NUTRITIONAL STATUS OF YOUNG CHILDREN AND RISK FACTORS AMONG REFUGEES AND HOST POPULATION IN BIDI BIDI SETTLEMENT, YUMBE DISTRICT, UGANDA

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DECLARATION

This dissertation is my original work and has not been presented for a degree in any University

Signature: Date: 20th August 2020

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This dissertation has been submitted with our approval as University supervisors

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DEDICATION

In a very special way, I have dedicated this dissertation to my loving uncle Titus Xavier Ambayo; he has been so instrumental from day one, advising me on making the right decisions towards my education and career. My beloved parents Florence Madraa and Jacob Maku encouraged me to finish this dissertation despite the global lock-down during the COVID-19 pandemic. The everlasting guidance by my twin Uncle Elijah Opio and Elias Ochen were helpful. Lastly, the kind support of Moi Peter towards completion of this dissertation was so eloquent. May the merciful God who is the creator of the mountains, the rivers, the lakes, heaven and earth abundantly bless you all.

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DECLARATION OF ORIGINALITY FORM

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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
DDS	Dietary Diversity Score
DEFF	Design Effect
DFSNT	Department of Food Science Nutrition and Technology
DRC	Democratic Republic of Congo
ENA	Emergency Nutrition Assessment
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FSIN	Food Security Information Network
GAM	Global Acute Malnutrition
HFA	Weight for Age
HH	Household
HIV	Human Immunodeficiency Virus
ICGC	International Consensus Guideline Committee
IDPs	Internally Displaced Persons
IQ	Intelligence Quotient
KII	Key Informant Interview
LBW	Low Birth Weight
MAM	Moderate Acute Malnutrition
MIYCAN	Maternal Infant Young Child Adolescent Nutrition
MND	Micro Nutrient Deficiencies
MUAC	Mid Upper Arm Circumference
NGO	Non-Governmental Organization
NPHC	National Population and Housing Census
ODK	Open Data Kit
OPM	Office of the Prime Minister
RDA	Recommended Dietary Allowance
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SDG	Sustainable Development Goals

SMART	Standardized Monitoring and Assessments of Relief and Transitions
UBOS	Uganda Bureau of Statistics
UGX	Uganda Shillings
UN	United Nations
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children Fund
UNPD	United Nation Development Programme
USD	United States Dollars
VHT	Village Health Teams
WASH	Water Hygiene and Sanitation
WFH	Weight for Height
WHO	World Health Organization
WHZ	Weight for Height Z score

OPERATIONAL DEFINITIONS

Acute Malnutrition: Refers to unusual body thinness of children that is indicative of loss in body weight (FAO *et al*., 2018). In this study, a child whose; WHZ was <-2.00 z score and had a bilateral pitting oedema was classified as having acute malnutrition.

Children: The persons in the Bidi Bidi refugee and host population whose age, at the time of study, was between 6 and 59 months.

Climate Change: Refers to factors that significantly affected crop or animal production in Bidi Bidi and the host.

Food Insecurity: for this study meant that households were unable to provide adequate amount of food for the members for normal growth and healthy living and were exposed to inaccessibility to adequate, health and nutritious foods.

Food Security: The study adopted the definition given by FAO et al (2018). Therefore, it meant that everyone in the household always ate adequate and safe food for healthy living (FAO *et al*., 2018). That is, had all time access to food.

Host Population: Constituted the persons living in households within a radius of 10 kilometers of the refugee settlement.

Household: Comprised of a person or group of persons who shared a house or houses and at least a meal in a day under the same household head.

Milk and milk products: foods rich in calcium that promotes bone development in human.

Nutritional Status: In line to (FAO *et al*., 2018), this study defined it as States of the body influenced by the dietary intake, the level of nutrients in the body.

Nutritional Wellbeing: Children having normal nutritional indices for height and weight were considered to be nutritionally well in this research.

Refugee: For this study were the persons, who were forced to flee their country, due to civil strife and distinctive forms of disasters and were at the time of the study living in Bidi Bidi refugee camp.

Risk Factors: Direct or indirect attributes that lead to reduced nutritional wellbeing of children. Household size, episode of illness, lack deworming and anemia were risk factors to nutritional wellbeing in this study.

Settlement: In this study meant Bidi Bidi Refugee Settlement.

Skilled Enumerator: Were the persons the study recruited and trained to become proficient in reading, writing and in data collection techniques that were employed to participate in data collection, assist in language translation and back translation.

Young Children: persons who were included in this study and at the time of data collection, the age was between 6-59 months of age.

ABSTRACT

About 25.4 million people worldwide are living as refugees of whom 1.36 million are resident in Uganda. Uganda is the largest refugee host in Africa and third globally. The burden of refugees' presence on the host population is rarely discussed by funding and development agencies. Despite continuous relief food interventons in refugee settlements in Uganda, the nutritional status of Bidi Bidi was high at 11.8%. The main objective of this study was to determine the nutritional status of children in the refugee settlement and to elucidate the risk factors that contribute to poor nutritional status of children in the settlement in order to illuminate strengths or weaknesses of the host population.

Using analytical cross-sectional design, host and refugee populations were compared with emphasis on the nutritional status of children under the age five years. The sample size determination used 11.8% prevalence of wasting for the refugees to yield a simple random sample of 340 mother-child dyads. Using digital questionnaire, mothers provided data in Open Data Kit. The data included demographic and socio-economic characteristics, health-seeking behaviour, immunization status, child-feeding practices, anthropometric measurements, mother's nutritional knowledge, attitude and practices. Data were analyzed using SPSS version 20.0 and Python version 3.7.3.

The overall prevalence of underweight for the two groups was 14.1% (p=0.5) while global acute malnutrition (GAM) was 3.9% (p=0.9). GAM was 4.1% and 3.6% (p=0.9) for the host and refugee populations, while stunting was 27.0% and 22.4% (p=0.5), respectively. In ascending order, five factors contributed to poor nutritional status; size of household with large or medium being most affected (Adjusted Odds Ratio (OR[a]) =1.34 or 1.92), experience of illness episode in the 14 days prior to the study (wasting, stunting and underweight) (OR[a]=1.47, 1.49 and 1.97), being part of host population (wasting and stunting) (OR[a]=1.81 and 1.36), deworming status (lack of it) and anemia (OR[a]=3.2 and 2.13), respectively.

Even though the host had relatively better nutrient intake, they were worse off compared to the refugees in Bidi Bidi; the refugee children had better nutritional status and better vitamin A intake. Therefore, the host should be equally targeted for nutritional interventions while strengthening family planning programmes to moderate household size for both groups. The government of Uganda should thereby formulate

and enforce policies based on the principle of non-discrimination that allow the host to benefit equally from food relief during emergencies. Lastly, livelihood programmes involving animal rearing should be promoted in Bidi Bidi and the host population.

ACKNOWLEDGEMENTS

1. CHAPTER ONE: INTRODUCTION

This chapter covered background information on global, regional and national (Uganda) refugee crisis. Problem statement, justification, benefits of the study, aim and purpose of the study, general objective and specific objectives of the study.

1.1 Background

The World Bank estimates that about two billion people live in countries affected by crisis (*Lattre-Gasquet, D. and Moreau, C., 2018*) and further categorizes 36 nations or territories as being in instability (Martineau *et al.*, 2017). Globally, man-made disasters, such as civil war and natural disasters, such as, drought and floods are major causes of fragility. A report compiled by (Martineau *et al.*, 2017), predicts that the population of people living in unstable areas will rise by 50 % by the year 2030. Globally, about 40 million people are living as Internally Displaced Persons (IDPs) and 25.4 million as refugees (Lancet and 2017). According to (Carter, 2018), this level of population movement is the highest in the modern times with about 201 million people affected and in need of humanitarian support. Further, (Caroline Krafft *et al.*, 2018) estimate that two thirds of refugees, globally, are from South Sudan, Somalia, Afghanistan, Myanmar and Syria. Furthermore, majority of the refugees are below the age of 18 years. According to United Nations High Commission for Refugees (UNHCR), this kind of movement results into malnutrition due to loss of farming lands and livelihoods, compounded by high morbidity rates among the population, (UNHCR, 2018). Approximately, 124 million people in 51 countries in the world are faced with significant food access problems (Kiess *et al.*, 2017).

Uganda is a stable country in an unstable region (*UNHCR, 2017*). However, with 1.5 million refugee population, Uganda is the biggest host of refugees in Africa (UNICEF Uganda, 2018). Over 1.1 million of refugees in Uganda originate from South Sudan, 288,434 from Democratic Republic of Congo (DRC), 41,932 from Burundi, and over 37,000 from Somalia (*UNICEF Uganda. 2018*). Over 50 % of this refugee population are children. Uganda has limited resources to take care of the many refugees it is hosting. The population of refugees is continuously increasing, putting immense pressure on already strained public services, natural resources and local infrastructures (*UNHCR, 2017*).

Bidi Bidi refugee settlement is situated in Yumbe district, North West region of Uganda. It is the host to the largest number of refugees from South Sudan. The settlement comprises five locations called zones. According to *Hodgson, C. (2018)*, the settlement was opened in August 2016 and closed to new refugees in December of the same year. Bidi Bidi Settlement at that time was described as the largest Settlement in the world with population of 285,000 refugees (*Hodgson, C. 2018*). The Settlement covers 250 square kilometres of land negotiated to host the refugees through the Office of the Prime Minister, OPM (2018).

1.2 Statement of Problem

Despite continuous relief food interventions in the refugee settlement in Uganda, Bidi Bidi has high Global Acute Malnutrition (GAM) of 11.8 % (*UNHCR, 2017*) higher than the national prevalence which is 4 %. Based on World Health Organization (WHO) standards (*WHO, 2006*), GAM 10-14 % is categorised as severe level of malnutrition. Furthermore, the highest Confidence interval of GAM is greater than 15 % indicating level of emergency among the refugee population and level of severe food insecurity among households. In regards to Vitamin A status among children, Bidi Bidi settlement had the highest prevalence of Vitamin A deficiency in Uganda with an alarming level of 56.6 % (*UNHCR, 2017*) in a context in which WHO classifies vitamin A deficiency level greater than 40 % as a public health emergency.

Whereas the nutritional status of the refugee population is worrying despite adequate, resource input by relief agencies and the government in Bidi Bidi refugee settlement, little or nothing is known about the nutritional wellbeing of the host population especially the children; who are the most vulnerable. It is highly likely that the nutritional status of the host has deteriorated due to resource constraints and competition for limited services from the refugees. For example, the percentage of host population able to access free public health service was 28,361 (44.5 %) within the radius of five kilometres according to 2014 National Population and Housing Census (NPHC). Distance of more than five kilometres is an indicator of inadequate access to health service according to WHO. Presence of refugees could have strained the limited resources as the host and the refugee population share available facilities whether government or non-governmental organization (NGO) owned.

The situation could have been further aggravated when the government of Uganda in 2016 revised its refugee policies allowing them to access and own land; this has placed further pressure on the host regarding access to land for agricultural production. It is likely that this has considerably threatened food security and nutritional wellbeing of the host population.

On the other hand, Current data about food and nutrition security are rather generalized than specific for the host and refugee population. There is no available data for comparative study of nutritional status for host and refugee population in Uganda presently. A recent comparative study about refugees and host population was conducted in 1999, Northern Kivu, Eastern Democratic Republic of Congo during the Rwanda refugee crisis (Porignon *et al.*, 2000). Furthermore, Nambuya Esther (2018) carried out a research among refugees' population in Adjumani District on food security and coping strategies but no data was collected on the hosting population. Lastly, Okiria Apio (2019) examined the nutritional wellbeing of children in the host and the settlement in Nakivale Settlement in Insingiro District. Whereas the research pointed at the factors that led to low nutritional wellbeing in both the host and the refugee population, the research has not specified the factors in the unpublished research.

1.3 Justification

Given the number of refugees globally in the modern time, the demand for effective, efficient and evidence-informed relief response has increased. In light of the problems stated above, it is fundamental to establish the nutritional wellbeing of children in the host population. Besides, not giving nutritional support to children from the host population deprives them of their rights to food in situation of reduced food production by their parents or caregivers. According to Article 2 (1) of the Convention on the Rights of the Child, "State-owned Parties shall duly respect and ensure the rights put forward in the current Convention to every child amidst their jurisdiction without discrimination of any form, regardless of the child's or his or her parents or legal guardian's race, colour, sex, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status. This information will be appropriate for the government and aid agencies to help plan and guide on food and nutrition interventions in Bidi Bidi and other refugee settlements in Uganda.

Ensuring equitable allocation of food for every needy person is in line with the global goals. The sustainable development goal number two (SDG) is to end hunger in all forms globally and realize improved food and nutrition security and boost sustainable agriculture United Nations (UN, 2015). According to the (UN, 2015), targets to end hunger in all its form is to ensure food access by all people especially people in crises.

Utilization of the findings from this study further justifies that, this research was important to further guide and inform government of Uganda, aid agencies and future studies with appropriate recommendations, from food and nutrition policy point of view. Table 1 below summarizes how different stakeholders will benefit from the findings of this study.

Table 1: Beneficiaries and Benefits of the Study

Beneficiaries of the Study	Benefits of the Study
Government of Uganda	Use the findings as a reference to strengthen existing food distribution policies during emergencies.
NGOs	Improve existing food and nutrition interventions by targeting everyone during emergencies.
Households in the host population	Considerations for food distribution where there is a need.
Households in the refugee Settlement	Improve childcare practices through the recommendations from the research.
Researchers	Data available for future research work.

1.4 Aim of the Study

To contribute towards improvement of policies in food and nutrition interventions to the host and refugee population during and post emergencies in Uganda.

1.5 Purpose of the Study

To generate data that will be used to improve the nutritional situation of children 6-59 months of age in Yumbe district by the government of Uganda and other aid agencies working in Bidi Bidi settlement.

1.6 Objectives of the Study

1.6.1   General Objective

The main objective of this research was to determine risk factors of nutritional status of children 6-59 months of age among refugee and host population in Bid Bidi settlement, Yumbe district, Uganda.

1.6.2   Specific Objectives

1. To determine the demographic and socio-economic factors affecting nutritional status of children 6-59 months of age in the settlement and host population.
2. To determine the nutritional status of children 6-59 months of age living among the refugee and host populations.
3. To determine feeding practices in children 6-59 months of age among the refugee and host populations.
4. To assess the knowledge, attitude and practices of mothers and caregivers on nutrition in the settlement and host population.

1.7 Hypothesis of the Study

1. **$H_1$1:** The socio-economic and demographic factors affecting children 6-59 months of age in the settlement and host population were different.
2. **$H_1$2:** The Nutritional status of children 6-59 months of age in the settlement and the host population were different. The refugees had better nutritional status compared to the host.
3. **$H_1$3:** Feeding practices in the host were better in the host population compared to the refugee population.
4. **$H_1$4:** Mothers or caregivers from the refugee population were knowledgeable, had better nutritional and hygiene practices and attitudes compared to the host.

2. CHAPTER TWO: LITERATURE REVIEW

This section detailed the current information about the nutritional wellbeing of children and the predisposing risk factors. The chapter is divided in to eight sub-headings; historical perspective of refugee's crisis in the world, malnutrition and causes, maternal and infant young child nutrition, nutrition screening and assessment, micro-nutrient deficiencies, forced migration, climate change and food security, study designs and finally gaps in knowledge.

2.1 Historical Perspective of Refugees Crisis in the World

According to the United Nations Population Division (UNPD), international migration is one of the largest striking and poorly managed pressing issues in the information era policy agenda. Currently, over 232 million migrants are living outside their countries. All countries in one way or the other are affected by migration of people as a transit or arrival country. Further to the topic of mass migration, the displacement of people and individuals running from life threatening situations is specifically an imperative concern. The UNHCR in 2014 reported about 60 million refugees and IDPs worldwide and this figure is the highest in modern time. The notion of protecting refugees originated from the breakdown of the international community to save refugees from Nazi, Germany. As reported by (*Martin, S.F., 2015*), the rise in the number of Jewish and other oppressed people from other countries in 1930s led German to gradually close doors for outsiders. Problems faced by refugees were discussed in July 1938 in a conference attended by 30 countries in Nazi, Germany. Key issues discussed during the summit were to stop countries from resettling refugees and support Germany in repatriation of refugees. Several words of sympathy came out of the meeting for the refugees but little significant proposals ensued.

The UNHCR was instituted in 1950 to save and provide resolutions for immigrants in Europe. The following year saw the adoption of the 1951 UN treaty pertaining to the grade of refugee, which well-defined the categories to include individuals with an understandable fear of intimidation on the ground of religious and ethnic belonging, nation of origin or social and political affiliation. The 1951 UN resolution was principally applied to refugees in Europe and those who became refugees earlier than the year 1951. The convention was further extended to give protection and support to refugees worldwide including Africa (UN Relief and Works).

2.2 Malnutrition and Causes

2.1.1 Global, Regional and National Trend of Malnutrition

According to the global nutrition report 2018 (Cesare, 2019), the extent of under-nutrition has remained poor, set targets to reduce prevalence of malnutrition globally have not been achieved. All forms of malnutrition are still high worldwide and cut across in the regions of the universe. Global nutrition report (2018) (Cesare, 2019) stated that despite the decreased stunting rate, 150.8 million children (22.2%) are still stunted. Furthermore, 50 million children are wasted and about 20 million new-borns are likely to be Low Birth Weight (LBW), 38.3 million children are overweight. A report by (Briend *et al.*, 2015) described that the global prevalence of malnutrition is gradually reducing with the global prevalence declining from 32.6% in 2000 to 22.2% in 2017.

Regionally, the prevalence of malnutrition for Asia declined from 16.9% to 9.6%; Africa has declined from 38.3% to 30.3%; Latin America and Caribbean from 16.9% to 9.6% (Cesare, 2019) . South Asia had the largest burden of chronic malnutrition all over the world on regional basis and accounts for more than half of global burden of wasting, globally at 26.9 million people. According to (Briend *et al.*, 2015), out of the 38.3 million overweighed children worldwide, 5.4 million are in South Asia and 4.8 million in East Asia, which is 26.6% of the global load.

In Uganda, the rate of acute malnutrition (wasting) among children is 4% and it is 10% for West Nile sub-region where majority of refugees in Uganda are settled (Ickes *et al.*, 2018). Malnutrition is a complex issue in conflict and post conflict contexts. In a publication by (Stevens *et al.*, 2015), children affected by crisis mostly die from preventable diseases like diarrhea, pneumonia and malaria. Majority of refugees in Uganda fled the war in South Sudan which has triggered big task for hosting countries especially Uganda accommodating the highest number of refugees in Africa (Morrison-Métois, 2017).

Bidi Bidi Settlement is located in northwestern region of Uganda in Yumbe district. According to (*Hodgson, C.* 2018), Bidi Bidi was the largest refugee camp in the world in 2017 and the largest host to South Sudanese refugees. In a report by (*UNHCR, 2017*), the prevalence of GAM in Bidi Bidi was 11.8 % higher than the national prevalence, which was only 4%. In addition to this, vitamin A deficiency among children is at an

alarming level of 56.6 % (*UNHCR, 2017*).

2.1.2 Causes of Malnutrition

According to (Meybeck *et al.*, 2018), poor nations are currently facing the three burdens of malnutrition. Malnutrition affects infants, young children and women generally. Malnutrition is an indicator of disrespect to young person's rights to existence and welfare. The problem of malnutrition is significant in low resource countries (UNICEF, 2015). A research completed by (Olofin *et al.*, 2013) stated that wasting in children is an indicator of mortality among this age group. Frequent illnesses among children, poor care and inadequate access to societal amenities is the other cause of child undernourishment. Figure 1 below summarises the causes of malnutrition.
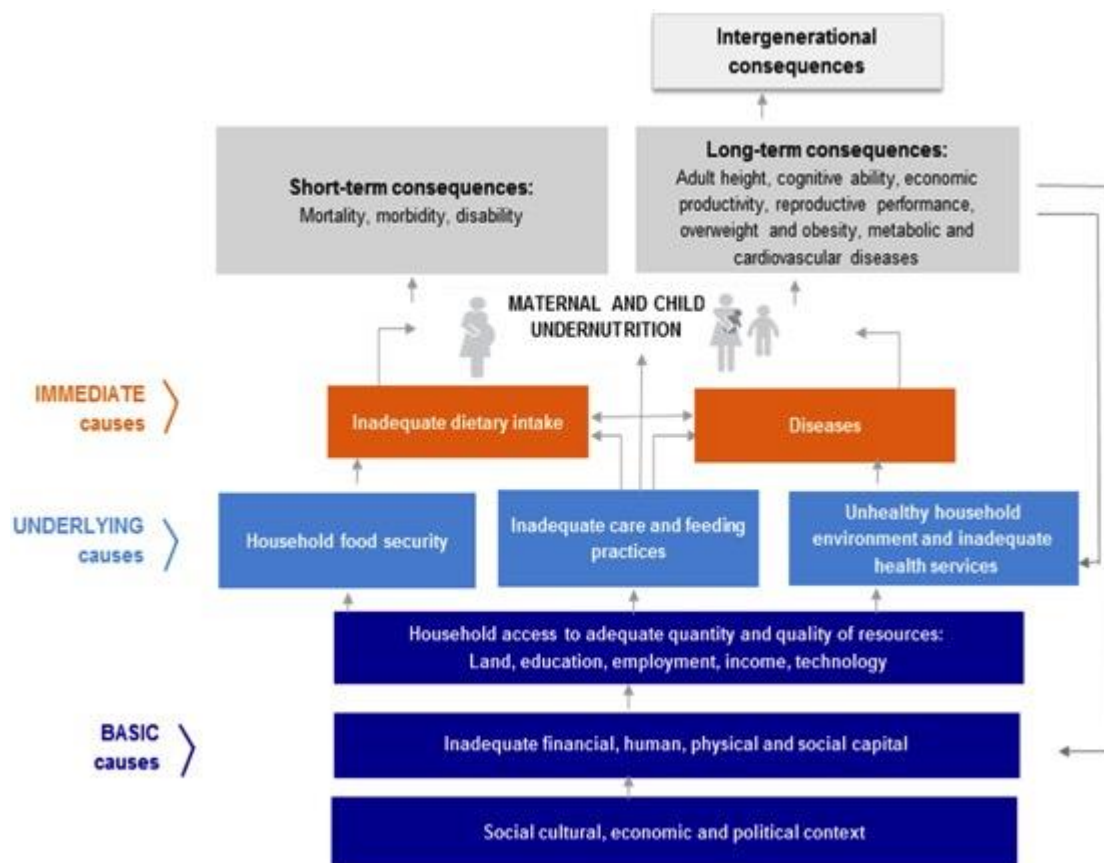
Figure 1: The UNICEF (2013) conceptual framework of under-nutrition

2.1.2.1 Immediate Causes of Under-nutrition

The immediate factors contributing to under-nutrition are inadequate dietary intake and diseases (Berhanu, Mekonnen and Sisay, 2018).

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2.1.2.2 Underlying Causes of Under-nutrition

Underlying factors comprising of household food inadequacy, inappropriate care of children, unhygienic household and nearby surroundings and unreachable and mostly poor health service results into inadequate dietary intake and frequent exposure to diseases of children.

2.1.2.3 Basic Causes of Under-nutrition

These include social institutions and developments that disregard human rights and prolong poverty. According to (Patavegar, Kamble and Shelke, 2015), prolonged malnutrition leads to poverty and eventually this becomes a vicious cycle.

2.1.2.4 Other Basic Causes of Under-nutrition

Climate change and variability: Agreeing with (Ruel and Levin, 2000), droughts and floods are likely to have the greatest impact of reduced harvests from agricultural productions hence reducing adequate nutritious foods in poor countries of the world. A research by (*Lloyd, S.J., Kovats, R.S., Chalabi, Z., 2011*) stated that 80% of illness caused by adverse environmental changes shall impact nutritional welling of children negatively, 20-30% compared to when the environmental factors are stable by 2050.

Increased Cost of Foods: According to (*World Bank Group*, 2014), international costs of food and non-food items have experienced great changes from the year 2007 to 2008. According to (Brinkman *et al.*, 210), the challenge in economic access to food mostly affect children and women.

Rural urban migration: About 54% of the global population in 2014 lived in urban settlement. An estimate by (Crisp, Morris and Refstie, 2012) put 33% of people living in urban slums. Major challenges in slum settings include; unsafe water sources, inadequate nutritious foods and social services putting the dwellers in a high risk of under-nutrition and other infections.

Dietary shifts: Social way of life has affected feeding patterns of people globally. Increased consumption of fats and oils, sugar and sugar products and street vended foods have become a common phenomenon. This is mostly attributed to the change in the food systems and the value chain that includes the fast food restaurants providing highly refined foods and unwholesome foods. Findings of (Asfaw *et al.*, 2015) argued that intake of these fast foods coupled with sedentary life styles are the major causes of obesity worldwide. WHO (2010) reported that the major causes of death in poor

countries are caused by sedentary life style.

Increased humanitarian crises and fragility: According to Food and Agriculture Organization FAO (2012), livelihoods of communities, particularly those living in fragile situations are affected by natural and man-made calamities. This unfortunate event results in to poor physical and economic access to food and hence increased magnitude of malnutrition.

2.3 Maternal Infant Young Child Nutrition

2.1.3 Benefits of Breastfeeding and Consequences of inadequate Breastfeeding

Breast milk gives children a good start to life and promotes cognitive development and it is a natural immune booster for the child. Breastfeeding benefits both the child and the mother as it reduces morbidity and the cost of healthcare. Currently, about 40 % of the children do not receive adequate breast milk within the first 180 days of life worldwide. According UNICEF (2016), about 45% of children receive adequate breast milk by the age two. According to (Victora *et al.*, 2016) , more than 800,000 infant mortality especially ones related to diarrhoea and pneumonia each year would be reduced if breastfeeding were promoted universally.

2.1.4 Complementary feeding

Breast milk and complementary feeds are very important for taking care and raising healthy children and infants. Appropriate types of feeding create bonds between the child and the mother. The outcome of adequate breastfeeding includes improved growth, reduced burden of diseases for the child (Moghaddam *et al.*, 2015). In rural communities, appropriate feeding methods can result into good intakes of macronutrients and micronutrients.

2.1.5 Breastfeeding

Breastfeeding is a process where the child suckles milk from the mother for survival and growth into healthy adulthood. Agreeing with (Bayyenat *et al.*, 2014), breast milk reduces complications related to respiratory tract and other infections. Giving infants, the mother's milk within the 60 minutes after birth protects him/her from susceptible infections and reduces young child deaths. The mother's milk nourishes the baby with half of the energy requirement of the child for optimal growth from 6 months to one-year-old and 33% of energy between first and the second birthday.

2.1.6   Feeding in Extremely Challenging Situations

Physical and emotional support needs to be accorded to households in difficult situation. The help should cater for babies and mothers to stay together and get the necessary help they require and any other feeding means that maybe present. In crises, breastfeeding is the ultimate means of feeding children 0-6 months of age. According to WHO (2015), the situations that present feeding difficulties include LBW infants or premature infants, under aged mothers, infant and young children who are malnourished and families stuck in multifaceted disasters or suffering their effects.

2.1.7   Windows of Opportunity in the First 1000 Days of Life

The first 1000 days of life is the time from conception (270 days), child's first birthday (365 days) spanning to the second birthday (365 days). It is the time to build a good foundation for the child in terms of adequate growth and neurodevelopment across the lifecycle. In resource limited nations, this foundation is weakened by malnutrition and other associated factors resulting into poor health, damage of growth potential and early mortality. Whereas under-nutrition remains a serious global challenge, the effect of over-nutrition has also become more evident in the current time in form of obesity and risky nutrition in form of unbalanced diets adulterated with potential toxins. According to (*Walker SP, Wachs TD, Gardner JM, Lozoff B, Wasserman*, 2008), at least 200 million children staying in developing nations failed to meet their growth related potential.

Interventions tailored to increase knowledge of these critical windows have the possibility to utilize an insightful global impact, as improvement of nutritional deficits alone has been projected to have the control to raise the world's intelligence quotient (IQ) by 10 points (*Morris SS, Cogill B, Uauy R.*, 2008). Simple rules should be followed for the first 1000 days for both developed and developing countries. Avoid spina bifida by giving adequate food to pregnant mothers plus folic acid supplement. According to (Wen *et al.*, 2012), infants should receive safe complementary foods in addition to breast milk up to two years of age or beyond, and a safe toxin free food should be assured. Figure 2 below shows the importance of investing in nutrition within the first 1000 days of a child's life.
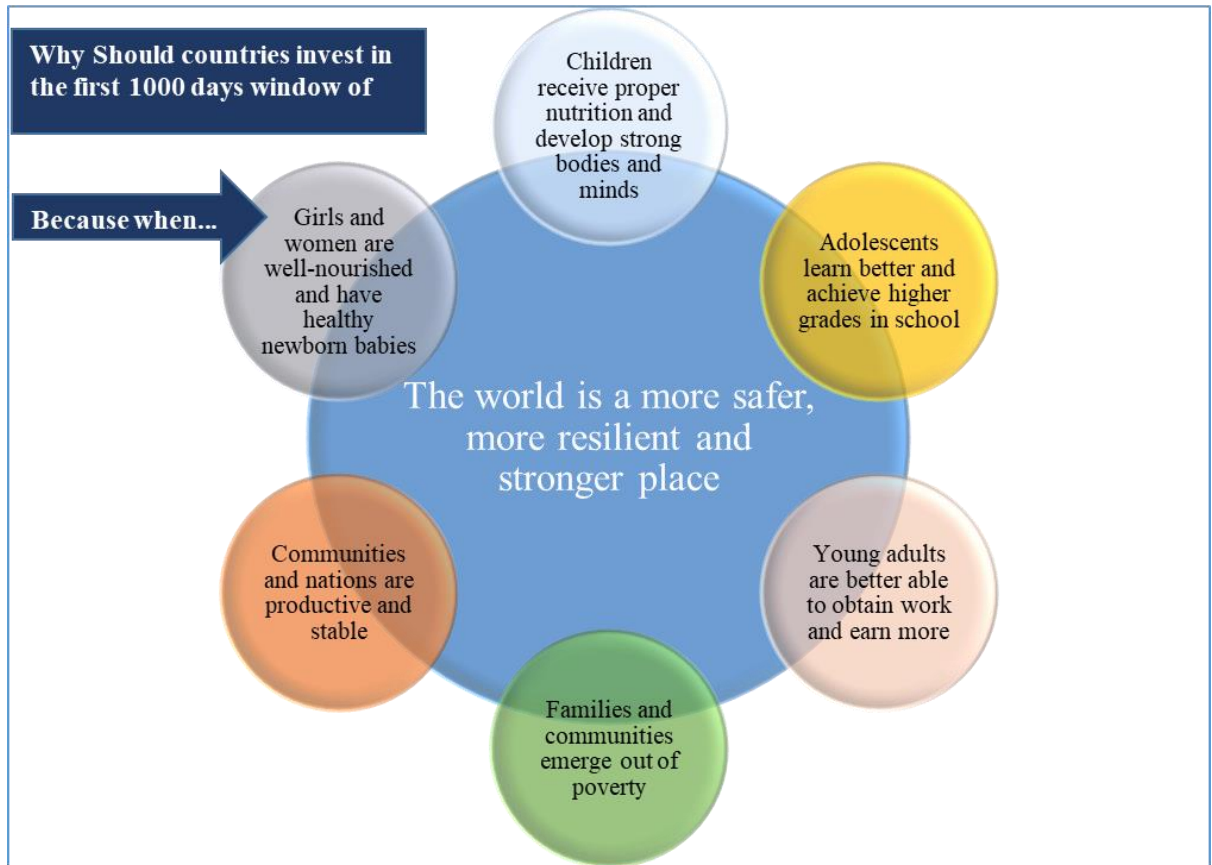
Figure 2: Relevance of Investing during the windows of opportunity
Source: Modified by Joseph Mandre (May 2020) from Usman Ahmadu (Paediatrician)

2.4 Nutrition Screening and Assessment

Many anthropometric tools have been designed to help in detecting malnutrition in all patients visiting health facilities. All clients who visited health centers should have their nutritional status recorded. Checking for nutritional status of clients should begin with screening and then followed by assessment (Wen *et al.*, 2012). Individuals at a high risk of malnutrition can be easily identified using nutrition screening tools. Figure 3 is a schema of steps involved during diagnosis of malnutrition.
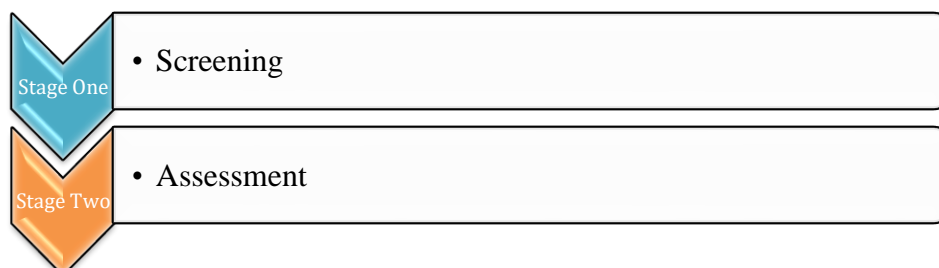
Figure 3: Diagnosis of malnutrition
Source: International Consensus Guideline Committee (ICGC), 2010

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Screening process should not be difficult for health personnel but rather simple. As reported by (Kondrup *et al.*, 2002), experimental designs used in nutrition screening should be validated before being put into use. Nutrition screening should be performed on arrival to all patients and on regular basis. Health and nutrition workers should perform comprehensive assessments to clients detected to be at risk of nutritional diseases.

2.1.8 Importance of Nutritional Assessment

Good nutritional status is when the body has balanced nutrients to run its normal metabolic processes. A good balance of nutrients in the body helps in the prevention and curing of illnesses. As reported by (Smart *et al.*,2010), over 10 percent of body wasting is as a result of prolonged hospital admission. He further stated that in well-nourished individuals, 35% weight loss is the commonest cause of deaths. Nutritional status is assessed due to multitude of reasons stated below:

On time treatment and transfer of severe cases, before they become live threatening. To initiate treatment for clients identified to be undernourished, find out the major practices contributing to poor nutritional status of individuals and to provide key messages to clients and follow up children on growth monitoring plan. Table 2 provides information on the required frequencies of nutrition screening and assessment during different stages of life.

Table 2: References for conducting nutrition screening and assessment

Categories	Regularity of Nutrition assessment
Infants 0–< 6 months of age	Every postnatal visit and immediately after delivery.
Infants 6–59 months of age	Schedules for growth follow-up for children 0-24 months and every quarter for children 3 years and above.
Children 60 months of age and above	All visits to the health facility.

Source: Food and Nutrition Technical Assistance **(**FANTA) (2016)

2.1.9 Anthropometric Assessment

This is a method of measuring body dimensions; it entails measuring body size, weight, and mid-upper arm circumference among others (FANTA, 2016). Measured body

dimensions are recorded as indices like Body Mass Index (BMI) Weight for Height (WFH) and Height for Age (HFA). The measured indices are recorded as z-scores also known as standard deviation (SD). Figure 4 is a normal distribution chart showing under nutrition and over nutrition.
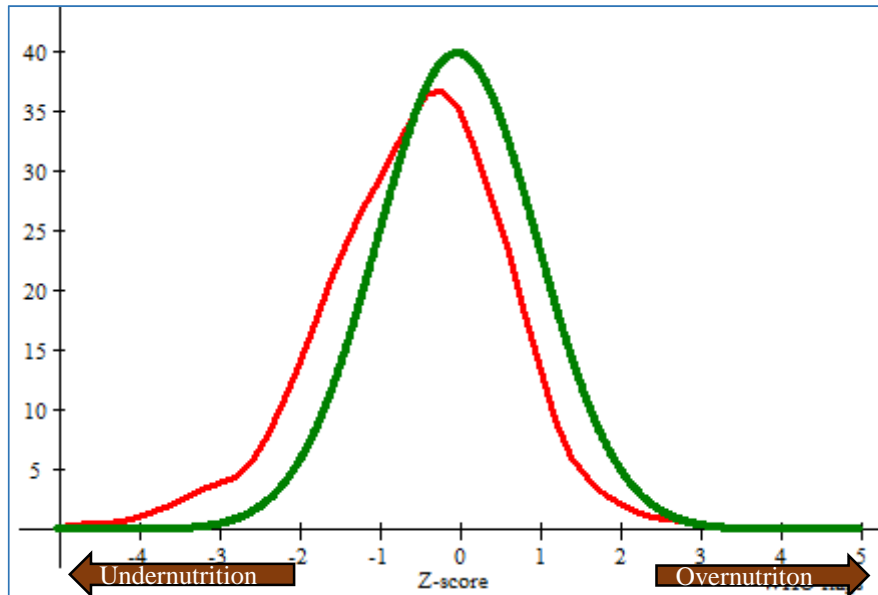
Figure 4: Gaussian Normal Distribution curve for malnutrition (Modified from SMART, 2012)

2.1.9.1 Weight

Weight measurement is the first step in anthropometric assessment and it is used to calculate the Weight for Height z score (WHZ) for children and BMI for adults (FANTA, 2016). Weight is a good indicator to assess the nutrition and health status of children. When an individual loses weight unknowingly, it is a sign of poor health status and this reduces their natural immunity. Weight is measured using a weighing scale and it is recorded in kilogram to the closest 100g. Health workers should take caution while taking weights to avoid giving wrong medications to patients including nutritional foods (FANTA, 2016). Women of childbearing age should maintain healthy weight before conceiving and even during pregnancy to give birth to healthy babies. It is important for mothers to have regular nutrition screening to ascertain their nutritional status because there nutritional wellbeing is the exact translation of the child nutritional status. Table 3 provides BMI reference for categorizing the nutritional status of mothers during pregnancy.

Table 3: BMI Reference before pregnancy

Before pregnancy nutritional status	Before pregnancy BMI
Underweight	< 18.5
Normal weight	18.5–24.9
Overweight	25.0–29.9
Obese	>30

Source: FANTA (2016)

Weight measurement at birth used for neonates is not for measuring acute malnutrition. Babies with LBW, less than 2,500g are susceptible to neurodevelopment disorder and stunting later in life (FANTA, 2016). Weight loss immediately after birth should not be cause of alarm but it should not be beyond 10 percent of the baby's birth weight. The lost weight should be gained within a period of 7 days. By the time a baby reaches the age of 5 months, the weight most times doubles (*Mayo Clinic. 2014*). Beam balance or UNISCALE is used to take weight of infants by taking the weight of the mother and the infant together and subtracting the weight of the mother or the caregiver to get the infants weight.

2.1.9.2 Length and Height

Length or height is measured using a height board and recorded in centimeters (FANTA, 2016). Children below 24 months or less than 87cm tall are measured for length. Children above the age of 24 months and taller than 87 cm are measured for height.

Weight-for-height

This index is used to measure the nutritional wellbeing of children from birth until 59 months of age. It is measured by comparing the weight of children of the same height and sex with that of WHO growth standards. Different genders have different growth references. In a report by (Grijalva-Eternod *et al.*, 2017) WHZ can be used for infants below 6 months of age but there are no globally agreed cut-off points for classification of nutritional status. Emergency Nutrition Assessment (ENA) for Standardized Monitoring and Assessments of Relief and Transitions (SMART) automatically computes the WHZ.

2.1.9.3 Mid Upper Arm Circumference (MUAC)

A tape called MUAC (Mid Upper Arm Circumference) is used to perform

anthropometric measurement on the left arm of the hand (FANTA, 2016). The mid mark between the apex of the shoulder and the elbow is obtained to take the MUAC reading in millimeters or centimeters that is less accurate than the former unit is. The MUAC measurement is used as a substitute indicator of nutrient store in muscle and fat that is hardly affected during pregnancy and not affected by height of mothers or children. MUAC is good for measuring the nutritional status of pregnant mothers up to six months postpartum. Table 4 is a reference for MUAC of children 6-59 months of age.

Table 4: MUAC Limits for Nutritional Status, 6-59 Months of Age

	Severe Acute Malnutrition (SAM)	**MAM (Moderate Acute Malnutrition)**	**Normal**
6-59 months	<115mm	>=115 to <125mm	>=125mm

Source: FANTA (2016)

2.1.9.4 Body Mass Index

This is an anthropometric procedure used to measure the nutritional wellbeing of adults based on the ratio of weight to height. It is not advisable to use it during pregnancy and individuals who are oedematous (FANTA, 2016). Table 5 is a BMI look-up table adult nutritional status.

$$BMI = Weight\ (Kg)/Height\ (m^2)$$

Table 5: BMI Look-up Table

BMI	Nutritional Status
<16.0	SAM
>=16.0 to <17.0	MAM
>=17.0 to <18.5	Mild malnutrition
>=18.5 to <25.0	Normal
>=25.0 to <30.0	Overweight
>=30.0	Obesity

Sources: WHO (1999)

2.1.10 Biochemical Assessment

According to (FANTA, 2016) biochemical assessment is where nutrient levels of individuals are checked in the blood, urine or stools. The result after detailed analysis will give a report about the nutritional status of individuals.

2.1.11 Clinical Assessment

Signs of nutritional deficiencies are checked including bilateral pitting oedema, thinness, hair loss and paleness of hair color. Medical history to find out opportunistic infections, use of nutrition supplements, smoking and drinking of alcohol that may influence one's nutritional status. During clinical assessments, clients are asked for other medical conditions that may increase nutrient needs for the body like fever, diarrhea, vomiting and individuals with chronic illnesses including Human Immunodeficiency Virus (HIV) and celiac diseases. As recommended by (*Maqbool, A., Olsen, I.E. and Stallings, V.A., 2008*), health facilities should keep records of sickness, admissions, surgeries performed and diagnostic tests that can affect nutritional status.

2.1.12 Dietary Assessment

Examining food and fluid intake of individuals can assess nutritional status of individuals. Information on quality and quantity of food and fluids taken are generated from this data on food intakes. According to (Tang *et al.*, 2016), the results from dietary assessments should be compared to Recommended Dietary Allowance (RDA) to advise clients on how to prepare adequate diets in order to control nutritional disorders and treat cases negatively impacted by food consumption and nutritional status like cardiovascular disease, cancer, obesity, diabetes and hyperlipidemia. The commonest approaches to measure dietary intake include the following.

2.1.12.1   The 24-Hour Recall

This approach involves recording the entire food intake in the previous 24 hours by an individual. It can also be modified for a group of people like households (FANTA, 2016). Clients are asked to remember all the drinks and foods taken with the specific times they have been consumed. The same procedure can be repeated several times to account for daily differences in the consumption (FANTA, 2016). The approximations of food intake are done through food models, home cooking wares, pictures or the real food.

2.1.12.2   Food frequency questionnaire

This is a checklist formulated to get data on dietary quality instead of nutrient composition and intake (FANTA, 2016). The form analyses how frequent one consumes specific foods, the bulk and the parts. This technique is fast and less costly but low reporting is major setback during administering the questionnaire.

2.1.12.3   Food group questionnaire

This is used to do food intake assessment and to demonstrate to the client's image of distinguished food categories and ask whether they ate or consumed any of the food listed in the image the day before the interview.

2.5 Micro Nutrient Deficiencies (MND)

About 6.9 million children died globally in the year 2011 because of malnutrition and high susceptibility to diseases (*You, D., New, J.R. and Wardlaw, T., 2012*). More than 3 billion children and women face the burden of deficiencies in Vitamin A, iodine and iron (Kennedy *et al.*, 2003) and (World Health Organization, 2003). In addition, most of these children come from poor families. According to (Kennedy *et al.*, 2003) folate and B vitamins deficiencies are also major public health issues.

2.1.13 Short and Long Term Strategies to Address Micro Nutrient Deficiencies
Short-term Strategies

Food supplementation: According to (Pritwani and Mathur, 2015), the major problem facing the world currently is the incapacity of food systems to provide the food and nutrient needs of the population. In countries that are still developing, the immediate action plan is food supplementation

Nutrition supplementation: This is an intervention where specific people in need of food are provided with pills; powders and it can only work in small population setting (Pritwani and Mathur, 2015). This method can treat both acute and chronic MND.

Long term Strategies

This is a type of intervention that allows continuous availability of nutrients to people in need and additional forms of livelihood and health services to the population in need. In a research carried out by (Ruel and Levin, 2000) , this method has the capacity to provide bioavailability of nutrients like vitamin A and iron among poor communities.

2.6 Forced Migration, Climate Change and Food Security

2.1.14 Forced Migration and Food Security

Currently, the major causes of food insecurity have been attributed to unending conflicts and movement all over the world. According to (*UNHCR, 2017*) and (*World Bank, 2017*), population of 40 million in 2011 to about 66 million in 2016 were forcefully displaced. A report by (Meybeck *et al.*, 2018) found that rural population carries much of the burdens related to displacements. Civil unrests are mostly compounded by natural disasters like climate shocks hence increasing the severity of food insecurity.

2.1.14.1   A Vicious Circle of Food Insecurity in Conflict Context

Civil unrests result into limited options for food and livelihood in rural communities. Food price fluctuations during crisis time often results into further deterioration of the existing situations. Food price fluctuation and food insecurity may result into certain communities being excluded and marginalised (Breisinger *et al.*, 2015). Protests formed along tribal lines or other communal context habitually ends into conflict (*FAO, 2017a*). Figure 5 below shows the relationship between conflict, forced migration and food insecurity in the context of an emergency.
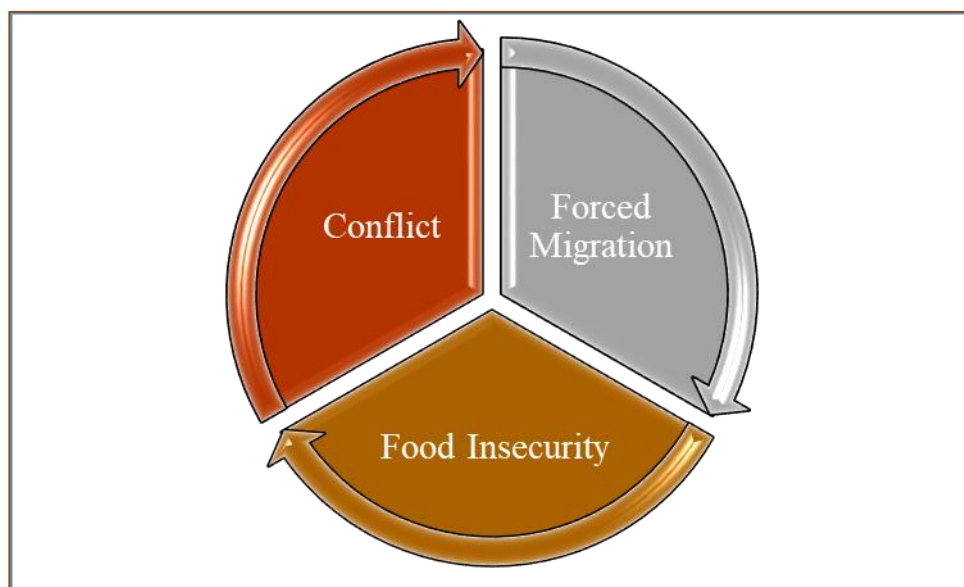
Figure 5: The conflict-food insecurity-migration circle (FAO, 2017)

This circle is certainly not straight (FAO et al., 2017), in the wake of war or severe food security situation, households may decide to migrate or remain. Mass migration occurs when the fighting intensifies or the food security situation deteriorates further and all

possible coping mechanisms are exhausted. In a report compiled by (*WFP. 2017*), an estimated refugee outflow in every 1,000-population rise by 0.4 percent for every additional year of crisis and by 1.9 percent for every percentage rise in the rate of nutritional deficiencies. According to (Meybeck *et al.*, 2018), an approximate total of 122 million of 155 million children are chronically malnourished and live in war torn countries.

2.1.15 Climate Change and Food Security

According to (FAO *et al*., 2018), the current food problem worldwide was majorly caused by climate change and extremes. Climate change is causing breakdown of the entire food security framework. The situation is additionally compounded by other causes of malnutrition in relation to infant care practices, health care and the environment. Climate change, food security and nutrition pointers corroborates the following:

2.1.16 Increased under-nutrition associated with Severe Drought

Drought results into poor harvest or total crop failure and this has adverse effect on the nutritional wellbeing of communities. Widespread drought can possibly affect national food availability and nutritional adequacy hence intensifying the rate of undernourishment in a country (FAO *et al*., 2018). Agreeing to Food Security Information Network (FSIN, 2018) (Meybeck *et al.*, 2018), there is also an increased problem of under-nutrition in communities directly or indirectly impacted by drought and floods like in Kenya, Sindh province in Pakistan and Ethiopia.

2.7 Study Designs

2.1.17 Cross-sectional Study Design

This is an observational study design where the investigator finds the outcome and the exposures in the research participants concurrently (*Setia, M.S., 2016*). In this study design, the subjects are chosen based on some set criteria for inclusion and exclusion whereas case-control studies (subjects are chosen based on the outcome status) and cohort studies (subjects are chosen based on the exposure status). According to (*Setia, M.S., 2016*), cross-sectional study methods are useful for population-based assessments to measure prevalence of diseases in clinical setting. Figure 6 below is a schema of conducting a cross-sectional study.

Step 1	Step 2	Step 3
•Participants recruited based on inclusion and exclusion principle	•Investigate the exposure and the outcome concurrently	•Approximate the rate (of outcome and exposure as well) Calculate ratio of odds
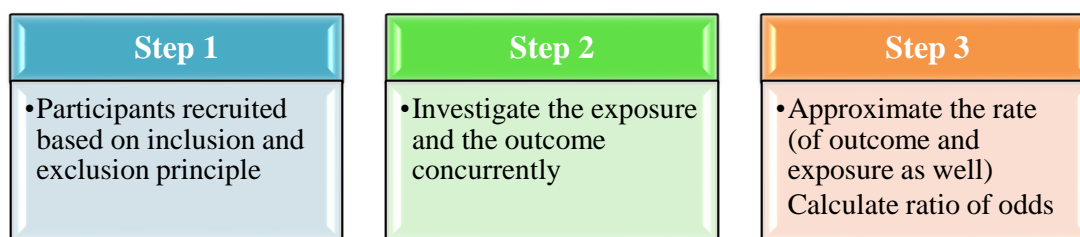
Figure 6: Paradigm of a cross-sectional design

2.8 Gaps in Knowledge

There is no comprehensive and documented literature on nutritional status and risk factors in children 6-59 months of age for refugee settlement and host population in Uganda. A recent study conducted by Nambuya Esther (2018) assessed the relationship between household food insecurity and child under nutrition for only the refugee population with sample size of 200 participants in Adjumani District, Uganda. Whereas food insecurity is one of the underlying causes of malnutrition (UNICEF, 2013), the study has not looked at other basic causes of malnutrition like knowledge, attitudes and practices of mothers, which are all predisposing factors to poor nutrition in children. Another study in Koboko district of Uganda assessed the prevalence malnutrition of refugee children integrated with the host (Legason D. and Dricile, 2018); this study has not looked at the in-depth risk factors associated with malnutrition to give a clear picture of how the presence of refugees in the region affected the host positively or negatively. This comparative cross-sectional study sought to find out the risk factors affecting nutritional wellbeing of children in the settlement and host population in Bidi Bidi, Yumbe District, Uganda.

3. CHAPTER THREE: STUDY DESIGN AND METHODOLOGY

This chapter described the information about the study setting, the population distribution at the study location, study design for data collection, sampling and sampling procedure, data collection, and method of data analysis.

3.1 Study Setting

Uganda is located in the Eastern African region about 800 kilometers inland from the Indian Ocean. The country lies in the coordinate 10° 29' South and 40° 12' North latitude, 290° 34' East and 350° 0' East longitude. Uganda is a land locked country, bordering Kenya to the East, DRC to the West, and South Sudan to the North, Tanzania to the South and Rwanda and Burundi to the South West. Uganda has an estimated total area of 241,551 square kilometers, of which the land area covers 200,523 square kilometers (UBOS, 2017). Figure 7 shows a geographical information system map of the location of five (5) zones that make Bidi Bidi settlement and the host population in Yumbe District.
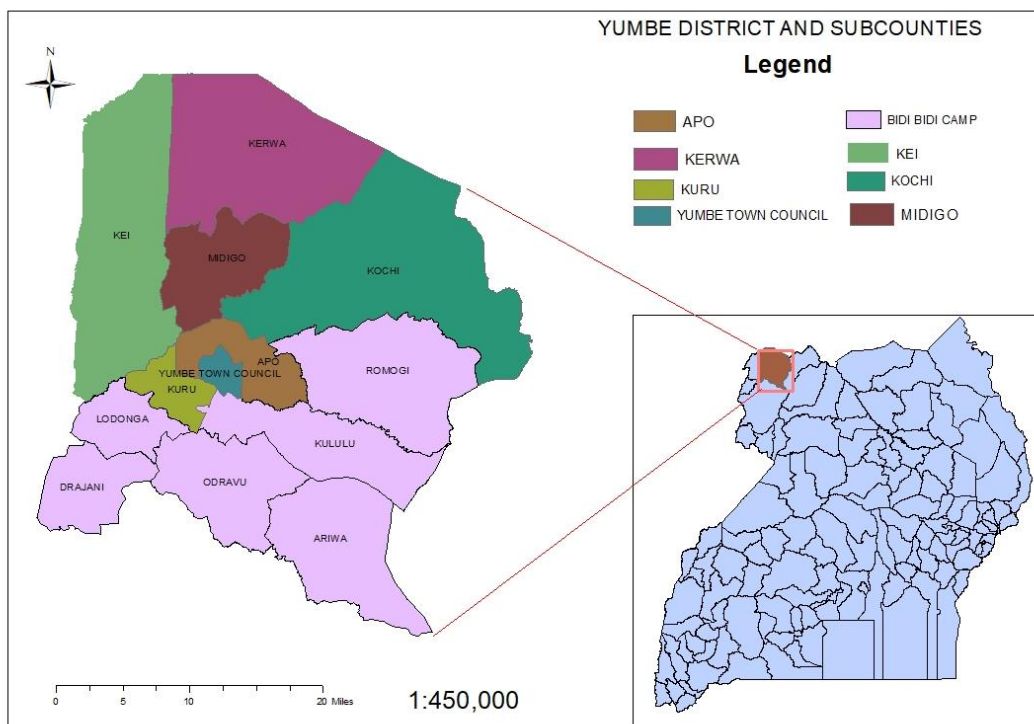
Figure 7: Map of Yumbe District and Sub Counties
Source: Lubajo Bosco, February 2019

Yumbe district is located in Northwestern part of Uganda (West Nile Web, 2018). From Yumbe Town to Bidi Bidi Settlement and the host population, Zone 1 (Romogi) is 19.0

Km, Zone 2 (Kochi) is 12.4 km, Zone 3 (Kululu) is 10.9 Km, Zone 4 (Odravu) is 15.3 Km and Zone 5 (Ariwa) is 40.1 Km (Satellite Google Map, May 2020).

 It borders republic of South Sudan to the North, Moyo district to the East, Koboko district Northwest and Arua district in the South. The district is generally flat although the Eastern region has many hills, Midigo and Kei being the two major hills. Gravels cover some areas of Kuru, Romogi and Odravu sub-counties. Yumbe covers a total area of 2,411 square kilometres (which is 1.2 %) of Uganda total area, of this, 80.01% is used for agricultural production. Forests and water bodies cover the remaining portion of the district.

3.2 Study Population

3.2.1   Host Population

According to the (UBOS, 2017), the population of Yumbe district was 484,822 of whom 230,626 and 254,196) male and female, respectively. The office of the Prime Minister and UNHCR (2018) approximated the population of the district at 584,221; 278,089; male and 306,132 females. The children aged between six and 59 months, who made the study population constituted 17.6 % of the population (UBOS, 2017). The mothers or caregivers were interviewed during this study about the diet of the children, health seeking behaviour, knowledge, attitude and practices.

3.2.2   Refugee Population

The recorded population of Bidi Bidi refugee settlement was 285,000 (*Hodgson, C.*, 2018), but at the time of this study, the population was 223,253 (UNHCR and OPM 2019). The population of children 6-59 months was estimated at 42,750 (15%).

3.3 Study Design

A comparative cross-sectional study design was employed to collect data, both qualitative and quantitative among the refugee and the host population in Yumbe district. Mothers or caregivers who were present in the household provided answers to the research interviews on ODK.

3.4 Sampling

3.4.1   Sample Size Determination

Sample size Calculation, (Fisher and Hall, 1991)formula.

$$n = \frac{Z^2\,pq *DEFF}{d^2}$$

Where:

n= required sample size

Z= standard normal deviation which is 1.96

Design Effect (DEFF) = Design Effect for cluster sampling

p= proportion of the target population estimated to have the problem, 11.8% GAM prevalence (*UNHCR, 2017*).

q = population lacking the features being measured (1-p)
   Where p= 0.118 (q= 1-0.118), q= 0.882

d= degree required for precision 0.05

The formula $(n=Z^2pq \div d^2)$ substituted as **n=** $\dfrac{1.96^2 *0.118\,(0.882) *2}{0.05^2}$

    n= 319.85

 Including attrition of 5% $=$ **337 households**

In this study, 169 was the minimum number of households interviewed in each of the two population groups giving a total of 338 households.

For equal distribution of the households among the two sub-counties of Romogi, Kululu, Kochi and Odravu, 340 households were considered for this study and each cluster was allocated 170 households. A cluster was equivalent to a population group in this study; hence, the host and the refugee population were each apportioned 170 households.

3.4.2   Sampling Procedure

Multi-stage sampling method was used to select the study area cascading through households to the index child as shown in figure 8. Yumbe district, Aringa South County and Bidi Bidi Settlement were purposively selected for this study. Bidi Bidi and the neighbouring host population were purposively chosen because the study sought to examine the impact of large refugee population on the hosting population and according

to (Sedgwick, 2013), this study used purposive sampling method because the researchers had special interest in studying variances in nutritional relief among children in refugees and the host population in post-emergency state.

Bidi Bidi Settlement is located in five sub-counties of Aringa South County. Due to its extremity, Ariwa sub-county was excluded from this study. Four sub-counties, namely; Romogi, Kochi, Kululu and Odravu were selected for this study by convenient sampling methodology. The four sub-counties were selected for this study because they were relatively close to the centre of the district and accessible by cars (Sedgwick, 2013). However, due to resource limitations, data were collected from two Zones. In Zone one 244 HHs were collected both in the host and the settlement and Zone two had 96 HHs included in the study. Zone 1 and 2 were included in the study because they were accessible by car compared to Zone 3 that had poor weather roads and Zone 4 was far and not included in the study due to financial limitations.

The households and the study children in the two-population group were selected using simple random sampling (SRS) method. The samples were randomly picked from the villages both in the host and in the settlement that constituted the sampling frames. In the sampling frame, samples of interest were selected (West, 2016). In households where more than one index child was found, the youngest child was selected in this study.

In the host population, data were collected from the following villages; Amatanga 28 HHs, Barakala 40 HHs, Luzira 16 HHs, Onoko 28 HHs, Swinga 29 HHs, Village 10 (1 HH), Village 4 (27 HHs) and Likichonga 1 HH. In the refugee population, data were collected from Villages; 13 (18 HHs), 4 (26 HHs), 5 (30 HHs), 6 (56 HHs) and 7 (40 HHs).

```
Purposive Sampling          Yumbe District

Purposive Sampling          Aringa South County

Purposive Sampling          Bidi Bidi Settlement

Convenient Sampling    Zone 1 (Romogi)   Zone 2 (Kochi)   Zone 3 (Kululu)   Zone 4 (Odravu)
                       420 HHs           230 HHs

Convenient Sampling         244 HHs                                    96 HHs

Simple Random Sampling (HHs)   Village 4 (53), Village          Swinga Village 29,
                               5 (28), Village 6 (16),          Village 6 (40), Village
                               Village 7 (13), Village          7 (27)
                               10 (3), Amatanga 28,
                               Barakala 40,
                               Likichonga 1, Luzira
                               16, Onoko 28

Simple Random Sampling      Index Child                        Index Child
```

Figure 8: Sampling procedure schema for study households

3.4.2.1 Focus Group Discussion and Key Informant Interviews

Four Focus Group Discussions (FGDs) were carried out, two in the host and two in the settlement. The groups were purposively selected for this research and the essence of the discussion were to provide more insights on child nutrition and food security situation among households (Eeuwijk and Angehrn, 2017). In all the FGDs conducted, eight (8) participants were included in every session. A total of 32 mothers voluntarily provided answers in the FGDs in both the host and the settlement. The Village Health Teams (VHTs) supported in the identification and mobilization of mothers for the FGDs.

Four Key Informant Interviews (KIIs) were conducted, two in the settlement and two in the host. The KII participants were purposively selected to take part in this study (Mumtaz, David and Lee Ching, 2014). The participants for this study were from different sectors including health, nutrition, WASH and Protection. The data from KIIs and FGDs were triangulated to enhancing understanding of the relationship between other data sources provided in this study. The FGD and KIIs were collected after the completion of household interviews.

3.4.3   Inclusion Criteria

Presence of a child 6-59 months of age in the household, only one child per household was included as an index child. The justification for considering one child in a household was that all children in the same household are exposed to the same factors at any given time.

3.4.4   Exclusion Criteria

Mothers who did not consent to participate in the study, households with no index child and children with disability or chronic diseases were excluded from this study.

3.5 Data Collection

3.5.1   Data Collection Tools

Digitized questionnaire in Open data kit (ODK) format was used to collect information on social, economic and population features; childcare, feeding practices, disease frequencies, nutritional status, water, sanitation and hygiene practices, knowledge and attitude. Data on feeding practices were collected using 24-hour recall. KII and FGD question guides were used to collect general qualitative information (Appendix 8.2).

The KII interview targeted either Public Health Officers or Nutrition Focal persons but not both. The KII participants were staff of NGOs and government working in the settlement and the host population. Four persons were interviewed, two in the host population and two in the refugee population. The KII took between 30 to 45 minutes and no payments were made to the participants.

The FGD participants were mothers with children 6-59 months of age. Four FGDs were conducted. Each FGD took on average between 45 to 60 minutes. Audio recording of FGDs was done. The sessions were held at the home of one of the participants after consulting the local authorities for permission to conduct these activities. Bottled sodas (350ml) were provided as refreshment during FGD sessions. Each session of FGD had eight (8) participants and attendance was voluntary with informed consent to show acceptance. No cash payment for being a participant was provided in the FGD sessions.

Furthermore, observation checklist was used to collect information on subjects that were not easily found through verbal interviews like latrine usage and use of hand washing facilities.

3.5.2   Selection and Training of Interviewers

This study focused on two population settings, the host and the settlement population. One experienced data collector with intermediate knowledge on nutrition and skilled in

operating smart android phone assisted in data collection. Thirteen (13) skilled enumerators who were fluent in both English and the local language spoken in the settlement and the host population were recruited and trained to support the data collection assistant and the lead investigator. The research enumerators were Village Health Assistants based in the various villages in the study area.

One day was used to introduce the research enumerators to the project, study tools and the objectives of the study. As part of the training of the enumerators, the lead researcher explained the benefits, aim, objectives, purpose and ethical issues to be followed during data collection. Thereafter, the data assistants were involved in pre-test of data tools in Linga village (not part of the sampled population) a component that provided them with hands-on exposure. The training utilized the following learning techniques, lecture, and role-play, brainstorming and practical experience (Appendix 8.3).

3.5.3 Ethical and Human Rights Consideration

An introduction letter was obtained from the head of department, food science nutrition and technology, University of Nairobi that was used to introduce the lead researcher in Uganda where the study was carried out (Appendix 8.7). To conduct the research in Uganda, a research ethical approval certificate was obtained from Gulu University Research Ethics Committee (GUREC) (Appendix 8.8). The Office of the Prime Minister (OPM) in charge of refugee welfare in Uganda based in Arua, Yumbe District local authorities and Aringa South County local authorities also provided written and verbal approvals to conduct this research (Appendix 8.9).

Decision of interviewees who did not consent to be part of this study were respected (Appendix 8.4, 8.5 and 8.6). Pregnant women and children were given special ethical considerations during data collection. For example, pregnant mother's session was relatively kept short. Children were first measured for anthropometry before starting the interview sessions with mothers or caregivers. The findings of this study were treated with high level of privacy and used only for research purposes.

3.5.4 Pretesting

Four households with children 6-59 months were randomly selected in Linga for a pre-test study before the actual survey commenced. Linga is a village located in the host community that was not involved in the study. The objective of the pilot study was to capacity build the data collection assistants on how to collect data, conduct anthropometric measurements (weight and height) and assess children for oedema and

do accurate recording of data. This procedure was also intended to help familiarise the data enumerators with the different data collection tools in the ODK application.

3.5.5 Data Collection methods

3.5.5.1 Demographic and Socio-economic Characteristics

The study used face-to-face interviews to collect demographic and socio-economic data. Household data including age, gender, education level and marital status were collected using structured and semi-structured questionnaire built in ODK application. Data in regards to household water source, access to sanitation facilities and hygiene practices were also collected. Primary information in regards to market access, household source of livelihood was additionally included in the structured and semi-structured questionnaire (Annex 8.1).

Variables were assigned indicators during data analysis to measure level of significance. Age of the study children in months were grouped as young (6-23) months and older children (24-59) months. The age of the household heads collected as age were categorized as below 18 years (juvenile), 18-28 years (mid-age), 29-39 (mature) and greater than 40 as senior citizens. Household size were categorized as small (1-4) members, medium (5-10) members and larger (≥11) members.

3.5.5.2 Wealth Index

Wealth indicators in the study setting were assessed on estimated monthly income level, households with low or no earning were considered having low wealth status. Income in this study refers to the total amount of money obtained by the households through formal employment, sale of agricultural produce and non-agricultural produce like gravels and bricks for house construction estimated on monthly basis. Income was categorized into three (3) levels; low income (less than USD 54), moderate income (USD 54.5-135) and high income (USD 135.5-271). Households who stayed in self-owned homes were considered wealthier than those staying in refugee owned or rented houses. Households who owned iron roof building were considered wealthier than their counterparts who have roofs thatched with grass or made using plastic sheet. Having wall made of brick was considered as being wealthy. Cemented flour is a sign of high wealth status at the household level. Lastly, presence of cultivated land and cooking using charcoal was considered as a high wealth status in the study setting.

3.5.5.3 Nutritional Status
Weight

To measure the weight of children, two in one digital scale was used Uniscale (Seca, Deutschland). Children who could not stand were weighed through their mothers or caregivers, the mother was first weighed and later the child together with the mother. In between these two measurements, the digital scale was reset to zero reading (FANTA, 2016). The child's weight was read to one decimal place in Kilograms. Children were weighed without shoes and only light clothes were worn during taking weight. No analogue scale was used in this study.

Measured weights were converted to z-scores as indices and were categorized to indicate the nutritional status of the study children; normal nutritional status ($\geq$-2 z score) and wasted, stunted or underweight (<-2 z score).

Critical point considered during weight measurement included, presence of oedema (oedematous children were not weighed).

Height/Length

To obtain the height or length of the child; length was taken for children below the age of 24 months and less than 87 cm tall. Height was taken only for children older than 24 months of age or taller than 87 cm tall who could stand (FANTA, 2016). The study assumed that by the age of two, children have achieved the growth milestone of being able to stand and are concomitantly able to stand. Standardized height boards of UNICEF were used to take both height and length.

Measured heights were converted to z-scores as indices and were categorized to indicate the nutritional status of the study children; normal nutritional status ($\geq$-2 z score) and wasted, stunted or underweight (<-2 z score).

Critical points considered during height measurements were position of the measurer, age of the child (when to take height >87.0cm or length, <87cm tall) and presence of physical disability.

Oedema

Nutritional oedema was checked on the both feet by applying gentle pressure for an estimated period of three seconds on the mid-feet (metatarsals), on removing the pressure if pitting or indentation on the metatarsals, the child was classified to be

oedematous and vice-versa (FANTA, 2016). In this study, oedema was recorded as grade 1 (+), bilateral pitting present on the metatarsals and lower limbs. Grade two (++) oedema when there was bilateral pitting in the upper limbs and grade three (+++) when the face, upper limbs and the low limbs all have pitting (generalized oedema).

Mid Upper Arm Circumference (MUAC)

MUAC tape was used to measure mid upper arm circumference of children. The measurements were recorded in centimeters (cm). Measurements were taken from the left arm of the child. The arm was bent to make a right angle and a mid-point was determined; the half way point between the tip of the elbow and the shoulder. Measurements were taken at the mid-point marked using an ink pen. To take the MUAC reading, the arm was straightened and MUAC readings taken twice and an average value computed and recorded for analysis (FANTA, 2016).

MUAC measurements were categorized as; normal (>12.5 cm), MAM (11.5-12.4 cm) and SAM (<11.5 cm) (FANTA, 2016).

Age Estimation

Ages of the children were extracted from birth certificates or refugee's attestation certificates as date of birth. Mothers or caregivers to record age provided documents. Calendar of events were used to estimate the age of children where there was no written age record or certificate. Age was recorded in months to the nearest one decimal place.

3.5.5.4 Child Feeding Practices
Individual Dietary Diversity Score and 24-hour Recall

The Seven (7)-food group was used to assess Dietary Diversity Score (DDS) of the study children and the 24-hour recall was used to assess nutrient intake. The 24-hour recall tool consisted of sixteen (16) food groups as recommended by the Food and Agriculture Organization (FAO, 2010).

3.5.5.5 Immunization, Morbidity Patterns and Health Seeking Behaviour

Data on access to health services and treatment of worms and vaccinations were obtained from mothers or caregivers using a structured digital questionnaire. The collected data were corroborated with the child health card. In the host population, 165 (97.1%) of the children had immunization cards and 5 (2.9%) did not have it. In the refugee settlement, 160 (94.1%) had immunization cards and 10 (5.9%) lacked it.

3.5.5.6 Maternal Knowledge, Attitudes and Practice Assessment

Mothers or caregiver's knowledge on nutrition were determined through elementary questions on nutrition and healthy living, nine (9) questions were asked in this interview in form of ODK checklist (appendix 8.1, Section D).

To ascertain whether community attitudes were positive or negative, respondents provided responses to six (6) attitude questions including questions related to desired nutritional practices (appendix 8.1, Section D) as recommended by *FAO (2014)*, health or nutritional challenges, food choices and food taboos. The answers included; positive answer, middle option answer, which was neutral and captured attitudes that were uncertain and lastly a negative answer.

3.6 Data Quality Control

The study used the following seven (7) data quality control strategies; training of enumerators, exposure to hand on experience, calibration of anthropometric instruments, DEFF during sample size calculation. Pre-interview counselling for the respondents, by this, they understood the main objective of the study. And lastly digital questionnaires were used to collect primary data for this study (Appendix 8.1). Thirteen (13) enumerators participated in this study and pre-test was conducted in Linga town, which is not included in the study. Morning and evening meetings were conducted to address setbacks like faulty weighing scales or unethical conducts by the data assistants that evolved during field days and were corrected accordingly. The research assistants worked in teams to ensure proper anthropometric measurements were done especially during height measurements and recordings. Two sets of data were collected and the average values were used for final analysis.

3.7 Data Analysis

The collected digital raw data were exported from ODK server ONA to an excel file and detailed examination was done using SPSS version 20.0 and Python version 3.7.3 to measure relationship between nutritional status and other parameters including demography, social-economic status and child feeding practices. Table 6 shows the detailed data analysis method that were applied.

Table 6: Data Analysis Matrix

Specific Objectives	Data Analysis Method
Demographic, socio-economic and ecological characteristics of households	Categorical data; sex, age, education status, marital status, economic status were analyzed for frequencies and proportions. Central tendencies were used to summarize data. Chi square (x^2) to test association between nutritional wellbeing and demographic and socio-economic factors.
Anthropometric data	ENA for SMART (version 2012) was used to convert anthropometric data into indices of nutritional status.
The 24-hour recall data	Python software was used to establish nutrient intake levels.
Maternal knowledge, attitudes and practice assessment	Mothers' nutritional knowledge, attitudes and practices were ranked as percentages. Statistical significance of mothers by population group were determined using Chi-square. Statistical tests at $p < 0.05$ was considered significant.
Morbidity pattern, immunization and health seeking behavior	Diseases were grouped as present and absent based on two weeks' recall period. Multiple Logistic Regression (MLR) was used to measure the relationship between morbidity, nutritional status and immunization status.

4. CHAPTER FOUR: RESULTS

This chapter detailed the study findings based on the four specific objectives namely; socio-economic and demographic factors, nutritional status, child feeding practices and knowledge, attitude and practices of mothers or caregivers in the study setting.

4.1 Demographic and Socio-Economic Factors Affecting Nutritional Status of Children 6-59 Months of Age in the Host Population and Refugees' Populations

A total of 340 households participated in the study of whom, 170 represented the host population and 170-refugee population, respectively. The demographic and socio-economic characteristics of the host and refugee groups are demonstrated in Table 7. The number of male children in the refugee settlement was higher 108 (63.5%) compared to that of the host 82 (48.2%) (p=0.00) while distribution of children by age was not significant (p=0.19) but most of the children were older than 11 months. Few male respondents participated in this research, 7 (4.1%) in the host and 14 (8.2%) in the refugee population, but, the difference was not significant. Majority of the households in the host were male-headed 139 (81.8%) unlike the refugee camp where women predominantly were the household heads 93 (55%) (p=0.00). There was no statistical difference in the age of household heads for the two sites, but the majority were of the ages above 29 years. The proportion of household heads whose age was below 18 years was very low (0.6% versus 1.8%) in the host and refugee populations, respectively.

The socio-economic characteristics of the host and the refugee populations has been shown in table 8. There was no statistical difference in the marital status of the respondents of the two study populations, however, those in married category were the majority, 156 (91.8%) and 145 (85.8%), for host and refugee, respectively. The household sizes were not different for the two sites. Many of the households were of medium size (with 5-10 members), host 115 (67.6%) and refugees 127 (74.7%). The host had better income status compared to the refugees (p=0.00). Households with low-income status, that is, living below USD 54 per month, were the majority, 87 (51.2%) for the host and 135 (79.4%) for the refugees. There were statistical differences in the religion, education and occupations of household heads between the two populations groups. Greater number of the host population were Muslim 159 (93.5%) whereas the refugees were predominantly Catholic 125 (73.5%). The literacy rate of the heads of households was low, whereby attainment of formal education and completion rate was

below 20% for the two populations. Majority of the heads of households did not get formal education, 62 (36.5%) and 97 (57.4%) among the host and refugee populations, respectively. Farming was the major occupation of the household heads in the host population 82 (48.2%) compared to 25 (14.8%) in the refugee settlement. Majority of household heads in the refugee camp were unemployed (70.4%).

Table 7: Demographic characteristics of the host and the refugee populations in Bidi Bidi Settlement

N=340	Host		Refugees		X^2 (p-Value)
	n	%	n	%	
Gender of children					8.1 (0.00)
Male	82	48.2	108	63.5	
Female	88	51.8	62	36.5	
Age of children					4.7 (0.19)
6-11 Months	30	17.6	17	10	
12-23 Months	56	32.9	56	32.9	
24-35 Months	38	22.4	41	24.1	
36-59 Months	46	27.1	56	32.9	
Gender respondents					2.5 (0.88)
Male	7	4.1	14	8.2	
Female	163	95.9	156	91.8	
Gender of household head					49.5 (0.00)
Male	139	81.8	76	45	
Female	31	18.2	93	55	
Age of household head					2.1 (0.57)
<18 Years	1	0.6	3	1.8	
18-28 Years	45	26.5	48	28.4	
29-39 Years	72	42.4	75	44.4	
>40 Years	52	30.6	43	25.4	

n sample size; % percentage; x^2 Chi Square

Table 8: Socio-economic characteristics of the host and the refugee populations in Bidi Bidi Settlement

N=340	Host		Refugees		X^2 (p-Value)
	n	%	n	%	
Marital status of household head					4.7 (0.32)
Married	156	91.8	145	85.8	
Separated	7	4.1	16	9.5	
Divorced	2	1.2	1	0.6	
Single	1	0.6	2	1.2	
Widowed	4	2.4	5	3	
Household size					3.7 (0.16)
Small (1-4)	40	23.5	26	15.3	
Medium (5-10)	115	67.6	127	74.7	
Large (>11)	15	8.8	17	10	
Household income (USD)					35.0 (0.00)
Less than 54	87	51.2	135	79.4	
54.5-135	70	41.2	35	20.6	
135.5-271	13	7.6	0	0	
Religion of the household					280.2 (0.00)
Catholic	11	6.5	125	73.5	
Protestant	0	0	40	23.5	
Muslim	159	93.5	5	2.9	
Education level of household head					32.8 (0.00)
Never went to school	62	36.5	97	57.4	
In primary	0	0	3	1.8	
Completed primary	7	4.1	6	3.6	
Primary drop-out	33	19.4	38	22.5	
Completed Secondary	25	14.7	13	7.7	
Secondary drop-out	31	18.2	10	5.9	
Tertiary Education	12	7.1	2	1.2	
Occupation of household head					108.4 (0.00)
Farmer	82	48.2	25	14.8	
Salaried Employed	13	7.6	7	4.1	
Businessperson	16	9.4	5	3	
Casual laborer	6	3.5	1	0.6	
Student	1	0.6	1	0.6	
Unemployed	26	15.3	119	70.4	
Others	26	15.3	11	6.5	

n sample size; % percentage; x^2 Chi Square

4.1.1 Wealth Index of the Study Participants

Wealth status were calculated on the presence of income, nature of household ownership, types of building materials, presence of cultivated land and type of cooking fuel used. Table 9, below, shows the wealth indices in the study setting. HHs who resided in the host population were generally wealthier than the refugee population, there was significant differences in all the wealth indicators ($p<0.05$) except for cooking fuel ($p=0.23$). Estimated income per month (USD 135.5-271) in the host was 8% and 0% in the settlement; both group had poor income status. Majority of the host owned their homesteads, 99% compared to 54% of the refugees. More host had buildings roofed using iron 14% compared to 5% in the settlement. The number host who built wall using brick were 77% more than refugees who had 49% of their walls built using bricks. No building in the settlement had a cemented floor while 18% of the host had their floor cemented. In the host population, 82% of the HHs had their kitchen separated from the main house compared to the refugees at 92%. The refugee population had a better index in this compared to the host community. The refugee population had more dwelling rooms 26.2% (greater than three or more rooms) compared to the host community 24.1%. Greater number of the host had cultivated land in the previous planting season 84% compared to 63% in the settlement. A marginal number of the host and refugees were using charcoal or firewood as a cooking fuel; 34% and 27%, respectively.

Table 9: Household wealth indices in the host and refugee samples in Bidi Bidi Settlement

	Host		Refugee		X² (p-Value)
	n	**%**	**n**	**%**	
Estimated monthly household income					**35.05 (0.00)**
Less than 54	87	51	135	79	
54.5-135	70	41	35	21	
135.5-271	13	8	0	0	
Ownership of home					**98.27 (0.00)**
Self-owned	168	99	92	54	
Refugee owned	1	1	78	46	
Others	1	1	0	0	
Building materials for roof					**9.07 (0.01)**
Grass/tukul	145	85	160	94	
Iron roof	24	14	8	5	
Tent	1	1	2	1	
Building materials for wall					**29.02 (0.00)**
Brick	130	77	84	49	
Iron sheet	1	1	0	0	
Stone	0	0	1	1	
Tent	1	1	3	2	
Floor for the main house					**35.33 (0.00)**
Cement	31	18	0	0	
Earth	138	81	170	100	
Others	1	1	0	0	
Is the Kitchen separated from the main house?					**18.95 (0.00)**
No	31	18	6	4	
Yes	139	82	164	97	
Number of rooms in the dwelling place					**14.53 (0.04)**
Less than three rooms	77	45	59	35	
Three rooms	52	31	63	37	
Greater or equal to three rooms	41	24.1	48	26.2	
Do you have cultivated land?					**18.38 (0.00)**
No	28	17	63	37	
Yes	142	84	107	63	
Household type of cooking fuel					**5.60 (0.23)**
Charcoal	13	8	9	5.3	
Firewood	99	58	116	68	
Charcoal/firewood	43	34	45	27	
Others	1	1	0	0	

n sample size; % percentage; x^2 Chi Square

4.2 Nutritional status of Children 6-59 Months of Age in the Study Setting

4.2.1 Overview of Nutritional Status in the host and the settlement population

While the GAM was low in the study area, the children in the host community had poor nutritional status 4.1% compared to the refugees 3.6%. Table 10, below illustrates the nutritional status by gender and population group in the study setting. There was no statistical difference in the nutritional status by gender and population group. The prevalence of stunting among the host children was higher, though not statistically

different, from that of the refugees; 27% and 22.4%, respectively. Prevalence of underweight was the same in the host and refugee populations; 14.1%.

Table 10: Nutritional status by gender and population group of study children in Bidi Bidi Settlement

	Female	Male	X^2 (p-Value)	Host	Refugees	X^2 (p-Value)
	% (n=150)	% (n=170)		% (n=170)	% (n=170)	
Wasting			**0.8 (0.9)**			**0.2 (0.9)**
Normal	97	96		95.9	96.5	
Wasted	3.4	4.2		4.1	3.6	
Stunting			**3.2 (0.4)**			**2.1 (0.5)**
Normal	79	73		73	77.6	
Stunted	21	27		27	22.4	
Underweight			**5.0 (0.2)**			**2.3 (0.5)**
Normal	90	83		85.9	85.9	
Underweight	10	17		14.1	14.1	

n sample size; % percentage; x^2 Chi Square value

4.2.2   Multivariate Logistic Regression for Wasting

The odds ratio has shown that being a host was a risk factor to wasting (OR[a]=1.81; p=0.36; 95% CI 0.51-6.39). Table 11 is a result of multivariate logistic regression for wasting as the dependent variable and associated factors as independent variables in the study area. Children who were not dewormed were at a higher risk of becoming wasted (OR[a]=3.20; p=0.22; 95% CI 0.49-20.75) and there was no significant difference. Child illness 14 days prior to the study was a potential risk factor to wasting (OR[a]=1.47; p=0.56; 95% CI 0.40-5.44) and there was no significant difference. The other factors that contributed to wasting were medium household size (5-10 members) (OR[a]=1.29; p=0.76; 95% CI 0.25-6.63) and presence of palmar pallor (OR[a]=2.13; p=0.31; 95% CI 0.05-9.13) and there was no significant relationship. The important protective factors to wasting were being a female (OR[a]=0.64; p=0.46; 95% CI 0.20-2.08) and dietary diversity score of ≥4 food groups (OR[a]=0.39; p=0.29; 95% CI 0.07-2.21).

Table 11: Results of multivariate logistic regression for wasting and risk factors in Bidi Bidi Settlement

	ORᵃ	p-Value	95% Confidence Interval	
			5%	95%
Household income of less than USD 54	0.30	0.14	0.06	1.47
Being a female child	0.64	0.46	0.20	2.08
Lack of deworming	3.20	0.22	0.49	20.75
Not fully immunized	1.00	1.00	0.20	5.03
Presence of palm pallor	2.13	0.31	0.50	9.13
Child being ill	1.47	0.56	0.40	5.44
Host population	1.81	0.36	0.51	6.39
Dietary diversity score ≥4 food groups	0.39	0.29	0.07	2.21
Household of medium size	1.29	0.76	0.25	6.63
Household of large size	0.68	0.77	0.05	8.92
Child age	0.94	0.06	0.88	1.00

ORᵃ adjusted Odds Ratio, % percentage

4.2.3 Stunting and Risk Factors in the Study Setting

Households in the refugee population had high prevalence of stunting 71.0% among low income households (less than USD 54) compared to the host whose stunting level was 52.0% in the same income group. Table 12 shows the relationship between stunting, household income and household size in Bidi Bidi settlement. Overall, the host had better income status compared to the refugees. There was no significant difference in stunting and estimated household income in the study setting (p=0.51). Larger households had relatively lower prevalence of stunting and the host scored better 7.0% than the refugees 13.0%. In smaller households, the prevalence of stunting was lower in the refugee population 11.0% compared to the host 26.0%. Generally, the refugees had acceptable level of stunting compared to the host and there was no significant difference in this relationship (p=0.99).

Table 12: Relationship between stunting, household income and household size in Bidi Bidi Settlement

	Host population					Refugee population					X^2 (p-value)
	Normal		Stunted		X^2 (p-value)	Normal		Stunted		X^2 (p-value)	
	N	%	n	%		n	%	n	%		
Estimated household income (USD)					0.12 (0.94)					1.48 (0.22)	**1.33 (0.51)**
Less than 54	63	51.0	24	52.0		108	82.0	27	71.0		
54.5-135	50	41.0	19	41.0		24	18.0	11	29.0		
135.5-271	10	8.0	3	7.0		0	0.0	0	0.0		
Household size					0.39 (0.82)					1.23 (0.54)	**0.02 (0.99)**
Small (1-4)	28	23.0	12	26.0		22	17.0	4	11.0		
Medium (5-10)	84	68.0	31	67.0		98	74.0	29	76.0		
Large (>10)	11	9.0	3	7.0		12	9.0	5	13.0		

n sample size; % percentage; x^2 Chi Square value

4.2.3.1 Multivariate Logistic Regression for Stunting

Children in the host population were at a higher risk of becoming stunted compared to the refugees (OR[a] 1.36; p=0.28; 95% CI 0.8-24) but the difference was no significant. Table 13 shows logistic regression for stunting as the dependent variable and associated factors as independent variables. The other factors that contributed to stunting were lack of hand washing (OR[a] 3.06; p=0.02; 95% CI 1.3-7.8) and there was significant difference. Child illness 14 days prior to the study (OR[a] 1.49; p=0.17; 95% CI 0.9-2.6) and household size (greater than 10 members) (OR[a] 1.34; p=0.35; 95% CI 0.8-2.5). The potential protective factors to stunting were being a female child (OR[a] 0.62; p=0.08; 95% CI 0.4-1.1), deworming (OR[a] 0.65; p=0.18; 95% CI 0.4-1.3) and individual dietary diversity score of at least four food group (OR[a] 0.7; p=0.26; 95% CI 0.4-1.4).

Table 13: Results of multivariate logistic regression for stunting and risk factors in Bidi Bidi Settlement

	Coef	Std err	OR[a]	p-Value	95% Confidence Interval 5%	95%
Being a female child	-0.5	0.3	**0.62**	**0.08**	0.4	1.1
Lack of hand washing	1.2	0.5	**3.06**	**0.02**	1.3	7.8
Lack of deworming	-0.5	0.4	**0.65**	**0.18**	0.4	1.3
Child being ill	0.4	0.3	**1.49**	**0.17**	0.9	2.6
Host population	0.4	0.3	**1.36**	**0.28**	0.8	2.4
Dietary diversity score >=4 food groups	-0.4	0.4	**0.7**	**0.26**	0.4	1.4
Household of large size	0.3	0.4	**1.34**	**0.35**	0.8	2.5
Child age	-0.1	0.1	**0.95**	**0.00**	1	1

OR[a] adjusted Odds Ratio; Coef Correlation Coefficient; Std err Standard error

4.2.4 Underweight and Risk Factors in the Study Setting

Underweight was high in the host population 92% compared to the refugee population 67% among children who were partly immunized for age. Table 14 shows the relationship between underweight, immunization status and cultivation in the study site. For children fully immunized, the refugee population had very high prevalence of underweight 33% compared to the host 8%. There was no significant association between underweight and immunization status in the settlement (p=0.28). Cultivation was a risk factor to underweight in both the host 88% and the refugee population 79%. Households who have not cultivated land had lower prevalence of underweight, host population 12% and refugee population 21% respectively. There was no significant variance between underweight and cultivation in the settlement (p=0.12).

Table 14: Prevalence of underweight against immunization status and cultivation in Bidi Bidi Settlement

	Refugee population			Host population			X^2 (p-Value)
	Normal	**Underweight**	**X^2 (p-Value)**	**Normal**	**Underweight**	**X^2 (p-Value)**	
	%	%		%	%		
	(n=146)	(n=24)		(n=145)	(n=24)		
Fully immunized							
No	80%	67%	1.4 (0.22)	61%	92%	7.3 (0.01)	**1.14 (0.28)**
Yes	20%	33%		39%	8%		
Have cultivated land						0.08 (0.78)	
No	40%	21%	2.39 (0.12)	17%	12%		**2.38 (0.12)**
Yes	60%	79%		83%	88%		

x^2 Chi Square; n number of samples; % percentage

4.2.4.1 Multivariate Logistic Regression for Underweight

Children who were ill 14 days prior to the study had large odds of becoming underweight (OR[a] 1.97; p=0.07, 95% CI 0.95-4.08) and there was no significant difference. Table 15 shows logistic regression for underweight as the dependent variable and associated independent variables. The other factors that contributed to underweight were medium household size (5-10 members), (OR[a] 1.92; p=0.10; 95% CI 0.87-4.24) and hand washing (OR[a] 1.81; p=0.24; 95% CI 0.68-4.83) and there was no significant association. The potential protective factor to underweight was being female (OR[a] 0.46; p=0.03; 95% CI 0.23-0.93) and this was significantly different. Dietary diversity score of >=4 was likewise a protective factor to underweight (OR[a] 0.34; p=0.02; 95% CI 0.14-0.84) and this was significantly different.

Table 15: Results of multivariate logistic regression for underweight and risk factors in Bidi Bidi Settlement

	coef	ORᵃ	p-Value	95% Confidence Interval	
				5%	95%
Being a female child	-0.8	**0.46**	**0.03**	0.23	0.93
Lack of hand washing	0.6	**1.81**	**0.24**	0.68	4.83
Child being ill	0.7	**1.97**	**0.07**	0.95	4.08
Dietary diversity score >=4 food group	-1.1	**0.34**	**0.02**	0.14	0.84
Household of Medium size	0.7	**1.92**	**0.10**	0.87	4.24
Child age	-0.1	**0.92**	**0.00**	0.89	0.96

Coef Correlation Coefficient; ORᵃ Adjusted odds ratio

4.3 Feeding Practices in Children 6-59 Months of Age in the Camp and Host Population

4.3.1 Individual Dietary Diversity Score of the Study Children

Generally, the refugee population had better dietary diversity score (DDS) compared to the host population. Table 16 shows the DDS of the host and refugee population. In the host population, the female children had more diverse diet 53.0% compared to the males 47.0% whereas in the refugee population, male children had better DDS 71.0% compared to the female 29.0%. There was no significant difference in terms of gender and DDS in the study area (p=0.91). In the two-population group, young children had poor DDS and good DDS increased with age. Conversely, the children in the refugee population in older age category (36-59 months) scored better DDS 42.0% compared to the host 35.0%, respectively. Dietary diversity score in the host and refugee population in the different age categories was significantly different (p=0.01).

In terms of household size, good DDS in the small household size (1-4) and large household size (>10) in both the host 32%, 0.0% and refugee population 10%, 7.0% were poor. Household size and DDS was significantly associated (p=0.00). Poor DDS was a major contributing factor to stunting in the two-population group, in the host, 33.0% of the stunted children had low DDS and 24.0% in the refugee population. There was no significant relationship (p=0.97). Underweight was high in children who had

low DDS in the study setting, 19.0% in the host and 18.0% in the refugee population (p=0.00).

Table 16: Dietary diversity score of children in the host and Bidi Bidi settlement

	Host Population				Refugee Population				X^2 (p-value)
	DDS <4		DDS >=4	X^2 (p-value)	DDS <4		DDS >=4	X^2 (p-value)	
	n	%	n	%		n	%	n	%		
Gender of child					0.02 (0.88)					1.13 (0.29)	**0.01 (0.91)**
Male	50	50.0	32	47.0		74	61.0	34	71.0		
Female	51	50.0	36	53.0		48	39.0	14	29.0		
Age group of study child					18.66 (0.00)					3.54 (0.32)	**11.13 (0.01)**
6-11 months	27	26.0	3	5.0		11	9.0	6	12.0		
12-23 months	36	36.0	20	29.0		44	36.0	12	25.0		
24-35 months	17	17.0	21	31.0		31	25.0	10	21.0		
36-59 months	21	21.0	24	35.0		36	30.0	20	42.0		
Household size					13.05 (0.00)					2.65 (0.27)	**9.79 (0.00)**
Small (1-4)	18	18.0	22	32.0		21	17.0	5	10.0		
Medium (5-10)	69	68.0	46	68.0		87	71.0	40	83.0		
Large (>10)	14	14.0	0	0.0		14	12.0	3	7.0		
Stunting					3.12 (0.78)					0.25 (0.61)	**2.74 (0.97)**
Normal	68	67.0	55	81.0		93	76.0	39	81.0		
Stunted	33	33.0	13	19.0		29	24.0	9	19.0		
Underweight					3.49 (0.06)					4.38 (0.036)	**8.59 (0.00)**
Normal	82	81.0	63	93.0		100	82.0	46	96.0		
Underweight	19	19.0	5	7.0		22	18.0	2	4.0		
Wasting					0.06 (0.80)					1.22 (0.27)	**1.35 (0.24)**
Normal	96	95.0	66	97.0		116	95.0	48	100.0		
Wasted	5	5.0	2	3.0		6	5.0	0	0.0		

n sample size; x^2 Chi square value; % percentage; DDS Individual Dietary Diversity Score

4.3.2 Feeding Frequency and Complementary Foods of the Study Children

The refugees had better child feeding frequencies and similarly the timing for the provision of family foods and there were no significant relationships in feeding frequencies in the two population group (p>0.05). Table 17 shows child feeding frequencies and time of introduction of complementary foods. In the two-population setting, mostly food was given to children when they cry 48.8% in the host and 44.7% at the settlement. The refugee children had better meal frequency per day; majority of them had three meals 60% compared to 54% for the host. Complementary feeding practices were better in the settlement compared to the host; introduction of foods at 6 months, 77.7% in the settlement compared to 72.7% in the host.

Table 17: Child Feeding Frequencies in Bidi Bidi Settlement

	Host		Refugee		X^2(p-value)
	n	%	n	%	
Times when child is fed					3.88 (0.144)
Asks for food	24	14.1	38	22.4	
At specified times	63	37.1	56	32.9	
When the child cries	83	48.8	76	44.7	
Number of times child is fed per day					4.39 (0.494)
Less than thrice	52	30.6	52	30.6	
Thrice	92	54	102	60	
Greater than thrice	26	15.4	16	9.4	
Age of introduction of complementary foods					7.68 (0.567)
Less than 6 months	7	4.3	3	1.8	
At 6 months	117	72.7	129	77.7	
After 6 months	37	23	34	20.5	

n sample size; x^2 Chi square value; % percentage

4.3.3 Nutrient Intake

4.3.3.1 Proportion of Children Who Met Recommended Dietary Allowance by Population Group

The analysis of 24-hour recall data showed that the intake of macronutrient was relatively good in the study setting although micronutrient intake was poor. Generally,

large number of children from the host population have met their nutrient intake compared to the refugee population. Table 18 below shows nutrient intake in the study site in a 24-hour recall period. In terms of macronutrient intake, 16.2% of the children in the host population have not met their daily energy intake compared to 17.7% in the refugee settlement and there was no significant difference (p=1). Protein food consumption was poor in the refugee settlement, 13.2% have not met intake compared to 2.9% in the host population and there was no significant relationship (p=0.06).

In regards to micronutrient intake, consumption of calcium rich food was the worst in the two-population group. The number of children who have not met intake of calcium was 97.1% in the host and 100% in the settlement and there was no significant relationship (p=0.48). The second poorly consumed micronutrient was folate, 6.8% of the host have not met intake compared to 75.0% for the refugees (p=0.54). Vitamin A consumption was better in the refugee population 80.9% have met intake compared to 63.3% in the host and there was a significant difference (p=0.04). Iron intake was similarly good in the two population group, 92.7% in the host have met intake compared to 88.2% in the settlement and there was no significant difference (p=0.56). The consumption of vitamin B rich foods was good in the study setting apart from vitamin B1. The intake of Selenium, Vitamin C and Magnesium was good for both group.

Table 18: Proportion of Children Who met RDA by population group in the Host Population and Bidi Bidi Settlement

	Nutrient Met	Host Population		Refugee Population		X² (p-Value)
		n	%	n	%	
Energy	2	11	16.2	12	17.7	0 (1)
	1	57	83.8	56	82.4	
Protein	2	2	2.9	9	13.2	3.56 (0.06)
	1	66	97.1	59	86.8	
Calcium	2	66	97.1	68	100.0	0.51(0.48)
	1	2	2.9	0	0.0	
Iron	2	5	7.4	8	11.8	0.34 (0.56)
	1	63	92.7	60	88.2	
Zinc	2	35	51.5	44	64.7	1.93 (0.16)
	1	33	48.5	24	35.3	
Magnesium	2	12	17.7	10	14.7	0.05 (0.82)
	1	56	82.4	58	85.3	
Selenium	2	20	29.4	19	27.9	0 (1)
	1	48	70.6	49	72.1	
Vitamin A	2	25	36.8	13	19.1	4.42 (0.04)
	1	43	63.2	55	80.9	
Vitamin C	2	8	11.8	19	27.9	4.62 (0.03)
	1	60	88.2	49	72.1	
Vitamin B1	2	44	64.7	57	83.8	0.60 (0.44)
	1	24	35.3	11	16.2	
Vitamin B2	2	8	11.8	19	27.9	4.42 (0.04)
	1	60	88.2	49	72.1	
Vitamin B3	2	2	2.9	5	7.4	2.18 (0.14)
	1	66	97.1	63	92.7	
Folate	2	42	61.8	51	75.0	0.37 (0.54)
	1	26	38.2	17	25.0	
Vitamin B12	2	14	20.6	18	26.5	0.37 (0.54)
	1	54	79.4	50	73.5	

n sample size; x² Chi square value; % percentage; 2 nutrient not met; 1 nutrient met

4.3.3.2 Mean Nutrient Intake by Population Group

In general, the mean nutrient intake in the host population was better than for the refugees. Table 19 shows the mean nutrient intake by population group. In terms of mean energy and macronutrient intake, the host scored better than the refugees did in all the nutrients; energy (2501.38Kcal, 1699.85Kcal), fat (199.98g, 103.22g), carbohydrate (177.7Kcal, 135.79Kcal) and protein (122.37g, 74.26g) ($p<0.05$). The host scored better than the refugees did in the entire mean nutrient intake for vitamins and minerals. For instance, mean intake for Iron was (786.26mg, 345.26mg), Magnesium (335.65mg, 295.3mg), Potassium (2686.89mg, 1785.71mg) and Sodium (158.77mg, 145.87mg). Mean Vitamin A intake in the host was better 258.74µg compared to the refugees 198.67µg. In regards to mean B vitamin intake, the highest intake was for B1 both in the host 635.34µg compared to 287.42µg in the settlement (p=0). Vitamin B2 and B3 had the lowest mean intake in both the host and the settlement 1.69µg, 0.86µg and 7.79µg, 6.37µg respectively. The overall worst mean intake in this study was for Calcium where both the host and refugees scored 0mg.

Table 19: Mean nutrient intake by population group in the Host Population and Bidi Bidi Settlement

	Mean Nutrient Intake				X^2	p-value
	Host	**SD Host**	**Refugees**	**SD Refugees**		
Energy	2501.38	1704.45	1699.85	1268.92	3.1	0.00
Fat	199.98	209.23	103.22	136.27	3.16	0.00
Carbohydrate	177.7	114	135.79	71.82	2.54	0.01
Protein	122.37	105.7	74.26	71.07	3.1	0.00
Iron	786.26	785.91	345.26	477.56	3.94	0.00
Magnesium	335.65	254.77	295.3	229.55	0.97	0.34
Potassium	2686.89	2209.57	1785.71	1606.3	2.72	0.01
Sodium	158.77	176.36	145.87	187.55	0.41	0.68
Zinc	7.83	6.61	6.54	5.03	1.28	0.2
Vitamin A-Retinol	258.74	1194.19	198.67	214.34	0.4	0.69
Vitamin B1	635.34	713.51	287.42	414.76	3.47	0.00
Vitamin B2	1.69	4.13	0.86	2.03	1.48	0.14
Vitamin B3	7.79	5.37	6.37	4.02	1.74	0.08
Vitamin B6	14.16	18.17	6.6	10.4	2.95	0.00
Vitamin B12	52.7	54.6	28.55	29.89	3.19	0.00
Folate	515.49	452.36	365.07	369.85	2.12	0.04
Vitamin E	0.66	0.63	0.31	0.36	3.92	0.00
Vitamin C	247.07	232.69	120.96	119.5	3.97	0.00
Selenium	57.48	70.5	37.5	44.37	1.96	0.05
Calcium	0	0	0	0	4.02	0.00

SD standard deviation x^2 Chi square value

4.3.3.3 Proportion of Children Who Met Recommended Dietary Allowance by Gender

Mainly, more female children met their RDA compared to the males. Table 20 shows the frequency and number of children who have met and not met their nutrient intake in the study setting. The number of females who have met energy intake were higher 85% compared to the male 66% and this was significantly different (p=0.02). All the female children met their protein intake, 100% compared to the male children 93%. For both gender, greater than 50% of the population have not met Calcium intake (p=0.22). Iron intake was good for both gender, the number of people who have met their RDA was greater 60%. In terms of Vitamin A intake, both gender had very poor intake. Only 15% of the female met their intake compared to male 11%. Vitamin B consumption was generally good for both gender with the exception of B12 and B2 where RDA met was less than 30%.

Table 20: Proportion of Children Who met RDA by gender in the Host Population and Bidi Bidi Settlement

	Nutrient Met	Female		Male		X^2	p-value
		n	%	n	%		
Energy	2	9	15	25	34	5.69	0.02
	1	53	85	49	66		
Protein	2	0	0	5	7	2.65	0.10
	1	62	100	69	93		
Calcium	2	54	87	70	95	1.52	0.22
	1	8	13	4	5		
Iron	2	2	3	8	11	1.84	0.17
	1	60	97	66	89		
Zinc	2	25	40	31	42	0.00	0.99
	1	37	60	43	58		
Magnesium	2	6	10	10	14	0.18	0.67
	1	56	90	64	86		
Selenium	2	11	18	21	28	1.57	0.21
	1	51	82	53	72		
Vitamin A	2	53	85	66	89	0.15	0.70
	1	9	15	8	11		
Vitamin C	2	8	13	12	16	0.09	0.76
	1	54	87	62	84		
Vitamin B1	2	32	52	38	51	0.04	0.84
	1	30	48	36	49		
Vitamin B3	2	2	3	4	5	0.30	0.58
	1	60	97	70	95		
Folate	2	23	37	32	43	0.08	0.78
	1	39	63	42	57		
Vitamin B12	2	13	21	13	18	0.08	0.78
	1	49	79	61	82		
Vitamin B2	2	7	11	19	26	0.15	0.70

n sample size; x^2 Chi square value; % percentage; 2 nutrient not met; 1 nutrient met

4.3.3.4 Mean Nutrient Intake by Gender

Essentially, large number of female children had higher mean nutrient intake compared to the males and there was significant relationship for all the variables (p>0.05). Table 21 illustrates the mean nutrient intake by gender in the study setting. The mean intake for all micronutrient was better for female compared to male. The poorest mean intake for both gender was for B2 (1.1µg, 1.5µg) and B3 (6.5µg, 7.7µg) for male and female respectively.

Table 21: Mean nutrient intake by gender in the Host Population and Bidi Bidi Settlement

	Mean Nutrient Intake				X^2	p-Value
	Male	SD	Female	SD		
Energy	1894.3	1537.9	2346.8	1540.8	-1.67	0.1
Fat	142.9	179.6	161.1	186.2	-0.58	0.57
Carbohydrate	146.6	86.0	168.3	108.3	-1.29	0.2
Protein	86.0	86.6	113.0	98.6	-1.2	0.23
Iron	462.8	625.9	688.7	735.0	-1.89	0.06
Magnesium	306.6	246.5	326.0	239.1	-0.45	0.65
Potassium	2134.2	1880.2	2358.2	295.4	-0.64	0.52
Sodium	148.4	175.9	157.0	189.3	-0.27	0.79
Zinc	6.9	5.7	7.5	6.1	-0.63	0.53
Vitamin A Retinol	159.5	187.4	311.3	1250.6	-1.85	0.07
Vitamin B1	401.4	555.6	533.0	660.7	-1.01	0.32
Vitamin E	0.4	0.6	0.6	0.5	-1.23	0.22
Vitamin B2	1.1	2.3	1.5	4.1	-1.42	0.16
Vitamin B3	6.5	4.5	7.7	5.1	-0.77	0.44
Vitamin B6	8.7	14.9	12.3	15.5	-1.41	0.16
Folate	423.4	403.2	460.4	438.5	-1.38	0.17
Vitamin C	160.4	169.6	212.2	219.3	-0.5	0.62
Selenium	38.8	53.2	57.9	65.2	-1.52	0.13
Vitamin B12	36.4	42.9	45.6	48.2	-1.15	0.25

SD standard deviation x^2 Chi square value

4.4 Knowledge, Attitude and Practices of Mothers or Caregivers in the Refugee and Host Population

4.4.1 Mothers Nutritional Knowledge

Predominantly, the mothers in the refugee settlement were knowledgeable than their host counterpart. Table 22 illustrates the knowledge level of mothers or caregivers in Bidi Bidi and the host population. The number of host mothers who stopped breastfeeding at optimal time, 18-24 months were 74.7% compared to the settlement 74.1%. Although the difference was marginal, there was a significant difference in the relationship (p=0.03). More refugees attended antenatal care (ANC) visits, more than 4 times, 24.9% compared to 13.6% in the host (p=0.00). Introduction of complementary foods was timely at the settlement 77% compared to 72.7% in the host and there was no significant association (p=0.57). More host mothers 51.7% begun breastfeeding in the recommended first 30 minutes after birth compared to the refugees at 47.1% (p=0.49). Mothers in the settlement knew the importance of colostrum 82.4% better compared to the host 68.2% and there was a significant difference (p=0.00). The

mothers from the host population knew the time of weaning a child 94.1% better compared to the refugee 87.6%.

Table 22: Mothers Nutritional Knowledge in Bidi Bidi Settlement

	Host		Refugee		X^2 (p-Value)
	n	**%**	**n**	**%**	
When did you stop breastfeeding?					**8.86 (0.03)**
12-18 months	28	16.5	15	8.8	
18-24 months	127	74.7	126	74.1	
6-12 months	15	8.8	28	16.5	
Below 6 months	0	0	1	0.6	
How many antenatal visits have you attended?					**31.55 (0.00)**
Less than four times	28	16.6	46	27.2	
Four times	118	69.8	81	47.9	
Greater than four times	22	13.6	42	24.9	
How old was your child when he/she started special foods?					**7.68 (0.57)**
Less than 6 months	7	4.3	10	3	
6 months	117	72.7	129	77	
Greater than 6 months	37	23	34	20	
How soon after delivery was breastfeeding initiated.					**2.39 (0.49)**
After 24 hours	10	5.9	17	10	
First 1 hour	72	42.4	73	42.9	
First 30 minutes	88	51.7	80	47.1	
Should a baby be given the first milk (colostrum)? at birth or soon after?					**9.12 (0.00)**
No	54	31.8	30	17.6	
Yes	116	68.2	140	82.4	
Do you know when you are to wean the child from breastfeeding?					**4.29 (0.03)**
No	10	5.9	21	12.4	
Yes	160	94.1	149	87.6	

	Host		Refugee		X^2 (p-Value)
	n	**%**	**n**	**%**	
Do you know the signs to show if your child is					**6.74 (0.00)**
malnourished (not receiving enough food)?					
No	4	2.4	15	8.8	
Yes	166	97.6	155	91.2	
Have you ever used the color coded MUAC to					
measure the nutritional status of your child at					**0.01 (0.91)**
home?					
No	67	39.4	66	38.8	
Yes	103	60.6	104	61.2	

n sample size; x^2 Chi square value; % percentage

4.4.2 Mothers Nutritional Attitude and Beliefs

Mothers were asked in regards to their opinion of breastfeeding the child on demand and expression of breastmilk and leaving it behind in order for someone to feed the child in case they went on errands. Figure 9 is a graphical presentation of nutritional attitudes and beliefs that affected nutritional status in the study area. The refugee mothers felt that, feeding the child on demand is good 57.6% compared to the host 56.5%. In regards to expressing and leaving breastmilk behind, less than 20% of the mothers in the two-population group said this was a good thing to do whereas over 80% in both the host and settlement said it is not a good thing to do.

Mothers were further asked about their opinions on giving different types of foods to children throughout the day and whether malnutrition is a serious issue for their children. Figure 10 shows attitude of mothers on giving different types of foods to children and whether malnutrition was a serious issue to their children. A higher percentage (78.2%) of the refugees felt it was a good thing, to give children diverse diet, compared to 64.7% for the host. In terms of their opinion on seriousness of malnutrition in the study area, 71.2% of the mothers from the settlement group felt this was a serious issue compared to 53.3% in the host community.

Mothers or caregivers gave their opinion on who would fall sick if not well fed and who should be given priority while serving food at the household. Figure 11 shows the graphical presentation of mothers or caregivers attitudes and beliefs on child sickness

due to inadequate feeding and serving priority at household level. About 98.2% of the mothers/caregivers of the refugee stated that their children were likely to fall sick if not fed or fed once in a day compared to the host at 97.6%. Much as the difference was negligible, higher number of the host population were of the view that children should be given higher priority while serving food 96.5% compared to the refugees 95.9%.
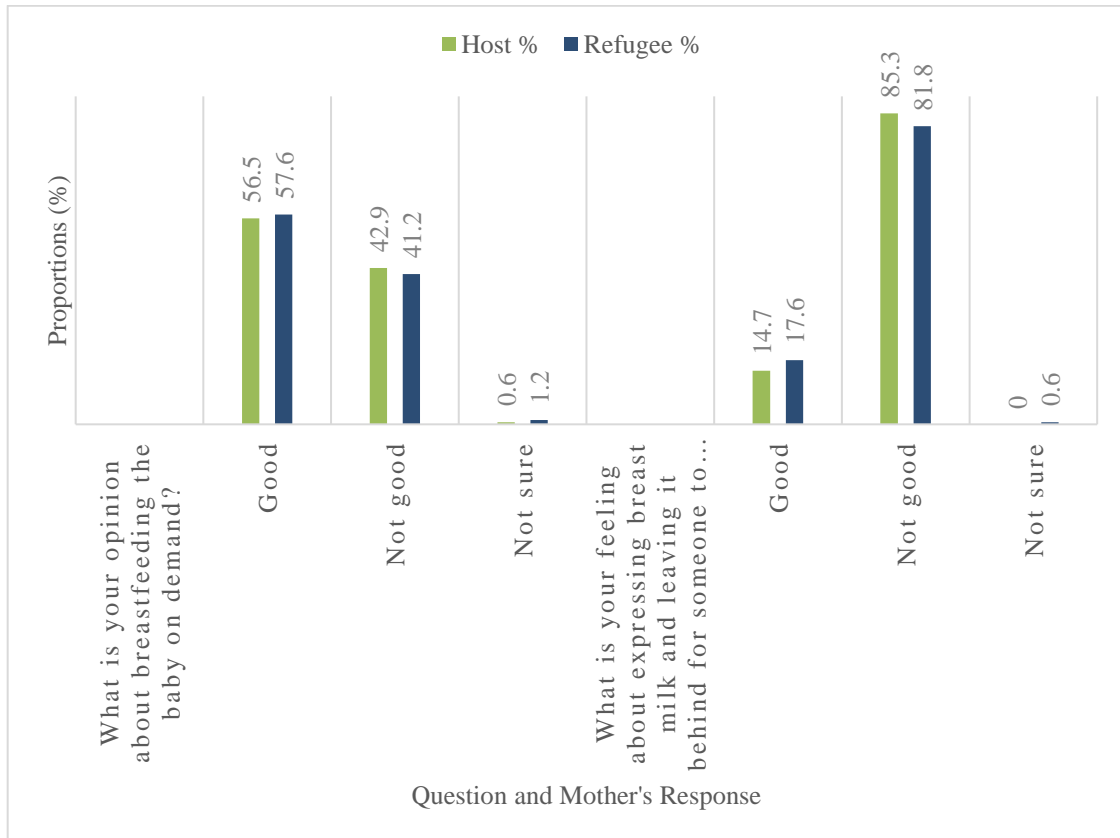
Figure 9: Attitude on breastfeeding baby on demand expressing and leaving breast milk at home in Bidi Bidi Settlement
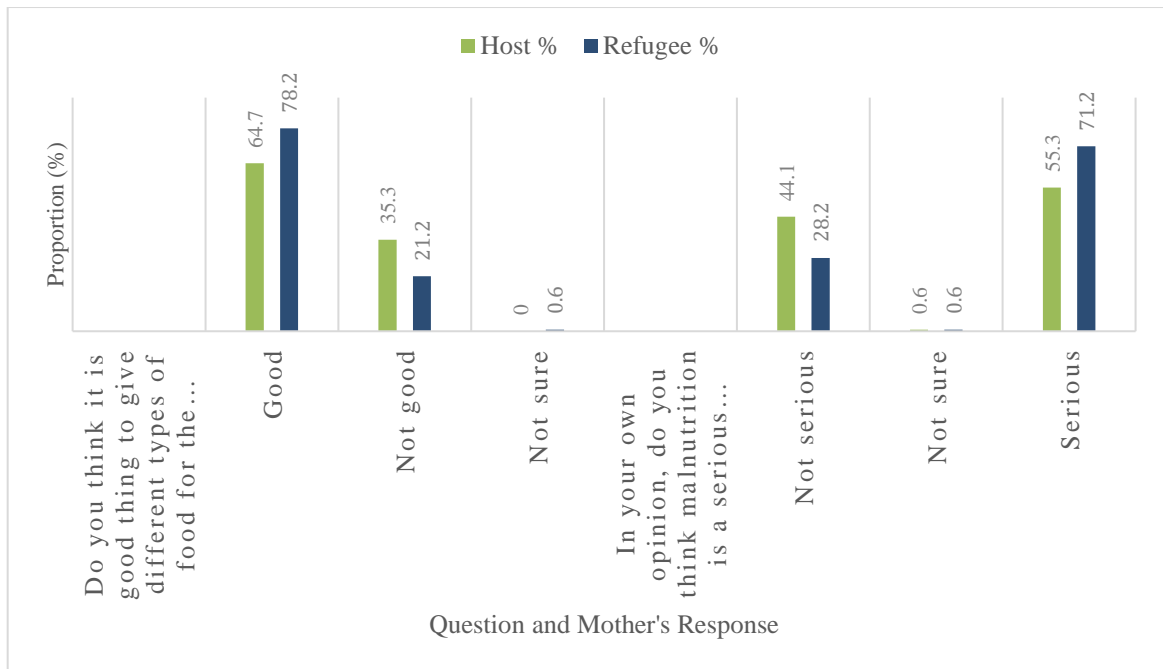
Figure 10: Attitude on giving different food types for children and whether malnutrition is a serious issue among children
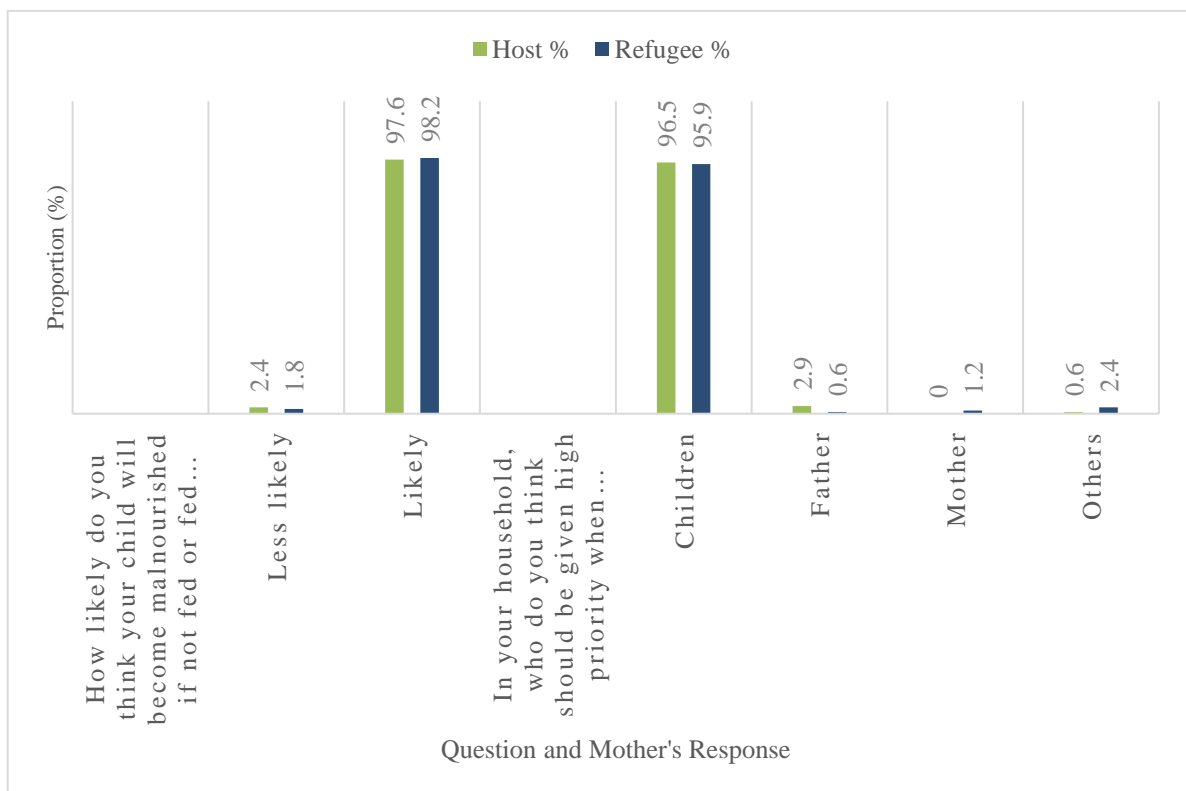
Figure 11: Opinion on whether child will not fall sick if not fed and who should be given food-serving priority throughout the day at the household

4.4.3 Mothers Practices that affected Nutritional Status

4.4.3.1 Nutrition and Kitchen Hygiene

This study explored the practices done by mothers in the host and the settlement in terms of nutrition and kitchen hygiene. There was no significant relationship in the variables by population group. Table 23 illustrates mothers' nutritional and kitchen hygiene practices in the study setting. More refugees' mothers, 48.2% reported that exclusive breastfeeding for the first six months was difficult for them compared to 47.6% for the host community. The number of mothers who found difficulties keeping their compound clean was more in the host 37.1% compared to the settlement 32.4%. In the study area, both population group felt it was not a good practice to give highly nutritious foods for the husband or head of the household alone.

Table 23: Nutrition and Kitchen Hygiene Practices

	Host		Refugee		X2 (p-Value)
	n	%	n	%	
How difficult was it for you to breastfeed your child exclusively					
for the first six months?					0.01 (0.914)
Difficult	81	47.6	82	48.2	
Not difficult	89	52.4	88	51.8	
Do you find difficulties keeping your surrounding clean while preparing food for the					
child or the family in general?					2.71 (0.26)
Difficult	63	37.1	55	32.4	
Neither difficult nor easy	0	0	2	1.2	
Not difficult	107	62.9	113	66.5	
In this community, men are served with chicken and women eat foods other than					
chicken, is this a good practice?					0.09 (0.75)
Good	6	3.5	5	2.9	
Not good	164	96.5	165	97.1	

n sample size; x^2 Chi square value; % percentage

4.4.3.2 Water Hygiene and Sanitation

This study also assessed the water hygiene and sanitation (WASH) practices of the mothers in the study area. Table 23 shows the WASH practices in the study area. Overall, the host had better WASH practices compared to the refugee population. Both population group majorly used tap water, host 74.7% and refugees 99.4%. The host used large quantity of water per day (>= 40 liters) 98.8% compared to the refugees 95.9%. In both settings, majority of the households did not treat drinking water, 97% in the host and 98% among refugee households. The host had better access to toilet

facilities 97% compared to the host 93%. In both study settings, large number of people hygienically disposed of child faeces and did hand washing with soap.

Table 24: Water Hygiene and Sanitation Practices

	Host		Refugee		X^2 (p-Value)
	n	**%**	**n**	**%**	
Household main source of water					**84.98 (0.00)**
Borehole	43	25.3	1	0.6	
Tap water	127	74.7	169	99.4	
Household water usage per day					**24.49 (0.22)**
Less than 40 liters	2	1.2	7	4.1	
>= 40 liters	168	98.8	163	95.9	
Treatment of water before drinking					**2.72 (0.99)**
Treat	5	2.9	1	0.6	
Do not treat	165	97	169	98	
Access to toilet facility					**2.11 (1.46)**
No access	6	3.5	12	7.1	
Access available	164	97	158	93	
Disposal of child feces, observed					**0.34 (0.56)**
Disposed of immediately and hygienically	168	98.8	169	99.4	
Not disposed of immediately	2	1.2	1	0.6	
Usage of soap during handwashing					**0.06 (0.80)**
No	8	4.7	9	5.3	
Yes	162	95.3	161	94.7	

n sample size; x^2 Chi square value; % percentage

5. CHAPTER FIVE: DISCUSSIONS

This chapter described and related the key findings in this study with similar studies in different parts of the globe. It compared results of demographics, socio-economic status, nutritional status, child-feeding practices and KAP of similar published studies.

5.1 Demographic and Socio-economic Status

The mean age of the study children was 21.4 months, meaning majority of the children in the study setting were born after August 2016 when the refugees settled in Bidi Bidi settlement. The average household size was 6.7 with the refugees having large household proportion compared to the host. This was because households in the settlement were caretakers to relative's children including orphans whose parents died during the July 2016 crisis in South Sudan. The host had better economic status compared to the refugees and this was in agreement with a study done by (Pernitez-Agan *et al.*, 2019) among Syrian refugees in the neighboring countries of the Middle East. In contrast to the host, the refugees had limited access to formal and informal employment and business opportunities that would increase their household income. The number of refugees who recorded having completed secondary education and advanced to tertiary education, as their education status were more than the host. This is in line with the Uganda housing and national population census (UBOS, 2017) where the literacy rate in Yumbe district was low. The refugees were in a protected living condition and had access to free education materials giving them higher motivation to study. According to (UBOS, 2017) report, 44.5% (>18 years) and 76.9% (>60 years) of the people in Yumbe district were non-literate and with this high proportion, the young children and adolescents received less guidance and motivation to further their education.

5.1.1   Wealth Index

The wealth index in both the host and refugee population was poor. Majority of the households earned less than USD 50 per month, lived in grass-roofed building, main house floor was earthed and had less than three dwelling rooms. This finding was consistent with that of (Berhanu, Mekonnen and Sisay, 2018). With low level of employment or skilled jobs, the households lacked money to construct permanent buildings.

5.2 Nutritional Status

To the best of the researchers' knowledge, this is one of the most recent comprehensive studies that contextualizes the nutritional status and risk factors among host children, aged 6-59 months, vis-à-vis their spatial and temporal coexisting refugee children. While acknowledging the need to first establish the status quo of the nutritional status and risk factors among the host and refugee children population, the study also elicited dimensions of discrimination against host children. This study, determined the differences in the nutritional wellbeing and risk factors among the two-population group three years after the arrival of South Sudanese refugees in Bidi Bidi Settlement in 2016. With the current immigration crisis in Uganda and other parts of the globe, this is a critical subject from policy perspective. The GAM prevalence in Bid Bidi settlement and the neighboring host population was 3.9% below the national average 4% and West Nile region 10% (UBOS, 2017). According to (WHO *et al.*, 2006 date), GAM level below 5% is acceptable. Collectively, the prevalence of acute malnutrition in Bidi Bidi Settlement was acceptable. This study agrees with similar studies conducted in Jordan, Lebanon and Iraq where the GAM levels were below 5% (Hossain *et al.*, 2016). A similar study by (Legason and Dricile, 2018) in Lobule refugee settlement in West Nile region of Uganda found GAM prevalence of 1.1%. The nutritional status of the refugees and the host children was comparable to a study done among Syrian refugees and the host (Pernitez-Agan *et al.*, 2019). The host were highly stunted, 27.0% compared to the refugees 22.4%. The height difference could be that the South Sudanese refugees had better genetic traits for height compared to the host population (Lettre, 2011).

The scaled nutrition intervention in the settlement afforded better nutrition services for the refugees (Dubois *et al.*, 2012). Investing in the first 1000 days of life is an important intervention to reduce child stunting. This is a window of opportunity to improve child growth and neuro development from conception until the child's second birthday (de Onis and Branca, 2016). Behavior change and communication of the population is an important component of nutrition education where food scarcity is a huge challenge and this can help reduce child stunting. Underweight in the study setting was 14.1% for both population groups.

5.2.1 Factors that Affect Nutritional Status of Children aged 6-59 months

In a hierarchical order, five factors majorly contributed to poor nutritional wellbeing in the study setting: medium or large household size, illness 14 days prior to the study, being a host, lack of deworming and anemia. Our findings agree with those of (Berhanu, Mekonnen and Sisay, 2018) where high level of stunting mainly occurred in large households. Households with many members were at a higher risk of food insecurity as portion intake and size is reduced and children 6-59 months of age were particularly affected (Berhanu, Mekonnen and Sisay, 2018). While on the other hand, (Asfaw *et al.*, 2015) stated that when the household size is large, infant and young children got little attention especially in their food intake and feeding habits. This study is also consistent with a finding from Oromia State in Ethiopia (Alemu *et al.*, 2013). Child sickness 14 days prior to the study affected nutritional status of the study children. Disease weakens appetite of children and results into less food intake and illnesses that involves vomiting affects nutritional status to a larger extend (*Mayo Clinic. 2014*). Additionally, mothers or caregivers of the children give more time to stay with the children and less time was accorded to prepare food for the children during sickness (Bo, Samuel and Lawal, 2010). Being a host was a potential risk factor to malnutrition. This study agrees with the findings by Aaby et al. (1999) in Guinea-Bissau (Aaby *et al.*, 1999). In addition to providing their farmlands to settle the refugees, the host were not provided with 50/50 relief aid in the study area. Relief support was 70% and 30%, for the refugees and the host respectively as per the Uganda's refugee policy and these excludes food relief.

The findings from this study also exhibits that anaemia was an additional causative factor to poor child nutritional status in the study area (OR^a=2.13; p=0.31; 97.5% CI 0.05-9.13). This result is consistent with the study done by (Lutfy *et al.*, 2014) among refugee children resettled in the United State from 2004 to 2010. Anaemia in refugee settlement could be attributed to the point that relief food is only limited to plant based foods with no or limited inclusion of animal food sources in the diet. Low deworming meant that, cases of helminths in the study area was high and therefore, likely to have contributed to anaemia in children. Adequate interventions targeting micronutrient supplementation in the settlement and the host population may complement the impact of major nutrition interventions. Iron deficiency Anemia (IDA) affects the cognitive development of children and for mothers; it leads to pre-term births (Lutfy *et al.*, 2014).

5.3 Child Feeding Practices

5.3.1 Dietary Diversity Score

Other factors that influenced nutritional status were child-feeding practices. In terms of DDS, the refugee children had a diverse diet compared to the host. Young children, less than 36 months of age had poor DDS compared to those in the age range of 36-59 months in the host and refugee population. The findings from this study are similar to those of a study conducted in Ghana that found a better DDS in older children compared to young ones (Bandoh and Kenu, 2017). Poor household socio-economic status is a major factor for low individual DDS among the different age groups (Aemro *et al.*, 2013). Furthermore, young children have limited food options compared to the older ones. Other possible reasons for low DDS in the study area could be low maternal knowledge on the importance of different food groups for their children. Poor DDS was equally linked to high stunting and underweight in the study area.

5.3.2 Child Feeding Frequency

Child feeding frequency in the settlement was generally acceptable; however, the study found that children were mostly given food when they cry. Mothers should be counseled on the importance of timely feeding of their children and breastmilk should be given on demand to infants. This shall be an important remedy to reduce acute and chronic malnutrition during childhood development. The number of times children were fed per day and introduction of complementary food were acceptable in the two-population groups. It is highly likely that strengthened Maternal Infant Young Child Nutrition (MIYCN) activities in the study area, positively contributed to these practices.

5.3.3 Nutrient intake

The adequacy of nutrient intake in Bidi Bidi settlement was assessed by use of 24-hour recall. Intake of energy giving food was good for both the refugees and host groups. The host had better protein intake compared to the refugees. Whilst the refugees had access to relief food that positioned them at an advantage in terms of food security, these were not amino acids dense foods. The host have access to income generating activities unlike the refugees that enables them to provide protein rich foods for their households. Micronutrient intake was poor in the study area; the poorest intake was for calcium. Milk and milk products are the richest source of calcium, in this present study, the consumption of these products was low and this could be attributed to the high prices of these products in the study area. Iron and Vitamin A consumption was good.

However, the refugees had better Vitamin A intake compared to the host. This could be attributed to the monthly distribution of Vitamin A fortified palm oil by aid agencies in the settlement. Effective home gardening of leafy vegetables afforded the study children with a good intake of Vitamin A rich foods and Iron among the study households.

5.4 Nutritional Knowledge, Attitude and Practices of Mothers

5.4.1   Mothers Nutritional Knowledge

This study found that mothers, both in the settlement and host population have adequate nutritional knowledge. Majority of the mothers knew the right age to stop their children from breastfeeding (18-24 months). Large number of the mothers or caregivers were aware of the time of introduction of complementary foods (from 6 months), knowledgeable on the time of initiation of breastfeeding (first 30 minutes or within an hour) after birth and the essential benefits of colostrum milk, knew when to wean children from breastfeeding. These findings are similar to those of a study done in Ethiopia, Oromia State (Mengistu, Alemu and Destaw, 2016). It is important to initiate breastmilk immediately after birth and in situations where the mother has no breastmilk; concerted effort has to be put in place to encourage mothers to feed their children until breastmilk production is initiated. Continuous counselling on early initiation of breastfeeding and importance of feeding the colostrum milk will help to improve the immune system of infants, as it is rich in anti-bodies. At 6 months, introduction of additional foods to children is essential as the breastmilk provides inadequate energy to sustain the nutritional demand of the child.

5.4.2   Mothers Nutritional Attitude

The opinion of mothers towards expressing breastmilk and leaving it behind and someone feeds their children was negative. While this was a positive practice, in order to boost the nutritional wellbeing of the child, most mothers seemed not to have received adequate counselling on the importance and how to express breastmilk for their breastfeeding children. Mothers in the study setting believed that feeding the baby on demand and serving different types of food throughout the day was good practice. Additionally, mothers or caregivers in the study area, in their opinion felt that malnutrition was a serious issue in the community they reside. They also believed that if children were not given adequate food, chances are very high that they would fall sick. Lastly, mothers felt that when serving food to the family members, it is important

that children are targeted and nutritious foods should not only be targeted to the head of the household or the father. The speed of digestion in children is faster than in adults. Mothers or caregivers should ensure that children are given the available foods on every occasion they need to eat. Eating different types of food provides diverse nutrients for the rapidly growing children and enable them to have strong immunity to fight different opportunistic infections.

5.4.3   Mothers Nutritional Practices

Practice of exclusive breastfeeding was not difficult according to this study, in the two-population groups, more than 50% of the mothers had not faced difficulties in breastfeeding their children in the first six months. This could be attributed to the intensive MIYCN Programme in the study area. Majority of the households in the study area used more than 40 liters of water per day. This research contradicts the finding of a study conducted in Oromia State of Ethiopia (Mengistu, Alemu and Destaw, 2016) that found majority of the households used less than 40 liters of water per day. However, the findings of this study are consistent to that of (Mengistu, Alemu and Destaw, 2016) where most of the HHs didn't treat water before drinking. Access to toilet, disposal of child faeces and hand washing in this present study were acceptable. This could be attributed to efficient WASH intervention in the study area that supported both the refugee and the host populations.

6. CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Even though, the prevalence of GAM in Bidi Bidi refugee settlement and the host population was below the WHO 5% threshold and lower than the national rate, the host children had poor nutritional status compared to those of refugee population. The refugee children had better nutritional status and better vitamin A intake. Household size, illness 14 days prior to the study, being a member of host population, lack of deworming and suffering from anemia are five factors that negatively influence nutritional status of children in Bidi Bidi settlement and the host population.

6.2 Recommendations

The government of Uganda should equally target the host children, thus formulate a policy that allows them to benefit from the apportionment of food and nutrition items during emergencies. The policy should link the host children to the refugee settlement for inclusivity so that planning adequately caters for both refugee and host children.

Humanitarian partners working in the settlement should strengthen and incorporate family planning programmes in nutrition interventions. The refugee community should continuously be advised on the advantages of having moderate household size.

Health and Nutrition partners working in the settlement should do malaria campaign every year. This will help reduce illnesses related to malaria and at the same time, the refugee's gets educated on the importance and effective use of mosquito net.

Livelihood programmes involving animal rearing should be promoted in Bidi Bidi settlement and the host population. The residents in the settlement and the host population mostly relied on plant-based foods and this deprived them of iron rich foods that are mostly obtained from animal sources.

Lastly, health workers should ensure that mothers or caregivers are always reminded on the next schedules of deworming. In this study, through checks done on the child health cards, many children have not received deworming within 12 months.

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8. APPENDICES

8.1 Appendix 1: Data Collection Tools

Digital Questionnaire Built in ODK
Sub county
Population group
Name of village
Name of interviewer
What is the name of the respondent
Gender of respondent
Obtain Consent First
Hello, my name is (*mention your name*)   You are being invited for an interview about the nutritional status of your child and other questions related to household food consumption. The investigator for this study is **Joseph Mandre**, a Master Student from University of Nairobi, Kenya. The study plans to take nutritional indicators called anthropometric measurements; height, weight and MUAC. We will ask you some questions about your child and food consumption for about 30 minutes. Your child will not face any form of injury or pain by being a subject to this study. You will not receive any cash assistance by being interviewed. The direct benefit of this study; should your child be below normal anthropometric measurements, our team will advise on helpful procedures to follow and refer you to the nearest health facility for further assessment and possible treatment. Indirect benefits will comprise of; improved policies on food and nutrition interventions in your area by the government and other partners working here. Privacy and confidentiality: all the data collected about your child will be kept confidential and shall only be shared among the study participants. If you have read or understood this form and you are okay with your child being part of this study, kindly understand that your child's participation is at your will and you may withdraw in the middle of the interview or withdraw your consent without any form of penalty. The child's privacy will be maintained in all published and written reports from this study. If you are okay with this, may we start to ask you some questions in relation to household food consumption, child feeding practices and your knowledge about nutrition at this household?
If this is okay with you, may we proceed to ask you some questions related to the child's health and household food consumption?
Section A: Household Demographic Characteristics
Household profile
How many people live in this household including yourself?
How many are adults?

Digital Questionnaire Built in ODK
Household member names
Name of hh member #${name_number}?
Demographic of household members
Age of ${namefromearlier}
Gender of ${namefromearlier}
Relationship of ${namefromearlier} to household head
Marital status of ${namefromearlier}
Education level of ${namefromearlier}
If other specify
Occupation of ${namefromearlier}
If occupation other (specify)
What kind of business?
Reasons why ${namefromearlier} is unemployed
What is the main religion of the household?
If other specify
Section B: Socio-Economic Characteristics
What is the estimated combined household income?
Describe the ownership of the home where you stay?
If other specify
Type of building material for roof?
Type of building material for walls?
If other specify
Type of floor for the main house?
If other specify
Is the kitchen separated from the main house?
Number of rooms in the dwelling place?
Do you have cultivated land?
If yes, what is the acreage of the land?
What crops have you planted in the previous season?
If other specify
What domestic animals do you keep?
What is the main type of cooking fuel used in this household?
If other specify
Does your household own any of the following asset?

Digital Questionnaire Built in ODK
If other specify
Section C: Information About The Index Child
Name of the child
Date of Birth of ${child_n}
Age in months of ${child_n}
gender of ${child_n}
Where was ${child_n} born?
If other specify
Have you gone for antenatal visit during the pregnancy of ${child_n}?
How many antenatal visits have you attended?
How soon after delivery was breastfeeding initiated?
If other specify
Are you still breastfeeding this child?
When did you stop breastfeeding?
What are the reasons why you stopped breastfeeding? (repeat question to get more reasons, if necessary)
Section D: mothers knowledge and attitude on nutrition
Mothers Knowledge on Nutrition
Should a baby be given the first milk (colostrum) from the breast at birth or soon after?
May you explain your answer briefly?
During the first 3 days after birth, has anyone given you support or advice to help you start breastfeeding?
At what age have you started giving foods to your child?
How many times in a day do you serve food to your child?
Where do you get foods to cook in this household?
If other specify
Do you wash your hands before and after feeding the child?
Do you know when you are to wean the child from breastfeeding?
Do you know the signs to show if your child is malnourished (not receiving enough food)?
Have you ever used the color coded MUAC to measure the nutritional status of your child at home?
Mothers Attitude About Nutrition
What is your opinion about breastfeeding the baby on demand?

Digital Questionnaire Built in ODK
What is your feeling about expressing breast milk and leaving it behind for someone to feed your child?
In your household, who do you think should be given high priority when serving food throughout the day?
If other specify
How likely do you think your child will become malnourished if not fed or fed once in a day?
In your own opinion, do you think malnutrition is a serious issue for the child's health?
Do you think it is good thing to give different types of food for the child throughout the day?
How difficult was it for you to feed your child exclusively for the first six months?
Do you find difficulties keeping your surrounding clean while preparing food for the child or the family generally?
In this community, it is believed that when chicken is being prepared at the household, the husband is supposed to receive the largest portion and women are allowed to only have the soup. In your opinion, do you think this is a good practice?
Section E: Household Water Consumption And Sanitation
Household Water Consumption
What is your main current water source for household?
How long does it take to go to the main source of water and come back in minutes
On average how many LITRES of water does the household use per day
How much do you pay for a 20 Liter Jeri can (enter zero if water is free)
Do you do anything to the water before drinking it? (More than one response possible)
Sanitation
Does your household have access to a toilet facility?
If YES, What type of toilet facility?
If NO, where do you go/use? (probe further)
If other specify
How is Children's feces disposed (OBSERVE)
If other specify
At what times do you wash your hands? (Multiple answers possible)
If other specify
When washing hands do you use soap
Section F: Household Food Insecurity Access Scale (Hfias) Measurement Tool
In the past four weeks, did you worry that your household would not have enough food?

Digital Questionnaire Built in ODK
How often did this happen?
In the past four weeks, were you or any household member not able to eat the kinds of foods preferred because of lack of resources?
How often this happen?
In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?
How often did this happen?
In the past four weeks, did you or any household member have not to eat because of a lack of resources to obtain other types of food?
How often did this happen?
In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?
How often did this happen?
In the past four weeks, was there even no food to eat of any kind in your household because of lack of resources to get food?
How often did this happen?
In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?
How often did this happen?
In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?
How often did this happen?
Section G: Person Feeding Child
Who feeds your child?
How many feedings (meal+snacks) is your child fed?
How frequently is your child fed?
Does your child take family foods or special food?
How old was your child when he/she started special foods?
Section H: Immunization
Does your child (X) have an immunization card?
Immunization Card verified
BCG
OPV0
Pentavalent1 and OPV1

Digital Questionnaire Built in ODK
Pentavalent2 and OPV2
Pentavalent3 and OPV3
Measles
DPT1and OPV4
DPT2 and OPV5
Has the child being dewormed this year?
Is the child fully immunized for age?
Section I: Clinical Appearance Of Children In Relation To Iron And Vitamin A
Pallor
Night blindness
Bitot spot
Section J: Morbidity And Health Seeking Behaviour
Has the child been ill in the last 14 days?
If yes, what type of illness? (specify)
If other specify
If yes, have you consulted anyone for the major sickness during the past two weeks?
If yes, how fast did you seek help?
If yes, where was the first consultation during the past 2 weeks?
If no, why was no one consulted for the major illness?
Section K: Diversity Of Food For The Index Child
Food groups with examples
Cereals: Millet/Sorghum/Maize porridge,
Cereal products: Spaghetti, pasta, anjera, rice, bread, mahmri, mandazi, ugali (sima) or other foods made from grain like: Sorghum, Millet, Wheat
Vitamin A rich vegetables and tubers: Pumpkins, carrots, orange or yellow fleshy sweet potatoes
White tubers and roots: Sweet Potato (white), white Yams, Cassava, Irish Potato or any other foods made from roots
Dark green leafy vegetables including wild green vegetables like: cassava leaves, amaranths, mchicha, pumpkin leaves, spinach, kales, sweet potato leaves
Other vegetables: Cabbage, Eggplants, Tomatoes, Onions, Green Pepper, Mushroom, Okra, celery
Vitamin A rich fruits :Ripe mangoes, papayas + other locally available vitamin A rich fruits
Other fruits: Bananas, Oranges, Lemons, Tangerines, Pineapples, coconut
Organ meat (iron rich: Liver, Kidney, heart, gizzard or other organ meats

Digital Questionnaire Built in ODK
Fresh meats and offal's: Meat, poultry, offal (e.g. chicken/poultry, camel/goat meat, beef)
Eggs: Chicken, Ducks, Guinea fowls, Turkey, Pigeon, or other eggs from any kind of birds
Fish: Fresh or dried fish or shell fish (Tilapia, octopus, crab)
Pulses/Legume, nuts (e.g. beans, lentils, green grams, Cowpeas)
Milk and milk products (e.g. goat/camel/fermented milk, milk powder)
Oils/fats*(e.g. cooking fat or oil, butter, ghee, margarine)
Sweets, Sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candles.
Condiments and Spices: Chilies, Pepper, Ginger, Spices, Herbs, Salt
Beverages: Kahawa, black tea
Section L: Dietary Intake 24-Hour Recall
Please I would like to ask you about the foods and drinks (meals and snacks) that your child ate yesterday during the day and at night (24 hours), whether at home or outside the home. Kindly recall all foods and beverages that the child has eaten (include the quantities eaten) starting with the first food eaten in the morning. Write down all food and drinks mentioned by the respondent. When the respondent has finished, probe for meals and snacks not mentioned starting with breakfast until dinnertime. 1. Was yesterday a feast or celebration day? 1. Yes   2. No 2. Has your child eaten anything (meal or snack) OUTSIDE of the home yesterday? 1. Yes   2. No 3. How many meals has your child eaten in the last 24 hours? 4. When the respondent recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed.

8.2 Appendix 2: Focus Group Discussion and Key Informant Interview Guide

Focus Group Discussion (done in group of 8 participants) *Consent was sought before starting the sessions (greetings, introduction etc.)*
Child Feeding Practices
Name of Participants (Female only)
What are the problems faced by mothers during breastfeeding in your community?

Do you know some of the reasons why children in this community look so thin or frequently fall sick?

Food Access and Availability

May you list some of the factors affecting food access and availability in your community

Health Service Delivery

How satisfied are you about health and nutrition service delivery in your community?

Availability of drugs: 1. Good ☐   2. Fair ☐   3. Bad ☐

Staff attitudes: 1. Good ☐   2. Fair ☐   3. Bad ☐

Referrals: 1. Good ☐   2. Fair ☐   3. Bad ☐

Distance to Health Facility:1. Good ☐   2. Fair ☐   3. Bad ☐

Overall Client Satisfaction:1. Good ☐   2. Fair ☐   3. Bad ☐

Key Informant Interview (interview Nutrition officer or Public Health officer

Informed consent before interview (the data collected will be treated with the highest level of privacy and be used only for academic purpose)

What is your position/role in this community?
How long have you stayed in this community?
Do you know health and nutrition activities provided in this community?
Who is providing food and nutrition services in this community?
Do you know some of the items being provided in the activities mentioned above?
Are there some challenges facing the implementation of food and nutrition programmes in this community?
Do you have any suggestion on how the Programme should be implemented?
What is the overall satisfaction of the community about food, nutrition and health services provided in your community?

Observation Checklist		
Are available latrines being used?	1. Yes ☐	2. No ☐
Availability of mosquito net and usage?	1. Yes ☐	2. No ☐
Availability of drying table for utensils	1. Yes ☐	2. No ☐
Cleanliness of kitchen	1. Yes ☐	2. No ☐

8.3 Appendix 3: One Day Training Curriculum for Research Assistants

Morning	Training Curriculum for Research Assistants			
	Person Responsible	**Subject**	**Strategy**	**Learning Aid**
	Lead researcher	Introduction to the study (Purpose, objectives and Benefits)	Lecture	Flip chart, projector
	Lead researcher	Ethics and Human Rights in research	Brainstorming, Lecture	Flip chart projector
	Lead researcher	Over view of Malnutrition and causes	Buzz groups	
Breakfast				
	Lead researcher	Introduction to data collection tools	Lecture	Flip chart, projector
		Introduction to open data kit (ODK) as a tool for collecting field data	Brainstorming and lecture	Flip chart, projector
Lunch				
	Lead researcher	Standardization Test	Individual/team work	Anthropometric tools
	Lead researcher	Pre-test of questionnaires	Individual/team work	Data tools

8.4 Appendix 4: Informed Consent for Household Interviews

Informed Consent for Household Interview (English)
Title of the study Nutritional Status of Children 6-59 Months of Age and Risk Factors among Refugees and Host Population in Bidi Bidi Settlement, Yumbe District, Uganda
Investigator(s): Mandre Joseph
Institution(s): University of Nairobi, Kenya

Introduction

Hello, my name is (mention your name)

You are being invited for an interview about the nutritional status of your child and other questions related to household sanitation and food consumption. The investigator for this study is Joseph Mandre, a Master Student from University of Nairobi, Kenya. This research has no financial support from any organization and it is self-sponsored by Joseph Mandre. The in-kind support for this research is inform of anthropometric equipment provided by UNICEF Uganda Country office through Yumbe district nutrition department.

Who will participate in the study?

The study will be carried out by 6 participants; the lead investigator, a research assistant and 4 data enumerators (2 from the camp and 2 from the host population).

Procedure

The study plans to take nutritional indicators called anthropometric measurements; height, weight and MUAC. We will ask you some questions about your child, food consumption and sanitation for about 30 minutes.

Risks/discomforts:

Your child will not face any form of injury or pain by being a subject to this study. You will not receive any cash assistance by being interviewed. This interview will take some part of your time to attend to other household needs.

Benefits

The direct benefit of this study to the participants; should your child be below normal anthropometric measurements, our team would advise on helpful procedures to follow and refer you to the nearest health facility for further assessment.

Privacy and confidentiality

All the data collected about your child will be kept confidential and shall only be shared among the study participants. If you have read or understood this form and you are okay with your child being part of this study, kindly understand that your child's participation is at your

Informed Consent for Household Interview (English)
will and you may withdraw in the middle of the interview or withdraw your consent without any form of penalty. The child's privacy will be maintained in all published reports from this study. **Questions:** If you have any questions related to the study, or your rights as a research participant, you can contact the principal investigator, **Mandre Joseph** on telephone number **0777207252** or via email on **joman2011@yahoo.co.uk** **Report to the contacts below in case of other issues** If you have any issues pertaining to your rights and participation in the study, please contact the Chairperson, Gulu University Research Ethics Committee, Dr. Gerald Obai Tel: 0772305621; Email: lekobai@yahoo.com/lekobai@gmail.com; or the Uganda National Council for Science and Technology, on plot 6 Kimera road, Ntinda, Kampala on Tel 0414705500. **Statement of consent** .... Has described to me what is going to be done, the risks, the benefits involved and my rights as a participant in this study. I understand that my decision to participate in this study will not affect me in any way. In the use of this information, my identity will be concealed. I am aware that I may withdraw at any time. I understand that by signing this form, I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate. A copy of this form will be provided to me. Name(Participant)……………………..Signature/Thumb………………Date……………... Name (Witness)…………………… Signature ……………….Date……………... Name (Interviewer)………………………….Signature……………….Date……………...

Informed Consent for Household Interview (Arabic Language, Google Translation, 11th June 2019)
اللاجئين بين الخطر وعوامل شهرًا 59 و 6 بين أعمارهم تتراوح الذين للأطفال التغذوية الحالة: الدراسة عنوان أوغندا ، يومبي مقاطعة ، بيدي مخيم في المضيفين والسكان
جوزيف ماندر :(الباحثون) المحقق
كينيا ، نيروبي جامعة :(المؤسسات) المؤسسة

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المقدمة

(اسمك اذكر) اسمي مرحبا

واستهلاك للأسر الصحي بالصرف المتعلقة الأخرى والأسئلة لطفلك الغذائية الحالة حول مقابلة لإجراء دعوتك تمت البحث هذا يحتوي لا .كينيا ، نيروبي جامعة من ماجستير طالب ، ماندري جوزيف هو الدراسة هذه في الباحث .الطعام معلومات هو البحث لهذا العيني الدعم إن .ماندري جوزيف بواسطة ذاتية برعاية وهو مؤسسة أي من مالي دعم أي على يومبي مقاطعة في التغذية قسم خلال من أوغندا في اليونيسف مكتب يوفرها التي البشرية المعدات عن .الدراسة عن؟ في سيشارك من

من 2 و المخيم من 2) للبيانات عدادين 4 و باحث ومساعد الرئيسي الباحث ؛ مشاركين 6 بواسطة الدراسة إجراء سيتم .(المضيفين السكان

إجراء

بعض عليك نطرح سوف .MUAC و والوزن الطول ؛ البشرية القياسات تسمى غذائية مؤشرات لاتخاذ الدراسة تخطط .دقيقة 30 لمدة الصحي للصرف واستهلاكه طفلك حول الأسئلة

:المضايقات / المخاطر

عن نقدية مساعدة أي تتلقى لن .الدراسة لهذه التعرض خلال من الألم أو الإصابة أشكال من شكل أي طفلك يواجه لن .الأخرى المنزلية الاحتياجات لتلبية وقتك من جزءًا المقابلة هذه ستستغرق .معهم مقابلات إجراء طريق

كنت إذا .الدراسة في المشاركين بين فقط مشاركتها وسيتم طفلك حول جمعها تم التي البيانات جميع بسرية الاحتفاظ سيتم طفلك مشاركة أن تفهم أن فيرجى ، الدراسة هذه من جزءًا طفلك بكون دراية على وكنت فهمته أو النموذج هذا قرأت قد سيتم . العقوبة أشكال أي دون موافقتك سحب أو المقابلة منتصف في الانسحاب رغبتك ويمكنك بناءً على رغبتك تكون .الدراسة هذه من المنشورة التقارير جميع في الطفل خصوصية على الحفاظ

:الأسئلة

Mandre ، الرئيسي بالمحقق الاتصال يمكنك ، باحث كمشارك بحقوقك أو ، بالدراسة متعلقة أسئلة أي لديك كانت إذا Joseph على رقم الهاتف 0777207252 أو عبر البريد الإلكتروني على joman2011@yahoo.co.uk أخرى مشاكل وجود حالة في أدناه الاتصال جهات إلى تقرير

البحوث أخلاقيات لجنة برئيس الاتصال فيرجى ، الدراسة في ومشاركتك بحقوقك تتعلق مشاكل أي لديك كانت إذا / lekobai @ yahoo.com :الإلكتروني البريد ؛ 0772305621 :هاتف أوباي جيرالد الدكتور ، غولو بجامعة lekobai @ gmail.com ؛ أو المجلس الوطني الأوغندي للعلوم والتكنولوجيا ، على قطعة 6 Kimera road نتيندا .0414705500 ، هاتف على كمبالا

الموافقة بيان

والفوائد والمخاطر به القيام سيتم الذي ما لي وصفت قد .... شكل بأي علي يؤثر لن الدراسة هذه في بالمشاركة قراري أن أدرك .دراسة هذا في كمشارك وحقوقي ينطوي عليها التي من أنه أدرك .وقت أي في الانسحاب لي يجوز أنه أدرك .هويتي إخفاء سيتم ، المعلومات هذه استخدام في .الأشكال من

Informed Consent for Household Interview (Arabic Language, Google Translation, 11ᵗʰ June 2019)
بالدراسة أبلغت قد أنني إلى فقط أشير لكنني ، القانونية حقوقي من أي عن أتنازل لا ، النموذج هذا على التوقيع خلال إلي النموذج هذا من نسخة تقديم سيتم. فيها المشاركة على طوعًا أوافق التي البحثية. ... . تاريخ .... الإبهام / Signature .. .. (مشارك) اسم ... . Date .... Signature .... (الشاهد) اسم .. .. Date .Signature .... (المقابلة) اسم

Informed Consent for Household Interview (Aringa)
Eyodri:Anzi Ma Nyaka Nyaza Ma Wura Anzi Mba Edozu 6-59 Ma Eselea Eyo Ewaru Be Emunyala Dika Suru Anzi Ma Eselea Bidibidi Campua Yumbe District
Baa Eyo Eti Ondapiri: Mandre Joseph
Sukulu(s): University of Nairobi, Kenya
Edoza
Mi ngoni ma rusi Mandre joseph ii.
Baa aii mi emu zu zitaa omvizu eyo I bii pi nyaka mi mva ni ri madria vini zitaa azi dii be birupi aku mivile ri ma alataabe azini nyaka nyaza be.Agu eyo di ma eti ondaapiri Joseph Mandre ii engazu university Nairobi niri ma alea kenyaa.
Adii Eco Ovuu Onitaa Di Ma Alea Niyaa?
Eyo iti ondaza di riba 6 diipi ni ki ye ni: alenia onitaa di ma eii,ba azi azakopi ri I,vini ba 4 oduko efu pi alenia ri ma tambapiri ki(ba 2 engazu emunyale pi ma eseleavini 2 engazu ba dia ri yi ma eselea.
Eyo Aleniari
Efutaa eyo di maalea ri eccozu nyaka ayutaa eri ngoni baa ni omve ogarabatisi anthropometric measurements: ecetaa si zotaa, kilo azi ni muac.ama nga mu mi zii mi mva ma nyaka nyaza azini alataa ogogo dekika 30 dipi.
Eyo Ewaru
Mi vele mva ri ngani eyo ewaruni esuku ecetaa si azo kani bile esu ku erini adriria eyo iti ondaza di ma alea.

I ngani vini orodri shilingi run i esu ku mini zitaa dii ki omvizu bo ri ma vutia.zitaa di ki nga mi ma sawa azi aku alea ri ngazu ri du were ra.
Orodri
I ngani vini orodri shilingi run i esu ku mini zitaa dii ki omvizu bo ri ma vutia.zitaa di ki nga mi ma sawa azi aku alea ri ngazu ri du were ra.
Orodri minimu esu zitaa dii ma omvitaa ma alea ri tutu ni baa azi di ngapi dii ni mini embataa fezu mi eco te mva miveleri ma aza ko ngoni ya ri ma dria mva de kaa ovu eyo azitaa ni le ri ma vuleaa ria.
Eyo Tambaza
Eyo woro bani esu mivele mva ri ma dria rib a nga tani mba kilili baa ngani vini ere baa azi onitaa dii ma alea dii be ku.ika eyo bani si dii laara dika fivini midria ra dikaa mi atii mivele mvarini ovuzu otitaa di ma alea ra ,le inira kini mi mva ni ovuzu otitaa dii ma alea ri ni enga mivu.mieco vini mi nzee otiitaa dii ma alea risi sawa mi ni le risi panga azi ni yo.
Mivele mvari ma ta ni nga ovu mbazaru ofutaa dii ma alea.ika di ati ra ama dii edo mi ozi zitaa ru bipi mivele aku ma nyaka be,vini azinyiri ma nyaka dika eyo mi ni nyaka emini nyaa akua dii be.(baa aii pi radii ma ti dri ni)
Zitaa
Mi vu eyo azi ru biipi onitaa dii be kani mi driwala be ni kaa adri ci? mi eco baa eyo iti ondaapiri Mandre Joseph ni omve ra simu 0777207252 kani ku odu fe erini joman2011@yahoo.co.uk.
Eyo azi ka ovu ci mi omve baa eleleru diyi:
Chairperson, Gulu University Research Ethics Committee, Dr. Gerald Obai Tel: No., 0772305621; Email: lekobai@yahoo.com/lekobai@gmail.com; or the Uganda National Council for Science and Technology, on plot 6 Kimera road, Ntinda, Kampala on Tel 0414705500.
Atitaa
.... baa ece mani eyo onitaa dii ma alea ri ki ra eyo ni alenia ri ki pie ,eyo ewaru kani orodri ru dikaa maa driwala be.eyo di fi ma dria ra ani ra maa ma ma fitaa aleniari eco eyo azi ewaru ni fe mani ku.baa ni ofutaa diri ayu ria baa nga ma taa mbar a.ani ra ma eco vini fu sawa ciri ma alea ra.. ani ra dri ti za mani ti disi ma ece

kini baa lu manira ani ra ma ati vini maa asisile si. (A copy of this form will be provided to me.)
Ru (baa eyo omvipiri)……………………..dritiza………………mba odu……………...
ndremazi(Witness)…………………………….dritiza………………mba odu……………...
ru (baa eyo iti ndaa pi ri)…………………………….dritiza……………….mba odu……………..
Ru:……………………….….dri ti za:…………………………mba odu:…….......

8.5 Appendix 5: Informed Consent Key Informant Interview

Informed Consent For Key Informant Interview (English)
Title of the study: Nutritional Status of Children 6-59 Months of Age and Risk Factors among Refugees and Host Population in Bidi Bidi Settlement, Yumbe District, Uganda
Investigator(s): Mandre Joseph
Institution(s): University of Nairobi, Kenya

Informed Consent For Key Informant Interview (English)

Introduction

Hello, my name is Joseph Mandre.

You are being invited for an interactive meeting about health and nutrition activities in your community. I am the lead investigator for this study, a student from the University of Nairobi, Kenya pursuing a Master's Degree in Applied Human Nutrition. This research has no financial support from any organization and it is self-sponsored by me. The in-kind support for this research is inform of anthropometric equipment provided by UNICEF Uganda Country office through Yumbe district nutrition department.

Who will participate in the study?

The study will be carried out by 6 participants; the lead investigator, a research assistant and 4 data enumerators (2 from the camp and 2 from the host population).

Procedure

This meeting will last between 30 to 45 minutes and I will be asking you some specific questions about health and nutrition implementation in your community; activities, challenges facing implementation and how you think the challenges could be addressed.

Risks/discomforts:

You will not get any injury (direct or indirect) by participating in this research.

This meeting will take some of your time to do your daily routine.

Benefits

Participating in this study will fetch no financial benefit. Refreshment in form of soft drink will be provided (soda or water).

You will benefit through this research through recommendations that will depend on the final analysis of the data to improve the health situation in your community.

Privacy and confidentiality

All the data collected from this study will be kept confidential and shall only be shared among the study participants. If you have read or understood this form and you are okay, kindly understand that your participation is at your will and you may withdraw in the middle of the interview or withdraw your consent without any form of penalty. Your privacy will be maintained in all published reports from this study.

Questions:

Informed Consent For Key Informant Interview (English)

If you have any questions related to the study, or your rights as a research participant, you can contact the principal investigator, **Mandre Joseph** on telephone number **0777207252** or via email on **joman2011@yahoo.co.uk**

Report to the contacts below in case of other issues

If you have any issues pertaining to your rights and participation in the study, please contact the Chairperson, Gulu University Research Ethics Committee, Dr. Gerald Obai Tel: 0772305621; Email: lekobai@yahoo.com/lekobai@gmail.com; or the Uganda National Council for Science and Technology, on plot 6 Kimera road, Ntinda, Kampala on Tel 0414705500.

Statement of consent

.... Has described to me what is going to be done, the risks, the benefits involved and my rights as a participant in this study. I understand that my decision to participate in this study will not affect me in any way. In the use of this information, my identity will be concealed. I am aware that I may withdraw at any time. I understand that by signing this form, I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate. A copy of this form will be provided to me.

Name(Participant)…………… Signature /Thumb………………Date……………...

Name(Witness)……………… Signature ……………….Date……………...

Name(Interviewer)…………… Signature ……………….Date……………..

(Only those who have consented should sign the form)

Informed Consent For Key Informant Interview (Arabic)

عنوان الدراسة: الحالة التغذوية للأطفال الذين تتراوح أعمار هم بين 6 و 59 شهرًا وعوامل الخطر بين اللاجئين والسكان المضيفين في مخيم بيدي بيدي ، مقاطعة يومبي ، أوغندا

المحقق (الباحثون): جوزيف ماندر

المؤسسة (المؤسسات): جامعة نيروبي ، كينيا

المقدمة

مرحباً ، اسمي جوزيف ماندري.

أنت مدعو لحضور اجتماع تفاعلي حول أنشطة الصحة والتغذية في مجتمعك. أنا الباحث الرئيسي في هذه الدراسة ، وهي طالبة من جامعة نيروبي ، كينيا تسعى للحصول على درجة الماجستير في التغذية البشرية التطبيقية. لا يحتوي هذا إن الدعم العيني لهذا البحث هو معلومات عن البحث على أي دعم مالي من أي مؤسسة وهو برعاية ذاتية من قبلي. المعدات البشرية التي يوفرها مكتب اليونيسف في أوغندا من خلال قسم التغذية في مقاطعة يومبي.

من سيشارك في؟ الدراسة
سيتم إجراء الدراسة بواسطة 6 مشاركين ؛ ومساعد وباحث الرئيسي الباحث و 4 عدادين للبيانات (2 من و المخيم 2 من (السكان المضيفين).

إجراء
سيستمر هذا الاجتماع ما بين 30 إلى 45 دقيقة وسأطرح عليك بعض الأسئلة المحددة حول تنفيذ والتغذية الصحة في مجتمعك ؛ الأنشطة والتحديات التي تواجه التنفيذ وكيف تعتقد أنه يمكن مواجهة التحديات.

المخاطر / المضايقات:
لن تحصل على أي إصابة (مباشرة أو غير مباشرة) خلال المشاركة في هذا البحث.
سيستغرق هذا الاجتماع بعض وقتك للقيام بروتينك اليومي.

فوائد
المشاركة في هذه الدراسة لن تحقق أي فائدة مالية. سيتم تقديم المشروبات المنعشة في شكل مشروب غازي) الصودا أو الماء).
سوف تستفيد من خلال هذا البحث من تعتمد توصيات على التحليل النهائي للبيانات لتحسين الوضع الصحي في مجتمعك.

والخصوصية السرية
سيتم الاحتفاظ بسرية جميع البيانات التي تم جمعها من هذه الدراسة وسيتم مشاركتها فقط بين المشاركين في الدراسة. إذا كنت قد قرأت هذا النموذج أو فهمته وأنت على يرام ما ، فالرجاء أن تفهم أن مشاركتك ستكون كما تشاء ويمكنك الانسحاب في منتصف المقابلة أو سحب موافقتك دون أي شكل من أشكال العقوبة. سيتم الحفاظ على خصوصيتك في جميع التقارير المنشورة من هذه الدراسة.

الأسئلة:
إذا كانت لديك أي أسئلة متعلقة بالدراسة ، أو بحقوقك كمشارك ، باحث ، يمكنك الاتصال بالمحقق الرئيسي ، Mandre Joseph على رقم الهاتف 0777207252 أو عبر البريد الإلكتروني على joman2011@yahoo.co.uk

Informed Consent For Key Informant Interview (Arabic)
أخرى مشاكل وجود حالة في أدناه الاتصال جهات إلى تقرير البحوث أخلاقيات لجنة برئيس الاتصال فيرجى ، الدراسة في ومشاركتك بحقوقك تتعلق مشاكل أي لديك كانت إذا / lekobai @ yahoo.com :الإلكتروني البريد ؛ 0772305621 :هاتف أوباي جيرالد الدكتور ، غولو بجامعة نتيندا ، Kimera road 6 قطعة على ، والتكنولوجيا للعلوم الأوغندي الوطني المجلس أو ؛ lekobai @ gmail.com 0414705500. هاتف على كمبالا ، الموافقة بيان والفوائد والمخاطر به القيام سيتم الذي ما لي وصفت قد .... شكل بأي علي يؤثر لن الدراسة هذه في بالمشاركة قراري .أدرك أن كمشارك هذا في .دراسة وحقوقي وحقوقي عليها ينطوي التي من أنه أدرك .وقت أي في الانسحاب لي يجوز أنه أدرك .هويتي إخفاء سيتم ، المعلومات هذه استخدام في .الأشكال من بالدراسة أبلغت قد أنني إلى فقط أشير لكنني ، القانونية حقوقي من أي عن أتنازل لا ، النموذج هذا على التوقيع خلال .إلي النموذج هذا من نسخة تقديم سيتم .فيها المشاركة على طوعًا أوافق التي البحثية ... . تاريخ .... الإبهام / Signature .. .. (مشارك) اسم ... . Date .... Signature . ... (الشاهد) اسم .. .. Date. Signature . ... (المقابلة) اسم (النموذج على التوقيع عليهم يجب وافقوا الذين أولئك فقط)

Informed Consent For Key Informant Interview (Aringa)
Eyodri: Anzi Ma Nyaka Nyaza Ma Wura Anzi Mba Edozu 6-59 Ma Eselea Eyo Ewaru Be Emunyala Dika Suru Anzi Ma Eselea Bidibidi Campua Yumbe District.
Baa eyo eti ondapiri: Mandre Joseph
sukulu(s): University of Nairobi, Kenya
Edoza
Mi ngoni ma rusi Mandre joseph ii.
Baa aii mi emu zu zitaa omvizu eyo I bii pi nyaka mi mva ni ri madria vini zitaa azi dii be birupi aku mivile ri ma alataabe azini nyaka nyaza be.Agu eyo di ma eti ondaapiri Joseph Mandre ii engazu university Nairobi niri ma alea kenyaa.
Ma baa eyo di ma iti ondaa piri I, ma sukulu mva enga pi okalamvu onitaa ni oru leru Nairobi ni ria kenyaa ma kokobi birupu applied Human Nutrition be ri be.
Eyo eti ondaza dii esu ni atii taa amuti azi vu ku ma eyo ni alenia dii ma aza ko ma ii.

Atitaa azi ndundu dii engazu UNICEF Uganda country office geri Yumbe District okalamvu nyaka ma eyo onepi ri vusi.

Adii Eco Ovuu Onitaa Di Ma Alea Ni

Eyo iti ondaza di riba 6 diipi ni ki ye ni: alenia onitaa di ma eii, ba azi azakopi ri I, vini ba 4 oduko efu pi alenia ri ma tambapiri ki (ba 2 engazu emunyale pi ma eseleavini 2 engazu ba dia ri yi ma eselea.

Eyo Ale Nia Ri

Drifuza di ni nga saa du dekika 30 cazu 45 di pi, ma vini nga zitaa azi birupi alataa be mi vele ongulumu ma alea ri dria,eyo emi niye ri ki,eyo eyaru ri ki,dika eyo miniega bani eco zu eyo ewaru dii ma aza ko zu rii,

Drifuza di ni nga mi ma sawa du were ra dika drifuza di ngani mi ni orodri silingi run i fe ku kani ba nga mini yii kaniku soda fe ii.

You will benefit through this research through recommendations that will depend on the final analysis of the data to improve the health situation in your community.

Orodri

Mi nga orodri esu geriko bani mi ma ega taa esu zugeriko bani ecozu alataa ongulumu mi vele ri ma alea ri outu zu.

Eyo Ewaru

Mii econi eyo ewaruni esu onitaa di ma alea ku.

Eyo Tambaza

Eyo mi ni nze rib a nga ayu onitaa ni ovuni biasara ni ku.mi ma aii ni enga mivu dika mi ma futaa ni vini enga mivu eyo pangaru ni yo.

Zitaa

Mi vu eyo azi ru biipi onitaa dii be kani mi driwala be ni kaa adri ci? Mi eco baa eyo iti ondaapiri Mandre Joseph ni omve ra simu 0777207252 kani ku odu fe erini joman2011@yahoo.co.uk.

Eyo azi ka ovu ci mi omve baa eleleru diyi:

The Chairperson, Gulu University Research Ethics Committee, Dr. Gerald Obai Tel: 0772305621; Email: lekobai@yahoo.com/lekobai@gmail.com; or the Uganda National Council for Science and Technology, on plot 6 Kimera road, Ntinda, Kampala on Tel 0414705500.

Atitaa

.... baa ece mani eyo onitaa dii ma alea ri ki ra eyo ni alenia ri ki pie ,eyo ewaru kani orodri ru dikaa maa driwala be.eyo di fi ma dria ra ani ra maa ma ma fitaa aleniari eco eyo azi ewaru ni fe mani ku.baa ni ofutaa diri ayu ria baa nga ma taa mbar a.ani ra ma eco vini fu sawa ciri ma alea ra. ani ra dri ti za mani ti disi ma ece kini baa lu manira ani ra ma ati vini maa asisile si. (A copy of this form will be provided to me.)

Ru (baa eyo omvipiri)…………………..dritiza………………mba odu……………...

ndremazi (Witness)……………………………dritiza………………mba odu……………...

ru (baa eyo iti ndaa pi ri)……………………………dritiza………………mba odu……………..

Ru:…………………………….dri ti za:…………………………mba odu:……......

8.6 Appendix 6: Informed Consent Focus Group Discussion

Informed Consent For Focus Group Discussion (English)
Title of the study: Nutritional Status of Children 6-59 Months of Age and Risk Factors among Refugees and Host Population in Bidi Bidi Settlement, Yumbe District, Uganda
Investigator(s): Mandre Joseph
Institution(s): University of Nairobi, Kenya
Introduction Hello, my name is Joseph Mandre. You are being invited for an interactive discussion about child feeding practices, food access and health seeking behavior in your community. I am the lead investigator for this study, a student from the University of Nairobi, Kenya pursuing a Master's Degree in Applied Human Nutrition. This research has no financial support from any organization and it is self-sponsored by me. The in-kind support for this research is inform of anthropometric equipment provided by UNICEF Uganda Country office through Yumbe district nutrition department. **Who will participate in the study?** The study will be carried out by 6 participants; the lead investigator, a research assistant and 4 data enumerators (2 from the camp and 2 from the host population). **Procedure** This meeting will last for about 45 to 60 minutes and we will be asking you some specific questions in regards to breastfeeding, food access and health seeking behavior in your community. **Risks/discomforts:** You will not get any injury (direct or indirect) by participating in this research. This meeting will take about an hour of your time from your home, which you could have used to cook food for your family. **Benefits** Refreshment will be provided during the meeting (soda). You will not receive cash by participating in this meeting. The direct benefit of this meeting, you will learn some child feeding techniques during the discussion from one another or from the investigator. **Privacy and confidentiality** Your respond from this discussion will be used only for academic purposes and participation is voluntary. You may withdraw from the middle of the interview with no penalty. **Questions:**

Informed Consent For Focus Group Discussion (English)
If you have any questions related to the study, or your rights as a research participant, you can contact the principal investigator, **Mandre Joseph** on telephone number **0777207252** or via email on **joman2011@yahoo.co.uk** **Report to the contacts below in case of other issues** If you have any issues pertaining to your rights and participation in the study, please contact the Chairperson, Gulu University Research Ethics Committee, Dr. Gerald Obai Tel: 0772305621; Email: lekobai@yahoo.com/lekobai@gmail.com; or the Uganda National Council for Science and Technology, on plot 6 Kimera road, Ntinda, Kampala on Tel 0414705500. **Statement of consent** .... Has described to me what is going to be done, the risks, the benefits involved and my rights as a participant in this study. I understand that my decision to participate in this study will not affect me in any way. In the use of this information, my identity will be concealed. I am aware that I may withdraw at any time. I understand that by signing this form, I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate. A copy of this form will be provided to me. Name(Participant)………………… Signature /Thumb………………Date……………... Name(Witness)…………………… Signature ……………….Date……………... Name(Interviewer)……………… Signature ……………….Date…………….. *(All participants in focus group discussion must sign a consent form; the group should have a minimum of 6 participants and max of 8. FGD session must not exceed 60 minutes)*

Informed Consent For Focus Group Discussion (Arabic)
عنوان الدراسة: الحالة التغذوية للأطفال الذين تتراوح أعمارهم بين 6 و 59 شهرًا وعوامل الخطر بين اللاجئين والسكان المضيفين في مخيم بيدي بيدي ، مقاطعة يومبي ، أوغندا
المحقق (الباحثون): جوزيف ماندر
المؤسسة (المؤسسات): جامعة نيروبي ، كينيا
المقدمة
مرحباً ، اسمي جوزيف ماندري.
أنا الباحث الرئيسي في هذه الدراسة ، وهي طالبة من جامعة نيروبي ، كينيا تسعى للحصول على درجة الماجستير في تتم دعوتك لمناقشة تفاعلية حول ممارسات تغذية الطفل ، والوصول إلى والغذاء السلوك الصحي في مجتمعك. أنا التطبيقية البشرية التغذية. لا يحتوي هذا البحث على أي دعم مالي من أي مؤسسة وهو برعاية ذاتية من قبلي. إن العيني الدعم لهذا البحث هو معلومات عن المعدات البشرية التي يوفرها مكتب اليونيسف في أوغندا من خلال قسم التغذية في مقاطعة يومبي.
من سيشارك في الدراسة؟ سيتم إجراء الدراسة بواسطة 6 مشاركين ؛ الباحث الرئيسي ومساعد باحث و 4 عدادين للبيانات (2 من المخيم و 2 من السكان المضيفين).
إجراء
سيستمر هذا الاجتماع حوالي 45 إلى 60 دقيقة وسنطرح عليك بعض الأسئلة المحددة فيما يتعلق بالرضاعة الطبيعية والحصول على والغذاء السلوك الصحي في مجتمعك.
المخاطر / المضايقات:
لن تحصل على أي إصابة (مباشرة أو غير مباشرة) من خلال المشاركة في هذا البحث. سيستغرق هذا الاجتماع حوالي ساعة من وقتك ، منزلك ، والتي كان من الممكن استخدامها لطهي الطعام لعائلتك.
فوائد
سيتم تقديم المشروبات خلال الاجتماع (الصودا). لن تتلقى نقدًا من خلال المشاركة في هذا الاجتماع. الفائدة المباشرة لهذا الاجتماع ، سوف تتعلم بعض تقنيات تغذية الطفل أثناء المناقشة من بعضها البعض أو من المحقق.
الخصوصية والسرية
سيتم استخدام إجابتك من هذه المناقشة فقط للأغراض الأكاديمية والمشاركة طوعية. يمكنك الانسحاب من منتصف المقابلة دون أي عقوبة.
الأسئلة:
إذا كانت لديك أي أسئلة متعلقة بالدراسة ، أو بحقوقك كمشارك ، باحث ، يمكنك الاتصال بالمحقق الرئيسي ، Mandre Joseph على رقم الهاتف 0777207252 أو عبر البريد الإلكتروني على joman2011@yahoo.co.uk
تقرير إلى جهات الاتصال أدناه في حالة وجود مشاكل أخرى

Informed Consent For Focus Group Discussion (Arabic)
البحوث أخلاقيات لجنة برئيس الاتصال فيرجى ، الدراسة في ومشاركتك بحقوقك تتعلق مشاكل أي لديك كانت إذا lekobai @ yahoo.com / :الإلكتروني البريد ؛ 0772305621 :هاتف أوباي جيرالد الدكتور ، غولو بجامعة lekobai @ gmail.com أو ؛ المجلس الوطني الأوغندي للعلوم والتكنولوجيا ، على قطعة Kimera road 6 ، 0414705500. هاتف على كمبالا ، نتيندا. الموافقة بيان والمخاطر به القيام سيتم الذي ما لي وصفت قد .... يؤثر لن الدراسة هذه في بالمشاركة قراري أن أدرك. دراسة هذا في كمشارك وحقوقي عليها ينطوي التي والفوائد أي في الانسحاب لي يجوز أنه أدرك. هويتي إخفاء سيتم ، المعلومات هذه استخدام في. الأشكال من شكل بأي علي إلى فقط أشير لكنني ، القانونية حقوقي من أي عن أتنازل لا ، النموذج هذا على التوقيع خلال من أنه أدرك. وقت إلي النموذج هذا من نسخة تقديم سيتم. فيها المشاركة على طوعًا أوافق التي البحثية بالدراسة أبلغت قد أنني ... . تاريخ .... الإبهام / Signature .. .. (مشارك) اسم .. .. Date .... Signature .... (الشاهد) اسم .. .. Date .... Signature .... (المقابلة) اسم لا ما للمجموعة يكون أن ويجب ؛ موافقة نموذج على التركيز مجموعة مناقشة في المشاركين جميع يوقع أن يجب) (دقيقة 60 المناقشة مجموعة مناقشات جلسة تتجاوز ألا ويجب 8. أقصى بحد مشاركين 6 عن يقل

Informed Consent For Focus Group Discussion (Aringa)
Eyodri: Anzi Ma Nyaka Nyaza Ma Wura Anzi Mba Edozu 6-59 Ma Eselea Eyo Ewaru Be Emunyala Dika Suru Anzi Ma Eselea Bidibidi Campua Yumbe District
Baa eyo eti ondapiri: Mandre Joseph
sukulu(s): University of Nairobi, Kenya
Edoza
Mi ngoni,ma rusi Joseph Mandre ii.
Ba omve mi emuzu eyo onizu eyo I bipi mivele mva ri ma nyaka nyaza be vini nyaka esuza vini adriza alataa ni ri be mi vele ongulumu ma alea ri be.
Ma baa eyo di ma iti ondaa piri I, ma sukulu mva enga pi okalamvu onitaa ni oru leru Nairobi ni ria kenyaa, ma kokobi birupu applied Human Nutrition be ri be.
Eyo eti ondaza dii esu ni atii taa amuti azi vu ku ma eyo ni alenia dii ma aza ko ma ii.
Atitaa azi ndundu dii engazu UNICEF Uganda country office geri Yumbe District okalamvu nyaka ma eyo onepi ri vusi.

Adii Eco Ovuu Onitaa Di Ma Alea Ni
Eyo iti ondaza di riba 6 diipi ni ki ye ni: alenia onitaa di ma eii, ba azi azakopi ri I,vini ba 4 oduko efu pi alenia ri ma tambapiri ki(ba 2 engazu emunyale pi ma eseleavini 2 engazu ba dia ri yi ma eselea.
Eyo Ewaru Ri
Mii econi eyo ewaruni esu onitaa di ma alea ku.
Eyo Aleania Ri
Drifuza di ni nga saa du dekika 45 cazu 60 di pi, ma vini nga zitaa azi birupi anzi nyiri ma ba ndrutaa be, alataa be mi vele ongulumu ma alea ri dria,
Drifuza di ni nga sawa du alu engazu mivele aku ma saawa alea,te mini eco ayu enya adizu mivele aku ni ri i.
Orodri
I ngani sente esu mini adrizu drifuza di ma alea ri siku.eyo orodri ru mini mu esu ri ni nga ovu mi ni eyo onizu mva ma nyaka nyaza dria ri I engazu ambgatara emi eselea kani ku engazu ba eyo iti ondaa pi ri vu.
Eyo Tambaza
Eyo emini mu omvi drifuza di ma alea rib a nga ayu eyo onitaa ni si dika mi ma atitaa ni enga mivu dika mi eco vini gaasi ra eyo ewaru ni yo.
I ka atira, ama eco di ido ra.
Zitaa
Mi vu eyo azi ru biipi onitaa dii be kani mi driwala be ni kaa adri ci? Mi eco baa eyo iti ondaapiri Mandre Joseph ni omve ra simu 0777207252 kani ku odu fe erini joman2011@yahoo.co.uk.
Eyo azi ka ovu ci mi omve baa eleleru diyi:
GUREC: Dr. Gerald Obai Tel: 0772305621; Email: [lekobai@yahoo.com/lekobai@gmail.com](mailto:lekobai@yahoo.com); Alternatively, Uganda National Council for Science and Technology, Plot 6, Kimera Road, Ntinda, Kampala Uganda, Tel: on 0414705500.
Atitaa

.... baa ece mani eyo onitaa dii ma alea ri ki ra eyo ni alenia ri ki pie, eyo ewaru kani orodri ru dikaa maa driwala be.eyo di fi ma dria ra ani ra maa ma ma fitaa aleniari eco eyo azi ewaru ni fe mani ku.baa ni ofutaa diri ayu ria baa nga ma taa mbar a.ani ra ma eco vini fu sawa ciri ma alea ra.. ani ra dri ti za mani ti disi ma ece kini baa lu manira ani ra ma ati vini maa asisile si. (A copy of this form will be provided to me.)

Ru (baa eyo omvipiri)……………………..dritiza………………mba odu……………...

ndremazi(Witness)…………………………….dritiza………………mba odu……………...

ru (baa eyo iti ndaa pi ri)…………………………….dritiza……………….mba odu……………..

Ru:…………………….……….dri ti za:…………………………mba odu:……......

(All participants in focus group discussion must sign a consent form; the group should have a minimum of 6 participants and max of 8. FGD session must not exceed 60 minutes)

8.7 Appendix 7: Research Permit Issued by University of Nairobi

UNIVERSITY OF NAIROBI
COLLEGE OF AGRICULTURE AND VETERINARY SCIENCES
Faculty of Agriculture
DEPARTMENT OF FOOD SCIENCE NUTRITION AND TECHNOLOGY
Tel: 3592734-9 Extn: 27093: 020-25858558 E-mail:dftn@uonbi.ac.ke Website: www.foodtech.uonbi.ac.ke

Our Ref: A56/11955/2018   **Date:** April 12, 2019

TO WHOM IT MAY CONCERN

RE: **RESEARCH PERMIT**
        MR. JOSEPH MANDRE - A56/11955/2018

The above named student is a bonafide student at the University of Nairobi undertaking Msc. Applied Human Nutrition and is required to undertake his research Tittle **"Nutritional Status of children 6-59 months of age and risk factors among refugees and host population in Bidi Bidi Camp, Yumbe District, Uganda"** starting on **Saturday 1st June, 2019 till Friday 30th August , 2019**.

Kindly accept him in the research area for successful undertaking of this research which will aid in providing information to inform policy.

This will enable the student to achieve the requirement for the conferment of Masters Degree in Applied Human Nutrition.

Thank you in advance.

CHAIRMAN
DEPT. OF FOOD SCIENCE, NUTRITION
& TECHNOLOGY

Dr. Sophia Ngala
Ag. Chairman
Department of Food Science, Nutrition and Technology

S.N /pk

8.8 Appendix 8: Research Permit Issued by Gulu University Research Ethics Committee

GULU **UNIVERSITY**

P.O. Box 166 Gulu Uganda
Website: www.gu.ac
Email: guluuniversity.rec@gmail.com

Tel: +256-4714-32096
Fax: +256-4714-32913
Mob:+256772305621/776812147

RESEARCH ETHICS COMMITTEE

11th June 2019

APPROVAL NOTICE

Joseph Mandre
University of Nairobi

Re: **Application No. GUREC-049-19**

Type of review:
[X] **Initial review**
[ ] Amendment
[ ] Continuing review
[ ] Termination of study
[ ] SAEs
[ ] Other, Specify:_____

Title of Proposal: **"Nutritional Status of Children 6-59 Months of age and Risk Factors among Refugees and Host Population in Bidi Bidi Camp, Yumbe District, Uganda"**

I am pleased to inform you that at the 52nd convened meeting on 23rd May 2019, the Gulu University Research Ethics Committee (**GUREC**) voted to approve the above referenced application.

Approval of the research is for the period of **23rd May 2019 to 22nd May 2020**

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.

2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the **GUREC** for re-review and approval prior to the activation of the changes. The **GUREC** application number assigned to the research should be cited in any correspondence.

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GULU UNIVERSITY
INSTITUTIONAL REVIEW COMMITTEE
    APPROVED
  ★  11 JUN 2019  ★
 FACULTY OF MEDICINE
  P. O. Box 166, Gulu
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3. Any unanticipated problems involving risks to participants must be promptly reported to the **GUREC**. New information that becomes available which could change the risk: benefit ratio must be submitted promptly for the **GUREC** review.

4. Only approved and stamped consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The **GUREC** may conduct audits of all study records, and consent documentation may be part of such audits.

5. Regulations require review of an approved study not less than once per 12-month period. Therefore, a continuing review application must be submitted to the **GUREC** eight (8) weeks prior to the above expiration **date of 22nd May 2020** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely manner may result in suspension or termination of the study, at which point new participants may not be enrolled and currently enrolled participants must be taken off the study.

The following documents have been approved in this application by the **GUREC:**

	Document	Language	Version	Version Date
1	Protocol	English	Version 2.0	11th June 2019
2	Data Collection Tools	English	Version 2.0	11th June 2019
3	Informed consent Document	English/Arabic/Aringa	Version 2.0	11th June 2019

Signed,

GULU UNIVERSITY
INSTITUTIONAL REVIEW COMMITTEE
APPROVED
★ 11 JUN 2019 ★
FACULTY OF MEDICINE
P. O. Box 166, Gulu

Mr. Robert Kiduma
For; Chairperson
Gulu University Research Ethics Committee

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8.9 Appendix 9: Research Permit Issued by Office of the Prime Minister, Refugee Section Kampala Uganada

THE REPUBLIC OF UGANDA

Uganda Vision 2040

OFFICE OF THE PRIME MINISTER

PLOT 9-11 APOLLO KAGGWA ROAD. P.O. BOX 341, KAMPALA, UGANDA
TELEPHONES: General Line 0417 770500, Web: www.opm.go.ug, E-mail: ps@opm.go.ug

In any correspondence on this subject, please quote No: *OPM/R/107*

May 24, 2019

Mr. Joseph Mandre
University of Nairobi

RE: PERMISSION TO CARRY OUT RESEARCH IN BIDI BIDI REFUGEE SETTLEMENT

Reference is made to your letter dated May 6, 2019 in regard to the above subject matter.

This is to authorize you carry out research on *"Nutritional Status of Children 6-59 months of age and risk factors among refugees and host population in Bidi Bidi Refugee Settlement"*, from June 1 to August 30, 2019.

You are requested to observe the rules and regulations governing the settlement. Office of the Prime Minister authorities in the settlement are hereby requested to accord you the necessary assistance.

Gerald Menhya
FOR: PERMANENT SECRETARY

C.C.   Refugee Desk Officer, Arua

C.C.   Settlement Commandant, Bidi Bidi

OPM Vision: A Public Sector that is responsive and accountable in steering Uganda towards rapid economic growth and development.

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