hemoglobin which carries oxygen from the lungs to various tissues in the body. Common sources of iron include red meats, egg yolks, legumes, dark green vegetables, potatoes, and dried fruits. Fortified pasta and cereals are also a good source of iron. Individuals suffering from iron deficiency complain of dizziness, shortness of breath, and weakness (Townsend, 1994). Non hematological benefits of iron include physical performance, thermoregulation, cognitive function, and immune function (Agarwal, 2007).

This literature review exemplifies the importance of well-balanced nutrition with adequate macro and micro nutrients for the physical and mental growth and development of children.

*Nutrition and Cognition*

Nutrition deficiencies also impact the cognitive abilities of children. Malnutrition has been shown to predispose children to neuro-cognitive deficits which in turn predispose them to persistent externalizing behaviors suggesting that early nutrition intervention may reduce early antisocial and aggressive behaviors. A prospective longitudinal study showed that children with malnutrition signs at age three were more aggressive or hyperactive at age eight, had more externalizing problems at age eleven and greater conduct disorder at age seventeen (Liu et al., 2004). Another study by Liu et al. showed that malnutrition at age three is associated with poor cognition at age 11 years independent of any psychosocial adversity. Developmental disability due to malnutrition
and cognitive dysfunctions associated with parasitic infections are the most common neurological disorders (Bergen & Silberberg, 2002).

**Signs and Symptoms of Malnutrition**

Characteristics of poor nutrition include, dull, lifeless hair, greasy pimpled facial skin, dull eyes, slumped posture, fatigue, depression, stunted growth, constipation, and decreased attention span (Townsend, 1994). In the Pediatric arena, there are many diagnostic tools that are available to assess the growth of the child. In the 1880’s, an infant’s weight was considered to be a good indicator of infant health. The Emerson Standard, which stated that any child below 7% of average weight for height had an abnormal weight, was used to study the nutrition status of children in large communities. In 1924, Dublin and Gebhart questioned the value of weight test in diagnosing nutrition (Brosco, 2001). The WHO defines malnutrition as requiring hospital admission for weight for height z scores (WHZ) of less than or equal to -3 or as less than or equal to 70% of the reference median using the US National Center for Health Statistics reference values for severe wasting (JAMA, 2005).

It is important to know that currently there is no single laboratory test that can assess the nutritional status of an individual. A complete blood count is an ideal place to begin to identify protein deficiencies. Additionally, a low albumin or low transferrin level would indicate protein and iron deficiency respectively. But in developing countries, where malnutrition is prevalent, invasive testing is an unrealistic diagnostic tool due to the limited access to care, and financial issues. The difficulty with recording the height in a distressed child, and the unavailability of working scales are two of the reasons why the WHZ are running out of favor (Berkley *et al.*, 2005). The study by Berkley *et al.*, showed
that the Mid Upper Arm Circumference (MUAC) is a practical screening tool that performs equally well in predicting subsequent mortality among malnourished children as the WHZ (2005).

National and Local Organizations

There are many organizations at the national and local level that have adopted various educational strategies to address the issue of malnutrition. The Expanded Food and Nutrition Education Program (EFNEP) is a branch of the United States Department of Agriculture that operates in all 50 states and six other regions. Its main objective is to assist low income families and youth by improving their diet quality and maximizing their resources to help maintain a healthy lifestyle. In 2006, EFNEP reached 150,270 adults and 409,389 youth directly and more than half million family members indirectly (EFENP, 2006). Multiple delivery methods are used by EFNEP. The adult education program predominantly encompasses one on one discussion, telephone and mailed educational materials, or a combination of methods. The information is delivered to the youth via school curriculum, after school programs, day camps, community centers, and workshops. EFNEP educators follow a research-based learning model which allows them to effectively reach and educate program participants. Their educators are members of the community they support, trained and supervised by university faculty, skilled in using hands-on teaching materials, committed to delivering sound instruction and dedicated to reaching diverse and low income populations. The 2006 impact report showed significant improvement in increasing desirable practices in adults (Figure 5). EFNEP uses multiple choice pre and post tests with pictures for nutrition evaluation in the youth. An evaluation of EFNEP’s nutrition education program was conducted in a multi ethnic low income
population. A significant decrease in the food insecurity score was observed in both the graduated and terminated group (p < 0.05) (Dollahite, Olson & Scott-Pierce, 2003). A cost effectiveness analysis of EFNEP was designed to examine resource management, household nutrient intake, and food cost between two groups. The individuals in the EFNEP program showed significant improvement in resource management by making shopping lists and planning meals in advance. The study also showed that the EFNEP participants saved $124-$234 on average per year (Burney & Haughton, 2002).

![Participants With Desirable Practices](image)

*Figure 5: Observed changes in participants after EFNEP’s education program. Food Resource management (FRM), Nutrition Practices (NP), Food Safety (FS).*

The Women, Infants and Children (WIC) program, supported by the United States Department of Agriculture, serves to safeguard the health of low-income women, infants, and children under the age of five who are at a nutritional risk by providing nutritious foods to supplement diets, information on healthy eating, and referrals to healthcare. WIC is available in all 50 states, 34 Indian Tribal organizations, America Samoa, District of
Columbia, Commonwealth Islands of Northern Marianas, Puerto Rico, and the Virgin Islands. In 2004, WIC served 7.9 million individuals of whom four million were children, two million were infants and 1.9 million were women. Eligibility of pregnant or post partum women, infants, and children under the age of five was determined by income guidelines, state residency, and nutritional risk assessment by a health professional. Nutritional risk was divided into two categories; medical based risks, such as anemia, underweight, poor pregnancy outcome and dietary risks, such as failure to meet the dietary guidelines. WIC offers breastfeeding promotion and support, Revitalizing Quality Nutrition Services (RQNS), immunization screening and referrals, and WIC food packages to their participants. Most protocols followed by WIC education programs provide an education lesson session followed by multiple choice questions pre and post tests to assess the level of comprehension of the different topics. Some of these topics include breastfeeding, general nutrition, fruits and vegetables, and milk comparison. The model adopted for the current study is similar to that implemented by EFNEP and WIC.

There are also a number of international efforts focused on the issue of malnutrition in children across the world. International agencies such as, World Health Organization, United National Children’s Funds, Food and Agriculture Organization, and World Bank have played a critical role in advocating for and raising awareness of these issues at the international, regional, and national levels among policy makers and the general population (Dalmiya & Schultink, 2003). Some of these organizations have focused their efforts primarily on food assistance, while others have placed emphasis on nutrition education. USAID is an international organization dedicated to decreasing hunger and malnutrition throughout the developing world. They work to address this
issue by concentrating on areas such as micronutrient supplementation and fortification, improved infant and child feeding, education, and improved food security. The Community Based Therapeutic Care (CTC) is a community-based approach adopted by USAID, to manage large numbers of acutely malnourished children in times of stress. It aims to build community capacity to manage and respond to repeated cycles of relief. The Positive Deviance/ Heath Approach was introduced in the 1990s, and focused on energizing volunteer mothers to rehabilitate malnourished children by using local, affordable, and nutritious foods. These positive behaviors were in turn used as motivators for other mothers within the community to encourage healthy child nutrition practices.

Understanding the importance of education, USAID has established efforts for general primary education and nutrition education programs globally. Through its office of Education in the Bureau of Economic Growth, Agriculture and Trade (EGAT/ED) works with USAID mission to educate the population at the primary, middle, and secondary levels and also through radio-based instruction to bring about an educated and healthier workforce which will in turn contribute to the economic framework of the countries.

In Honduras, USAID has had various successes in establishing programs such as EDUCATODOS, an alternative education program, which includes the development of low cost, high quality alternatives for pre-school education and the development of pilot programs to improve the quality of early primary education and to reduce failure rates. In collaboration with the Centers for Excellence in Teacher Training (CETT), USAID is also committed to the initiative for the development of teaching strategies and materials to improve reading and writing skills in the first years of primary school (USAID, Last retrieved July 8, 2007). In addition to basic education, USAID is also committed to
nutrition education. A 2005 story published in Mozambique showed great success in the Model Families program. The model families were educated and trained to cook healthy food and they in turn became the educators of the community. This approach was shown to be beneficial in breaking cultural feeding habits, taboos and ignorance. (General Health, 2005).

The Pan American Health Organization (PAHO) is an international public health agency working to improve health and living standards in the Inter-American system. The World Health organization (WHO) in association with the World Food Programs, the United Nations System Standing Committee on Nutrition, and the United Nations has adopted a community-based approach to allow for timely detection of acute malnutrition and provisions of food supplies such as Ready-to-Use Therapeutic Foods (RUTF’s). Multiple international efforts, such as dietary fortification, nutrition education, and food supplementation are some of the means by which international organizations have addressed the issue of malnutrition.

The World Bank in conjunction with the UK Department of International Development (DFID) and the Bank Netherlands Partnerships Program (BNPP), established a workshop for Fighting Chronic Malnutrition in Honduras on November 27-30 (2006). The workshop identified five priorities in fighting malnutrition in Honduras: regular monitoring of child growth; targeting efforts on pregnant women and children in the first two years of life; educating parents about hygiene and monitoring health in their children; action at the national, program and community levels; and monitoring and evaluation of nutrition programs (World Bank, 2006). USAID also redesigned its Food for Peace program to provide health education, to build roads, to help farmers acquire
new tools, and to learn farming techniques. The program also taught farmers the art of irrigation, assessing markets, and provided them means of micro-irrigation systems (USAID, Last retrieved July 8th, 2007).

Environmental Scanning

Understanding the external conditions of the community, through environmental scanning, is important for evaluation and management of nutrition programs. Environmental scanning is the acquisition and use of information about events, trends and relationships in an organizations/communities external environment, which would assist in planning the future course of action (Choo, 2001). It has also been defined as a method of assessing the strengths, weaknesses, opportunities and threats to an organization and its environment (Koontz, 2006). Understanding the external environment prior to intervention is a key step for strategic planning and for the future. The conceptual framework of environmental scanning is shown in Figure 6.

![Conceptual framework for Environmental scanning](image)

*Figure 6: Conceptual framework for Environmental scanning (Choo, 2001).*
Environmental scanning is a vital tool to the field of research. An environmental scan conducted in Canada illustrated the lack of national food and nutrition surveillance information required to support nutrition program development to measure the impact and outcomes of programs and to anticipate emerging issues (McAmmond, 2000). The “Eat Smart, Play Hard” campaign, Phase I, started by the Food and Nutrition Services (FNS), conducted an environmental scan that included a review of nutrition and physical activity programs targeted for children ages 2-18, demographic information, and relevant information regarding the children’s knowledge, attitudes and behavior (Prospects Associates, 2003). The Departments of Community Services and Health Promotion and Protection of Nova Scotia conducted an environmental scan to assess the current practices related to food and nutrition support for licensed child care centers in order to determine potential enhancements for support (Nova Scotia Health Promotion and Protection, 2008). Environmental scanning has been used in a number of nutrition programs in different countries in order to increase the efficacy of the programs prior to implementation.

Theories of Behavior Change

There are many theories and models that explain the different aspects and complexities of behavior change. Human behavior is a reflection of the complex interplay of universal human capacities, cultural responses to unique histories and circumstances, and individual differences (Smith, Spillane & Annus, 2006). The same complexity of events is responsible for individual dietary habits. Approaches that give advice to stimulate dietary behavior change are typically based on the Knowledge-Attitudes-Behavior model which assumes that exposing an individual to new information leads to a
gain in knowledge, promoting changes in attitudes, which in turn will result in improved
dietary behavior (O’Brien & Davies, 2007). Failure to convert all nutrition knowledge
into improved dietary behavior exhibits a limitation in this logic.

It is important to understand human behavior and change in behavior as it is
usually the motif of most educational programs. Behavior theories provide a platform to
understand the reasons that individuals engage in health risk or health compromising
behavior and the adoption of a health protective behavior (DiClemente, Crosby & Kegler,
2002). The Health Action Process Approach (HAPA) helps us understand health
behavior change through emphasizing the distinction between motivational and volitional
influences on behavior and focusing attention on maintenance and initiation of healthy
behaviors (Conner, 2008). The Precaution Adoption Process Model (PAPM) focuses on
the psychological processes within an individual that explains how a person comes to the
decision to take an action and then converts this decision into action (DiClemente,
Crosby & Kegler, 2002). The Elaboration Likelihood Model (ELM) proposes two routes
to persuasion; central and peripheral. The central route is characterized by cognitive
scrutiny of the intended message yielding a positive or negative outcome. A peripheral
route is categorized by little cognitive scrutiny of the message. The responses are
dependent on the peripheral cues such as environment, credibility of the source,
attractiveness of the message, and the mood of the target population (Henningsen,
Henningsen, Cruz & Morril, 2003). The Behavior Ecological Model is a multifaceted
model concerned with behavior, environment change, and public policy. It recognizes
that behavior is affected at the individual, local, community, and social cultural level
(Dressler-Hawke & Veer, 2006).
The nutrition education program implemented in the current study was designed using the Knowledge Attitude Behavior Model which assumes that presenting any new information within the context of the three nutrition lessons will lead to gain in knowledge in these areas which in turn will bring about dietary behavior change.

*Nutrition and economically disadvantaged*

The goal of a nutrition program is to encourage positive behavior change to improve dietary practices. Multiple factors should be considered when implementing a nutrition program in a developing country. Poor access to nutritious food is a key dimension of poverty (Yu & Hannum, 2007). Socio-cultural influences should also be considered when formulating a nutrition education program in developing countries (Hubley, 2006). Education, occupational class, household income, home ownership, and current economic difficulties have been shown to be associated with healthy food habits (Lallukka, Laaksonen, Rahkonen, Roos & Lahelma, 2007). Similar socio-economic factors have also been shown to affect food purchasing choices. A study published by Ricciuto, Tarasuk, & Yatchew, showed that an individual with a university degree purchased significantly (p <0.0001) more fruits and vegetables and less meat and alternatives relative to their counterparts with lower educational levels (2006). The literature shows that there are multiple factors that hinder economically disadvantaged individuals from improving their dietary habits. Nutrition, cognitive ability, economic impact of malnutrition, behavior change, and other relevant factors discussed to this point in the dissertation illuminate the key factors important to a nutrition program. The structural issues pertaining to how these factors and the content should be organized for an effective nutrition program must be further discussed.
Nutrition Program Content

Nutrition programs in the United States and Latin American regions have similar structure and concept development. In this section of the review of literature, specific topics that are commonly part of a nutrition program are discussed and in particular, drawn into the context for this study. EFNEP and WIC are examples of structured nutrition programs. They provide concepts and constructs important for successful programs and provide key goals and/or implications that could be useful for this study. These two programs, along with other relevant references, formed the foundation for the structural analyses in this section of the review of literature.

Nutrition Facts

Delivering accurate nutritional facts is an important component of any nutrition program. The content of the nutrition education program should be delivered at the educational level of the participants. Nutrition programs should focus on basic concepts of nutrition education such as the food pyramid and basic introductory level of major topics of nutrition. Such knowledge will enable individuals to purchase and choose items that provide the most nutritional value for the least amount of money.

Food Selection

Individual habits or family food habits are influenced by choice, availability, and financial resources. Development of nutrition education programs need to be aware about these cultural and financial barriers in order to provide practical advice to encourage healthy eating habits. Based on the information received from the panel of experts in Honduras for the study, it was apparent that certain cultural barriers needed to be understood prior to the implementation of the nutrition program. For example, fruits such
as apples and kiwi are considered “a rich man’s” food. It would be unrealistic to educate the women on the benefits of an apple in their diet when it is not part of their daily diet. Another example is the social stigma against the use of white corn versus yellow corn. Identifying the specific characteristics and barriers of a target population is important prior to formulating a nutrition program. Strolla, Gan & Risica identified barriers to healthy eating in three main dietary behaviors; lowering fat, increasing fruit, and increasing vegetables and motivators and food interests in the target population (2006). In the Nuer nutrition education program, concepts and American food preparation techniques were integrated to the existing methods of food preparation in the Nuer culture (Laverentz, Cox & Jordan, 1999). Thus the success of any educational program is dependent on the respect for and acceptance of the population and their culture, the incorporation of the entire target population in defining the problem, and goals and solutions for the issue.

Resources

A nutrition program does a great disservice to the population by merely providing the food needed. Instead the nutrition program must provide resources and opportunities to allow for self sustaining practices in participants. As mentioned earlier, the current nutrition program at Baxter is designed to address this concept by providing sewing and hair cutting classes to the participants of the nutrition program by which the caretakers can increase their income within their household. This in turn increases the self sustenance among the caretakers in the program. The JMA Clinic has a great opportunity to teach these women about the basic nutrition facts while providing them with a constant food supply while they are enrolled in the program.
Social Support

Successful change and adoption of a new behavior is more likely to occur in the presence of a strong social and emotional support. Members of a nutrition program must be provided with the opportunity to interact with one another, work together and provide positive encouragement for one another as seen by the success of many EFNEP and WIC nutrition programs.

Educating mothers in general and nutrition education has been identified as important contributory factors in the nutritional status of the children. In addition, household income, frequency of illness and nutrient intake was also shown to contribute to the nutritional status of children (Marinda, 2006). There are a plethora of means by which women can be educated about the importance of nutrition and its impact on their children. Peer help approach and dyadic discussion brings about solutions for child feeding problems, an approach similar to EFNEP’s peer education program (Ticao & Aboud, 1998). Educational lessons in different nutrition-related topics leads to improvement in mothers’ nutrition knowledge. A study published by Yousey et. al, incorporated four topics in its nutrition program which were; Benefits of Beverages, Building strong bones and muscles, Healthy meal choices and Nutritious snack ideas. A significant improvement in nutrition knowledge among the women was observed within a nine-month period in each of the nutrition topics (2007).

CIPP model

CIPP which stands for Context, Input, Process and Product is a comprehensive framework used to guide summative evaluations of programs, products and systems. The CIPP model is illustrated in Figure 7. Context evaluation assesses the needs, and
problems to define the goals priorities and outcomes of a particular program. Input evaluations assess the resources set in place to help achieve the targeted needs and goal as set by the program. Process evaluation assesses the implementation of plans and future evaluation of program performance and outcomes. Product evaluations assess the outcomes of a particular program in light of meeting the targeted needs (Stufflebeam, 1971). A study published by Shams, Golshiri, Zamani and Pourbdian utilized the CIPP model to evaluate a community based program to improve mother’s participation in increased growth and nutrition of the children (2008).

*Figure 7*: Key components of the CIPP model. Image taken from the 2003 Annual Conference of the Oregon Program Evaluators Network (OPEN).

**Summary**

Based on the literature, it is apparent that nutrition education must be a vital component to a nutrition program when targeting developing countries. Targeting the women to receive the nutrition education has great potential to improve the health of their children. There are various components of a successful nutrition education program that
deserve attention, these include: understanding the cultural and socio-economical barriers that are present within the community, planning appropriate program content, and understanding the complexity of behavior change.
Chapter 3
Method

Introduction

This chapter will begin by restating the research questions and reiterating the scope of the study in more detail. Subsequently the methodology, statistical techniques, design of the education program, population and participants’ descriptions, and instrumentation will be further discussed. Then the data analysis method, reliability, and validity of the study will be discussed.

Research Objectives

Quantitative

1. Determine the change in knowledge of the caretakers after implementation of the nutrition education program by comparing the pretest and posttest scores for each lesson.

2. Determine change in dietary habits in the household by comparing dietary pretest and posttest scores in the caretakers.

3. Determine the correlation in dietary habits in the household after the caretakers have been enrolled in the nutrition education program by comparing dietary posttests in the children and adults.

4. Determine the correlation between the nutrition education and dietary habits in the household by comparing posttest scores (1) in the caretakers from the nutrition lessons and dietary posttests taken by the caretakers.
Qualitative

1. To understand the community of Tegucigalpa, Honduras and the benefits of the current nutrition program to the community.

2. To determine the current needs and future of the nutrition program.

Environmental Scanning

An environmental scan was conducted in May 2007, designed to collect demographic information and understand the perceptions and knowledge base of the caretakers enrolled in the nutrition program. The environmental scanning was conducted by a native Honduran school teacher, who visited sixteen randomly selected homes from all four groups of the nutrition program. A 12-question questionnaire was administered at their homes. The questions were targeted to learning more about maternal education, number of occupants at home, occupation, diet, and perceptions about the importance of nutrition. The environmental scanning revealed some vital information that provided the foundation for the nutrition education program seen in Table 1, Figure 8 and Figure 9.

In addition to demographic information, the environmental scanning revealed information about the caretakers’ perceptions of nutrition. It was interesting to note that the 16 women defined nutrition as helping a child when he/she is malnourished, a happy child, important with a low-weight child, and taking vitamins. When asked how they knew that their child was healthy, the majority of the women responded as follows: 1. When the doctor told them, 2. When they were not sick, 3. Have a good weight, and 4. Look healthy.
Table 1.

Demographic data of caretakers and household involved in the Nutrition Program at Baxter Institute, Tegucigalpa, Honduras.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age of caretakers</td>
<td>35.9 years</td>
</tr>
<tr>
<td></td>
<td>SD: +/- 13</td>
</tr>
<tr>
<td>Average number of occupants in the house</td>
<td>5.3</td>
</tr>
<tr>
<td>Average salary per month</td>
<td>L. 2459.28 ($130.12)</td>
</tr>
<tr>
<td></td>
<td>($1.0 = L. 18.9)</td>
</tr>
<tr>
<td>Average start weight on child at entry into the program</td>
<td>29.4 lbs</td>
</tr>
<tr>
<td></td>
<td>SD: +/-10.5</td>
</tr>
</tbody>
</table>

Figure 8: Occupations of the caretakers whose children are enrolled in the Nutrition Program at Baxter Institute.
Figure 9: Level of Education of women in the Nutrition program at Baxter Institute.

Primary: Grade 1-6, Secondary: Grade 7-11 (if studying for a bachelor degree) or 7-12 (if studying for a technical degree), University: usually 5 yrs (medicine and dentistry)

**Research Design**

The purpose of this mixed qualitative and quantitative study was to identify a sustainable and ideal nutrition education program in Tegucigalpa, Honduras in order to a) Improve the educational knowledge of the women in Tegucigalpa and b) Help reduce malnutrition of children in the city of Tegucigalpa, Honduras. The pretest-posttest model was based on the nutrition education program conducted by WIC and EFNEP. The primary independent variable in the study was the nutrition education lessons and the dependent variable was the dietary score within the households. Some of the other variables that were not accounted for in this study are lower socioeconomic status, prior education level, and availability of resources. These variables were outside the scope of
this study since the researcher had no control over the participants entered in the nutrition program.

The nutrition education program was designed using the Knowledge Attitude Behavior Model which assumes that presenting any new information will lead to gain in knowledge in these areas which in turn will bring about dietary behavior change. The new information was presented in the form of three nutrition lessons as listed in Table 2. The gain in knowledge in the mothers was examined by the differences in pretest and posttest scores for each lesson. Change in dietary behavior in the household was measured by the dietary pretest and posttest in caretakers. The qualitative component of the study included five interview questions based on the Contexts Input Processes and products (CIPP) model given to the administrative officials of Baxter institute and JMA clinic.

Population and Sample

The target population included the caretakers of the malnourished children in the nutrition program at Tegucigalpa, Honduras based on the criteria established by the clinic administration. In this study a convenience sample was used since no change could be made to the inclusion criteria of the already existing nutrition program at the JMA clinic. The sample population included group I, II and III in the education program at Baxter who returned to the clinic every ten days. Group IV was excluded from the study due to the long commute to the clinic, which required them to only return to the clinic once every month. The distinction between Groups I, II, III and Group IV was entirely based on the commute distance from their homes to the clinic. The individuals in Groups I, II and III were placed into each group based on their identification number upon entering
the program (PN #). The sample size included 31 caretakers and 26 children. Five children were excluded from the study based on our exclusion criteria of children with cerebral palsy, mental retardation, and microcephaly. These children were excluded due to their limited verbal response and communication making it difficult to perform the dietary pretest and posttests. The caretakers of the excluded children were allowed to participate in the educational program. Each participant was identified by his/her PN number, which could be identified only by the participant, the primary researcher, Dr. David Ayes (Director of the Clinic) and Arelly Amador (Nutrition program coordinator). Such coding helped maintain confidentiality of the participants at all times.

The participants in the qualitative component of the study included the President of Baxter Institute, Vice President of Baxter Institute, Director of JMA clinic and Physician of JMA clinic. These individuals were selected due to their administrative positions at Baxter Institute and the JMA clinic.

**Data Collection**

The education program was conducted over six weeks running simultaneously with the already existing nutrition program at Baxter Institute. No changes were made to the nutrition program. According to the nutrition program, the women returned to the clinic approximately every ten days to receive their food (Figure 4 a). The education program was divided into three lessons, each addressing a particular topic. In addition to the education lesson, a five-question interview was conducted with four individuals involved with the administration of Baxter Institute and the Clinic. The questions were
formulated within a conceptual framework, including topics of context, inputs, processes, and products (CIPP) (Stufflebeam, 1971). The interview questions are listed in Table 3.

Table 2

Nutrition Education Program lessons.

<table>
<thead>
<tr>
<th>Lesson 1</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What is Nutrition?</td>
</tr>
<tr>
<td></td>
<td>Importance of Water</td>
</tr>
<tr>
<td>Lesson 2</td>
<td>Fruits and Vegetables</td>
</tr>
<tr>
<td>Lesson 3</td>
<td>Importance of Proteins</td>
</tr>
<tr>
<td></td>
<td>Building Healthy Bones</td>
</tr>
</tbody>
</table>

Table 3

Interview Questions

1. What are some of the contributions of the nutrition program to this community and to the mission of Baxter?
2. Which components are required for the nutrition program to operate effectively?
3. Which functional and process components of the nutrition program make it highly effective? Are these elements in place? What else is needed?
4. What outcomes and impacts do you believe are most effective? What are some examples?
5. What should be the future of the nutrition program?
The procedures were approved by the IRB at the Edward Via Virginia College of Osteopathic Medicine November 2007. The IRB included a thorough description of procedures and in particular protection of human subjects including informed consent and assent forms. Due to the high illiteracy rate among the participants, the informed consent forms were read aloud to the caretakers and the assent forms were read aloud to the children. Individuals were provided with the opportunity to ask any questions. If interested in participating in this study, each caretaker and child signed the appropriate forms. Informed consent forms (Appendix A) and assent forms (Appendix B) were completed before any individual was enrolled in the study.

A dietary pretest was conducted on the caretakers and children to learn about the current dietary habits in their household. The women returned to the clinic approximately every ten days, at which point they were required to take a lesson pre intervention test, followed by teaching of the lesson and then the lesson post intervention test (1). A posttest intervention (2) for a particular lesson was conducted at the next visit 10 days later. The pre intervention and post intervention tests were administered in hard copy format (paper). The pre intervention and post intervention tests were designed to determine the knowledge base of the caretakers in each respective lesson topic. This same pre and post intervention test design was continued for each of the three lessons. After completion of all three lessons, a dietary posttest was given to the caretakers and the children to determine the dietary habits after the educational intervention. Table 4 demonstrates the timeline of the study. All pre intervention and post intervention tests (Appendix C- V) for the caretakers and the children were conducted at the Baxter Clinic,
in Tegucigalpa Honduras. The dietary pretests and posttests for the children were conducted individually with Arelly Amador (Nutrition Program coordinator).

Each caretaker had only one child enrolled in the nutrition program. The same child took the dietary pretest and posttests. Arelly Amador read the questions and multiple choice answers out loud to the children individually and marked their answers once they verbalized it. The pretests and posttests for the caretakers were conducted as a group. The questions with the respective answer choices were read aloud to all the participants followed by the caretakers identifying a single correct answer for each question. At the end of each lesson, the answers were copied into an excel document.

Table 4
Timeline of the Study

<table>
<thead>
<tr>
<th>Dates</th>
<th>Program Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 8th, 2008</td>
<td>Informed Consent/ Assent Form</td>
</tr>
<tr>
<td></td>
<td>Dietary Pretest for Adults</td>
</tr>
<tr>
<td></td>
<td>Dietary Pretest for children</td>
</tr>
<tr>
<td></td>
<td>Pretest Lesson 1</td>
</tr>
<tr>
<td></td>
<td>Teach Lesson 1</td>
</tr>
<tr>
<td></td>
<td>Posttest on Lesson 1</td>
</tr>
<tr>
<td>February 18th, 2008</td>
<td>Posttest on Lesson 1</td>
</tr>
<tr>
<td></td>
<td>Pretest on Lesson 2</td>
</tr>
<tr>
<td></td>
<td>Teach Lesson 2</td>
</tr>
<tr>
<td></td>
<td>Posttest on Lesson 2</td>
</tr>
<tr>
<td>February 28th, 2008</td>
<td>Posttest on Lesson 2</td>
</tr>
<tr>
<td></td>
<td>Pretest on Lesson 3</td>
</tr>
<tr>
<td></td>
<td>Teach Lesson 3</td>
</tr>
<tr>
<td></td>
<td>Posttest on Lesson 3</td>
</tr>
<tr>
<td>March 4th, 2008</td>
<td>Posttest on Lesson 3</td>
</tr>
<tr>
<td></td>
<td>Dietary Posttest for Adults</td>
</tr>
<tr>
<td></td>
<td>Dietary Posttest for children</td>
</tr>
<tr>
<td>March 13th, 2008</td>
<td>Qualitative Questions to Administration.</td>
</tr>
</tbody>
</table>
The data were safely stored in a locked cabinet in a locked office in the nutrition office. An electronic copy of all the data received was also stored on a password-protected computer, accessible only by the primary researcher.

The interviews were conducted using questions designed using the CIPP model. The interviews were conducted in the offices of each of the four interviewees. Each interview lasted 15-40 minutes and was recorded on a Pocket PC. Each interviewee was allowed to elaborate on their perceptions and views. The interview process was anonymous with no identifying information collected at the time of the interview.

Reliability and Validity

Validity is defined as the appropriateness, correctness, and usefulness of the specific inferences researchers make based on the data collected (Fraenkel & Wallen, 2006). The validity of a study can be divided into two types; external and internal validity. The external validity is defined as the degree to which the results can be generalizable to environments outside the research setting (Fraenkel & Wallen, 2006). The small sample size and the lack of random sampling in this study limit the external validity of the study to the purposive sample that was selected.

The internal validity is defined as the degree to which observed differences on the dependent variable are directly related to the independent variable (Fraenkel & Wallen, 2006). The eight potential threats to internal validity include history, maturation, testing, instrumentation, statistical regression, differential selection of participants, mortality, and interaction effects (Onwuegbuzie, 2000).

In this study, the threats to internal validity were controlled within the context of the research design. Due to the short six-week educational program, the threat from
history is minimized. It is unlikely that other factors that influence dietary habits at home, such as income, socioeconomic status, availability of resources could have influenced the participants’ decisions. There is a threat to testing in this study that refers to the improved scores on a posttest as a result of the subjects taking a pretest (Fraenkel & Wallen, 2006). Testing is likely to occur when the cognitive measures utilized involve recollection of factual knowledge and when there is a short duration between the pretest and the posttest (Onwuegbuzie, 2000). In this study, the participants are tested on actual nutritional facts on the pretests and the posttests. The participants also took the pretest and the posttest on the same day allowing for limited time between each test administration. But, in order to establish retention of knowledge, a second posttest was repeated when the participants returned in ten days.

Maturation is the possibility that results are due to changes that occur in subjects as a direct result of the passage of time. Due to the short six-week time span for the length of the project, it is unlikely there is an influence of maturation.

Low education level (highest was 6th grade) among the caretakers, along with their motivation and boredom might influence responses on the pretest and posttest. The instrumentation threat to validity occurs when the scores collected are not valid scores as a result of content, criterion, or construct (Onwuegbuzie, 2000). The pre intervention and post intervention tests were reviewed by a panel of experts in Tegucigalpa, Honduras to determine content validity. Based on the illiteracy level, the content of the test was designed appropriately for the level of education of the participants. The format of the tests (multiple choice questions on paper, accompanied by pictures) was designed so that the questions could be read out to the caretakers in the nutrition program. Instrumentation
including the pre-intervention and post intervention model utilized by WIC and EFNEP and in particular tests used in this study may have produced an effect. The instruments used in this study have not been compared to or used with other established programs. Internal validity was compromised in this study since no test-retest analysis was performed using Cronbach alpha.

Statistical regression, which occurs when participants who are selected based on their extremely high or low scores have a tendency to regress to the mean, is unlikely to have occurred in this study (Onwuegbuzie, 2000). The participants in the study include caretakers who were already in the nutrition program at Baxter. The differential selection of participants’ threat also does not exist in this study. Since this study does not compare groups, the underlying differences prior to the commencement of the nutrition intervention, would have little significance on the results. The concept of mortality is when the participants in a research study either fail to take part or drop out during the study (Onwuegbuzie, 2000). In this study, the mortality is attributed only to a minimal number of individuals in the sample who failed to complete the study. The drop-out rate in this study might be attributed to the lack of motivation or boredom in the participants.

Triangulation is defined as the process of corroborating evidence from different individuals, types of data, or data collection methods, which in turn encourages accuracy and credibility of the data (Creswell & Miller, 2000). Incorporating the quantitative and qualitative components was the method of triangulation used in this research study.

**Data Analysis**

The pretest and posttest score for each lesson was the total number of correct answers in that lesson which ranged from 0 to the total number of questions in each
Lesson. Gain in knowledge for each lesson was calculated by taking the mean of the differences between the pretest and posttest score for each individual lesson. A paired t-test was then utilized to analyze any significant gain in knowledge for each lesson.

Dietary pretest and post test scores for the children and caretaker were calculated first by assigning a numerical value for each of the answer choices for each question as indicated in Table 5 and Table 6. The total dietary pretest and posttest score for each individual was the sum of all the numerical values of their answer choices. The dietary score for children ranged from 10-40. The dietary score for the adults ranged from 7-27. Change in dietary habits in the household was calculated using the mean of the difference between the dietary pretest and posttest scores in the caretakers. Pearson correlation studies (R value) were used to study the correlation between a) Lesson posttest scores (1) and the dietary posttest scores in the caretakers and b) dietary posttest scores in caretakers and dietary posttest scores in children. An acceptable p value was set at p <0.05.
Table 5:
Calculating dietary pretest and posttest score for caretakers.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q6</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: The score of 4 being better than 3, 3 being better than 2, 2 being better than 1.

Table 6
Calculating dietary pretest and posttest score for children.

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q5</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q6</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q8</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q9</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Q10</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: The score of 4 being better than 3, 3 being better than 2, 2 being better than 1.
A constant comparison analysis was utilized for the qualitative data (Leech & Onwuegbuzie, 2007). The data was transcribed and analyzed into codes, themes and categories.

**Summary**

A pre and posttest design was adopted to determine the gain in knowledge in the caretakers after the nutrition education lessons and the change in dietary habits in the household. The lesson pretests and posttests and dietary pretests and posttests were the main source of quantitative data collection. A paired t-test and correlation studies were used for data analysis. A five question interview was used to gather qualitative data on the perceptions and views of the administration on the current nutrition program at the institute. The data were analyzed by open coding and categorizing the responses into themes.
Chapter 4

Results

The purpose of this mixed method study was to identify a sustainable nutrition education program in Tegucigalpa, Honduras in order to improve the nutritional knowledge of the women in the region and help reduce malnutrition of children in the city of Tegucigalpa. A pretest-posttest design was utilized to determine the gain in knowledge in the caretakers following the educational lessons and determine the dietary changes in the households. Interviews of administrative officials were conducted to understand the perceptions and views of the providers of the nutrition program at Baxter Institute.

Quantitative Objectives:

The data answered each of the following research objectives:

1. Determine the change in knowledge of the caretakers after implementation of the nutrition education program by comparing the pretest and posttest scores for each lesson.

2. Determine change in dietary habits in the household by comparing dietary pretest and posttest scores in the caretakers.

3. Determine the correlation in dietary habits in the household after the caretakers have been enrolled in the nutrition education program by comparing dietary posttests in the children and adults.

4. Determine the correlation between the nutrition education and dietary habits in the household by comparing posttest scores (1) in the caretakers from the nutrition lessons and dietary posttests taken by the caretakers.
Objective 1: To determine the change in knowledge of the caretakers after implementation of the nutrition education program by comparing the pretest and posttest scores for each lesson.

The change in nutrition knowledge in the caretakers after the nutrition lessons was determined by comparing the pretest and posttest scores for each lesson and using a paired t-test statistical tool as represented in Table 7. The comparison of the pretest and posttest scores of each lesson, the associated t-values and p-values yielded different results and significance, making it important to address each value individually. A significant change in score was noticed in pretest 1 & posttest 1 (1), pretest 1 & posttest 1 (2), pretest 2 & posttest 2 (1) as marked by the symbol * in table 7. A significant gain in knowledge was observed only in pretest 2 & posttest 2 (1) (t value = 6.11, p = value <0.0001) as observed by the symbol ** in table 7. A significant decrease in knowledge was observed in pretest 1 & posttest 1 (1) (t value = -2.77, p value = 0.0099) and pretest 1 & posttest 2 (2) (t value = -2.54, p value = 0.0173). Figure 10 demonstrates the bar graph data of the comparisons of the sum of the pretest, posttest (1) and posttest (2) for lesson 1, 2 and 3. Thus no significant gain in knowledge was observed through all the nutrition lessons.
Table 7

Gain in knowledge in the caretakers.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std Error</th>
<th>t-Value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest 1 &amp; Posttest 1 (1)</td>
<td>-0.75</td>
<td>0.27</td>
<td>-2.77</td>
<td>0.0099 *</td>
</tr>
<tr>
<td>Pretest 1 &amp; Posttest 1 (2)</td>
<td>-2</td>
<td>0.78</td>
<td>-2.54</td>
<td>0.0173 *</td>
</tr>
<tr>
<td>Pretest 2 &amp; Posttest 2 (1)</td>
<td>0.83</td>
<td>0.14</td>
<td>6.11</td>
<td>&lt;0.0001**</td>
</tr>
<tr>
<td>Pretest 2 &amp; Posttest 2 (2)</td>
<td>0.23</td>
<td>0.27</td>
<td>0.85</td>
<td>0.4016</td>
</tr>
<tr>
<td>Pretest 3 &amp; Posttest 3 (1)</td>
<td>0.48</td>
<td>0.38</td>
<td>1.27</td>
<td>0.2151</td>
</tr>
<tr>
<td>Pretest 3 &amp; Posttest 3 (2)</td>
<td>0.42</td>
<td>0.37</td>
<td>1.14</td>
<td>0.2628</td>
</tr>
</tbody>
</table>

Note: Mean, Std Error, t-value and p-value for the nutrition lesson pretest and posttest scores for the caretakers. The number in the parenthesis signifies whether it was the first or second posttest for that specific lesson. Lesson 1: What is Nutrition and Importance of water. Lesson 2. Fruits and Vegetables. Lesson 3. Importance of building proteins and building healthy bones. One * indicates significant change in pretest and posttest score. Two ** indicates significant gain in knowledge.

Figure 10: Bar Graph showing gain of knowledge in caretakers with each lesson. This was done by comparing pretest, posttest (1) and posttest (2).
Objective 2: Determine change in dietary habits in the household by comparing dietary pretest and posttest scores in the caretakers.

A significant positive dietary change was seen in the household when comparing the dietary pretest and posttest scores of the caretakers (Mean 1.43, Std dev. 0.57, t value 2.51, p value 0.02). Thus a significant positive change in dietary habits in the household was observed.

Objective 3: Determine the correlation in dietary habits in the household after the caretakers have been enrolled in the nutrition education program by comparing dietary posttests in the children and adults.

The correlation data between dietary posttests in children and caretakers is illustrated in Table 8. The date showed $r = 0.57924$ and $r^2 = 0.335522$ (p value = 0.0019) with a degree of freedom (df) of 24. The data indicated that there was a coefficient of determination ($r^2$) of 0.33 between dietary posttest scores between caretakers and children. This also indicated that 67% of the relationship between the dietary score of the children and the dietary score of the caretakers cannot be explained by the data.
Table 8

Correlation studies data

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>r</th>
<th>r²</th>
<th>p value</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>DietSc</td>
<td>26</td>
<td>14.7</td>
<td>0.57924</td>
<td>0.33552</td>
<td>0.0019</td>
<td>24</td>
</tr>
<tr>
<td>Dietsc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sc</td>
<td>31</td>
<td>14.4</td>
<td>0.70998</td>
<td>0.50407</td>
<td>&lt;0.0001</td>
<td>29</td>
</tr>
<tr>
<td>DietSc</td>
<td></td>
<td>15.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: DietSc = posttest score of adults from dietary test, DietscChild = Posttest score of children from dietary test, Sc = Total posttest score of adults from lessons, r = Pearson Correlation Coefficient, df = degree of freedom. N = sample size.

Objective 4: Determine the correlation between the nutrition education and dietary habits in the household by comparing posttest scores (1) in the caretakers from the nutrition lessons and dietary posttests taken by the caretakers.

A correlation study between lesson posttest scores (1) and dietary posttest scores of caretakers was done to determine the correlation between nutrition education in the caretakers and dietary habits in the households. A significant positive correlation was observed between nutrition education and dietary habits in the household with r 0.70998, r² 0.50407, p < 0.0001, df 29 as represented in Table 8. The data showed a coefficient of determination of 0.50 between nutrition education and dietary change in the household.

Qualitative Objectives:

The CIPP model (Stufflebeam, 1971) was used to generate five interview questions that were asked to four administrative members of Baxter Institute and the JMA clinic. The structured interviews were conducted in the interviewees’ respective
offices when they were available. The information from the interviews was transcribed, coded and separated into categories. Table 9 demonstrates the code mapping for the qualitative data. The qualitative research objectives were:

1. To understand the community of Tegucigalpa, Honduras and the benefits of the current nutrition program to the community.

2. To determine the current needs and future of the nutrition program.
Table 9

Code mapping

<table>
<thead>
<tr>
<th>CODE MAPPING FOR NUTRITION PROGRAM IN HONDURAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1: Community of Tegucigalpa</td>
</tr>
<tr>
<td>Benefits of the current program</td>
</tr>
<tr>
<td>RQ2: Current needs and future</td>
</tr>
</tbody>
</table>

THIRD ITERATION

Individual self sufficiency with aid from the Nutrition program

SECOND ITERATION

1A. Productive member of society                    |
1B. Spiritual, Emotional and Physical Growth.       |
2A. Awareness and knowledge                         |
3B. Expansion and growth                            |

FIRST ITERATION: Initial Codes

1A. Poverty                                          |
1A. Feels like a person                              |
1B. Relief from problems                             |
1B. Comfort                                          |
1B. Evangelistic word                                |
1B. Helps souls and bodies                           |
1B. Normal development                               |
1B. Growth chart                                     |
1B. Identification of chronic problems              |
1B. Free medical and dental services                 |
1B. HIV outreach                                     |
1B. Relationship with church                         |
2A. Education/ Increase in classes                   |
2A. Food/Nutritional value                           |
2A. Sexual and Women’s Health                        |
Note Awareness                                       |
2B. Home visits                                     |
2B. Financial assistance                            |
2B. Social Worker/ Secretary                        |
2B. Follow up                                       |
2B. Trade occupation                                |
2B. Increase accessibility                          |
2B. Increase government Affiliations                |
2B. Communication                                   |
2B. Love/Care/Stimulation                            |
2B. Day care                                        |

Note: Three iterations of content analysis. The table must be read from bottom up. 1. Research question 1.
2. Research question 2. 1A. Iteration codes that support research question 1 and the topic of being
productive members of the society. 1B. Iteration codes that support research question 2 and the topic of
spiritual, physical and emotion growth.
The initial codes that were most consistent across all four interviewees were the need for a social worker, education for the caretakers and more funding. Follow-up and home visits were identified as the main job responsibilities of the social worker by all the interviewees. Self-sufficiency of the caretakers with the aid of the nutrition program was identified as the third iteration code. The qualitative data helps understand the community of Tegucigalpa, the benefits of the nutrition program, the program needs, and the future of the program. Three of the four interviewees emphasized the spiritual growth of the participants in the nutrition programs. The spiritual growth was described with phrases such as, “Helping their souls and bodies”, “spiritual help”, and “hear the word of God”. Appreciation for the nutrition lessons was also expressed in statements such as “After you finish this project, we have the first answer to many things we need to start,” and “Education is primary in my opinion.” The nutrition education lessons were found to be the center of the administrative goal of self sufficiency in their caretakers.

Summary

Quantitative

A significant gain in knowledge was observed only with pretest 2 & posttest 2 (1) (t value = 6.11, p = value <0.0001). A significant decrease in knowledge was observed in pretest 1 & posttest 1 (1) (t value = -2.77, p value = 0.0099) and pretest 1 & posttest 2 (2) (t value = -2.54, p value = 0.0173). Overall, no significant change in knowledge was observed in the nutrition lessons. The data also showed a significant change in dietary habits in the household as presented by the caretakers (Mean 1.43, Std dev. 0.57, t value 2.51, p value 0.02). A coefficient of determination ($r^2$) of 0.33 was observed between dietary posttest scores of caretakers and children. A significant positive
correlation was also observed between nutrition education and dietary habits in the household with $r = 0.70998$, $r^2 = 0.50407$, $p < 0.0001$, df 29.

**Qualitative**

The qualitative data helped understand the community of Tegucigalpa, the benefits of the nutrition program, the needs of the program, and the future of the program. The need for a social worker, education for the caretakers, and more funding were the major themes identified from the data. Self sufficiency in their participants was deciphered to be the third iteration coding for the data. The administrators of the nutrition program emphasized the importance of evangelism, trade classes, and education. Self sufficiency was also identified as a common future goal for the nutrition program.
Chapter 5

Summary, Discussion and Recommendations

Summary

Adequate nutrition is a vital component for the growth and development of a child. A lack of nutrition, also termed as malnutrition or under-nutrition, is a national and international issue that received attention from organizations such as WIC, EFNEP, USAID, UNICEF, PAHO and World Bank. The conceptual framework (Figure 2), presented by USAID, identifies the multi-factorial causes of malnutrition. Education was identified as one of the underlying causes of malnutrition. Malnutrition is a growing pandemic in developing countries. According to UNICEF about 11 million deaths in children under the age of five are attributed to malnutrition. Phengxay et. al also identified socioeconomic factors, low maternal education, poor nutrition knowledge of mothers, and poor feeding practices for sick children as some of the risk factors for protein energy malnutrition in children under the age of 5 years (2007).

This section summarizes the types of malnutrition and the various nutrition programs presented by different organizations. Malnutrition has been associated with increased risk of infections, decreased cognitive ability, and decreased growth and development. Iron, protein, zinc, and Vitamin A are the most common nutritional deficiencies identified in developing countries. Many national and international organizations, such as WHO, UNICEF, USAID, and EFNEP are devoted to improving the malnourished state of many countries around the world. The adult education program, offered by EFNEP based on a research-based learning model, predominantly encompasses one-on-one discussion, telephone and mailing instructions, or a
combination of methods. Most protocols followed by WIC education programs provide an education lesson session, followed by multiple choice question pretests and posttests to assess the level of comprehension of the different topics. Some of these topics include breastfeeding, general nutrition, fruits and vegetables. The Positive Deviance Hearth Approach has been used by USAID in many nutrition education programs focused on training volunteer mothers who rehabilitate malnourished children using affordable and local food sources, who later serve as motivators for other mothers within the community. USAID has also established efforts for primary and nutrition education globally.

This section summarizes malnutrition within Honduras, Central America. Honduras, like most developing countries, faces the issue of malnutrition. Honduras is identified as one of the poorest and least developed countries in Central America (UNICEF, 2008). A workshop to fight chronic malnutrition was conducted by World Bank which identified five priorities in fighting malnutrition in Honduras which included regular monitoring of child growth; targeting efforts on pregnant women and children in the first two years of life; educating parents about hygiene and monitoring health in their children; action at the national, and community levels; and monitoring and evaluation of nutrition programs. USAID has also redesigned the food for peace program to provide health education, to build roads and to help farmers acquire new tools, and to learn new farming techniques to help address malnutrition in Honduras.

The purpose of this study was to identify a sustainable nutrition education program in Tegucigalpa, in order to improve the nutrition knowledge of the women and
help reduce malnutrition in children in Tegucigalpa, Honduras. The research objectives were as follows:

Quantitative

1. Determine the change in knowledge of the caretakers after implementation of the nutrition education program by comparing the pretest and posttest scores for each lesson.

2. Determine change in dietary habits in the household by comparing dietary pretest and posttest scores in the caretakers.

3. Determine the correlation in dietary habits in the household after the caretakers have been enrolled in the nutrition education program by comparing dietary posttests in the children and adults.

4. Determine the correlation between the nutrition education and dietary habits in the household by comparing posttest scores (1) in the caretakers from the nutrition lessons and dietary posttests taken by the caretakers.

Qualitative

1. To understand the community of Tegucigalpa, Honduras and the benefits of the current nutrition program to the community.

2. To determine the current needs and future of the nutrition program.

This mixed method study utilized a pretest-posttest model based on the nutrition education program conducted by WIC and EFNEP. The target population included the caretakers and children enrolled in the nutrition program at Baxter (Groups I, II and III). The quantitative data analysis was analyzed using a paired t-test and correlation study. Three iterations of content analysis and code mapping were utilized for the qualitative
data analysis. A significant gain in knowledge was observed only with pretest 2 & posttest 2 (1). A significant decrease in knowledge was observed in pretest 1 & posttest 1 (1) and pretest 1 & posttest 2 (2). Overall, no significant change in knowledge was observed in the nutrition lessons. The data also showed a significant change in dietary habits in the household as presented by the caretakers. A coefficient of determination ($r^2$) of 0.33 was observed between dietary posttest scores of caretakers and children. A significant positive correlation ($r^2$ 0.50) was also observed between nutrition education and dietary habits in the household.

The qualitative data helped delineate the community of Tegucigalpa, the benefits of the nutrition program, the needs of the program, and the future of the program. The need for a social worker, education for the caretakers, and more funding were the major themes identified from the data. Self sufficiency in their participants was deciphered to be the third iteration coding for the data. The administrators of the nutrition program emphasized the importance of evangelism, trade classes, and education. Self sufficiency was also identified as a common future goal for the nutrition program.

This chapter will attempt to present a comprehensive conclusion, discussion and recommendations by targeting each research question. The conclusions are listed in response to each objective.

Conclusions:

*Quantitative*

**Objective 1:** Determine the change in knowledge of the caretakers after implementation of the nutrition education program by comparing the pretest and posttest scores for each lesson.
The change in knowledge in the participants was measured by comparing the pretest and posttest scores for each lesson. A significant positive gain in knowledge was observed only in pretest 2 & posttest 2(1) and a significant decrease in knowledge was observed in pretest 1 & posttest 1(1) and pretest 1 & posttest 2(2) as presented in Table 7. This could be attributed to the difference in the level of difficulty (content, vocabulary) between each nutrition lesson. For example, introducing a new topic, such as “The Food Pyramid” that the participants are not familiar with, as opposed to “Fruits and Vegetables”, which used familiar words was bound to bring about different outcomes. The difficulty in the lesson ‘food pyramid’ could be secondary to terms such as serving size, and measurements such as ounces/ cups which was unfamiliar to the caretakers. In anticipation of these challenges, the nutrition education was designed with “show and tell” demonstrations during the lessons.

Prior exposure to the nutrition education material also explains the difference in change in knowledge with each lesson. Information passed through generations can be associated with the varying comprehension of the different nutrition lessons. Based on the lack of education in this population, the families were more likely familiar with “Fruits and Vegetables” and “Importance of milk” as compared to the “Food pyramid”. The lack of familiarity with a topic, in a community where education is of little significance, can also give the impression that the topic is too difficult for the caretakers.

The mode of delivery, in combination with the level of difficulty can also be attributed to the difference in change in knowledge between each lesson. The mode of delivery, although consistent throughout the lessons, in combination with the varying difficulty could be attributed to the difference in change in nutrition knowledge. The
study did not account for extrinsic environmental distractions that the caretakers could have experienced during their participation in the nutrition lessons. The participant’s voluntary attention to a particular lesson could be greatly affected by the activities and stressors at their homes, concern for their other children. All these external factors could alter the caretaker’s attention span and diligence in learning making one lesson more difficult than others.

The data did not show any retention of knowledge across the nutrition lessons as observed by the lesson posttest (2) which was taken 10 days after the lesson was presented. The lack of retention could be associated with the lack of interest of the caretakers, in a community where education is not identified as a primary importance. This lack of educational importance could be a consequence of the lack of income, and lack of opportunities in the community that prevent education from being an affordable priority in a life where food, shelter, clothing, and the basic needs for survival are not met. The lack of retention could also be attributed to inadequate learning through the mode of delivery adopted in this study. Additional tools such as video recordings, music and practical demonstrations, in addition to the implemented verbal explanations and visual aids and interactive question and answer sessions, could prove a beneficial mode of delivery within this community. The unfamiliarity with bridging the gap between raw knowledge learned and practical applications in the lives of the caretakers could be beneficial using a native chef to integrate the two entities, which can also aid in retention of knowledge. Repetition of the nutrition lesson would also ensure long-term retention of the information.
Objective 2: Determine change in dietary habits in the household by comparing dietary pretest and posttest scores in the caretakers.

The significant change in dietary habits in the household without gain in knowledge does not align with the Knowledge Attitude Behavior Model used to design the nutrition education program used in this study. The Knowledge Attitude Behavior model states that the presentation of new information causes gain in knowledge which in turn brings about change in dietary behaviors. No significant change in knowledge was observed in this study across all the lessons. But significant change in dietary habits was observed. In the target population where limited nutrition knowledge exists, any small implementation of nutrition knowledge learnt, although not significant, can bring about significant changes in the dietary habits in the household. The discrepancy between, lack of change in knowledge with a positive change in dietary habits in the household can also be explained by the inexperience of the caretakers taking tests (pretests, posttests). A level of difficulty can also be expected in a population, with only a primary education, when taking multiple choice tests.

Objective 3: Determine the correlation in dietary habits in the household after the caretakers have been enrolled in the nutrition education program by comparing dietary posttests in the children and caretakers.

The coefficient of determination of 0.33 indicated the extent of correlation between the dietary posttest taken by the children and the caretakers. The lack of correlation between the rest of the mother’s and their children’s posttest data could be attributed to the caretaker’s falsification of data or incorrect representation by the children due to fear of being removed from the nutrition program since positive change
was established. Despite addressing this potential misconception in the assent and consent form, it still exists as a potential cause of the lack of correlation.

**Objective 4: Determine the correlation between the nutrition education and dietary habits in the household by comparing posttest scores (1) in the caretakers from the nutrition lessons and dietary posttests taken by the caretakers.**

The data showed a 0.50 coefficient of determination between nutrition education and dietary habits in the household. Since the nutrition program was conducted towards the end of the annual year of the nutrition program, the positive correlation can be associated with the nutrition education as opposed to the dietary supplements given since dietary supplements had been a part of the nutrition program prior to nutrition education implementation. In this target population, where nutrition education is not a priority and not emphasized, any additional nutrition training is likely to stimulate the caretaker to bring about dietary changes in the household. The desire of the caretakers to appease the ‘outsiders’ by answering the questions to indicate dietary improvement in the household must also be considered as a reason for such correlation. The caretakers could have felt obliged to lie on the dietary posttests.

The lack of correlation could be attributed to the lack of change in socioeconomic status making it difficult to implement any new dietary changes in the household. The participants’ financial and socioeconomic infrastructure was not changed during the course of this study. It can be inferred that providing nutrition education can be beneficial in making positive dietary changes in the households if it is accompanied by financial assistance or self sustaining parameters. The lack of correlation could also be due to the lack of significant change in knowledge due to the mode of delivery of the
instrumentation. Every individual has their own learning style. Perhaps oral presentations, discussions, and question and answer sessions were not sufficient for learning the nutrition information for some caretakers. Alternative modes of delivery of information and more time, might be necessary to learn the nutrition information given. This further emphasizes the multi-factorial causes of malnutrition.

*Qualitative*

Poverty was consistently identified as a description of the community of Tegucigalpa. Although not surprising, it shows some relevance to the larger issue at hand, malnutrition. The major benefits of the nutrition program identified by the administration can be seen in the second iteration as becoming a productive member of society and providing emotional, spiritual and physical growth for its members. Quotes from the interviewees describing this emotional, spiritual, and physical growth include “Relief from my problems,” “Feeling of being an individual”. These two examples provide evidence that the benefits of the nutrition program expand beyond the realm of nutrition. The nutrition program provided by Baxter offers a wide range of support to the people of Tegucigalpa. In addition to the lack of nutrition the caretakers feel neglected, lonely, useless and a burden to their community. Malnutrition in Honduras, often associated with gross poverty, is not an entity that can be addressed by itself. The main goal of the administration was to provide a well rounded support system for the caretakers and not exclusively supply food. In a community that lacks financial and social support, the administration recognized the need for assistance beyond nutrition to produce a positive change in the community. A quote from Mother Theresa explains this well:
“Being unwanted, unloved, uncared for, forgotten by everybody, I think that is a much greater hunger, a much greater poverty than the person who has nothing to eat.”

--Mother Theresa

All four interviewees also consistently identified awareness and knowledge in food, nutritional value, and women’s health and sexual practices as issues that need to be addressed in the community. They also unanimously identified the need for expansion and growth such as home visits by a social worker, trade classes, day care, and government assistance as the future of the nutrition program. It can be concluded that the administration at Baxter Institute and the JMA clinic understand the multi-factorial nature of malnutrition and are focusing their efforts to eliminate challenges that the caretakers face in the community that prevents progress.

Individual self sufficiency was identified as the third iteration from the interviews. Being self sufficient is one of the ingredients vital to empowering members of the community to take control and strive for a better life. The administration responsible for the nutrition program at Baxter Institute and the JMA clinic are motivated beyond the call to improve growth and development in the children. They are committed to targeting the core issues that are inherent to the community that prove to be a hindrance in motivating change. Some of these core issues, similar to most developing countries, include lack of financial resources, lack of education and poor infrastructure. The nutrition program at Baxter has tried to overcome these issues by teaching trade classes to allow these women to earn an income. The administration at Baxter continues to instill moral responsibilities, feelings of love and family, which are all prerequisites to participant compliance which in turn leads to program success. But without further financial assistance and support from
the national and local government, the needs and goals of the program will remain
unfinished.

This study identified the different aspects of malnutrition in developing countries
and identified one intervention, nutrition education that was proven to be a beneficial
component to a nutrition program in bringing about dietary change in the household.
Malnutrition is a consequence of the environment, socioeconomic status, and culture that
surrounds the caretakers. Malnutrition is an unfortunate result of the way our world is
structured today. Malnutrition is a very difficult pandemic to eliminate. It can be
overcome by targeting each community individually and recognizing the multiple barriers
that exist. This study showed the importance of basic nutritional education in the lives of
the caretakers. Basic nutrition education helps caretakers to make more informed dietary
decisions within their households to improve the nutritional status of their children.

Recommendations

Improvement in nutrition knowledge will equip caretakers to make better dietary
choices for the members of their households, particularly children. This study
demonstrated the impact of nutrition education in a very small sample population in
Tegucigalpa. A similar research could be done incorporating a larger target population in
Tegucigalpa, improving the internal validity of the study. Further research could also
focus on at the efficacy of video recordings of these nutrition lessons as opposed didactic
teaching from an instructor.

Baxter institute, with the resources available, had designed the nutrition program to
provide emotional, physical, nutritional and spiritual support to the children enrolled in
the program. Despite the success in the existing nutrition program, certain
recommendations can be incorporated to improve the program. Firstly, nutrition education should be incorporated into the program and become a mandatory part of the every ten day visit by the caretakers. Utilizing another mode of education such as video recordings of these nutrition lessons as opposed didactic teaching from an instructor can also be incorporated into the current program. The videos can be divided into different nutrition lessons and be played every ten days prior to the caretakers receiving their ration of food. This will allow for repetition and time efficiency in the clinic. The nutrition topics chosen in this study should be continued with the addition of practical applications by a chef. For example, instead of teaching the women the benefits of protein, although important, a beneficial adjunct would be to have a native cook show the women how to make more protein-rich foods using their limited resources.

Baxter Institute, recognizing the need for improving the financial resources and support for the caretakers to fight malnutrition must continue with their hair and sowing trade classes. Further efforts must be taken to raise the funds to provide the caretakers with the equipment needed to practice their trade once graduating the trade school at Baxter Institute. The sustainability of the nutrition education program is heavily dependent of the dedication and commitment of Baxter Institute in fighting malnutrition in Tegucigalpa. A combination of the current nutrition program goals, in addition with the educational component and other recommendations listed earlier, will enable Baxter Institute to make strides in fighting malnutrition in Tegucigalpa, Honduras.

In addition to changes being made within Baxter Institute, the battle of malnutrition requires a unified effort from local and government agencies in Honduras. A collaborative effort by local communities, government and national agencies can work
together to make appropriate changes that will ensure provisions to allow people to make such changes in their households. Providing provisions to the community must not be mistaken for the free distribution of food and money. It should be the responsibility of every country to nurture and ameliorate self sustenance within their people by facilitating more trade jobs, schools, support groups. How can we make every person yearn for self sustenance? Effort can be placed in utilizing local farmers to provide fresh produce to be distributed to the caretakers. Government land can be used to teach the caretakers to grow their own food providing them with an employment and a ration of the food grown, for their own household. The multi-factorial etiology of malnutrition demands such attention to help fight malnutrition in Tegucigalpa, Honduras.

Nutrition education is one of the keys to resolving malnutrition in this community in Tegucigalpa, Honduras. It is important to understand the needs, desires, and barriers of a particular community in order to be able to provide a valuable and sustainable solution. In Tegucigalpa, providing more education in the field of nutrition and women’s health, providing day care, more trade jobs, and resources that lead to self sufficiency are the predominant needs for the community. Implementing these steps is necessary for solving malnutrition in the community of Tegucigalpa. Malnutrition is a deep rooted issue that needs to be addressed. We must not be content with just understanding the issues. In addition to understanding malnutrition, we need to educate those who are malnourished. It is only through nutrition education that the cycle can be eradicated.
Appendices

Appendix A: Assent Form

Investigator Name: Sofia E. Abraham
Project Title: The effect of nutrition education: A study of Honduran caretakers and their children.

What is a research project?

A research project is a way to find out new information about something. Children do not need to be in a research project if they do not want to.

Why are you being asked to be a part of this research project?

We are asking you to be a part of this research project because we are trying to learn more ways to improve poor nutrition habits in Honduras. We are inviting you to participate because you are a part of the nutrition program here at Baxter Institute.

Why is this research project done?

The results of this project will help us to understand if educating mothers will help children with poor nutrition.

If you join the research project, what will happen to you?

If you join the research project, you will be asked to answer 8 yes or no questions first in August 2007 and then February, 2008. The questions will be read to you individually. This will be done when you return for your 3 month checkup at the clinic and will take about 20 minutes. The research project will last from Aug 2007 to Feb 2008.

Will any part of the research project hurt?

There are no risks or discomforts associated with this research project.

Will the research project help you?

There are no direct benefits of this research project to you.

Will the research project help others?

Your participation will help us make the nutrition program better and help other children.
Do my parents know about this research project?

This research project has been presented to your parents and they want to know if you want to do it. You can talk with them before you decide to join the research project.

Who will see the information collected about you?

The information collected about you during this research project will be kept safely. Nobody will know it except the people doing the research. The information will not be shown to your parents.

What do you get for being in the research project?

You and your caretaker will not get any direct benefit or compensation for joining this research project.

Will it cost anything to be in the research project?

It will not cost you or your family anything to be in this research project.

Do you have to be in the research project?

You do not have to be in the research project. No one will be upset with you if you do not want to do this research project. If you do not want to do this project, just tell us. You can always stop being the program later, if you do not want to.

What if I have any questions?

You can contact me directly or talk to Dr. Ayes and Arelly, if you have any questions.

Other information:

Please write your name below this line if you want to be a part of this research project.

You can change your mind and stop being part of it anytime. All you have to do is tell us.

You will be given a copy of this to keep.

NAME

WITNESS
Appendix B: Assent Form (Spanish)

Formato de Asentimiento (ninos/as)

Nombre del Investigador: Sofía E. Abraham

Titulo del Proyecto: Educación Nutricional para madres Hondureñas y su Influencia en los Hábitos y Comportamientos alimenticios en el Hogar.

¿Qué es un proyecto de Investigación?
Un proyecto de investigación es una forma de obtener nueva información acerca de algo. Los niños no necesitan ser incluidos en un proyecto de investigación si ellos no quieren estarlo.

¿Por qué se te pide que seas parte de este proyecto de investigación?
Te estamos pidiendo que seas parte de este proyecto de investigación porque queremos aprender nuevas formas de mejorar los hábitos alimenticios en Honduras. Te invitamos a participar porque eres parte del programa de nutrición del Instituto Baxter.

¿Por qué estamos ejecutando este proyecto de investigación?
Los resultados de este proyecto ayudarán a entender si educando las madres ayudará a los niños que padecen de desnutrición.

Si tu participas en este proyecto, ¿Qué podría ocurrirte?
Si tu participas en el proyecto, se te pedirá que contestes 8 preguntas cerradas en dos tiempos: primero, en agosto del 2007, y después en febrero del 2008. Las preguntas se te leerán individualmente, y se te harán cuando regreses a tu chequeo medico trimestral en la clínica y tomaran unos 20 minutos de tu tiempo. El proyecto de investigación durará de agosto 2007 a Febrero 2008.

¿Te causará dolor físico participar en el proyecto?
No hay ningún riesgo o incomodidad asociados con el proyecto.

¿Cómo te ayudará ser parte del proyecto?

No hay beneficios directos para ti al participar en el proyecto.

¿Ayudará a otros el ejecutar el proyecto?

Tu participación ayudará a mejorar el programa de nutrición y así ayudar a otros niños.

¿Conocen mis padres este proyecto?

Este proyecto de investigación a sido presentado a tus padres y ellos quieren saber si tu quieres participar. Puedes hablar con ellos antes de decidir si participas.

¿Quién mirará la información colectada sobre ti?

La información colectada sobre tu persona durante el desarrollo del proyecto será totalmente confidencial. Nadie la conocerá al menos que sea un investigador del proyecto. La información no se le mostrará a tus padres.

¿Qué obtienes por participar?

Ni tu ni tu cuidador tendrán ninguna compensación económica o beneficio directo por participar.

¿Tendrá algún costo el participar?

No tendrá ningún costo para ti o tu familia al participar en este proyecto de investigación.

¿Tienes que participar obligatoriamente?

No tienes que participar si no quieres. Nadie se enojará contigo si no quieres participar. Si quieres participar solo comunicalo a nosotros. Puedes dejar de participar si después ya no quieres hacerlo.

¿Qué si tienes preguntas?

Puedes contactarme directamente o hablar con el Dr. Ayes y Arely, si tienes preguntas.
Información Adicional:

Por favor escribe tu nombre bajo esta línea si quieres participar en este proyecto. Puedes cambiar de opinión y dejar de participar en cualquier momento. Todo lo que tienes que hacer es decirlo. Tendrás una copia personal de este escrito para que lo tengas contigo siempre.

______________________________
NOMBRE

______________________________
TESTIGO

______________________________
FECHA
Appendix C: Informed Consent (English)

Investigator Name: Sofia E. Abraham

Project Title: effect of nutrition education: A study of Honduran caretakers and their children.

Purpose:

- To identify a sustainable and ideal nutrition education program in Tegucigalpa, Honduras in order to:
  - To improve the educational knowledge of the women in Tegucigalpa.
  - Help reduce malnutrition in the city of Tegucigalpa, Honduras.

- This research project is focused on providing education in 4 topics related to nutrition and to see its influence on dietary habits and behavior in the household.

- The participants will be asked to take a pretest of 5-7 questions on each of the topics, sit through a 15 min lesson on the topic and then followed by the post test 2 weeks later. These will be conducted every two weeks when you come to the clinic to receive the food.

- Your children will also be asked a set of 8 pre and post test, related to nutrition in August 2007 and Feb 2008, respectively.

- The duration of this project will be from Oct 2007 to Feb 2008.

Risk and Discomfort:

- There are no or minimal risks associated with your and your child’s participation in this research project.

Benefits:

- There are no direct benefits with you joining the program.
Your participation will allow us to make this nutrition program better at Baxter Institute.

**Alternative procedures:**

- There are no alternative procedures that can substitute for nutrition education.

**Costs and Payments:**

- There are no costs to be enrolled in this research project.

**Confidential Information:**

- All records and information received will remain confidential.
- Only individuals associated with the research project (Dr. David Ayes and Arelly) and myself will have access to the information.
- All information will be placed in a locked cabinet and a locked room and Baxter Institute nutrition office. The information will also be saved on my computer which will be accessible only by me.
- All information will be destroyed by 2010.

**Compensation:**

- No compensation will be provided for the participants of this research project.

**Inquiries:**

- If you have any questions you can contact me, Dr. Ayes or Arelly at anytime. The contact information is provided below. You can also contact Dr. Misra, VCOM’s IRB chairperson if needed.

Sofia Abraham: sabraham@vcom.vt.edu, (215) 760-3475
Dr. David Ayes: davidayes@yahoo.com

Arelly:

Dr. Misra: hp.misra@gmail.com, (540) 231-4000.

Voluntary Participation:

- Your participation in this research project is voluntary.
- If you do not want to participate there will be no consequences, penalties or loss of benefits from the nutrition program at Baxter Institute.
- You may leave the research project at anytime without any penalties.

I ______________________ voluntarily agree to participate in this research project.

________________________________________________________
Signature

________________________________________________________
Witness

________________________________________________________
Date
Appendix D: Informed Consent (Spanish)

Formato de Consentimiento

Nombre del Investigador: Sofía E. Abraham

Título del Proyecto: Educación Nutricional para madres Hondureñas y su Influencia en los Hábitos y Comportamientos alimenticios en el Hogar.

Propósito:

- Identificar un programa educativo sobre nutrición que sea sostenible e ideal en Tegucigalpa, Honduras para:

- Mejorar el conocimiento sobre nutrición de las mujeres en Tegucigalpa.

- Ayudar a reducir la desnutrición en la Ciudad de Tegucigalpa, Honduras.

- Este proyecto de investigación se enfoca en proveer educación en 4 tópicos de nutrición y examinar su influencia en los hábitos y comportamientos alimenticios en el hogar.

- Los participantes contestaran una prueba preliminar de 5-7 preguntas en cada uno de los tópicos, escuchar una charla de 15 min en el tópico y tomar una prueba posterior 2 semanas después. Este proceso se repetirá cuando vengas a la clínica cada 2 semanas a recibir alimento.

- A tus hijos se les harán un conjunto de 8 preguntas relacionadas con la nutrición en forma preliminar en agosto del 2007 y posterior en febrero del 2008.


Riesgos e Incomodidades:

- No hay riesgos, y si los hay son mínimos, ya sea si tu persona o tu niño participan en el proyecto.
**Beneficios:**

- No hay beneficios directos al participar en el programa.
- Tu participación nos permitirá mejorar el programa de nutrición del Instituto Baxter.

**Procedimientos Alternativos:**

- No hay procedimientos alternativos que sustituyan la educación sobre nutrición.

**Costos y Pagos:**

- No hay ningún costo por participar.

**Información Confidencial:**

- Todos los registros de información permanecerán confidenciales.
- Solamente los individuos asociados con el proyecto (Dr. David Ayes y Arelly) y Sofía tendrán acceso a la información.
- Toda información será mantenida bajo llave en una oficina de Baxter. La información será guardada en mi computadora a donde solo yo tengo acceso.
- Toda información será destruida en el año 2010.

**Compensación:**

- No recibirás ninguna compensación por participar en este proyecto.

**Preguntas:**

- Si tiene preguntas habla conmigo, el Dr. Ayes or Arelly en cualquier momento. La información contacto aparece abajo. Puedes contactar al Dr. Misra, Jefe de Investigación en VCOM, si lo necesitas.

Sofía Abraham: sabraham@vcom.vt.edu, (215) 760-3475
Dr. David Ayes: davidayes@yahoo.com

Arelly:

Dr. Misra: hp.misra@gmail.com, (540) 231-4000.

Participación Voluntaria:

- Tu participación es totalmente voluntaria.

- Si no quieres participar no habrán consecuencias, castigos o perdida de beneficios del programa de nutrición del Instituto Baxter.

- Puedes abandonar el proyecto en cualquier momento sin ninguna consecuencia.

YO ______________________ voluntariamente estoy de acuerdo en participar en este proyecto de investigación.

_____________________________________________________________

Firma

_____________________________________________________________

Testigo

_____________________________________________________________

Fecha
Appendix E: Dietary Pretest/Posttest in Children (English)

1. Did you drink any milk yesterday?
   a. No, I did not drink any milk yesterday.
   b. Yes, I drank 1 glass of milk yesterday.
   c. Yes, I drank 2 glasses of milk yesterday.
   d. Yes, I drank 3 or more glasses of milk yesterday.

2. Did you drink any soda yesterday?
   a. No, I did not drink soda yesterday.
   b. Yes, I drank soda 1 time yesterday.
   c. Yes, I drank soda 2 times yesterday.
   d. Yes, I drank soda 3 or more times yesterday.

3. Did you eat any fruit yesterday?
   a. No, I did not eat any fruit yesterday.
   b. Yes, I ate fruit 1 time yesterday.
   c. Yes, I ate fruit 2 times yesterday.
   d. Yes, I ate fruit 3 or more times yesterday.

4. Did you eat any vegetables (beans, tomatoes, etc) yesterday?
   a. No, I did not eat any vegetable yesterday.
   b. Yes, I ate vegetable 1 time yesterday.
   c. Yes, I ate vegetables 2 times yesterday.
   d. Yes, I ate vegetables 3 times yesterday.

5. Did you drink any water yesterday?
   a. No, I did not drink any water yesterday.
b. Yes, I drank 1 glass of water yesterday.

c. Yes, I drank 2 glasses of water yesterday.

d. Yes, I drank 3 or more glasses of water yesterday.

6. Did you play outside yesterday?

a. No, I did not play outside yesterday.

b. Yes, I played about 1 hour outside yesterday.

c. Yes, I played about 2 hours outside yesterday.

d. Yes, I played 3 or more hours outside yesterday.

7. How often do you eat meat (chicken, beef, fish, other)?

a. No, I did not eat any meat yesterday. I do not usually eat meat.

b. I eat meat every day.

c. Yes, I eat meat every other day.

d. Yes, I eat meat once a week or less.

8. How many times did you eat a meal yesterday?

a. I did not eat anything yesterday.

b. I ate 1 meal yesterday.

c. I ate 2 meals yesterday.

d. I ate 3 meals or more yesterday.

9. Did you eat any whole grain foods yesterday?

a. No, I did not eat any whole grain foods yesterday.

b. Yes, I ate whole grain foods 1 time yesterday.

c. Yes, I ate whole grain foods 2 times yesterday.

d. Yes, I ate whole grain foods 3 times yesterday.
10. **Do you drink juice yesterday?**

a. No, I did not drink juice yesterday.

b. Yes, I drank juice 1 time yesterday.

c. Yes, I drank juice 2 times yesterday.

d. Yes, I drank juice 3 times or more yesterday.
Appendix F: Dietary Pretest/Posttest Children (Spanish)

1. Tomaste leche ayer?
   a. No. Yo no tome leche ayer.
   b. Si, yo tome 1 vasos de leche ayer.
   c. Si, yo tome 2 vasos de leche ayer.
   d. Si, yo tome 3 o mas vasos de leche ayer.

2. Tomaste refrescos de botella (no naturales) ayer?
   a. No. Yo no tome un refresco ayer.
   b. Si, yo tome refresco una (1) vez ayer.
   c. Si, yo tome refresco 2 veces ayer.
   d. Si, yo tome refresco 3 o mas veces ayer.

3. Comiste frutas ayer?
   a. No. Yo no comi fruta ayer.
   b. Si, yo comi fruta 1 vez ayer.
   c. Si, yo comi frutas 2 veces ayer.
   d. Si, yo comi frutas 3 o mas veces ayer.

4. Comiste vegetales ayer?
   a. No. Yo comi vegetales ayer.
   b. Si, yo comi vegetales 1 vez ayer.
   c. Si, yo comi vegetales 2 veces ayer.
   d. Si, yo comi vegetales 3 o mas veces ayer.

5. Tomaste agua ayer?
   a. No. Yo no tome agua ayer.
b. Si, yo tome 1 vaso con agua ayer.

c. Si, yo tome 2 vasos con agua ayer.

d. Si, yo tome 3 o más vasos con agua ayer.

6. **Jugaste fuera de tu casa ayer?**

a. No. Yo no juge fuera de mi casa ayer.

b. Si, yo juge fuera de mi casa por 1 hora ayer.

c. Si, yo juge fuera de mi casa por 2 horas ayer.

d. Si, yo juge fuera de mi casa por 3 horas o más ayer.

7. **Cuanto veces comes carnes (pollo, carne res, pescado, o otra)?**

a. No. Yo no comi carne ayer. Usualmente no como carne.

b. Como carne cada día.

c. Si, como carne un día de por medio.

d. Si, como carne una vez a la semana o menos.

8. **Cuanto veces comiste una comida completa ayer?**

a. No yo comi nada ayer.

b. Si, yo comi 1 comida completa ayer.

c. Si, yo comi 2 comidas completas ayer.

d. Si, yo comi 3 comidas completas o más ayer.

9. **Comiste granos de integrales ayer?**

a. No. Yo no comi comidas integrales ayer.

b. Si, yo comi comida integral 1 vez ayer.

c. Si, yo comi comida integrales 2 veces ayer.

d. Si, yo comi comida integrales 3 veces o más ayer.
10. **Tomaste jugos ayer?**

a. No. Yo no tome jugo ayer.

b. Si, yo tome jugo 1 vez ayer.

c. Si, yo tome jugo 2 veces ayer.

d. Si, yo tome jugo 3 veces o más ayer.
Appendix G: Dietary Pretest/ Posttest Adults (English)

1. **How often are fruits available in your house?**
   
   _____ Always   _____ Usually   _____ Sometimes   _____ Rarely/ Never

2. **How often are vegetables available in your house?**
   
   _____ Always   _____ Usually   _____ Sometimes   _____ Rarely/ Never

3. **How often is clean drinking water available at your house?**
   
   _____ Always   _____ Usually   _____ Sometimes   _____ Rarely/ Never

4. **How often are soft drinks available at your house?**
   
   _____ Always   _____ Usually   _____ Sometimes   _____ Rarely/ Never

5. **How often is milk available at your house?**
   
   _____ Always   _____ Usually   _____ Sometimes   _____ Rarely/ Never

6. **How many meals do you serve at home?**
   
   _____ Always   _____ Usually   _____ Sometimes   _____ Rarely/ Never

7. **How often is meat available at your house?**
   
   _____ Always   _____ Usually   _____ Sometimes   _____ Rarely/ Never
Appendix H: Dietary Pretest/Posttest Adults (Spanish)

1. ¿Cuán a menudo consumen frutas en su casa?
   ___ Siempre ___ Usualmente ___ algunas veces _____ Rara vez/Nunca

2. ¿Cuán a menudo consumen verduras en su casa?
   ___ Siempre ___ Usualmente ___ algunas veces _____ Rara vez/Nunca

3. ¿Cuán a menudo consumen agua potable o limpia en su casa?
   ___ Siempre ___ Usualmente ___ algunas veces _____ Rara vez/Nunca

4. ¿Cuán a menudo consumen bebidas de botella en su casa?
   ___ Siempre ___ Usualmente ___ algunas veces _____ Rara vez/Nunca

5. ¿Cuán a menudo consumen leche en su casa?
   ___ Siempre ___ Usualmente ___ algunas veces _____ Rara vez/Nunca

6. ¿Cuántas comidas se sirven en la casa durante el día?
   _______ Una sola _______ Dos solamente _______ Tres comidas

7. ¿Cuántas veces consumen carnes en su casa?
   ___ Siempre ___ Usualmente ___ algunas veces _____ Rara vez/Nunca
Appendix I: Lesson 1 (English)

What is Nutrition?

We all know you want the best for your children. You want them to healthy, strong and happy. You want them to have good food. We know you want the best for your family. Let us help you. This program is to help show you as to why it is important for children to eat healthy and some ways in which you can make that happen. Nutrition is the good we get from all the good food that we eat that help our bodies work well. Nutrients are the chemicals that are found in food that are essential for life. The food we eat can give us nutrients such as carbohydrates, fats, proteins, vitamins, water and minerals. Good nutrition makes our appearance better such as clear skin, healthy hair, good posture, good bones, stamina, and good brain function. When our body does not get all the nutrients, it is called malnutrition. Malnutrition can affect different functions in our body such as the brain, eyesight, organs, height and weight etc. Children who are malnourished look tired, have dull hair, bleeding gums, slumped posture, swollen abdomen and many more. Nutrition is important throughout the life of a child. It is not just a treatment when a child gets sick. It is important for your child to reach his/ her maximum growth potential. I am going to show you something that will help you ensure that your child is eating healthy. It is called the Food Pyramid. We encourage that you find out your child’s favorite meals and see where they align with the food pyramid. (Distribute the food pyramid to the women. Ask the audience about something they ate in the morning and chart in on the pyramid.). In order to eat healthy we need to eat servings from each of the groups; grains, fruits, vegetables and milk products. Every food item has
different nutrients that are important for the body. Here are some examples for each of the categories:

<table>
<thead>
<tr>
<th>Categories</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains &amp; starches (6-11 servings/day)</td>
<td>Tortilla, Bread, Cereal, Rice, pasta, cooked beans, potatoes,</td>
</tr>
<tr>
<td>Fruits (2-4 servings/day)</td>
<td>Apples, bananas, pears, grapes, strawberries, oranges, cantaloupe.</td>
</tr>
<tr>
<td>Vegetables (3-5 servings/day)</td>
<td>Carrots, tomatoes, peppers, spinach, lettuce.</td>
</tr>
<tr>
<td>Milk products (2-3 servings/day)</td>
<td>Milk, yogurts, cheese</td>
</tr>
</tbody>
</table>

(Show the serving sizes/ Ask question to reiterate the main points of this lesson).

**Importance of Water**

Ask the women: How many glasses of water you and your family drink every day? Wait for responses. Water is an essential component of our lives. It is very easy to forget this. Our body is made up of 55-75% of water. Our body needs a lot of water to stay healthy. Drinking water helps us in digestion of our food, absorption of the nutrients, regulates body temperature, regulates blood circulation, carries nutrient and oxygen to different part of our body and finally helps remove toxins from our body. When a person does not
drink enough water for the body, they are said to be dehydrated. Some common signs of dehydration are body pain, fatigue, confusion, disorientation and dizziness.

Drinking water is not the same as drinking coffee, sodas and fruit juices. Drinking too much coffee is not good for you because it acts on the body to increase secretion of water as urine. Drinking too much sodas contain a compound called phosphorous that removes calcium from your bones (remember we talked about calcium being important for your kids to grow strong bones). So, how much water should you drink a day? A non active person must drink at least half ounce of water per pound per day. (Show them what one ounce/ Take someone as an example, ask their weight and calculate how much water she should drink in one day/ Do the same for their kid). Make sure that you spread out your water intake through the day. Just like all the topics mentioned about, everything that you eat and drink must be done in balance.
Appendix J: Lesson 1 (Spanish)

Educación en Nutrición: (What is Nutrition)

Sabemos que usted quiere lo mejor para sus hijos. Usted quiere que ellos estén saludables, fuertes y felices. Usted quiere que ellos tengan una buena alimentación. Sabemos que usted quiere lo mejor para su familia. Permítamos ayudarle. Este programa está diseñado para mostrarle cuán importante es para los niños comer en forma saludable y algunas formas en que ustedes pueden lograrlo. Nutrición es lo bueno que obtenemos de los buenos alimentos que consumimos y que nos ayudan para que nuestros cuerpos trabajen bien. Los nutrientes son las sustancias químicas que se encuentran en los alimentos y que son esenciales para la vida. Los alimentos que consumimos nos dan nutrientes como carbohidratos, grasas, proteínas, vitaminas, agua y minerales. La buena nutrición hace que nuestra apariencia sea mayor como una piel limpia, pelo saludable, buena postura, huesos sanos, mas energía y buenas funciones del cerebro. Cuando nuestro cuerpo no obtiene todos los nutrientes que necesita, decimos que esta desnutrido. La desnutrición puede afectar diferentes funciones de nuestro cuerpo como el cerebro, la vista, otros órganos, estatura y peso, etc. Los niños y niñas desnutridos están siempre cansados, tienen el pelo apagado, les sangran las encías, postura decaída, barrigas hinchadas y muchas otras cosas mas. La nutrición es importante a todo lo largo de la vida del niño. No es solamente la medicina cuando están enfermos. Es importante que su niño o niña alcance su máximo potencial de crecimiento. Le voy a mostrar algo que le ayudará a asegurarse que su niño se está alimentando en forma saludable. Se llama la Pirámide de los Alimentos. Le animamos a que averigüe cuál es el alimento favorito de su niño y lo compare con la Pirámide de Alimentos. (Distribuya la Pirámide de Alimentos a las
mujeres en el grupo. Pregunte a la audiencia acerca de algo que comieron por la mañana y señálelo en la Pirámide). Para comer saludablemente necesitamos consumir porciones de cada uno de los grupos: granos, frutas, vegetales y productos lácteos. Cada alimento tiene diferentes nutrientes que son importantes para el cuerpo. He aquí algunos ejemplos de cada categoría:

<table>
<thead>
<tr>
<th>Categorías</th>
<th>Ejemplo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granos &amp; Almidones</td>
<td>Tortilla, pan, cereal, arroz, pasta, frijoles cocidos, papas.</td>
</tr>
<tr>
<td>(6-11 porciones/día)</td>
<td></td>
</tr>
<tr>
<td>Frutas</td>
<td>Manzanas, bananos, peras, uvas, fresas, naranjas, melón.</td>
</tr>
<tr>
<td>(2-4 porciones/día)</td>
<td></td>
</tr>
<tr>
<td>Verduras</td>
<td>Zanahorias, tomates, chiles verdes, espinaca, lechuga.</td>
</tr>
<tr>
<td>(3-5 porciones/día)</td>
<td></td>
</tr>
<tr>
<td>Milk products</td>
<td>Leche, yogures, queso</td>
</tr>
<tr>
<td>(2-3 porciones/día)</td>
<td></td>
</tr>
<tr>
<td>Carnes</td>
<td>Pollo, pescado, carne de res.</td>
</tr>
<tr>
<td>(2-3 porciones/día)</td>
<td></td>
</tr>
</tbody>
</table>

(Muestre el tamaño de las porciones / Haga preguntas para reiterar los aspectos principales de esta lección).

**Importancia de tomar agua potable (Importance of Water):**

Pregunte a las mujeres: ¿Cuántos vasos de agua toma usted y su familia diariamente? Espere las respuestas. El agua es un componente esencial de nuestras vidas. Es muy fácil que se olvide de esto. Nuestro cuerpo está compuesto por 55-75% de agua. Nuestro cuerpo necesita de mucha agua para permanecer sano. El agua potable nos ayuda a la digestión de nuestra comida, absorción de alimentos, regula la temperatura del cuerpo, la circulación de la sangre, y lleva los alimentos y el oxígeno a todas partes de
nuestro cuerpo. Finalmente, ayuda a eliminar toxinas del cuerpo. Cuando una persona no toma bastante agua para el cuerpo, se deshidrata. Algunas muestras comunes de la deshidratación son dolor, fatiga, confusión, desorientación y vértigos en el cuerpo.

El agua potable no es igual que el café, sodas y los zumos de fruta que tomamos. Beber demasiado café no es bueno para usted. Anime a sus niños para beban agua en vez de café. Beber demasiado sodas hace a los niños sentirse llenos y entonces no quieren tomar leche (recuerda que hablamos de la importancia de tomar leche para construir huesos fuertes). Entonces, cuánta agua debe usted tomar diariamente? Una persona no activa debe tomar por lo menos media onza de agua por libra de peso corporal por día. (Muéstreles cuanto es una onza de agua/ Escoja a alguien como ejemplo, pregúntele su peso y calcule cuánta agua debe tomar diariamente/ Haga lo mismo con su hijo).

Asegúrese de tomar el agua necesaria a lo largo del día. Como hemos mencionado en todas las lecciones anteriores se debe mantener una dieta balanceada vigilando lo que comemos y bebemos.
Appendix K: Pretest/Posttest Lesson 1 (English)

1. Circle the food that contains grains?
   a. Slice of Bread
   b. Candy Bar
   c. Banana
   d. Potato

2. Circle the food that is a vegetable?
   a. Carrots
   b. Pasta
   c. Grapes
   d. Cheese
3. Circle the food that is a fruit?

a. Apple

b. Pasta

c. Potato

d. Beans

4. Circle all the foods that are in the milk group?

a. Egg

b. Yogurt

c. Orange Juice

d. Cookies
5. Nutrition is important only when the child is sick. T/F.

6. What does a healthy child look like?
   a. Big abdomen.
   b. Bleeding gums.
   c. Tired.
   d. Erect posture.

7. How many glasses of water should you drink a day?
   a. 1 per day
   b. 4 per day
   c. 8 per day
   d. 15 per day

8. Drinking sodas, juices and coffee is equally good as drinking water. T/F

9. What is dehydration?
   a. When you eat too much protein.
   b. When you have little water in your body.
   c. When you eat too much tortillas.
   d. When you drink too much sodas.

10. What are some signs of dehydration?
    a. Headaches
    b. Dizziness
    c. Body Pain
    d. All of the above
11. A person who plays and works outside should drink more water than someone who stays at home. T/F
Appendix L: Pretest/Posttest Lesson 1 (Spanish)

12. Encierre en un círculo el alimento hecho con granos

a. Rodaja de pan

b. Chocolates o dulces

c. Bananos

d. Papas

13. Encierre con un círculo el alimento que es una verdura

a. Zanahoria

b. Pasta

c. Uvas

d. Queso
14. Encierre con un círculo el alimento que es una fruta.

b. Manzana

c. Papas

a. Pasta
d. Frijoles

15. Encierre con un círculo el alimento del grupo de lacteos

a. Huevos
c. Jugo de Naranja

b. Yogurt
d. Galletas
16. La nutrición solamente es importante cuando los niños están enfermos.

V / F.

17. ¿Cuál es la apariencia de un niño o niña sana?

a. Barriga grande.

b. Le sangran las encías.

c. Cansado siempre.

d. Una postura derecha.

7. Cuántos vasos de agua debe usted tomar diariamente?

a. 1 por día

b. 4 por día

c. 8 por día

d. 15 por día

8. Beber sodas, jugos y café es tan bueno como tomar agua para proporcionar líquido a su cuerpo. T/F

9. ¿Que es deshidratación?

a. Cuando usted come demasiada proteína.

b. Cuando usted tiene poca agua en su cuerpo.

c. Cuando usted come demasiadas tortillas.

d. Cuando usted bebe demasiadas sodas.

10. ¿Cuáles son algunas síntomas de deshidratación?

a. Dolor de cabeza

b. Mareos

c. Dolor de cuerpo
11. **Una persona que juega y trabaja afuera debe tomar más agua que alguien que permanece en la casa.** V/F
Appendix M: Lesson 2 (English)

Fruits and Vegetables

In order to be healthy, every person must eat 5-9 servings of fruits and vegetables a day. The type of fruits and vegetables that you decide to eat can be because of the taste, texture or need for a particular nutrient. You might also eat a particular fruit or vegetable because of a family tradition or because it just easy to make. (Arely will ask: What are some fruits that you eat) Whatever the reason for eating fruits and vegetables, we encourage that you eat them. Fruits and vegetables have many nutrients such as vitamins, minerals, fiber and water. Some fruits are high in Vitamin C, some are high in Vitamin A and others are high in folate and potassium.

For examples; Vitamin C is a nutrient that is needed to heal cuts and wounds and keep your gums healthy. This can be found in Oranges, strawberries, mangoes, red peppers and tomatoes. Vitamin A is another nutrient that is good for you skin and helps prevent infections because they have something called carotenoids. This can be found in carrots, pumpkin, squash, sweet potatoes, tomatoes and cantaloupe. Dietary fiber, which helps us have regular bowel movement, can be found in dry beans and peas. Magnesium helps to have good muscle function. Thus all these benefits from fruits and vegetables are needed in moderation in the body of your child to grow healthy.

We understand that sometimes children do not want to eat fruits and vegetables. But here are some things that you as the care taker can do:

- Be a role model. Let your children see that you are following a healthy diet too.
- Provide them with choices.
- Let the children help you when you cook.

So, you might be wondering what one serving of fruits and vegetables are. Below is a chart that might help you.

<table>
<thead>
<tr>
<th>One serving of fruit:</th>
<th>One serving of Vegetable:</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ cup fruit</td>
<td>½ cup chopped vegetables</td>
</tr>
<tr>
<td>1 medium piece of fruit</td>
<td>6-8 carrot sticks</td>
</tr>
<tr>
<td>12 grapes</td>
<td>1 medium potato</td>
</tr>
<tr>
<td>¾ cup fruit juice.</td>
<td>½ cup beans or peas.</td>
</tr>
</tbody>
</table>

These are just come examples to give you an idea of what is the quantity of a serving.

<table>
<thead>
<tr>
<th>COMMON FRUITS THAT YOU EAT</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas</td>
<td>Vitamin C, Vitamin B, Fiber, Potassium, Sugars, Iron</td>
</tr>
<tr>
<td>Oranges</td>
<td>Vitamin C, fiber, Vitamin B 1, Vitamin A</td>
</tr>
<tr>
<td>Water Melon</td>
<td>Vitamin C, Vitamin A, Vitamin B 6, Vitamin B1</td>
</tr>
<tr>
<td>Mangoes</td>
<td>Fiber, Vitamin A, Vitamin C, magnesium, Calcium.</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Vitamin A, Vitamin C, Carbohydrates, Potassium, Iron</td>
</tr>
<tr>
<td>Avocados</td>
<td>Calcium, Iron, Magnesium, Potassium, sodium, Vitamin C, A E</td>
</tr>
<tr>
<td>Beans</td>
<td>Protein, Vitamin C, Iron.</td>
</tr>
</tbody>
</table>
(Show what servings look like/ Cut up fruits and vegetables for them to see and try. Place images of fruits and vegetables on their reward card. Review main points of the lesson).
Appendix N: Lesson 2 (Spanish)

Frutas y Vegetales

Para poder tener una buena salud, cada persona debe comer de 5-9 porciones de frutas y vegetales al día. El tipo de frutas y vegetales que usted decida comer puede ser escogido de acuerdo al sabor, textura o por que usted necesita de un nutriente en particular. También puede usted comer una fruta o un vegetal en particular siguiendo una tradición familiar o simplemente por ser fácil de preparar. (Arelly preguntara.? Que frutas consume usted?). Cualquiera sea la razón por la que comemos frutas y vegetales, nosotros le animamos a continuar comiéndolas. Las frutas y los vegetales tienen muchos nutrientes tales como vitaminas, minerales, fibra y agua. Algunas frutas tiene un alto contenido de vitamina C, otras contienen un alto porcentaje de vitamina A y aun otras tienen un alto contenido de ácido fólico y potasio.

Por ejemplo, la vitamina C es un nutriente que se necesita para sanar cortaduras y heridas y para mantener las encías saludables. Esta puede ser encontrada en las naranjas, fresas, mangos, chiles rojos y en los tomates. La vitamina A es otro nutriente que es bueno para la piel y ayuda a prevenir las infecciones porque contiene una sustancia llamada caroteno. Esta puede ser encontrada en las zanahorias, los ayotes, zapallos, camotes, tomates y melones. La fibra dietética, que nos ayuda a tener evacuaciones regulares, puede ser encontrada en los frijoles y en los garbanzos. El magnesio ayuda al buen funcionamiento de los músculos. Así, todos estos beneficios de las frutas y los vegetales son necesarios en el cuerpo de su nino para que este crezca sano.

Entendemos que algunas veces los niños no quieran comer frutas y vegetales, pero aquí hay unas sugerencias que usted como la persona al cuidado de ellos puede seguir.
- Enseñe con el ejemplo. Permita que los niños vean que usted también está siguiendo una dieta sana.
- Déles alternativas..
- Permita a los niños ayudarle cuando cocine.

Bien, usted debe estar preguntándose qué es una porción de frutas y vegetales. Abajo hay una tabla que puede ayudarle.

<table>
<thead>
<tr>
<th>Una porción de frutas:</th>
<th>Una porción de vegetales:</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ taza de fruta</td>
<td>½ taza de vegetales en trocitos</td>
</tr>
<tr>
<td>1 fruta mediana</td>
<td>6-8 palitos de zanahoria</td>
</tr>
<tr>
<td>12 uvas</td>
<td>1 papa mediana</td>
</tr>
<tr>
<td>¾ taza de jugo de uva</td>
<td>½ taza de frijoles o garbanzos</td>
</tr>
</tbody>
</table>

Estos son solo algunos ejemplos para darle una idea de la cantidad que tiene una porción. (Muestre lo que es una porción/ Rodajee y corte frutas y vegetales para que ellas vean e intenten hacerlo por sí mismas. Coloque imágenes de frutas y vegetales en sus tarjetas de premio. Repase los puntos principales de la lección).

<table>
<thead>
<tr>
<th>COMMON FRUITS THAT YOU EAT</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas</td>
<td>Vitamin C, Vitamin B, Fiber, Potassium, Sugars, Iron</td>
</tr>
<tr>
<td>Oranges</td>
<td>Vitamin C, Fiber, Vitamin B 1, Vitamin A</td>
</tr>
<tr>
<td>Water Melon</td>
<td>Vitamin C, Vitamin A, Vitamin B 6, Vitamin B1</td>
</tr>
<tr>
<td>Mangoes</td>
<td>Fiber, Vitamin A, Vitamin C, magnesium, Calcium.</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Vitamin A, Vitamin C, Carbohydrates, Potassium, Iron</td>
</tr>
<tr>
<td>Avacados</td>
<td>Calcium, Iron, Magnesium, Potassium, sodium, Vitamin C, A E</td>
</tr>
<tr>
<td>Beans</td>
<td>Protein, Vitamin C, Iron.</td>
</tr>
</tbody>
</table>
Appendix O: Pretest/Posttest Lesson 2 (English)

1. How many serving of fruits and vegetables should a person eat a day?
   a. 1 to 2/day
   b. 2 to 4/day
   c. 5 to 8/day
   d. 12 to 15/day

2. Which food is high in Vitamin C?
   a. Apples
   b. Oranges
   c. Potatoes
   d. Chicken

3. What is Vitamin C good for in the body?
   a. Helps build strong bones
   b. Helps heal wounds and cuts.
   c. Helps go to the bathroom.
   d. Helps us sleep
4. **Children should eat carrots because it keeps your eye healthy.** T/F

5. **What is the best way to get your children to eat fruits and vegetables?**
   a. Force them
   b. Be a role model
   c. Just don’t care if they eat or not.

6. **What are some benefits of Vitamin A?**
   a. Helps to build healthy bones.
   b. Helps us to have a good bowel movement.
   c. Helps to fight infections and have healthy skin.
   d. Helps us learn.
Appendix P: Pretest/ Posttest Lesson 2 (Spanish)

1. Cuantas porciones diarias de frutas y vegetales debe consumir una persona?
   a. De 1 a 2/ al día
   b. De 2 a 4/ al día
   c. De 5 a 9/ al día
   d. De 12 to 15/ al día

2. Cual alimento tiene un contenido alto de vitamina C?
   a. Manzanas
   b. Naranjas
   c. Papas
   d. Pollo

3. Que beneficios le proporciona la Vitamina C al cuerpo?
   a. Ayuda a construir huesos fuertes.
   b. Ayuda a sanar heridas y cortaduras.
   c. Ayuda a ir al sanitario.
   d. Nos ayuda a dormir.
4. Los niños deberían comer vegetales de color amarillo y anaranjado porque ayudan a tener una vista saludable. V/F

5. Cual es la mejor manera para lograr que sus niños coman frutas y vegetales?
   a. Forzándolos a comerlos
   b. Enseñarles con el ejemplo
   c. No importarnos si los comen o no.

6. Que beneficios le proporciona la Vitamina A al cuerpo?
   a. Ayuda a construir huesos fuertes.
   b. Ayuda a ir al sanitario
   c. Ayuda para una piel saludable y combatiendo infecciones
   d. Ayud a aprender
Appendix Q: Lesson 3 (English)

**Building Healthy Bones**

You all want your children to grow big and strong. If you want this, they need to eat and drink certain foods that will give them the nutrients that they need to grow. Bones are called the framework for your child’s growing body. Children are constantly building new bone from infancy till their late 20’s. The more you help them take care of their bones as a child, the healthier they will be when they grow older. Nutrients such as calcium, magnesium, and Vitamin D are important to build healthy bone. Calcium helps to build strong bones and teeth. The two things that you can do are to provide for healthy nutrition and encourage them to play outside. Children can get enough Vitamin D from playing in the sun. This is the easiest way for children to get Vitamin D. They can also get Vitamin D from the yolk or yellow part of the egg or fortified milk. (This means that Vitamin D is added to the milk). Calcium is commonly found in milk and other dairy products such as cheese, yogurt etc. Drinking one 8 oz glass of milk provides 300 mg of calcium, which is 1/3\textsuperscript{rd} the daily requirement for children and 1/4\textsuperscript{th} the requirement for teenagers. Thus we recommend that your child drinks at least 2 glasses of milk a day. Most children like to drink coke, pepsi and other soft drinks instead of milk. If your child does not like drinking milk, try adding flavors such as chocolate or strawberry to make it tastier. It is important to know that it is always best to breastfeed your baby at least till two years of age. Do not give babies cow or goat milk before one year. These steps will prevent them from getting fractures, bone pain and prevents from osteoporosis as an adult. Without these essential nutrients children cannot grow.
(Show them a glass of milk/ Things that can be added to make milk taste better/ Ask questions and reiterate points learnt in the lesson)

**Importance of Proteins**

Protein is a substance that is found throughout your body. It is a very important part of our body. It is found in muscle, bone, skin, hair, and other parts in the body. The most important function of a protein is to build up, keep up and replace the tissue of your body as needed. Protein also makes antibodies to help you fight infections. Protein also makes hemoglobin that helps carry oxygen to different parts of the body. Eating a good amount of protein everyday is essential for making molecules that are vital for different functions in your body. Protein is essential for the muscles, brain and other organs to grow and repair as needed. Some good sources of proteins include eggs, beef, fish, poultry, avocados, nuts and legumes.

Children with protein deficiency present with fatigue, irritability, decrease work capacity and cognition and wasting. (What is a protein source that your child has eaten in the past week/ Show items that are high in protein sources/ Ask questions to reiterate topics learnt).
Appendix R: Lesson 3 (Spanish)

**Construyendo huesos sanos**

Todos ustedes quieren que sus hijos crezcan sanos y fuertes. Si ustedes quieren esto, sus niños necesitan comer y beber ciertos alimentos que les darán los nutrientes necesarios para crecer. A los huesos se les llama la armazón del cuerpo de su niño en crecimiento. Los huesos de los niños están en constante crecimiento desde la infancia hasta tarde entre los 20-30 años. Entre más les ayudemos en el cuidado de sus huesos cuando son niños, estos serán más saludables cuando sean mayores. Los nutrientes como el calcio, magnesio, y la Vitamina D son importantes para construir huesos sanos. El calcio ayuda a construir huesos y dientes fuertes. Dos cosas que puedes hacer son, proveer una nutrición sana y estimularlos a jugar al aire libre. La actividad física es muy importante para que los niños tengan huesos sanos. Los niños pueden obtener suficiente Vitamina D al jugar bajo el sol. Esta es la manera más fácil en que los niños pueden obtener Vitamina D. También pueden obtenerla de las yemas o la parte amarilla de los huevos o de la leche fortificada. (Esto significa que Vitamina D ha sido agregada a la leche) El calcio es comúnmente encontrado en la leche y en sus derivados como el queso, el yogur etc. A los bebés, la lactancia materna es suficiente para proveer a su bebe de estos nutrientes. Pero después de los 6 meses de edad, además de la leche materna deben darse otros suplementos. Tomar un vaso de 8 oz. de leche proporciona 300 mg de calcio, lo cual equivale a 1/3 de los requerimientos diarios de un niño y ¼ de los requerimientos para un adolescente. Así que, le recomendamos que su niño tome por lo menos 2 vasos de leche al día. El resto del requerimiento diario puede ser adquirido de otros alimentos como los vegetales de hojas verdes. A la mayoría de los niños les gusta tomar Coca-cola,
Pepsi, y otras gaseosas en lugar de leche. Si a su niño no le gusta tomar leche, trate de agregarle sabores como el chocolate o fresa para darle un mejor sabor. Es importante saber que siempre es mejor amamantar a su bebé por lo menos hasta los dos años de edad. No les de a los bebés leche de vaca o de cabra antes del año de edad. Estos cuidados evitarán que se fracturen, el dolor de huesos, y a prevenir la osteoporosis cuando sean adultos. Sin estos nutrientes esenciales no pueden crecer los niños.

(Muestreles un vaso con leche/Cosas que pueden agregársele a la leche para darle buen sabor/ Haga preguntas y repase puntos aprendidos en la lección)

**Importancia de las proteínas**

La proteína es una sustancia que se encuentra en todo el cuerpo. Es una parte muy importante de nuestro cuerpo. Se la encuentra en músculos, huesos, piel, pelo, y otras partes del cuerpo. La función más importante de la proteína es crear, mantener y reconstruir el tejido del cuerpo según sea necesario. La proteína también hace los anticuerpos para ayudarle a luchar contra infecciones. La proteína también hace la hemoglobina que ayuda llevar el oxígeno a diversas partes del cuerpo. Comer una buena cantidad de proteína diaria es esencial para crear las moléculas que son vitales para diversas funciones en su cuerpo. La proteína es esencial para que los músculos, el cerebro y otros órganos crezcan y reparen según sea necesario. Algunas buenas fuentes de proteínas incluyen: huevos, carne de res, pescado, pollo o pavo, aguacates, nueces y legumbres. Niños que carecen de proteínas presentan normalmente fatiga, irritabilidad, bajo capacidad de atención y cognición y pérdida de peso. ¿Cuál es una fuente de la proteína que su niño ha comido en la última semana? (Mostrarles comidas que tienen altas cantidades de proteína. Hacerles preguntas para reiterar los temas aprendidos).
Appendix S: Pretest/Posttest Lesson 3 (English)

1. Which is best source of calcium for children?
   a. Bananas  
   b. Soda  
   c. Milk  
   d. Pasta

2. Physical activity is important for proper bone development in children. T/F

3. How many glasses of milk should your child drink a day?
   a. One  
   b. Five  
   c. Two  
   d. Eight

4. What is the best and easiest source of Vitamin D for children?
   a. Bananas  
   c. Sun
5. Drinking milk everyday is important because

a. It helps fights infections.

b. Builds strong and healthy bones.

c. Helps us sleep.

d. Helps go to the bathroom.

6. Why are proteins important:

a. It helps muscles grow.

b. It helps with carrying oxygen to different parts of the body.

c. It helps fight infections.

d. All of the above.

7. Proteins affect many organs in your body. T/F

8. Which is a good source of protein for my child?

a. Orange

c) Banana
b. Beef
d) Coffee

9. Protein is essential only for children below the age of five? T/F
Appendix T: Pretest/ Post test Lesson 3 (Spanish)

1. Cual es la mejor fuente de calcio para los niños?
   a. Bananos
   b. Gaseosa
   c. Leche
   d. Pasta

2. La actividad física es importante para un desarrollo apropiado de los huesos de los niños. T/F

3. Cuantos vasos de leche debería su niño tomar al día?
   a. Uno
   b. Cinco
   c. Dos
   d. Ocho

4. ¿Cual es la mejor y más fácil fuente de vitamina D para los niños?
   a. Bananos
   b. Sol
5. Tomar leche a diario es importante porque

a. Ayuda a combatir las infecciones.

b. Ayuda a construir huesos sanos y fuertes.

c. Nos ayuda a dormir.

d. Nos ayuda a ir al sanitario.

6. ¿Porqué son importantes las proteínas?

a. Ayuda a los músculos a crecer.

b. Ayuda a llevar oxígeno a diversas partes del cuerpo.

c. Ayuda a luchar contra las infecciones.

d. Todo lo anteriormente dicho.

7. Las proteínas afectan muchos órganos de su cuerpo. T/F
8. ¿Cuál de los siguientes es una buena fuente de proteínas para mi niño?

a. Naranjas  

b. Carne de Res  

c. Plátanos  

d. Café  

9. ¿La proteína es esencial solamente para los niños menores de cinco años?

V/F
# Nutrition for my Child

## What is nutrition?

[Image of MyPyramid]

## NAME OF THEIR CHILD

### Building Healthy Bones

[Image of bones]

### Fruits and Vegetables

[Image of fruits and vegetables]

### Importance of proteins

[Image of proteins]

### Importance of water

[Image of water]
## Nutrición de mi niño

<table>
<thead>
<tr>
<th>NAME OF THEIR CHILD</th>
<th>¿Cuál es nutrición?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huesos Sanos Constructivos</td>
<td>Frutas y vehículos</td>
</tr>
<tr>
<td>Importancia de la proteína</td>
<td>Importancia del agua</td>
</tr>
</tbody>
</table>
Appendix W: IRB approval

February 6, 2008

Sofia Abraham, DO
PhD Candidate


Dear Sofia,

On October 22, 2007 your protocol was approved via expedited procedure. On February 5, 2008 I received your request to change the timeline of your study. I find that these modifications to your protocol are adequately justified and that they do not increase patient risk or confidentiality. Therefore, I approve the above modifications to the protocol.

Please note that your continuation review remains October 22, 2008. As the PI, you are responsible for promptly reporting any injuries or adverse events or unanticipated risks to subjects, as well as any proposed changes in the research activity.

Please be advised that the VCOM IRB will be conducting routine audits as a means of ensuring compliance with VCOM and federal policies in an effort to assure the protection of human subjects. Your project may, at any time throughout the approval period, be subject to this type of monitoring.

If you have any questions or concerns, please do not hesitate to contact the IRB Coordinator, Sharon Kauffman (skauffman@vcom.vt.edu, 231-4512).

Sincerely,

Hara P. Misra, DVM, PhD
Chairman, VCOM Institutional Review Board
Appendix X:

Transcriptions:

Dr. A Interview

March 7, 10:32 a.m

1. **What are some of the contributions of the nutrition program to this community and to the mission of Baxter? (contextual question)**

   Um…. The one more bigger contribution from this program is to help the children with bad situations in the nutritional things. But this program is so interesting in help not only the children, but help the mothers, try to help them in many topics things like. We giving to them classes right now for learning beauty salon things, and another things they can use to make money and have a job or have something like that. Another contribution is that mothers right now have the opportunity to know more about nutrition. In that manner they can help the children not only with the food we give them they can also help the children inside the home giving them better nutritional things. This is so incredible for Baxter mission because we help the people not only with health, we also help people in another things like spiritual things. They have the opportunity to hear the word from God in this project. And many of them are starting to find their way to God.

2. **What inputs of components are required for the nutrition program to operate effectively? (input question)**

   The resource we need is the financial resources, like in everything. (Sigh). Right now we have a support from many people in the United States. But this is not all we need. We need more because this support is more for the food for the children. We need more help
like in the program with the beautifying classes they don’t have materials. We don’t have the resource and we don’t have money to buy it. Sometimes the women buy it the things. And this is so hard for them. It is so expensive. The kitchen classroom, we don’t have nothing right now. We don’t use that part. Only 1 time per month we can make a class to give them instruction how they made the soy and the problem is that we don’t have financial resource for that. Money is one of the things we need more.

Another thing probably is that we need more people inside. But everything is have a relation with money. More support, is the first important thing we need.

**Q: What would you need more people for?**

For example: We need a permanent person can giving the cooking classes. It is not a chef. Someone can know the different recipes to make food. We are learning here, the make the beans in the right manner, you need to know many things. In this manner, you don’t lose the capacity of the food like iron and other things. But, we need a secretary. We don’t have a secretary. We need a social worker person. That is one of the most important things. We don’t have because we don’t have the support for that. We don’t have the money. We don’t have the budget for that. This is very important. We don’t have the budget from paying things like a gas for the car so that we can visit every house of the children. And that is one of the things we need to start right now. Visit the house of the children and in that manner really see what really happened there. What they need. What the things we can help them. Because right now we only helping with food. But they need another things. That is what I think.
3. What are the functional and process components of the nutrition program to make it highly effective? Are these elements in place? What else is needed? (process question)

Like I told in the last question, the first thing that we need is someone can find. That person is a social worker. I can say you many things for a person with experience and a person have the know the things to starting many different things. But the component process right now for the nutrition program is starting so good with this project you started. After you finish this project, we have the first answer to many of the things we need to start. Before you start with this project, we really don’t have any idea about many things from the nutrition. We don’t have any idea from many things we can make for the people like teaching and they learning about, not only about nutrition. We really are interested in giving more classes for the mothers like I don’t know health, how to be careful with the children so that they don’t have the same kind of diseases like cold something like that. Um…in this moment we starting many things. I can’t answer you really really the things we have in this moment. Because it is my project to have someone with experience can define all the components we really need to start in the nutrition program. This like we are starting again. We are starting from zero again. And your project is so important for us because you are giving to us the way and instrument to get there.

4. What are outcomes and impacts do you believe are most effective? What are some examples? (product question)
The most important impact is the health of the children. Um how you know we giving to them the option to have free medical attention, free dental attention. This is the most eager impact we are giving to them from outside. Inside, talking about our project is the experience we have everyday with the different children. The great impact for us, we have many many different children with different problems and many different disease. If you remember, we have children with down syndromes and another problems. And for us it is so important that right now we can have projects for every different children. When you give to them the opportunity to have medical attention free, the children really have better options. We are not only interested in nutrition; we are interested in all the topics. For example, I know probably 50 % of these women are starting to go to the church. They go to these places they are part of something. They feel they are someone. They are not alone. They are someone. And this is a beautiful impact for them because they are part of the society right now. I know many of these women starting to work in the beauty salons. Another thing, working inside the house from make clothes for the neighbors. In that manner, they starting to have options to make the money for the family. This is another impact. This is so wonderful because you really see, you really can touch all the things they really have right now. It is sad because we don’t have the children inside the nutrition program for many years like we want. But in the time we have inside the nutrition program, they are better persons and they are not alone. That is so important. We are starting right now a new project with HIV women and in this moment we have three. These women feel so happy that people are really interested in helping them, they are part of something and this is a beautiful thing. The impact you given to them, they
don’t feel alone. They feel they are part of someone and many of them are starting a good life with the church.

5. **What should be the future of the nutrition program? (product question)**

The future .. is my dream that the nutrition program grow up more and probably we try to make the children inside the nutrition program to have the opportunity to have the three meals in the same place. One of the projects we have right now from this project is starting a day care with the children under the age of five years. And probably in the future is starting a school. In that manner, you can have the children here and you can give to them the meals they need in the correct manner. You help them with education. You take the children out of the streets and put in a safe place. They are learning a good things and not bad things on the street. Um..the nutrition program probably is the most beautiful thing we can have in this clinic. I don’t know how much time we take to make all this but it is something we can do. We can do because another project like this is starting right now here. The mothers can help us and we can give to them employment. In that manner, the nutrition program is starting to give other options. The nutrition program is not only a nutrition program how you thinking with food. A nutrition program is we giving nutritional food to the spirit. And that is so great. Because we make the health of the body and the health for the soul go another way in the children and the moms. Um..probably in the future we can have that project and in that manner the nutrition program is not nutrition program, it is a program for the school and that will be great.
S: This is Sofia Abraham eleven o’clock, March the third and the interview begins.

The first Question that I have for you is, what are some the contributions of the nutrition program to this community and to the mission of Baxter?

P: I think the nutrition program is a wonderful program. It helps a lot of poor families with their nutritional needs. Some of the families enter the program with great expectations of their children improving their health and dieting. …...interruption in Spanish…..The program is working well and there are needs and for the time that it has been working it has been doing a great contributions to these poor families. Also for Baxter and the Amicus Associations to be contributing to the health of the poor families. And also for Baxter and the Amicus Association to be contributing to the well being of these poor children is important. We are planning on, I am traveling to the States to gather more support for the clinic as a whole and also for the nutrition, um one of the main things that I am thinking about is how to do a better follow up on the kids you know. Visiting their homes to see the difficulties that have and also seeing a measure of kind of think back on what the nutrition program is having on the kids. We need a social worker to do that full time to do that on the clinic.

S: Second question What inputs or components are required for the nutrition program for the nutrition program to operate affectively? Like what things must go into the program for it to work well?

P: Well, we need to have a better way, um, a better way to do a follow-up of the kids I think that is very important because it will tell us of how effective we have been with the program, more visiting in the kids homes and trying to assist more accurately what the
impact what the impact of the nutrition program has been on these kids. Also a better recruiting of kids. Not just being able to follow up on the kids that are already involved in the nutrition program but also looking for families that perhaps may not be able to come to the clinic because of limitation they may have. So single mother cannot leave their children home, they have perhaps three or four children and they cannot take the children with them. Perhaps home visit would be important for the future of the program. So for ..um recruiting kids that are in this disparate situation.

**S:** *Is finance a huge into the um, because the number of kids they fund in the program depends on how much money they have to buy the food and stuff like that, and so would more money mean more kids in the nutrition program.*

**P:** I think it would mean more kids in the program. Of course there is a limit to the number of kids we can enroll and the facility that we have in the clinic and the personal and the staff that is running the program. But I think more money is need to help the impoverished the clinic has and the community here. There are higher priority kids that are in a worst situation than the ones in the program that can be recruited in the future. I think that in the future that if we have a social worker to do a more systematic approach to getting more kids into the program. I thinking g that is very important and also I think we need current involvement needs to have so we make sure the food is going to the kids instead of being sold or to get cash for to buy other foods that the family wants. Also I think it is important to look at the nutrition value of the food they are receiving there needs to be a more strict or wise analyses of the type of nutrition the kids will get. With amount of food they receive and if that food is enough or more variety or more food being giving or less food being giving. I still don’t know that is if that needs to be done.
S: And another thing the mother might have five children at home but only one is enrolled in the program. How do you suggest that that be tackled? Because the mom can’t give that food that was meant for that one child, but she is not going to make it for just one but give it to everyone in the household.

P: This is a difficult question because the needs are there and the moms are giving to the other kids if they are enrolled or not. I think that the type of family more kids should be enrolled, at least the younger kids that need more nutritional value in their foods. I think those kids should be given high priority. Well those situations I feel are not that common. I feel that most of the family in the city will have less kids than those, something that happens. A well structure of the nutrition program follow-up and evaluation of the families inside there homes and going to visit their families are all that is very valuable to the program.

S: Question three. What are the functional and process components of the nutritional program to make it highly effective? Are these elements in place what else is needed. Like a process evaluation or evaluation component.

P: I feel that the medical evaluation of the kids is ok I feel that that is working very well. Perhaps there needs to be more education, and educational branch will assure that the relative that comes to pick-up the food are giving a better chance of and knowledge of nutrition. More education could be put into the package so that the moms would be able to, um giving other times they don’t pick-up their food, they could get a quality education. I feel the persons in charge of the program should be informed of the needs around the clinic so that there will be more awareness of the people involve in the clinic. I also feel the social worker I was talking about is very important. I have been trying to
raise money for that, we need to have more information of the nutritional value of the food that we distribute quantity and quality. So we will have more assurance that the program is meeting the basic needs. Of course in the world of the hungry and all the patients that they have this food is very important to them. We need to be more aware of the needs that they have and especially the multiple kids in the family, more could be done to help them. Not just nutrition but also in other areas in their lives.

S: Next questions. What are the outcomes and impacts that your believe are most effective.

P: Well I think rate at which the kids are entering the program is ok but I am not aware of the specifics. I feel that the impact has been great and it can be very structured and have nutritional value the issue I was mentioning before. I feel that there are many specific example I can show for sure that the kids that enter the program were in such a malnourished shape that when they entered the program that were in a much better state. I think there are many examples that show this.

S: Last question. What should be the future of the nutrition program?

P: Well um we need to do a better job of doing all the things and of course that is never enough because there are so many needs here. Many cannot work because they have to take care of the kids or they leave the little kids to be in charge by the older brothers and sister and sometimes they are not that old and it will take more than the clinic to be involved. There might need to be more linkages that the clinic needs to make with government to fix all the social problems that the people have and to be aware of what the clinic is doing. I believe they are but more could be done so that the nutritional
program. I am just talking out of my head. And in many ways the clinic can improve a lot more for the community and better fundraising and planning.

S: Well thank you so much for your time.

Dr. W

March 5th: 10:15 a.m

1. **What are some of the contributions of the nutrition program to this community and to the mission of Baxter? (contextual question)**

That is an interesting question. For the community, there are many many poor people and the children are the ones who generally suffer from the poverty in the area. So, the purpose of the nutrition program is help those children develop normally and live their lives as normal citizens. For Baxter, it provides good public relations. It makes people feel comfortable coming here and listening to the gospel of Jesus Christ which, can helps their souls and their bodies.

2. **What inputs of components are required for the nutrition program to operate effectively? (input question)**

There are a lot of resources that they require. Of course, they require the purchase of food. They also, the element that I think is most important, is the education element. People tend to live the way they have lived all of their lives and even though their diets tend to be pretty restricted and not very nutritional, they don’t know any better. So, it is up to us to teach them that they need some additional things in their diet such as soy beans, and more protein and less fat and those kind of things. So, unh it is very important that the education is primary in my opinion.
3. **What are the functional and process components of the nutrition program to make it highly effective? Are these elements in place? What else is needed? (process question)**

There are couple of things that we lack. We have some things that are in place. The doctors are the ones who recommend the children for entry into the program. The program is managed somewhat effectively by a person who keeps track of who comes, who does not come, is involved in the training, who is not involved in the training but one of the things that is missing most is a social worker. We need to have home visits to make sure that people who are in the program are really needy of the program. And we don’t have that in place. It is something that we are lacking and we are seeking to correct but we just have not found the right person yet.

4. **What are outcomes and impacts do you believe are most effective? What are some examples? (product question)**

Well, there are lots of good examples, I think. The outcomes that we are looking for is normal development. And when a child is back on the chart as a normally developing child after a year, the family leaves the program. That’s success. That’s our measure of doing the right things. We are also able to identify some chronic problems. Unh, for example, we have a guy that is in the program, who has a fistula in his brain. And he needs surgery and we are seeking to get that done in the United States. Without that surgery he is going to die, we don’t know how much time, probably a short time. So being able to monitor these children for a year, gives us incite on the chronic problems
that may go undetected because they don’t go to a doctor very frequently, only when they are sick.

**Do you think the program should have some sort of follow up for children after a year or should it just be for a year?**

I would love to have the ability to do a follow up, a year, five years, and ten years after they leave the program. That would be wonderful to know if the behavior of the mother particularly has changed. So that the child gets better nutrition, that the mother has found employment, because of our vocational training or stuff like that. We just don’t have the resources to do that right now. That would be a great thing.

**And the resources you are mentioning is financial and personnel?**

Yes, we need a social worker. That would be one of the tasks of a full time social worker, not only to do home visits but to do follow ups. In this culture it is very difficult to follow up because sometimes you just can’t find people. They just don’t have addresses very easily determined. They don’t have telephone numbers or they change very frequently. So it is just very hard to keeps on people like that. So, It would be a challenge to do that but it will be worth the effort.

5. **What should be the future of the nutrition program? (product question)**

Well, that is an interesting question too. You have good questions. Unh…. The future of the program is to expand. We have some, some ideas of expanding the program in ways that would make the program more accessible to more people. We want to be able to
provide more training. Not just in nutrition, but in sexual health, provide specific programs for women, papsmears, breast exams, perhaps mammograms in the future. Generally we are looking at family health. But right now we are focusing more on the children. We would like to expand that more to the women and perhaps to the whole family.

6. I know right now the program is just for one child in the family that is malnourished. Unh.. would at some point the nutrition program be thinking of the whole family not just in health issue but also in distribution of food. So, everybody in the family gets their fair ration.

That would be ideal. Right now, if the family has five children they get the same amount of food as if they only have one child. That’s the way it’s working because of funding issues. But it would be better if we could get more food to the larger families. But again, we got to have a social worker who would oversee that because the opportunity for abuse increases as the amount of food distributed increases. So, until we have somebody who can actually get to know these people in their actual living conditions, it is going to be difficult.

Well. That is all the questions I have. Thank you so much for your time.

Dr. X

March 7, 11:21 a.m

1. What are some of the contributions of the nutrition program to this community and to the mission of Baxter? (contextual question)
Well, we are or the nutrition program is bringing more people to achieve a good nutritional state that the kids benefit and the families per se, is given evangelistic word. They come here to a place where they find reliefs from their problems and unh.. spiritual help and food for their kids. That is the great impact.

2. What inputs of components are required for the nutrition program to operate effectively? (input question)

As usual, funding is required, because for the moment, I think, the option is for seventy kids and the community is extremely high and the word is coming around that we are helping people. And more people are coming to join the program. So, we are getting out of funding. So money will be the highest requirement for the moment.

3. What are the functional and process components of the nutrition program to make it highly effective? Are these elements in place? What else is needed? (process question)

What we are thinking that will be needed is a social worker to go home to home and acknowledge the actual family problem because that will make us realize if we are really helping the family or just providing supplies or providing food. Because if we can’t know how the family lives, we can’t be sure that the kid is actually receiving the help.

4. What are outcomes and impacts do you believe are most effective? What are some examples? (product question)
Well, the objective of the program will be achieved a good nutritional outcome in a kid make this child productive socially speaking so he can help the family afterwards. Um. We have some special cases like the kids that have brain paralysis that are little harder to get through but the results when the kids starts to walk and the kids starts to communicating to the family not just based on the nutritional part but the love and care and stimulation received, that’s the greatest outcome. Obviously, the kids reaching good nutritional health is also a good result.

5. **What should be the future of the nutrition program? (product question)**

Well, the future it should be make the program wider. Not just provide food for the kids but also provide other options. Place for the mothers to work. They are receiving classes, but I think it would be important if that same mothers teach other mothers so they can make a small business and if the institution can make a like a day care program where we can make sure that the kids are actually receiving the food. Or a little school, maybe to make sure that the kids develop adequately for a long term and not just for a three month baby.
REFERENCES:


Arija, V. et al. (2005). Nutritional status and performance in test of verbal and non verbal intelligence in 6 year old children. *Intelligence* 34, 141-149.


Burney, J. & Haughton, B. *EFNEP: A nutrition education program that demonstrates*


Liu *et. al.* (2004). Malnutrition at age 3 and externalizing behavior problems at age 8, 11


