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When Nutrition Kills You: Malnutrition for Children in Saudi Arabia

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When Nutrition Kills You:

Malnutrition for Children in Saudi Arabia

(TITLE)

BY

Layla Alahmari

THESIS

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2016

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Abstract

In this thesis, the issues of Saudi children and their sick and malnourished are shown. Many Saudi's children suffer from anemia. Usually Saudi's children suffer from malnutrition because their parents do not instill healthy food habits. Saudi's children also, suffered due to nutritional inequality consequential from the appearance of poverty, and parent illiteracy. The purpose of this study was to determine most significant factors that result in malnutrition of children in Saudi Arabia.

The study was a quantitative, non-experimental design. It was a survey and correlational study. The hypotheses results were not significant. The researcher observed in particular results, which was about patients who have malnutrition were significant consequences including questions asked about the poor eating habits, which found the p value significant 0.027. the second question which asked about the family if they suffer from poverty or not which was the p value significant 0.000. The third question asked if the family limit the amount of junk food to their child eats at home or not which found the p value significant 0.013. the final question asked if there child feel sad or depressed or not which was the p value significant 0.001.

The result of the study did not support the hypotheses in order that the data for fifty is not enough to show the real relations between the hypothesis and the reality of the community. The researcher also recommends having the sample from several countries to disclose the true nature of the link between the hypotheses and the population. Moreover, the researcher advise conducting another study with a larger sample size and controlling other factors that could influence the result of the study.

Dedication

I dedicate this to my family and friends for their encouragement, support, love, caring.

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With great appreciation, I would like to give credits to my father and mother for their love, caring and support. I could not have ended it without them.

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Chapter 1

Introduction

Overview of Topic

Food insecurity is an obstacle that threatens the foundation of a child's health, especially in children who are under five years old. Within this time period, researchers noticed that more than 200 million children under five years of age suffer from malnutrition (Grantham-McGregor, Cheung, Cueto, Glewwe, Richter, Strupp, & International Child Development Steering Group, 2007). The first few years of child development is very significant because the brain develops quickly through neurogenesis, cell death, synaptic pruning, myelination, and glycogenesis. Children who suffer from poverty, poor health and nutrition, and deficient care are often unable to reach higher levels of cognitive development (Grantham et al., 2007). The Food and Agriculture Organization (2015) noticed that around 795 million individuals in the world do not eat enough food. The prevalence of malnutrition in Saudi Arabia for children who were under than five years of age was 15, 516. The frequency of moderate and severe underweight children was 6.9% and 1.3%, as well as was 9.8% and 2.9% for wasting, and the 10.9% and 2.8% for stunting respectively (El Mouzan, Foster, Al Herbish, Al Salloum, Omar, & Qurachi, 2010). Severe malnutrition is one of leading causes of 12.6% of the 6.9 million deaths of children who are under 5 years old, showing for more than 800,000 dying annually (Black, Victora, Walker, Bhutta, Christian, De Onis, & Uauy, 2013). More than two billion people suffer from malnutrition in worldwide. Malnutrition can result in several factors, including decreased worker production, increased rates of chronic illnesses, reduced health, and high rates of death and illness (Welch & Graham, 1999)

Nutrition

Nutrition is a necessary factor in the maintenance and promotion of good health, as well as a way to prevent chronic diseases (Who & Consultation, 2003). Nutrition is an essential need for individual's that remains unmet for huge quantities of children every year (De Onis, Monteiro, Akre, & Clugston, 1993). The World Health Organization confirmed that balanced nutrition is very significant in the lives of human beings. Without it, a person can suffer from multiple diseases, in addition to decreased immunity, productivity, and development (The World Health Organization, 2016). Balanced nutrition is necessary for sufficient development and bodily well-being (Smith & Scholey, 2014).

Issues of malnutrition

Malnutrition is one of the primary causes of immunodeficiency worldwide. Diseases linked to malnutrition make up more than half of the deaths for children under the age of five, most of which are classified as undernourished. These deficiencies negatively affect growth, intellect, and susceptibility to infection (Katona & Katona-Apte, 2008). Malnutrition is most often linked to inadequate food supply and intake, especially in developing countries. These countries also suffer from insufficient food supplies (Martorell, Rivera, Kaplowitz, & Pollitt, 1992). One study confirmed that malnutrition was directly responsible for more than one third of all child deaths in the world (The World Health Organization, 2016). Many researchers noted that malnutrition directly correlates with poverty, as poverty can also result in low birth rate, anemia, or fetal loss. Many of these problems are influenced by the lack of healthy foods and inadequate healthcare resulting from poverty (Aftab et al., 2012)

Classification of malnutrition

Malnutrition can be present in two forms: chronic and acute. Chronic malnutrition happens when children do not meet the standard height and weight requirement for their ages. Acute malnutrition is when children are at an inadequate weight relative to the child's height, which is called "emaciation." Depending on the child's weight, cases of acute malnutrition can be severe (Humanium, 2016). Chronic diseases that usually associated with malnutrition include: cystic fibrosis, chronic renal failure, congenital heart disease, neuromuscular diseases, and chronic inflammatory bowel diseases (Martorell, Rivera , Kaplowitz, & Pollitt, 1992).

A study by the Food and Agriculture Organization of the United Nations explained the differences between malnutrition and severe malnutrition (2016). Researchers pointed out that if children suffer from severe wasting, or thinness, and/or edema of both feet, they are severely malnourished. This study confirmed how it is important to start treatment in the hospital because the disease is dangerous. Severe malnutrition, if left untreated, can often be fatal.

Effect of malnutrition

Malnutrition affects the lives of millions of people every year. Eating healthy is important and many countries suffer from a lack of healthy food. People do not often even notice the poor quality of the food because they are just glad to have food. Children suffer from malnutrition because of many factors, including a lack of breastfeeding or being fed the wrong foods. The consequences for these factors can include pneumonia, diarrhea, measles, and malaria (The World Health Organization, 2016). A study by Orphan nutrition (2016) mentioned that malnutrition also has negative effects for brain growth, which leads to delays in cognitive and motor development, such as reduced language development, attention deficit condition, reduced problem-solving abilities, and learning disabilities.

Malnutrition and anemia

Researchers in India confirmed a correlation between malnutrition and anemia. Researchers found that severe anemia should be considered as one of the comorbidities, which is accountable for increased mortality rates in severely malnourished children (Chandra, Pemde, and Singh, 2014). Researchers have also noticed the increased development of anemia in cases of malnutrition. A study by Wenfang and associates (2012) showed how the first 18 months of life are the most significant for long-term infant well-being. Malnutrition and anemia have grave consequences for individuals and communities, particularly in developing countries and rural regions. Researchers have suggested strategies for preventing malnutrition and anemia in children several ways, which include health and nutrition education that focus on nutrition practices (Wenfang, Xu, Ying, Shuiping, Liming, Xiang, & Weimin, 2012). Researchers in Egypt mentioned the importance of understanding the factors for malnutrition and anemia between populations, as these factors are essential to supply effective control and preventive measures (Barakat, Nada, & Ezzat, 2013).

Anemia

Researchers point out that iron deficiency is a common nutrition problem in the world and the most common cause of infant anemia (Sezik, Can, Kurnaz, Tuna, & Ay, 2015). Anemia itself exists when an individual suffers from an iron deficiency. Anemia typically occurs because the blood lacks folic acid or vitamin B12 because of poor dietary consumption (American Society of Hematology, 2016). One study described some symptoms of anemia as weakness, dizziness, headaches, pounding in the ears, cold hands or feet, fast or irregular heartbeat, chest pain, shortness of breath, and pale or yellow skin (American Society of Hematology, 2016).

A healthy diet provides adequate iron. Overall, most individuals need one milligram of iron a day. This means that deficiency of iron in the food is not a usual cause of anemia in adults, but instead in babies. This study confirmed that most of American adults might be taking in too much iron with their nutrition. Iron-poor foods are a cause of iron deficiency only in individuals who already experiencing risks of iron deficiency. Children who are not fed iron-fortified formulas or iron-enriched cereals also risk becoming anemic (University of Maryland Medical Center, 2016).

Need for Study

This study explored the causes of malnutrition, including research on parental influence on children to instill poor eating habits, nutritional imbalance resulting from the occurrence of poverty, and parental illiteracy. This study focused on the correlation between poverty, lack of education, and illiteracy and how those factors influence an individual's knowledge of healthy nutrition habits. The World Health Organization confirmed that the over 30% of the world's population suffer from anemia (The World Health Organization, 2016).

Purpose of the Study

The purpose of this study was to determine most significant factors that result in malnutrition of children in Saudi Arabia.

Research Question

What are the common causes of malnutrition in children who are in Saudi Arabia?

Research Hypothesis

H1. Families who are illiterate will have an advanced rate of children suffering from malnutrition.

H2. Families with lower incomes will have a higher rate of children suffering from malnutrition.

H3. Families where the parental education is lacking will have higher rate of malnutrition for children.

Definitions of Key Terms used throughout this study include:

Malnutrition – “results from the imbalance of nutrients and energy provided to the body (too low), relative to its needs (too high)” (Alberda, Graf, & McCargar, 2006).

Malaria- “is a mosquito-borne illness caused by a parasite” (Centers for Disease Control and Prevention, 2016).

Anemia –lack of adequate iron to form normal red blood cells (Johnson-Wimbly & Graham, 2011).

Illiterate-it is the incapability to read (Merriam-Webster Dictionary, 2016).

Chapter2

Literature Review

Researchers found the most common health problem in the world is anemia. In fact, 2 billion people, nearly 30% of the world's population, suffer from the disease (World Health Organization, n.d). Anemia can have negative effects on child survival, development, and growth (Kishawi, Kah Leng, Abed, & Muda, 2015). This disease is the main cause of death in sub-Saharan Africa and children living in this area are often hospitalized because of the effects caused by severe anemia (Kiguli, Maitland, George, Olupot-Olupot, Opoka, Engoru, & Crawley, 2015). In a study conducted in the city of Guinea-Bissau, researchers noted high levels of childhood death and found one of the highest factors of death to be malnutrition (Thorne, Roberts, Edwards, Haque, & Cumbassa, 2013). Anemia can affect children in several ways, including the impairment of cognitive and physical growth, as well as a decline in school performance (Mesfin, Berhane, & Worku, 2015). In a rural Shaanxi Province in northwest China, researchers visited 60 elementary schools and provided children with six months of daily iron supplements (Wong, Shi, Luo, Zhang, & Rozelle, 2014). Researchers noticed the supplements improved the children's hemoglobin levels. In addition to the supplements, researchers also met with parents and discussed the positive impacts of living healthier lifestyles.

Researchers observed that the iron supplements were generally more successful for improving the children's health rather than meeting with the children's parents (Wong et al., 2014). In this study, researchers attempted to discover the important causes of children's malnutrition by focusing on three main independent variables: parents have influence on a child's poor eating habits, nutritional imbalance is often result of poverty, and the correlation between illiteracy and malnutrition within families.

Parent's influence

After a study conducted in Sukkur, researchers noted strong relationships between severe malnutrition and large family size, as well as poverty and parental illiteracy. The study focused on how an unbalanced consumption of food can cause malnutrition. The researchers also focused on a variety of diseases linked to malnutrition, including rickets, osteomalacia, loss of vision, anemia, scurvy, and beriberi (Jamro, Junejo, Lal, Bouk, & Jamro, 2012). Also, in a study directed by Jamro, researchers concluded that in order to have healthy children, mothers should be educated on proper nutrition. One of the ways to encourage this education was to teach the mothers about the benefits of breastfeeding (Jamro et al., 2012).

Delisle (2008) conducted a study that helped to describe the adverse influence of gender inequities in women's nutritional health and income, as well as the dramatic consequences of these inequities. These consequences also affect families, children, and the rest of society. The researcher confirmed that the women have higher levels of malnutrition due to additional nutritional needs when they are pregnant and lactating (Delisle, 2008).

Mealtime Memo for Child Care (2012) informed parents of the important information regarding child care and the significance of providing nutritious and quality meals from parents to their children. Mealtime Memo for Child Care provides information about child nutrition by working with the Child and Adult Care Food Program, as well as child care providers. Mealtime Memo for Child Care mentioned that the nutrition is beneficial for children to maintain healthy lifestyles and continue developing. Nonetheless, providing meals in childcare facilities are considered half of the battle, as is increasing parental support. Providing parental support is a great method for decreasing the amount of children that are suffering from any diseases that are related to malnutrition. Mealtime Memo for Child Care provided some easy steps for success,

such as learning different ways to encourage parent participation, teaching and informing parents about the child care food program, and supporting and inviting parents, as well as the rest of society, to learn about this information. These steps are necessary because parents are a main factor for the development of healthy eating habits for young children (Tips for Parents, 2012).

Another study also confirmed the relationship between malnutrition and parent-child relationships. The researcher noted that the children who were suffering from malnutrition had other micronutrients and a deficiency of iron, all of which affect the development of children, as well as result in permanent consequences on cognitive development. Children who have nutritional deficits are more likely to withdraw from social situations and gatherings, which parents and caregivers may interpret as disinterest. The child also becomes moody and irritable creating stress and tension in an already stressed family relationship. Parents and children find themselves in an everlasting disagreement without a distinguishable reason and without a chance of a solution. Malnourished children are more likely to get sick and to have a slow recovery, giving them growth problems and resulting in problems such as stunting (Behavioral Patterns: The Parent-Child Relationship in Malnutrition, 2012).

The study by Pugliese (1987) proved that the parental misconceptions and health beliefs on what is the right dietary habits has been a major cause of malnutrition in kids and infants. Seven patients were studied, four of which were boys and three of which were girls. Their consumption was at only 60% to 94% of the recommended caloric intake. The concerned parents were unintentionally restricting their intake. They made these restrictions to prevent their children from becoming obese or developing atherosclerosis by implementing what they believed to be healthy eating habits. The parents constructed diets that followed the medical community's advice for adults at risk for these diseases. These diets caused inadequate weight

gain and decreased growth. After nutritional counseling, all dietary restrictions were removed. The weight gain rate and linear growth improved dramatically after the increase of dietary intake. Exaggerated concerns on food intake, such as what has been mentioned above, has made parents implement flawed diets for their infants consequently creating more harm than good (Pugliese, Weyman-Daum, Moses, & Lifshitz, 1987).

Different study showed the positive impact of the family's choice of food for their children and the relation of diet to children's nutrition. Researchers discussed that the parents have a basic understanding of their children's development, as well as a good impact on the development of their children relating to food choices and their investment in the children's health to prevent diseases caused by unhealthy food (Chernichovsky & Coate, 1980).

Researchers showed that part-time working mothers had the highest positive attitudes in term of highest household interaction scores and diet (Achterberg & Gillespie, 1989).

The researchers explains the impact of nourishment education for children, relies on the adoption of new nutritional knowledge by parents and their children. The study discussed nutritional problems associated with children and analyzed parental effect on a child's eating habits. Researchers imply that the information regarding nutrition acquired by mothers has an important influence on children's food choices; however, many mothers do not have much of an understanding regarding balanced meals, beneficial intake patterns, or other nutritional knowledge. The study's purpose was to observe parental strengthening of nutrition education and behavior impact on parents and children (Grossbart, Crosby, & Smith, 1986).

Poverty and malnutrition

Many of the causes of malnutrition in children affected those who were less than five years old. These children often had illiterate parents, parents without jobs, delayed weaning, poor living conditions, or were raised in families struggling with poverty(Irshad, Hayat, Ahmad, Khalil, & Hussain, 2014)

In Bangladesh, researchers noted that preventing unwanted pregnancies would help prevent the prevalence of childhood malnutrition (Rahman, 2015). Research completed by Aftab also noted that poverty that is a concern for women, especially pregnant women, as poverty can result in malnutrition, as well as anemia, fetal loss, and low birth rate (Aftab, Ara, Kazi, & Deeba, 2012).

Research by Hashim and associates (2014) conducted a study that helped define the rate of moderate to severe anemia over pregnancy. They completed the study to see the association between obstetric characteristics and socio-demographics researchers noted multiple key factors accountable for anemia during pregnancy booking status, parity, and inter-pregnancy interval (Hashim, Farooqi, Naqvi, & Jaffery, 2014).

Research by Fan (2012) showed a study that analyzes the association between academic successes of students in social studies and the socio-economic status of parents. In this study, researcher confirmed that there is a strong relationship between high socio-economic class and the performance of the children in school. On the contrary, the underperformance of the children who were from low socio-economic families was because the children were suffering from malnutrition (Fan, 2012).

The researchers described the relationship between poverty and health. Also, researchers noticed that poor children have higher rates of infections because they do not have

adequate nutrition, as well as a deficiency of knowledge, which are common because of their family backgrounds. There has always been a relationship between poverty, malnutrition, and children, but now, the effects of poverty and malnutrition extend throughout the lifespan. These manifestations include an increased propensity to both communicable and noncommunicable illnesses, a decreased physical work capacity, lower learning capabilities, an increased exposure to lifestyle-related and environmental hazards, and a decrease in social skills (Pena & Bacallao, 2002).

A study by Wazir and associates (2015) confirmed that the malnutrition could cause illness and death in children worldwide. Researchers identified the most dangerous factors for undernourishment in children who are less than five years age. These factors include that the highest number of children who suffer from malnutrition have parents who are illiterate, jobless, have a poor environment or living conditions, suffer from poverty, or experienced delayed weaning (Wazir, Khan, & Khattak, 2015).

In a study in India, researchers observed that the children living in slum regions were more likely to suffer from low birth weight, cough, fever, anemia, diarrhea, infant death, and malnutrition. On the contrary, children living in non-slum regions did not suffer from these diseases. The researchers described the children who were living in the slum regions as those who belong to lower socioeconomic levels than children from the non-slum regions (Kavitha, 2014).

The World Health Organization described the global database of child growth and malnutrition. The organization found that malnutrition in children is the result of a variety of influences, which are usually related to lacking food intake, severe and repeated infectious illnesses, poor food value, or often some combination of all three of these factors. Additionally,

these situations are associated with the general standard of living and whether a populace can meet its main requests, such as health care, access to diet, and home (Global Database on Child Growth and Malnutrition, 2016).

Research by Semba (2016) showed that iron deficiency, or anemia, was found to be incredibly common among inner city female injection drug users who had human immune deficiency virus and/ or hepatitis C infections. This iron deficiency and its anemia could contribute to other physical problems including reduced energetic efficiency and lower aerobic ability, affecting endurance and causing fatigue. All of this means that it could affect and hinder a woman's participation and engagement in her work, school, and social life. This effect on her work could decrease her earnings, making it harder for her to afford iron-rich foods, which creates a cycle that further feeds into her iron deficiency. This is especially problematic because the use of iron supplements, which could help with the deficiency, is not advised and should be approached with vigilance for HIV and HCV patients (Semba, 2016).

A United States study by Pollitt (2008) showed that African-American and Hispanic children in poor communities have anemia levels as high as 20%–24%. Researchers point out that the iron deficiency has several negative effects, including poor performance on motor and rational tests with children. The researchers confirm that the iron deficiency is a general community health problem among poor minority children that requires immediate concern (Pollitt, 2008).

Illiteracy for parents

In a study in Southern India, health workers provided health education to pregnant women to aid in the prevention of anemia throughout their pregnancies (Ny, Dejin-Karlsson, Udén & Greiner, 2006). The women were also given information intended to explain and clarify

health education for families (Ortiz-Andrellucchi, Peña-Quintana, Saavedra-Santana, Albino-Beñacar, Monckeberg-Barros & Serra-Majem, 2009). Researchers have noted a correlation between parental illiteracy and children's nutrition. One study concluded that the level of a mother's education directly impacted her health practices. Children growing up with mothers possessing adequate health education were less likely to suffer from iron deficiency (Souganidis, Sun, Pee, Kraemer, Rah, Moench-Pfanner & Semba, 2012). In addition, mothers who lacked health education were less likely to breastfeed or provide healthy sustenance for their children. One suggestion for research includes increasing the availability of health education for expectant mothers. This may be a helpful marker to distinguish at-risk families and assist in preventing malnourishment in children (Syed, Nasim & Abdul, 2005).

In a similar study done in Indonesia, researchers also noted the important correlation between health education and child anemia among families. After providing expectant mothers with iron supplements throughout their pregnancies and increasing the amount of health education they received, researchers confirmed the association between parental awareness of anemia and access to health resources. The children of the study were less likely to suffer from anemia when their parents were aware of healthier habits (Souganidis et al., 2012).

Shafqat and associates (2013) also completed a study to evaluate the potential hazards, as well as the nutritional status, for children who were less than five years of age. Researchers in the study noted that malnutrition is an important problem-affecting children and estimated that children suffering from malnutrition were often associated with illiterate parents (Shafqat, Manzoor & Abbasi, 2013).

Researchers assessed the widespread percentage of malnutrition affecting the children living in the slums of Mumbai. The reasons that these children suffered from malnutrition, such

as their histories of infections, immunizations, socio-economic statuses, literacy of parents, family sizes, birth intervals, and the smoking, tobacco, and alcohol habits of parents. The researchers concluded that 45% of the children living in the slum areas suffered from malnutrition. Researchers found particular methods to decrease the issue of malnutrition, such as providing employment and education opportunities (Reshamwala & Patne, 2010).

In Bangladesh, researchers observed that children in preschool had chronic malnutrition, which causes death and illness. Researchers conducted their cross-sectional study in Dhaka City, Bangladesh with children who were preschool aged. The study included 380 children who were randomly selected. The children had to be less than five years old so that researchers could understand the frequency of chronic malnutrition and could figure out the causes affecting the height-for-age z-score. Researchers concluded that the children who had higher levels of nutrition had parents who levels of higher education or at least a completed secondary education (Jesmin, Yamamoto, Malik & Haque, 2011):

In an additional study in India, researchers examined 17 villages within desert areas of Rajasthan. Researchers covered 538 houses, which included 834 preschool children in the observations. Researchers noticed that the frequency of Vitamin A and Vitamin B deficiencies, as well as skin, eye, and respiratory morbidities and anemia were higher within the desert villages when compared to the levels of similar issues within non-desert regions. Researchers listed the factors of malnutrition as the low salaries of the children's parents, parental illiteracy, poor housing situations, and the difficult environment within the desert regions (Singh, Haldiya, & Lakshminarayana, 2002).

In Province South Khorasan, Iran, which confirmed the prevalence of malnutrition in children who are under six years old, is one of the significant health problems for the country.

Researchers found out that malnutrition in developing countries has unwanted consequences on the physical and mental health of children. The prevalence of malnutrition in children was associated with several socioeconomic variables, including parental education, especially for mothers, as well as time spent breastfeeding and encouraging nutrition up until the child is six years of age (Sharifzadeh Mehrjoofard, & Raghebi, 2010).

Vani confirmed that the lack of education resulted in maternal illiteracy, which in return led to a prevalence of malnourishment in India. The researcher in this study attempted to reduce the risk of child malnourishment by increasing maternal literacy. The researcher pointed out several advantages for the children when their mother is literate, including a reduction in the risk of malnutrition. Literate mothers make more efficient use of health-care organizations, such as hospitals. As a result, increasing mother literacy includes advantages for their children because the mothers are more likely to cooperate with these health organizations (Vani, 2009).

A study in Nigeria by Agee (2010) attempted to reduce child malnutrition. The researcher used a sample of 1359 Nigerian households from the 2003 Demographic and Health Surveys. This study helped to improve parent's knowledge about nutrition and how they could reduce the malnourishment of children by using community health services. Researchers showed that the community health care access positively influences child nutrition. This study explained how social class and regional knowledge about health care access could positively affect child nutrition statistics measured through height and weight charts. However, nutrition gains can be fortified by disparities in mother's learning or her contact to community health services. These findings suggest that these interferences might encourage an improvement of public information about availability and entry to health care, which supports more overall improvement for child

food-enhancing interventions, like decreased poverty or an increase in community health infrastructures (Agee, 2010).

Researchers in Egypt examined the association between maternal and socioeconomic and dietary status for children who were under five years of age. In this study, researchers used a logistic regression technique to evaluate the likelihood of a child being malnourished. The researchers noted that the children who had mothers with higher levels of education had a lower risk of stunting than children of mothers without education. The parental relationship, country home, low birth order, and high birth interval meaningfully increased the chances of stunting (Zottarelli, Sunil & Rajaram, 2007).

Another study, which involved urban slum residents of low economic status, confirmed a strong relationship between the mothers' levels of education and the nutritional status of the children. Researchers also indicated that the father's level of education did not affect the children's' nutritional status at all (Mahesh, Manjusha, Sunita & Meenakshi, 1991).

Chapter 3

Methodology

Design of the Study

The study was a quantitative, non-experimental design. It was a survey and correlational study. Quantitative is appropriate for this study because quantitative research depends on clarification, which is causal for the study (Abdou & Pratt, 1979). As the result, it answers “why?” questions and is expressed numerically. Quantitative research aids to expect or clarify. In this study, data collection did not take much time because the applicant’s questions were arranged likert scale and not open-ended questions, and they noted that social phenomena could be quantified and measured (Leedy & Ormrod, 2010). The design of the study was modeled after research by Aftab, Ara, Kazi, and Deeba (2012), as they employed quantitative design to prove the effects the poverty on pregnant women and how the poverty is a significant problem for women, particularly pregnant women. Poverty can result in malnutrition, low birth rate, anemia, or fetal loss; many of these problems are exacerbated by poverty (Aftab et al., 2012)

Sample

The sample included patients from Riyadh in Saudi Arabia, both boys and girls, who were between 4-9 years of age with a deficiency of red blood cells. The researcher selected this sample because many children suffer from malnutrition and their families do not know the biggest factors for this disease. It is important that children’s mothers had good information about nutrition and held a job, the children also had higher nutritional levels, which help the parents to know the reasons for these diseases (Jesmin et al., 2011). The goal is to have 50 surveys completed.

Selection of the Sample

For this study, the researcher used a convenience sample of 50 patients. The researcher asked King Abdul-Aziz university hospital in Riyadh, Saudi Arabia about various patients who suffer from anemia. After that, the researcher went to the pediatric department and asked the nurse in charge to help her to distribute the questionnaire to cases that have anemia. Moreover, King Abdul-Aziz university hospital is the largest hospital in Riyadh and focuses on student research. Riyadh, Kingdom of Saudi Arabia has four main hospitals, which are included: King Khalid University Hospital, King Saud medical complex Hospital, King Abdul-Aziz and Prince Salman Hospital (Al-Rowais, 2002).

Description of the Sample

The sample included children from Riyadh in Saudi Arabia, both boys and girls, who were between 4 to 9 years of age. The family of children completed two surveys. The first survey included information about their demographics, and parental literacy. This survey also examined the multiple symptoms participants might display when suffering from anemia. The second survey included questions about food intake habits and the salary level of the children's parents. The responses were confidential. The researcher ensured that their responses remain confidential by not obtaining names or contact information by those completing the survey. The study submitted to IRB to make sure that the study was it ethical and appropriate for dealing with this sensitive population. The IRB approval number was 16-066.

Instrumentation/Measurement Description

The researcher utilized questionnaires and demographics to collect the data. The demographics included three information regarding age, gender, and parental literacy. Both an English version and an Arabic version of the survey is located in Appendix A and B respectively.

The survey is represented in English and Arabic languages because the data will be collected in Saudi Arabia.

The “Could I Be Anemic?” It is from American Regent from anemia in women questionnaire. This questionnaire analyzed the variety of symptoms participants might demonstrate when suffering from anemia. This questionnaire used a likert scale of 1-4, one being “always” and four being “never.” This questionnaire originally consisted of 13 questions broken down into four subsections. The researcher chose to delete specific questions that focused solely on girls’ health, as not all of these questions applied for children of multiple genders. The researcher then added two additional questions from her hypothesis, including, “Does your family suffer from poverty?” and “What kind of eating habits does your family have?”

The researcher included another questionnaire that asked about poor eating habits, as well as identified the income level of the children. Researcher added these questions after review of literature. These questions allowed the researcher to measure poor eating habits. The total number of questions is eight. seven of them use a sliding scale of 1-3, one being “yes,” two being “sometimes,” and third being “no.” The eighth question uses the household income to know the social situation for the children. The researcher chose to delete many questions that were not as important, had too much detail. The researcher then added one additional question from her hypothesis: “What is your total household income?” and two questions which related to nutrition education needed.

Procedure for Data Collection

The researcher contacted Riyadh hospital in Saudi Arabia and inquired about children who suffer from anemia. Researcher went to the Hospital, to the pediatric department and asked the nurse in charge to help her to distribute the questionnaire to cases that have anemia after introducing the researcher and the research topic. The participants were informed that the survey was voluntary and took approximately six to ten minutes to complete. The results of the questionnaire were both confidential and anonymous.

Data Analysis

The data were analyzed using frequencies for the demographics, as well as correlation tests to answer the three question's research hypothesis. Information was analyzed by using descriptive statistics. Survey questions 1 through 10 are based on a Likert-type scale, which are analyzed by a mean of the responses to each question.

Researcher got accepted from a King Abdul-Aziz university hospital in Riyadh to provide assistance to student Layla Alahmari in gathering the data needed for her research about malnutrition for children in Saudi Arabia.

Chapter 4

Results

This section includes demographical information about the families of children who suffer from malnutrition and the results of the study regarding the hypotheses questions, which discuss parents' education level, household income levels and parental influence on children in Saudi Arabia. The data presented in this section was analyzed using IBM SPSS program.

Demographic data

The Demographics section contains three pieces of information regarding age, gender, and parental literacy. Both an English version and an Arabic version of the survey is placed in Appendix A and B separately. Twenty females and thirty males had malnutrition anemia, according to the survey results.

Table 1

Gender of Participants (N=50)

<u>Gender</u>	<u>N</u>	<u>Percent</u>
Female	20	40
Male	30	60
Total	50	100

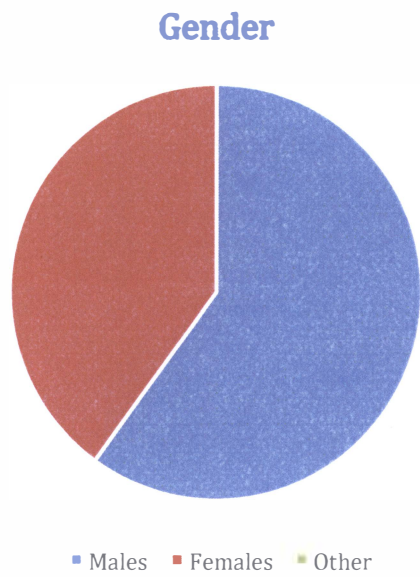


Figure 1. Pie graph showing gender distribution of sample (N=50)

Age of participants

The participants were between four to nine years of age. The number of participants who have anemia were fifty. Two of the participants were four years of age, two of the participants were six years of age, fifteen of the participants were seven years of age, eleven of the participants were eight years of age, and twenty of the participants were nine years of age.

Table 2

Age of participants (N= 50)

<u>Age</u>	<u>N</u>	<u>Percent</u>
4	2	4.0
6	2	4.0
7	15	30.0
8	11	22.0
9	20	40
Total	50	100.0

Illiteracy of participants

There were a total of fifty applicants. Ten of the parents of children were Illiterate, and forty of them were literate.

Table 3

Illiteracy of participants (N= 50)

<u>Illiteracy</u>	<u>N</u>	<u>Percent</u>
Illiteracy	10	18.0
Literate	40	80.0
Total	50	100.0

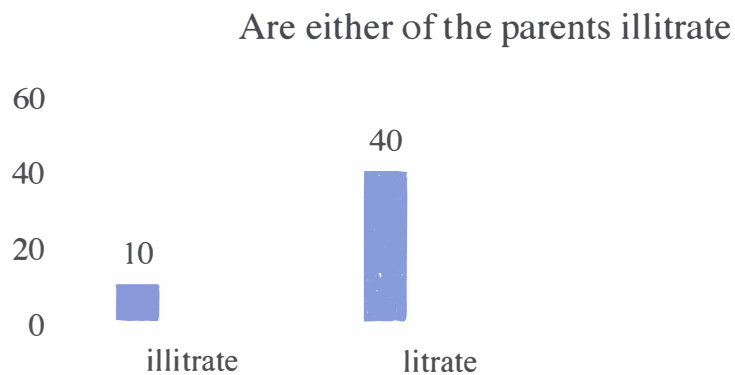


Figure 2

Bar graph showing education level distribution of sample ($N=50$)

Illiteracy: H1

Results hypothesis 1: Education level is not significant and has weak negative correlations with malnutrition ($r=-.0261$, $p=.86$)

Tables 4

Education level ($N=50$)

<u>N</u>	<u>VAR003</u>	<u>Mean</u>	<u>P</u>	<u>St</u>
50	.0261	1.86	.86	0.495

Income: H2

Results hypothesis 2: household income levels in Saudi Arabia are not significant and have negative correlations with malnutrition ($r=-.025$, $p=.86$)

Tables 5*Household income levels in Saudi Arabia (N=50)*

<u>N</u>	<u>VAR003</u>	<u>Mean</u>	<u>P</u>	<u>St</u>
50	-.025	2.26	.861	.558

Household income

This pie graph indicated what are the families said about the household income. Four of the families said the household income was enough to meet the needs of their families, seventeen of the families said the household income was not enough to meet the needs of their families and twenty nine of the families assumed that the household income was sometimes enough to meet the needs of their families.

Is the household income enough to meet the needs of your family

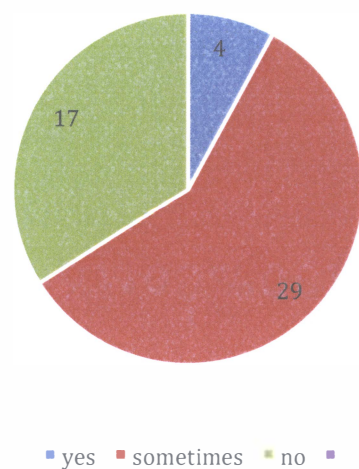


Figure 3

Pie graph showing household income's family level distribution of sample (N=50)

Classes: H3

Results hypothesis 3: Awareness levels for parents who have taken classes discussing healthy food in Saudi Arabia are not significant and have positive correlations with kids having malnutrition ($r=.261$, $p=.067$)

Tables 6

Awareness levels for parents who have taken classes discussing healthy food in Saudi Arabia
($N=50$)

<u>N</u>	<u>VAR003</u>	<u>Mean</u>	<u>P</u>	<u>St</u>
50	.261	2.24	.067	.642

Classes for healthy eating

This bar graph showed if the families taken classes that discuss healthy eating. Four of the families said yes they taken classes that discuss healthy eating, twenty one of the families said sometimes they taken classes that discuss healthy eating and twenty five of the families said that they never taken classes that discuss healthy eating.

Have you taken classes that discuss healthy eating

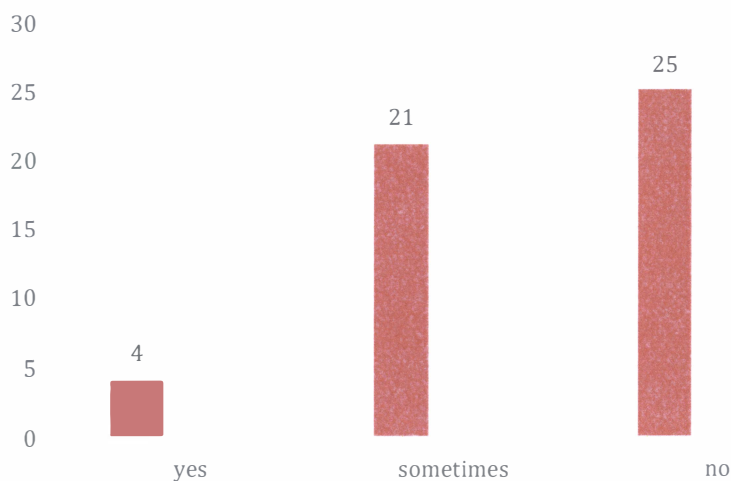
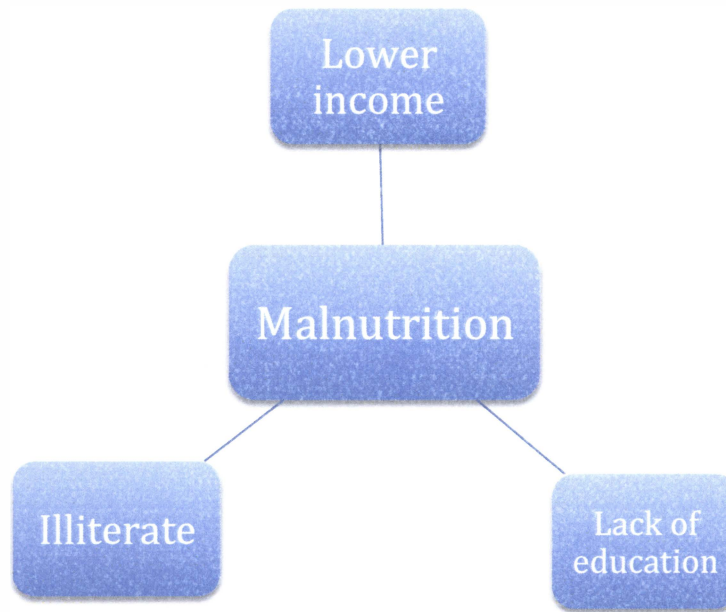


Figure 5

Bar graph showing awareness's family level distribution of sample ($N=50$)

Hypotheses' factors and malnutrition

These factors in figure five showed the relationship between these factors and malnutrition. This figure showed the relationship between these factors and malnutrition, which were insufficient. In figure five, lower income, education and illiteracy in relation to malnutrition were the hypotheses for the study. More data is needed to determine the causes of malnutrition.

*Figure 5*

This figure showing the relationship between the insignificant factors and malnutrition

Significant factors and malnutrition

These elements in figure six indicated the association between these factors and malnutrition, which were significant factors. In figure six, poor eating habits, junk food, poverty, and sadness were significant factors in relation to malnutrition.

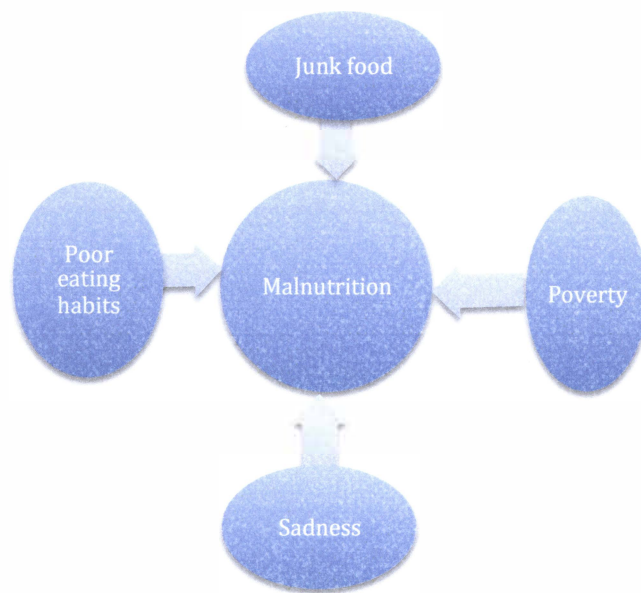


Figure 7

This figure showing the relationship between the significant factors and malnutrition

Chapter 5

Discussion & Conclusion

The researcher was not expecting all the hypotheses results to not be significant in relation to malnutrition as the outcome of this study. There was an expectation of a stronger relationship between lower income and education in relation to malnutrition. In reality, the study showed the relationship between these factors and malnutrition was insignificant with a negative correlation for hypotheses one and two and positive correlation for hypotheses three.

This is odd because one would think this to be illogical when looking at it, simply without addressing the sample size and other factors that can affect the results of the study. The data were analyzed by using correlation tests to answer the three question's research hypothesis then the information was analyzed by using descriptive statistics. The analyses focused on the parental effect on children to instill poor eating habits, nutritional inequity resulting from the appearance of poverty, and maternal illiteracy.

The result of the first hypothesis, which pertained to the parents' education level, was not significant and had a weak negative correlation with malnutrition, $r_s = -.0261, p = .86$. The result of the second hypotheses, which related to the household income levels in Saudi Arabia, was not significant and had negative correlations with malnutrition, $r_s = -.025, p = .86$. The consequence of the third hypotheses, which concerned to the classes, which discuss healthy eating in relation to malnutrition was not significant and had positive correlations, $r_s = .261, p = .067$. All the results were about the hypotheses showed that the results were not significant.

Even though the researcher did not find significant results from her hypothesis, the researcher noticed in certain correlations, which concerned patients who have malnutrition, there were significant results including questions:

- 1) “Does your family have the poor eating habits?” (P 0.027).
- 2) “Does your family suffer from poverty?” (P 0.000).
- 3) “Do you limit the amount of junk food your child eats at home?” (P 0.013).
- 4) “Does your child feel sad or depressed?” (P 0.001).

Poor eating habits

The results of this study found a correlation, $p = 0.027$ between malnutrition children who have poor eating habits at home. The most common form of nutritional insufficiency in the world is iron deficiency, which can aid in the development of anemia (Kaahe, 2016). This study required individuals to change their bad eating habits. King Abdullah Bin Abdulaziz Arabic Health Encyclopedia provides information about various medical topics, as well as other news and events related to healthcare, diet, and exercise, which individuals can use to change these habits (Alsughayr, 2013). Moreover, researchers point out that if individuals do not get an adequate amount of one particular nutrient they will develop a nutritional deficiency (Kaahe, 2016). As a result, Poor nutrition habits cause multiple issues in individuals that are related to general health.

Poverty

The consequences of this study found an association, $p = 0.000$ between malnutrition and families who were suffered from poverty. Researchers have found the most common reasons for food insecurity were poverty and poor levels of education, which are considered major risk factors in children’s health. Past researchers have also examined the relationship between maternal education and health nutrition for children who were in the first five years of age (Olson, 1999). Mostly, there is a prevalence of malnutrition in children because they could not reached healthy food due to poverty or parental education.

Junk Food

The results of this study found a correlation, $p = 0.013$ between malnutrition and parents who did not limit the amount of junk food for their children at home. Past research has also shown that many diseases lurk in unhealthy foods and can cause severe illnesses and even death when individuals do not pay attention (Kidshealth, 2016). There are different levels of malnutrition, from mild to severe, and the disease can last for a long or short period of time. Most individuals suffering from malnutrition get sick and might even die in more severe situations (Kidshealth, 2016). Moreover, one study found that the deficiency of accessing highly healthful foods, particularly in the current context of increasing food prices, aids in developing malnutrition (The World Health Organization, 2016). The diseases related to malnutrition, such as anemia and malaria, often develop because of poverty and poor parental education.

Feeling

The results of this study found a correlation, $p = 0.001$ between malnutrition and having depression. Researchers observed that the malnutrition could cause depression, which is correlated to unhealthy food (Koo, Yoon, Kim, Lee, Oh, Kim, & Son, 2003). There are multiple diseases that can result from malnourishment, such as; one of the most common diseases that result from malnourishment is Anemia. Anemia is when your blood lacks healthy red blood cells or hemoglobin; red blood cells are crucial to your health (Sakić, 2014). Often sadness and depression are signs of having malnutrition.

Risk and lessons of malnutrition

Many researchers have discovered the influence of providing lessons to school-age students about nutrition education, as well as incorporating active services into the schools. Both of these methods have been used to decrease the rate of anemia in children. Researchers noticed

that the nutrition lessons helped assist in the prevention of anemia in children's lives and also encouraged children to engage with healthier lifestyles (Haldar, Chatterjee, Prasad Sarkar, Bisoi, Biswas, & Chandra Sardar, 2012). Nutrition education lessons for students in school could aid in reducing the incidence of malnutrition.

PRECEDE and PROCEED planning model

The results of this study have shown that malnutrition is an issue in Saudi Arabia in which PRECEDE planning model may help in healthy food and lifestyle. This model offers a plan that allows individuals to start practices that deal with health complications. The PRECEDE planning model emphasizes that environmental factor may affect healthy food and lifestyle related to health practices, causing health problems such as poor eating habits. The step continually assures that environmental obstacles greatly influence the eating habits.

Epidemiological diagnosis offers the ground for evaluating existent problems, such as poverty. Especially, the social diagnosis step focusing on evaluating the existing problem and the following step helping in evaluating some of the resulting factors that lead to the highlighted problem (Moshki, Dehnoalian, Camp & Alami, 2016). Therefore, concerning poverty, epidemiological diagnosis provides various aspects ranging from social to economic problems that result in poverty. With relation to the junk food that a child eats at home, the theory above offers an illustration related to the effect of healthy food and lifestyle on influencing the preference of junk food.

The PRECEDE model influences healthy food and lifestyle, resulting in specific tendencies that may encourage or discourage the consumption of junk food. The model offers an alternative approach that incorporates a behavioral change in eliminating unhealthy tendencies (Gielen & Eileen, 1996).

Both theories focus heavily on developing strategies that lead to beneficial outcomes. Based on the outcome shown in the PROCEED model, it is essential that behavioral change is implemented. This approach involves eliminating existing factors that dictate behavioral trends. Therefore, the changes in a child's perception of growth and development greatly affect the environment in general.

Limitations of the study

The researcher provided the attributes of the participants through surveys, which reduced the accuracy of the data because of personal biases. The sample size also poses a limitation on the accuracy of the data for 50 is not adequate to reveal the true relationships between the hypotheses and the reality of the population. The researcher could not go to too many hospitals because the researcher did not have enough time to gather the information first hand. Furthermore, many patients were not totally comfortable with answering the questions on the survey even though it was anonymous.

Recommendations

The researcher recommends performing another study with a larger sample size and controlling other factors that could affect the outcome of the study such as social class, medical history, level of activity, and the amount and quality of food intake by monitoring participants rather than asking the participants provide the data themselves. The researcher also recommends having the sample covering multiple countries to discover the true nature of the relationship between the hypotheses and the population by reducing the effects of the culture and diet by providing a more comprehensive data set. All these recommendations were important because they can be more accurate by increasing the sample size and having the sample covering multiple countries.

Conclusion

This study discussed the causes of malnutrition, including research on the effect of parents on children to instill unhealthy eating habits, nutritional inequality consequential from the appearance of poverty, and parental illiteracy. This study focused on the relationship between poverty, lack of education, and illiteracy and how those influences impact a person's knowledge of healthy food habits. The researcher noted unexpected outcomes with regarding to the factors that contribute to malnutrition in patients. The researcher did not accurately predict any of the hypothesis results, which resulted in not having meaningful relationships between the variables being studied and malnutrition. In fact, the study discovered the relation between these factors and malnutrition was not significant, including a negative association. There was a belief of a significant relationship between lower household income levels, illiteracy and education about malnutrition. The researcher used correlation tests to answer the three hypotheses, and then the researcher used descriptive statistics to analyze the results. The study was concentrated on the parents' impact on children, which include poor eating use, which resulting from the condition of poverty, and maternal illiteracy.

References

- Abdou, I. E., & Pratt, W. K. (1979). Quantitative design and evaluation of enhancement/thresholding edge detectors. *Proceedings of the IEEE*, 67(5), 753-763.
- Achterberg, C.L., & Gillespie, A.H. (1989). Comparison of family interaction patterns related to food and nutrition. *Journal of American Dietetic Association*, 89(4), 509-512.
- Aftab, S., Ara, J., Kazi, S., & Deeba, F. (2012). Effects of poverty on pregnant women. *Pakistan Journal of Medical Research*, 51(1), 5-9.
- Alberda, C., Graf, A., & McCargar, L. (2006). Malnutrition: Etiology, consequences, and assessment of a patient at risk. *Best Practice & Research Clinical Gastroenterology*, 20(3), 419-439.
- Alsughayr, A. (2013). King Abdullah Bin Abdulaziz Arabic health encyclopedia: A reliable source for health information in Arabic in the internet. *Saudi Journal of Medicine and Medical Sciences*, 1(1), 53.
- Al-Rowais, N. A. (2002). Herbal medicine in the treatment of diabetes mellitus. *Saudi Medical Journal*, 23(11), 1327-1331.
- American Society of Hematology. (2016). *Anemia*. Retrieved from <http://www.hematology.org/Patients/Anemia/>
- Agee, M. D. (2010). Reducing child malnutrition in Nigeria: Combined effects of income growth and provision of information about mothers' access to health care services. *Social Science & Medicine*, 71(11), 1973-1980.
- Balint, J. P. (1998). Physical findings in nutritional deficiencies. *Pediatric Clinics of North America*, 45(1), 245-260.

Barakat, A. A., Nada, K. H., and Ezzat, D. A. (2013). Prevalence and determine factors of anemia and malnutrition among Egyptian children. *Indian Journal of Medical Sciences*, 67(7/8), 168-177.

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., De Onis, M., & Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427-451.

Brown University. (2012). Tips for parents: Video games and your children. *The Brown University Child and Adolescent Behavior Letter*, 28(S1).

Centers for Disease Control and Prevention. (2016, March 24). Retrieved from <http://www.cdc.gov/malaria/>

Chernichovsky, D., & Coate, D. (1980). The choice of diet for young children and its relation to children's growth. *Journal Of Human Resources*, 15(2), 255-263.

Child hunger facts. (n.d). *Feeding America.org*. Retrieved from <http://www.feedingamerica.org/hunger-in-america/impact-of-hunger/child-hunger/child-hunger-fact-sheet.html>

Codman Academy Junk Food Questionnaire. (n.d.). Retrieved from <https://www.surveymonkey.com/r/?sm=FtdQcRzXMrnA9YLQnGI8aA%3D%3D>

Could I Be Anemic? (n.d.) *Anemia in women questionnaire*. Retrieved from <http://www.anemiainwomen.com/html/questionnaire.htm>

Darroch, J. (1997.). Biologic synergism and parallelism. *American Journal of Epidemiology*. 145(7).

- Delisle, H. F. (2008). Poverty: The double burden of malnutrition in mothers and the intergenerational impact. *Annals of The New York Academy of Sciences*, 1136(1), 172-184.
- De Onis, M., Monteiro, C., Akre, J., & Clugston, G. (1993). The worldwide magnitude of protein-energy malnutrition: An overview from the WHO global database on child growth. *Bulletin of the World health Organization*, 71(6), 703-712.
- El Mouzan, M., Foster, P., Al Herbish, A., Al Salloum, A., Al Omar, A., & Qurachi, M. (2010). Prevalence of malnutrition in Saudi children: A community-based study. *Annals of Saudi Medicine*, 30(5), 381.
- Fan, F. A. (2012). The relationship between the socio-economic status of parents and students' academic achievements in social studies. *Research In Education*, (87), 99-103.
- Food and Agriculture Organization of the United Nations. (2016). *The Family Nutrition Guide*. Retrieved from <http://www.fao.org/docrep/007/y5740e/y5740e0e.htm>
- Food and Agriculture Organization. (2015). The state of food insecurity in the world: The FOA hunger map. Retrieved from <http://www.fao.org/hunger/en/>
- Gielen, A. C., & Eileen M. M. (1996). The PRECEDE-PROCEED Planning Model. In *Health Behavior and Health Education*, edited by Glanz, K, Lewis, F., & Rimer, K. B. San Francisco : Jossey-Bass.
- Grantham-McGregor, S., Cheung, Y. B., Cueto, S., Glewwe, P., Richter, L., Strupp, B., & International Child Development Steering Group. (2007). Developmental potential in the first 5 years for children in developing countries. *The Lancet*, 369(9555), 60-70.)
- Grossbart, S., Crosby, L., & Smith, L. (1986). Parental diffusion roles and effects of nutrition education on parents and children. *Advances in Consumer Research*, 13(1), 360-364.

- Haldar, D., Chatterjee, T., Prasad Sarkar, A., Bisoi, S., Biswas, A. K., & Chandra Sardar, J. (2012). A study on impact of school-based health and nutrition education in control of nutritional anemia among primary school children in rural west Bengal. *Indian Journal of Community Medicine*, 37(4), 259-262.
- Hashim, N., Farooqi, M., Naqvi, S., & Jaffery, H. F. (2014). Anemia; Moderate to severe during pregnancy. *Professional Medical Journal*, 21(2), 247-252.
- Humanium.org. (2016). *Problems linked to malnutrition*. Retrieved from <http://www.humanium.org/en/fundamental-rights/food/malnutrition/>
- Irshad, M., Hayat, M., Ahmad, A., Khalil, B., & Hussain, M. (2014). Case fatality rate and etiological factors of malnutrition in children less than 5 years of age. *Journal of Postgraduate Medical Institute*, 28(1), 42-48.
- Jamro, B., Junejo, A. A., Lal, S., Bouk, G. R., & Jamro, S. (2012). Risk factors for severe acute malnutrition in children under the age of five year in Sukkur. *Pakistan Journal of Medical Research*, 51(4), 111-113.
- Jesmin, A., Yamamoto, S. S., Malik, A. A., & Haque, M. A. (2011). Prevalence and determinants of chronic malnutrition among preschool children: A cross-sectional study in Dhaka City, Bangladesh. *Journal of Health, Population & Nutrition*, 29(5), 494-499.
- Kapil, U., Tandon, M., Nayar, D., Pathak, P., Yadav, R., & Dwivedi, S. N. (1999). Dietary intake of trace elements, minerals and vitamins among severely malnourished children and its interrelationship with nutritional status: A prospective study. *Asia Pacific Journal Of Clinical Nutrition*, 8(4), 268-271. doi:10.1046/j.1440-6047.1999.00122.x
- Kavitha, N. (2014). Are slum children at high risk of under nutrition, anemia and childhood morbidity? Evidence from India. *Indian Journal of Community Health*, 26(2), 124-131

- Katona, P., & Katona-Apte, J. (2008). The interaction between nutrition and infection. *Clinical Infectious Diseases*, 46(10), 1582-1588.
- Kidshealth (2016). *Anemia*. Retrieved from <http://kidshealth.org/en/parents/anemia.html>
- KidsHealth. (2016). *Hunger and malnutrition*. Retrieved from <http://kidshealth.org/en/parents/hunger.html>
- Kiguli, S., Maitland, K., George, E. C., Olupot-Olupot, P., Opoka, R. O., Engoru, C., & ... Crawley, J. (2015). Anaemia and blood transfusion in African children presenting to hospital with severe febrile illness. *BMC Medicine*, 13(1), 1-13.
- King Abdullah Bin Abdulaziz Arabic Health Encyclopedia. (2016). Anemia - Health Encyclopedia. Retrieved from <https://www.kaahe.org/health/en/264-anemia.html>
- Kishawi, R. E., Kah Leng, S., Abed, Y. A., & Muda, W. W. (2015). Anemia among children aged 2-5 years in the Gaza Strip- Palestinian: A cross sectional study. *BMC Public Health*, 15(1), 1-8.
- Koo, J. R., Yoon, J. W., Kim, S. G., Lee, Y. K., Oh, K. H., Kim, G. H., & Son, B. K. (2003). Association of depression with malnutrition in chronic hemodialysis patients. *American journal of kidney diseases*, 41(5), 1037-1042.
- Leedy, P. N., & Ormrod, J. E. (2010). *Practical research: Planning & design*. Person education.
- Mahesh C. Gupta, Manjusha Mehrotra, Sunita Arora, & Meenakshi Saran. (1991). Relation of childhood malnutrition to parental education and mothers' nutrition related KAP. *The Indian Journal of Pediatrics*, 58(2), 269-274.
- Martorell R, Rivera J, Kaplowitz H, Pollitt E. Long-term consequences of growth retardation during early childhood. Hernandez M, Argente J. *Human growth: Basic and clinical aspects*. Amsterdam: Elsevier Science Publishers; 1992. 143-149.

- Mesfin, F., Berhane, Y., & Worku, A. (2015). Anemia among primary school children in Eastern Ethiopia. *Plos ONE*, *10*(4), 1-10.
- Moshki, M., Dehnoalian, A., & Alami, A. (2016). Effect of Precede-Proceed Model on Preventive Behaviors for Type 2 Diabetes Mellitus in High-Risk Individuals. *Clinical Nursing Research*. <http://dx.doi.org/10.1177/1054773815621026>
- Ny, P., Dejin-Karlsson, E., Udén, G., & Greiner, T. (2006). Health education to prevent anemia among women of reproductive age in southern India. *Health Care For Women International*, *27*(2), 131-144.
- Olson, C. M. (1999). Nutrition and health outcomes associated with food insecurity and hunger. *The Journal of nutrition*, *129*(2), 521S-524S
- Orphanutrition.org. (2016). *Impact of malnutrition on health and development*. Retrieved from <http://www.orphanutrition.org/understanding-malnutrition/impact-of-malnutrition-on-health-and-development/>
- Ortiz-Andrellucchi, A., Peña-Quintana, L., Saavedra-Santana, P., Albino-Bañacar, A., Monckeberg-Barros, F., & Serra-Majem, L. (2009). Facing malnutrition and poverty: Evaluating the CONIN experience. *Nutrition Reviews*, *67*(1), S47-S55.
- Pelletier, D. L., Frongillo, E. A., and Habicht J.P.(1993) Epidemiologic evidence for a potentiating effect of malnutrition on child mortality. *American Journal of Public Health*: *83*(8): 1130-1133.
- Pena, M., & Bacallao, J. (2002). Malnutrition and poverty. *Annual Review of Nutrition*, *22*(1), 241.
- Pollitt, E. (1994). Poverty and child development: Relevance of research in developing countries to the United States. *Child Development*, *65*(2), 283-295.
- Pugliese, M. T., Weyman-Daum, M., Moses, N., & Lifshitz, F. (1987). Parental health beliefs as

- a cause of nonorganic failure to thrive. *Pediatrics*, 80(2), 175-182.
- Reshamwala, S., & Patne, A. (2010). Survey of malnutrition among children in a slum area of Mumbai. *Australasian Medical Journal*, 3(8), 553.
- Sakić, M. (2014). Anemia in children with malignant diseases. *Medical Journal*, 20(4), 264-266.
- Semba, R. D. (2003). Iron-deficiency anemia and the cycle of poverty among human immunodeficiency virus—Infected women in the inner city. *Clinical Infectious Diseases*, 37(2), S105-S111.
- Sezik, H. A., Can, H., Kurnaz, M. A., Tuna, M., & Ay, Z. (2015). Use of iron supplements in children aged 1-2 years with iron deficiency anemia: A cross-sectional study. *Pakistan Journal Of Medical Sciences*, 31(5), 1-6. doi:10.12669/pjms.315.7334
- Shafqat, N., Manzoor, S., & Abbasi, S. (2013). Relationship of sociodemographic factors with malnutrition in preschool children: A community based study. *Pakistan Journal of Medical Research*, 52(4), 120-125
- Sharifzadeh, G., Mehrjoofard, H., & Raghebi, S. (2010). Prevalence of malnutrition in under 6-year olds in South Khorasan, Iran. *Iranian Journal of Pediatrics*, 20(4), 435-441.
- Singh, M. B., Haldiya, K. R., & Lakshminarayana, J. (2002). Morbidity pattern and its association with malnutrition in preschool children in desert areas of Rajasthan, India. *Journal of Arid Environments*, 51(3), 461.
- Smith, M. A., & Scholey, A. B. (2014). Nutritional influences on human neurocognitive functioning. *Frontiers In Human Neuroscience*, 8
- Souganidis, E., Sun, K., Pee, S., Kraemer, K., Rah, J., Moench-Pfanner, R., & Semba, R. (2012). Relationship of maternal knowledge of anemia with maternal and child Anemia and

Health-Related Behaviors Targeted at Anemia Among Families in Indonesia. *Maternal & Child Health Journal*, 16(9), 1913-1925.

Syed, S. A., Nasim, K., & Abdul, G. B. (2005) Association of literacy of mothers with malnutrition among children under three years of age in rural area of district Malir, Karachi. Retrieved from http://jpma.org.pk/full_article_text.php?article_id=992

Thakur, N., Chandra, J., Pemde, H., & Singh, V. (2014). Anemia in severe acute malnutrition. *Nutrition*, 30(4), 440-442.

The hunger and under nutrition blog. (2012, November 7). *Behavioral Patterns: The Parent-Child Relationship in Malnutrition*. Retrieved from <http://www.hunger-undernutrition.org/blog/2012/07/behavioral-patterns-the-parent-child-relationship-in-malnutrition.html>

The World Health Organization (2016). *Global database on child growth and malnutrition*. Retrieved from <http://www.who.int/nutgrowthdb/about/introduction/en/>

The World Health Organization. (2016). *Micronutrient deficiencies*. Retrieved from <http://www.who.int/nutrition/topics/ida/en/>

The World Health Organization. (2016). *Malnutrition*. Retrieved from http://www.who.int/maternal_child_adolescent/topics/child/malnutrition/en/

The World Health Organization. (2016). *Nutrition*. Retrieved from <http://www.who.int/topics/nutrition/en/>

Thorne, C. J., Roberts, L. M., Edwards, D. R., Haque, M. S., Cumbassa, A., & Last, A. R. (2013). Anaemia and malnutrition in children aged 0-59 months on the Bijagós Archipelago, Guinea-Bissau, West Africa: A cross-sectional, population-based study. *Paediatrics & International Child Health*, 33(3), 151-160.

- University Hospitals. (2016). *Eating disorders/Malnutrition*. Retrieved from <http://www.uhhospitals.org/health-and-wellness/health-library/d-h/eating-disorders-malnutrition>
- University of Maryland Medical Center (2016). *Anemia*. Retrieved from <http://umm.edu/health/medical/reports/articles/anemia>
- Vani, B (2009) *The role of maternal literacy in reducing the risk of child malnutrition in India*. In: Gender and Discrimination: Health, Nutritional Status and Role of Women in India.
- Water-related diseases. (n,d). *The World Health Organization*. Retrieved from http://www.who.int/water_sanitation_health/diseases/anemia/en/
- Wazir, K., Khan, S. S., & Khattak, A. A. (2015). Risk factors for primary third degree malnutrition in children less than five years of age. *Gomal Journal Of Medical Sciences*, 13(1), 3-8.
- Welch, R. M., & Graham, R. D. (1999). A new paradigm for world agriculture: Meeting human needs: Productive, sustainable, nutritious. *Field Crops Research*, 60(1), 1-10.
- Wenfang, Y., Xu, L., Ying, L., Shuiping, Z., Liming, L., Xiang, W., & Weimin, L. (2012). Anemia, malnutrition and their correlations with socio-demographic characteristics and feeding practices among infants aged 0-18 months in rural areas of Shaanxi province in northwestern China: A cross-sectional study. *BMC Public Health*, 12(1), 1127-1133.
- What Are Hunger and Malnutrition? (n.d.) *kidshealth.org*. Retrieved from <http://kidshealth.org/en/parents/hunger.html>
- Who, J., & Consultation, F. E. (2003). Diet, nutrition and the prevention of chronic diseases. *World Health Organ Tech Rep Ser*, 916(i-viii).

Wong, H. L., Shi, Y., Luo, R., Zhang, L., & Rozelle, S. (2014). Improving the health and education of elementary schoolchildren in Rural China: Iron supplementation versus nutritional training for parents. *Journal of Development Studies*, 50(4), 502-519.

Zottarelli, L.K., Sunil, T.S., & Rajaram, S.(2007). Influence of parental and socioeconomic factors on stunting in children under 5 years in Egypt. *Eastern Mediterranean Health Journal*, 13(6), 1330-1342.

(Appendix A)

Please circle the answer you identify most with:

1. Gender: Boy ____ girl ____
Other: _____
2. Age: _____
3. Are either of your parents illiterate “is the inability to read”:
Yes _____ No _____

“Could I Be Anemic??” Questionnaire

This section is to identify the probability you would have the malnutrition “anemia”

	Questions	Always	Often	Sometimes	Never
1	Does your child feel tired or fatigued?	1	2	3	4
2	Does your child feel weak?	1	2	3	4
3	Does your child skin look pale?	1	2	3	4
4	Does your child short of breath?	1	2	3	4
5	Does your child get dizzy?	1	2	3	4
6	Is it difficult to concentrate?	1	2	3	4
7	Has your child experienced a rapid heartbeat?	1	2	3	4
8	Does your child feel sad or depressed?	1	2	3	4
9	Does your family suffer from poverty?	1	2	3	4
10	Does your family have the poor eating habits?	1	2	3	4

Adapted from American Regent from anemia in women questionnaire

(Appendix B)

يرجى وضع دائرة حول الإجابة المناسبة:

1 الجنس: فتى _____ فتاة _____ أخرى _____

2 العمر _____

3 "هل أحد والديك أمي" هو عدم القدرة على قراءة "

نعم _____ لا _____

يمكن لي أن فقر الدم؟؟ "الاستبيان

"هذا القسم هو تحديد احتمال وجود سوء التغذية "فقر الدم

أبدا	أحيانا	غالبا	دائما	الإسئلة	الترقيم
4	3	2	1	هل ابنك يشعر بالتعب أو الارهاق؟	1
4	3	2	1	هل ابنك يشعر بالضعف؟	2
4	3	2	1	هل تبدو بشره ابنك باهتة؟	3
4	3	2	1	هل يأتي ابنك ضيق في التنفس؟	4
4	3	2	1	هل يأتي ابنك دوار؟	5
4	3	2	1	هل يواجهه ابنك صعوبة في التركيز؟	6
4	3	2	1	هل يواجهه ابنك سرعة في ضربات القلب؟	7
4	3	2	1	هل يشعر ابنك بالحزن أو الاكتئاب؟	8
4	3	2	1	هل أسرتك تعاني من الفقر في مرحلة الطفولة لديك؟	9
4	3	2	1	هل عائلتك لديها عادات الأكل خاطئة؟	10

مقتبس من ريجنت الأميركية من فقر الدم في الاستبيان النساء

(Appendix A)

Codman Academy Junk Food Questionnaire

- 1) Is breakfast the most important meal of your child's day?
Yes Sometimes No
- 2) Do you limit the amount of junk food your child eats at home?
Yes Sometimes No
- 3) Do you know about the major health risks (ex: Diabetes, Obesity, Heart Disease) associated with poor eating habits?
Yes Somewhat No
- 4) Does your child frequently eat fatty and/or fried meats (ex: steak, hamburgers, hotdogs, fried chicken, fried fish)?
Yes Sometimes No
- 5) Does your child drink more than two cups of soda a day?
Yes Sometimes No
- 6) Have you taken classes that discuss healthy eating?
Yes Sometimes No
- 7) Do you prepare your meals for your child?
Yes Sometimes No
- 8) Is your household income enough to meet the needs of your family?
Yes Sometimes No

Adapted from Codman Academy charter School

Thank you for taking the survey

(Appendix B)

أكاديمية كودمان استبيان الوجبات السريعة

- 1 هل الفطور أهم وجبة في يوم طفلك؟
 نعم _____ أحيانا _____ لا _____
- 2 هل انت كوالد تحد من كمية الوجبات السريعة في البيت؟
 نعم _____ أحيانا _____ لا _____
- 3 هل تعرف عن المخاطر الصحية الرئيسية (مثلا: مرض السكري، السمنة، أمراض القلب) المرتبطة مع العادات الغذائية السيئة؟
 نعم _____ أحيانا _____ لا _____
- 4 هل ابنك كثيرا يأكل مأكولات دهنية و / أو مقلية من اللحوم (مثل: شريحة لحم، والهمبرغر، المقانق المقلية والدجاج المقلي والسّمك المقلي)؟
 نعم _____ أحيانا _____ لا _____
- 5 هل ابنك يشرب أكثر من كوبان من المشروبات الغازية في اليوم؟
 نعم _____ أحيانا _____ لا _____
- 6 هل حضرت حصص تناقش الأكل الصحي؟
 نعم _____ أحيانا _____ لا _____
- 7 هل تحرص على اعداد وجبات الطعام الخاصة بطفلك؟
 نعم _____ أحيانا _____ لا _____
- 8 هل دخل الاسره يكفي لتلبية احتياجاته العائله ؟
 نعم _____ أحيانا _____ لا _____

مقتبس من مدرسة الميثاق أكاديمية كودمان

شكرا لكم لإنهاء هذه الدراسة

(Appendix C)**CONSENT TO PARTICIPATE IN RESEARCH**

When nutrition kills you: Malnutrition in Saudi Arabia for children

You are invited to participate in a research study conducted by Layla Alahmari and Dr. Nichole Hugo from the School of Family and Consumer Sciences at Eastern Illinois University.

Your participation in this study is entirely voluntary. Please ask questions about anything you do not understand, before deciding whether or not to participate.

The purpose of this study is to determine most significant factors that result in malnutrition of children in Saudi Arabia. The participant will be asked to complete two surveys. It will take approximately six to ten minutes to complete. There are no foreseeable risks or discomforts that may come as a consequence of this study. There will be no monetary benefits for the participants in this study. Potential benefits from this study could be due to knowledge and may cause a decrease in malnutrition for the related community.

Any information that is obtained in connection with this study and that can be identified with me will remain confidential. The researcher will ensure that their responses remain confidential by not obtaining names or contact information by those completing the survey. The researcher will read for parents who are illiterate then will write their answers. Participation in this research study is voluntary and not a requirement or a condition for being the recipient of benefits or services from Eastern Illinois University or any other organization sponsoring the research project. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind or loss of benefits or services to which you are otherwise entitled. You may also refuse to answer any questions you do not want to answer.

If you have any questions or concerns about this research, please contact:

Layla Alahmari

Principle Investigator

Phone number: 217- 508-0575

Email addresses: lalhmani@eiu.edu

Nichole Hugo

Co-Investigator, Faculty Sponsor (if student is the P.I.), Co-Investigator(s), if any.

217-581-2410

nhugo@eiu.edu

If you have any questions or concerns about the treatment of human participants in this study, you may call or write:

Institutional Review Board

Eastern Illinois University

600 Lincoln Ave.

Charleston, IL 61920

Telephone: (217) 581-8576

E-mail: eiuirb@www.eiu.edu

You will be given the opportunity to discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community, as well as lay members of the community not connected with EIU. The IRB has reviewed and approved this study.

I voluntarily agree to participate in this study. I understand that I am free to withdraw my consent and discontinue my participation at any time. I have been given a copy of this form.

Printed Name of Participant

Signature of Participant

Date

I, the undersigned, have defined and fully explained the investigation to the above subject.

Signature of Investigator

Date