CONTRIBUTION OF OWN FOOD PRODUCTION, MARKET PURCHASE AND RELIEF DONATIONS TO HOUSEHOLD DIETARY DIVERSITY IN PALABEK REFUGEE SETTLEMENT - UGANDA

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A RESEARCH REPORT SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS IN PUBLIC HEALTH OF TEXILA AMERICAN UNIVERSITY

12TH AUGUST 2024

DECLARATION

I Opio Julius do declare that this work with exception of acknowledged references is my original work and to the best of my knowledge, it has never been presented to any institution for any award.

Signature

Opio Julius

Date: 17th August 2024

DEDICATION

I dedicate this proposal to my parents by names of Joyce Mary Acom and Malinga Tom

ACKNOWLEDGEMENTS

I thank the almighty God for the gift of life, energy and wisdom. My gratitude also goes to the lecturers for the support, patience, commitment and guidance rendered during this study.

My sincere thanks go to my beloved Wife for encouragement provided throughout my studies.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

BSFP	Blanket Supplementary Feeding Program
DD	Dietary Diversity
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agricultural Organization
GAM	Global Acute Malnutrition
GAM	Global Acute Malnutrition
HDDS	Household Dietary Diversity Score
HH	Household
LLG	Lower Local Government
MoH	Ministry of Health
NCD	Non -Communicable Disease
NGO	Non-Governmental Organization
RDA	Recommended Daily Allowance
SD	Standard Deviation
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations International Children Emergency Found
USAID	United States Agency for International Development
WFP	World Food Program

ABSTRACT

Background: Uganda is largest host of refugees in Africa with an estimated 1.5 million refugees, yet the prevalence of global acute malnutrition (GAM) remains unacceptable at 8.2%. In Palabek, refugee settlement, micronutrient deficiency is notably high as evidenced by the high prevalence (62.9%) of anemia. Improving dietary diversity (DD) in Palabek refugee settlement is pivotal to reducing all forms of malnutrition and this requires more attention to be paid on determining evidence-based food accessing strategies that offer an ideal solution to diversified diet in vulnerable refugee communities. The aim of the study was to compare the contribution of food accessing strategies to and to determine factors that affect household dietary diversity (HDD) in Palabek refugee settlement in order to provide guiding recommendations to policy makers, partners.

Methods: A quantitative cross sectional study design using face to face interview and semi-structured questionnaire was conducted among 398 household (HH) caregivers selected through multistage sampling approach in Palabek refugee settlement in Northern Uganda. A 24-hour recall method was used to capture different type of foods consumed by the HH in relation to the sources of food. Questionnaire also captured data on demographic and socio-economic characteristics of HHs. Data was analyzed using SPSS version 20.0 and Excel.

Results: The mean household diversity score (HDDS) was 5.05, diets were dominated by cereals while animal sourced foods and fruits were the least consumed. Own food production, market purchase and food donations had a significant effect on HDD. Poisson regression results show that education level of the HH head, access to agricultural land, presence of kitchen garden, acres of agricultural land and average HH income per month had significant effect on HDD.

Conclusion: Although, own food production had a greater contribution towards the HDD of the study population, all the three acquisition strategies had a significant positive association with the HDD. Education level of the HH head, access to agricultural land, presence of kitchen garden, acres of agricultural land and average HH monthly income had significant effect on HDD.

Recommendations: Emergency and development programs should therefore target all the three food acquisition strategies to increase HDD; UNHCR and other partners should negotiate for refugee friendly land reform policy; Livelihood programs involving access to finance and rearing of small animals should be promoted by agencies to increase food purchasing power and intake of animal sourced foods and; Intervention programs should incorporate market access as one of the strategies of food access.

CHAPTER ONE: INTRODUCTION

Background

Eliminating hunger, food insecurity and malnutrition is critical to the realization of sustainable development goals (SDG). A consensus developed in 2015 under the leadership of United Nations (UN) aspires to achieve zero hunger by 2030.The commitment to achieve this goal was demonstrated by ensuring that all people at all year-round access sufficient safe and nutritious food governed by the component of achieving food security and improved nutrition (United Nations, 2015). Accordingly, the UN declarations on human rights fundamentally protects the right to adequate food of all individuals including refugees and displaced persons. It is from this demand point of view that efforts to eliminate hunger, malnutrition and food insecurity continues to remain in global agenda.

Unfortunately, according to the report on the state of food security and nutrition in the World, 'prospects of eliminating all forms of malnutrition, hunger and food insecurity are not encouraging. The same report indicates that the number of people suffering from malnutrition is increasing with projections showing that they were more than 46 million people who are malnourished compared to 2019 and 2020 while three billion people were unable to afford healthy food' (FAO, 2022). This further exacerbates the prevalence of micronutrient deficiencies.

For vulnerable populations such as the refugees and displaced persons, it is highly likely that the prevalence of undernutrition and micronutrient deficiencies as well as hunger is underestimated and exacerbated by inadequate and monotonous diets brought by resource constraints and competition for limited resources in host country. In Uganda which is the largest host of refugees in Africa with an estimated 1.5 million refugees (UNHCR, 2022), the prevalence of GAM is 8.2%. In Palabek refugee settlement, the micronutrient deficiency as evidenced by the high prevalence (62.9%) of anemia is of public health concern (UNHCR, 2021). This kind of deficiencies have adverse health outcomes such as impaired cognitive growth and development, increased risk of morbidity and mortality, lower resistance to diseases and reduced physical and economic productivity.

A growing body of evidence advocates that DD is pivotal to reducing all forms of malnutrition (USAID, 2022). This is on the premise that DD is an indicator of food security, nutrient intake adequacy and nutrient quality (Ike et al., 2015). It also has positive health outcome associated with increased nutrients and children and women's anthropometry (Jones et al., 2013). While DD shows a positive health outcome, literature is evolving on how food accessing strategies contributes to HDD in vulnerable and

resource poor communities (Deaconu et al., 2021; Zanello et al., 2019). Given the income inequalities, limited resource and reliance on food donations coupled with limited market access in protracted refugee settlements, paucity do exist on which food accessing strategies offers an ideal solution for increasing DD in vulnerable refugee communities (Zanello et al., 2019). In light of the above gaps, a study was conducted to understand how own food production, market purchases and food donations contribute to HDD of the refugee households in Palabek settlement with subsequent aim of informing policy and program interventions that address the food access component of food security.

Problem Statement

Despite the benefits associated with consumption of diversified diets, Palabek refugee settlement has low DD. This has resulted into high GAM of 8.2% and high prevalence of anemia (62.9%) which portrays consumption of inadequate monotonous diet in this resource constrained population mainly relying on food donations which is limited in diversity (UNHCR, 2021).

Whereas its widely agreed that three sources of strategies are used by households to satisfy their dietary needs (INDDEX Project, 2018), disparity exist on contributions of each towards household dietary diversity. Relief donations which are the most immediate source of food does not offer a sustainable solution while usually supplying homogenous diet. Studies also argue that own production while offering more available food and income to increase DD offers little micronutrient rich foods (Sibhatu, 2019). Similarly, while other studies propose market purchase as the best option in improving dietary intake (Sibhatu & Qaim, 2017), market inequalities reduces its suitability (Herforth & Ahmed, 2015). These arguments for and against each food acquisition source increase the need to understand the contribution of food acquisition sources to HDD.

On the other hand, current studies on HDD are generalized. There is no available data for comparative contribution of food accessing strategies on HDD among the refugee HHs in Uganda. Studies that capture DD did not specify the sources of the food groups consumed. For example, the study was conducted in Bidi-Bidi refugee settlements to examine the nutrition status of children but did not specify the sources of food consumed (Mandre et al., 2021).

In light of the apparent lack of agreement and sustainability questions regarding the most suitable food acquisition strategy to improve household dietary intake and limited studies, this study aimed at understanding the relative contributions of food donations, market purchase and own food production to HDD in Palabek refugee settlement.

Even though several studies on food accessing strategies have been carried out, there is inadequate knowledge relating to how each food acquisition source contributes to HDD in refugee settings. Given the importance of DD in eliminating all forms of nutrition and growing need to understand the drivers of it, it was imperative to look at how different food acquisition strategies contribute to HDD.

Objectives

General objective

To compare the contribution of food accessing strategies to HDD in Palabek refugee settlement in order to provide guiding recommendations to policy makers, nutrition, food security and livelihood partners.

Specific Objectives

1. To assess the HDD of HHs in Palabek refugee settlement.
2. To compare the contribution of own food production, market purchase and relief donations to HDD.
3. To examine factors associated with HDD in Palabek refugee settlement

Research Questions

1. What is the HDD of the HHs in Palabek refugee settlement?
2. To what extent does own food production, market purchase and relief donations contribute to HDD?
3. What are the factors associated with HDD among refugee HHs in Palabek refugee settlement?

Justification

Globally, with the increasing number of refugees, there is a growing need to establish effective and evidence-based data relevant for relief intervention programs and informing policy. Furthermore, in light of the need to understand HH food access impact indicators, there is need to focus on desired outcome of improved food access and improved HH food consumption. With respect to the above stated focus, understanding HDD which is proxy indicator for diversified diet and food security is paramount. Ensuring that vulnerable refugee persons have access to safe, adequate and diverse foods is in line with SDG 2, that aims to end hunger and eliminate malnutrition in all forms. Information obtained from the results of this study is relevant for aid and government agencies in planning food and nutrition intervention not only in Palabek but other refugee settlements. Findings from this study can be used by researchers as a reference to future research work.

Conceptual Framework

This conceptual framework explains food access as one of the components of HH food security defined by different ways by which HHs' access or acquire food. This can be through own food production,

market purchase and food donations. The foods acquired through the different strategies are used to analyse different counts of food groups consumed which forms the HDDS. This conceptual framework also demonstrates that socio-economic and demographic factors such as occupation of the HH head, education level, HH size and age of the HH head among others indirectly influence HDD. For example, if the mother is employed in formal sector, more income is spent on nutritious diets compared to a mother who is unemployed since the purchasing power is enhanced and hence access to market is increased.

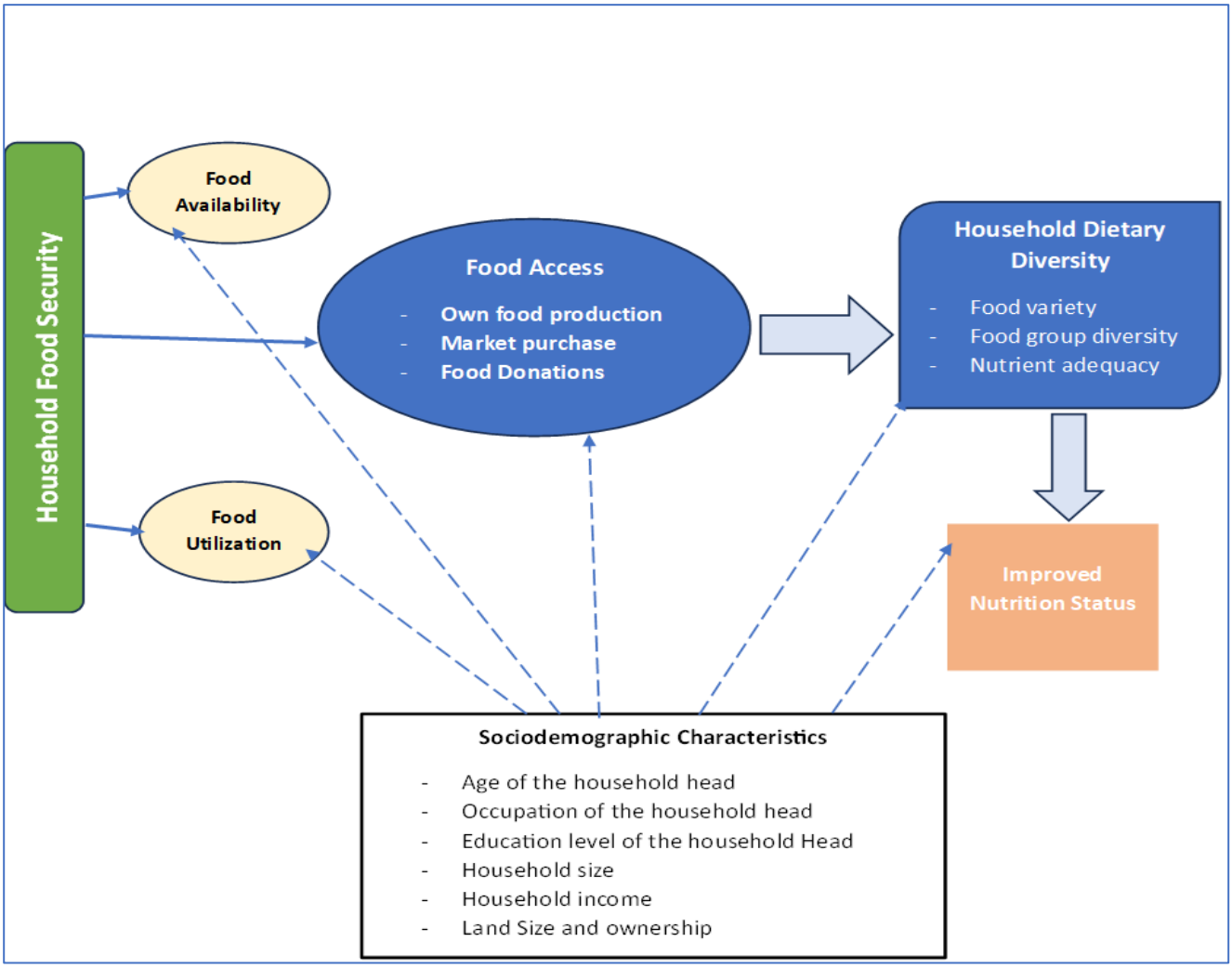

Figure 1: Figure 1: Conceptual Framework showing the relationship of food access strategies with household dietary diversity.

Source: Generated by the principal researcher.

CHAPTER TWO: LITERATURE REVIEW

Concept and global trends of food security

The UN committee defined food security as a condition in which all people at all times, have physical, social and economic access to sufficient safe nutritious food that meets their dietary needs and preferences for healthy lifestyle (FAO, 2017). This definition as related to the World summit definition in 1996 captures 3 pillars of food security; including availability, accessibility, and utilization. In 2015, there arose the need to repurpose the definition of food security to embrace the SDGs. Under the leadership of world leaders, the new framework was developed to ensure sustainable use of available resources that would result into achieving global peace and security. To ensure this realization, food security was given importance in SDG 2 where countries were urged to achieve food security, end hunger, improve nutrition and promote sustainable agriculture which gave rise to new dimension of food security (United Nations, 2015).

The complexity and continuous need to understand food security and its relationship to food system further led to addition of two new components. As high level panel experts on food security and nutrition points out, urgency and sustainability are key if food security is to be achieved (Harris et al., 2020). Based on the duration of occurrence, food and nutrition experts categorizes food insecurity as chronic when it is long and persistent and transitory when it is short and temporary. Given the multidimensional nature of food security, Maxwel et al., (2013) suggested several indicators of measuring food security which include DD, spending on food, consumption behaviors, experimental measures and self-assessment measures.

Apparently, the world is at backdrop as far as achieving food security is concerned despite increased food production. However, this can be expected as the world is facing unprecedented climate related shocks, wars, epidemics and rapid population growth which all negatively affects the food system. As indicated by FAO (2022), food insecurity is on the rise with an estimated 828 million people facing hunger globally while 2.3 billion people were either food insecure or severely food insecure. Similarly, about 3.1 billion people were unable to purchase healthy diets. Africa still has the highest increase in prevalence of food insecurity, hunger and malnutrition with estimates projecting 1 in 5 people facing hunger (FAO, 2022). Prevalence of undernourishment in East Africa remains high at 29.8% and most households among the refugee population remain food insecure as indicated by GAM of 8.3% and 8.2% in Adjumani and

Palabek refugee settlements respectively (UNHCR, 2021). This type of increased food security raises the stakes of even higher future vulnerabilities to food and nutrition security.

Dietary diversity (DD) and its relationship to food security and nutrition indicators

Ike et al., (2015), describes DD as consumption of single food items or food groups over a given reference period of time. DD is measured by counting the number of food groups consumed though number of servings of different food groups in relation to dietary guidelines (Jones et al., 2013). Based on the objective and purpose for which they are constructed, DD can be measured at either individual or HH level. Because the objectives are different at individual and HH level and the number of food groups used for measurement are different. At individual level DD is designed to capture nutrient intake adequacy while economic access to food is what it depicts at HH level. According to FAO (2020), DD scores can be modified into four different categories of which the different food groups consumed are different. These include: HDDS which has 12 food groups consumed; Individual Dietary Diversity Score (IDDS) with 14 food groups consumed; Women's Dietary Diversity Score (WDDS); and Minimum Dietary Diversity for Women (MDDW) which are modification of the individual dietary scores with 9 and 10 food groups consumed respectively.

Furthermore, Ike et al., (2015) noted that because accessibility which is one of the components of food security is captured by DD, it is a significant indicator of HH food security. In agreement with the same, Faber et al., (2016) found that HHs that eat less diverse foods are usually food insecure. A number of literatures recognize adequate diverse diet as a proxy indicator for care and health. For example, DD scores have been shown to act as a link of improved health outcomes especially birthweight while child anthropometry have also been shown to be positively associated with consumption of variety of foods (Ike et al., 2015; Khamis et al., 2019). Furthermore, when collected through HH surveys, Ike et al., (2015) argues that data from HDDS can be used as indicator for dietary quality. Similarly, dietary diversity is associated with calorie and nutrient intake adequacy (Jones et al., 2013).

Measurement of dietary diversity

DD can be measured at either individual or HH level using a questionnaire by use of count-based measures or food frequency measures. Food count measures involve food variety scores where different foods consumed by the HHs are counted while for food group counts, foods consumed are grouped into specific food groups at specified period of time. In frequency-based measurement, the number of times an individual or HH consumes a food group in a given reference period is recorded. This can be done by

use of standardized quantitative questionnaires to capture exact portion size, semi-quantitative questionnaires using models to estimate portion size or qualitative questionnaires that captures sources of foods consumed.

A dietary assessment using a 24-hour recall method that involves recording the entire food intake in the previous 24 hours by either individuals or HHs is often regarded as the gold standard for DD measurement. Respondents are asked to remember all the drinks and foods taken with the specific times they have been consumed. According to FANTA, (2016) the same procedure can be repeated several times to account for the daily differences in the consumption. The approximations of food intake are done through food models, home cooking wares or the real food.

Benefits of consumption of diverse diets

Given the wide array of nutrients contained in different food groups and the fact that foods in the same food group may have different nutrients, there is need to consume diverse foods. Emphasis related to advocacy of consumption of diverse food group emanates from nutrient deficiency and the need to increase nutrient adequacy among the population especially the vulnerable poor whose diets are mainly rich in monotonous diet comprising of calorie rich foods. Beyond acting as indicator of food security, DD has been shown to improve nutrient adequacy, calorie and protein intake (Jones et al., 2013) which translates into positive health outcome related to child and women's anthropometry and improved micronutrient adequacy (Khamis et al., 2019).

Inadequate intake of nutrients has detrimental effect particularly in children and women of reproductive age. This necessitated the implementation and promotion of WDD later expanded into MDDW as well as children dietary diversity score (CDD) to address nutrient intake adequacy in children and women. The spectrum of nutrients associated with consumption of diverse foods makes it an important component of healthy living among women and children. Khamis et al., (2019) found that increased consumption of diverse food is associated with significant growth and reduction in undernutrition in children while consumption of few food groups results into growth faltering and underweight .Similarly, Martin et al., (2018) and Mikkelsen et al., (2019) argue that different diets obtained by consumption of diverse food groups improves positive growth and cognitive development in children. Studies from Burkina Faso and South Africa indicate that nutritional status of children shows significant improvement in relation to increased dietary diversity scores diets (Aboagye et al., 2021; Sie et al., 2018). In their study of association between DD and child development, Kakwangire et al., (2021) found that, as DD scores

increase, cognitive development and motor skills also improved while Jones et al., (2013) indicate that, the variety of nutrients obtained by consumption of food from different food groups results into more nutrients that complement each other and subsequently leads to positive nutrition status in children and women. On the other hand, Ike et al., (2015) noted that the improvement in nutrition status could be attributed to other factors and thus DD alone cannot be a sole indicator of improvement in nutrition status.

In regards to women, increased DD scores are associated with positive health outcome such as optimal growth, improved birthweight and favorable perinatal survival (Gete et al., 2020; Madzorera et al., 2020). The micronutrients obtained from diverse food consumption such as iron, vitamin A and zinc confer nutritional benefits to both the mother and the fetus that results into positive health outcome. For example, Calder, (2021) argued that consumption of variety of diets rich in vitamin C promotes wound healing, protects against oxidative damage and promotes synthesis of collagen. Diets rich in zinc has also been shown to improve efficacy of immune cells as well as reducing oxidative stress associated with free radicals and on the same note, hemoglobin levels in pregnant women have been shown to increase after consumption of diverse diets (Gete et al., 2020). This reduces incidence of anemia which is significant health concern that has detrimental effect on both the fetus and pregnant women.

According to Kaibi et al., (2015), consumption of limited number of food groups results into low nutrient intake, low energy intake and micronutrient deficiencies which are the leading causes of nutrition related diseases, child deaths and stunting. Against this background, Cena & Calder, (2020) recommends consumption of adequate variety of food groups to prevent all forms of malnutrition and non-communicable diseases. Therefore, as a health promotion strategy, nutrition intervention programs should promote consumption of adequate diverse foods to increase nutrient adequacy which has positive health outcome.

Comparison of food accessing strategies and how they influence dietary intake

Categorically, food may be acquired by households for consumption in three ways; own food production, market purchase and donations/aids. The importance of knowing the sources of food for each HH enables quantification of nutrients and calories based on the respective food sources. This will be vital for designing intervention programs that best suit the context of the population. In principle the contribution of different food acquisition sources is done using HH consumption and expenditure scales which captures the sources of the food, and the quantity produced if required. As stated earlier, own food production, market purchase and relief donations/gifts are the main sources through which HHs acquire

food. Given the context in which people find themselves, its paramount to understand that different food sources may be used though each one has its pros and cons.

In vulnerable and poor population where food and market systems are disrupted by war and disasters, food donations which come inform of relief aid from international organizations and non-governmental organizations usually present a first line buffer against food insecurity and malnutrition. There is no doubt about the benefits offered by food aid both in short term and medium term including reducing hunger and malnutrition in both emergency and non-emergency setting (Devereux, 2012).

Nonetheless the efficiency and effectiveness of food aid as an intervention for malnutrition have provided little (if any) to justify its continuation as sustainable means for a problem that appears not to end soon (Matilsky et al., 2009). Many proponents against food aid argue that it only helps in short run and does not prevent the problems it ought to address and can even make worse the situation (Kirwan & Mcmillan, 2007; O'Connor et al., 2016). They opined that poverty which is the root cause of inadequate intake remains unaddressed while significance is given to address hunger. Similarly, grey literature has indicated little or no improvement in nutrition status of children in supplementary feeding programs (Kristjansson et al., 2016). Quite surprising is the relapse shown by children who had shown improvement brought by supplements. It is therefore evident that food donations offer no guarantee as long term solution against inadequate intake and malnutrition in refugee settings as highlighted by high rate of acute malnutrition among Palestinian refugees despite food assistance (Abdeen et al., 2007).

Additionally, the rations provided for the refugees are monotonous usually a grain of plant-based legume and cereals which are low in diversity and hence limited nutrients moreover this aid limits local productivity and encourages dependency and destabilizes local markets all which have negative effect in achieving food and nutrition security and may in the long run have more harm than good (Levinsohn & McMillan, 2007)

To bridge this gap, own food production has been suggested alongside food donations as sustainable means to overcome negative externalities of malnutrition that continues to cause millions of deaths. Typically, own food production involves consumption of foods from HH production though it may also include gathering of wild species, hunting of wild animals and fishing. Central to own food production is to make it nutrition sensitive which encompass HH food production, biofortification, livestock and poultry production (FAO, 2020).

Impact studies in Asia have demonstrated that if HH agriculture production can be supported with extensive research, improved technologies and extension services to small scale farmers, poverty and food insecurity can be reduced significantly (Christiaensen & Martin, 2018; Jayne et al., 2011). Extensive literature supports own food production as a healthy, sustainable and safe strategy to increase DD and adequate nutrient intake among the vulnerable poor through income generated from agricultural production that can be used for buying diverse foods and consumption from own food production (Ecker, 2018; Herforth & Ahmed, 2014). Similarly, because the purchasing power of HHs are not the same as are result of income inequalities, homestead food production presents the only option for HHs to increase consumption of variety of food. This is exemplified by a study in Cambodia where vulnerable households that increased production of fruits and vegetables were found with improved consumption of micronutrients (Olney et al., 2009).

However, some studies argue that own food production does not necessarily improve maternal and child nutrition outcomes. Whereas Olney et al., (2009) reported increased micronutrient nutrient consumption brought by increased home production, no significant improvement in child and maternal nutrition existed. Supporting this finding is a study in Sri Lanka that pinned reliance on own food production as a cause for low dietary diversity (Weerasekara et al., 2020). This as literature points out may be due to production of staples with limited variety of crops grown as well as diversification of home produce to market sales where income obtained may be used for non-nutrition related goods (Koppmair et al., 2016). Similarly among households consuming food from their own production, Muggaga et al., (2022) found that nutrients and energy were not enough to satisfy their recommended dietary allowances.

Amidst doubts over food donations and own food productions failure to provide reliable means of food accessing strategies to satisfy dietary intake, studies have proposed market purchase as more suitable option (Berti, 2015; Sibhatu & Qaim, 2017). The importance of market is based on its ability to provide a favorable ground for both selling produce and purchasing more nutritious foods given the lack of storage facilities to store excess fresh produce and inability to produce wide array of nutritious food moreover even wild collections and hunting products needs to be sold to the market to provide more income for consumption diversification (Koppmair et al., 2016). Evidence also indicates that when foods are purchased from the market, the HH dietary intake is improved significantly than from own food production (Luckett et al., 2015; Sibhatu et al, 2015). On the other hand, the relevance of market purchase as source of food acquisition is challenged by some studies. Herforth & Ahmed, (2015) opine that income

and market inequalities undermine its suitability in rural setting where basic source of livelihood is peasant farming and most of the rural market infrastructures are not well developed.

Determinants of dietary diversity

Socio-demographic factors

Several socio-demographic factors influence the HDD. Studies show that the elderly consume low number of food groups compared to the young generation. This is to be expected though given the anatomical and socio-cultural changes undergone by this sector of the population which limits their accessibility to diverse foods. For example, a study by Chalermsri et al., (2020) showed that restrictions brought by changes in health status and limited cooking skills, consumption of high number of food groups among the elderly is low. On the contrary, age did not have significant impact on DD. This according to Picco et al., (2016) could be due to reduced ability to perform specific tasks and thus its care takers who assume the responsibility of nutritional needs.

HH size: Contrasting literatures exist on how DD is impacted by HH size. The general agreement is that increased HH size negatively affects HH food security. With increased family size, intrahousehold allocation increases, quality and diversity of food eaten may also reduce while severe economic strain on HHs may be experienced reducing purchasing power (Kumar & Gautam, 2022). Ahmed et al., (2017) noted that with decreased family size, protein calorie malnutrition reduces as a result of increased HH income. On the other hand, Sibhatu et al., (2015) offers an interesting view about the positive impact of increased HH size on food security and DD where he noted increase in HH income increases DD for HHs particularly if the adults are educated and are employed.

Gender has been shown to affect HDD. In the study determinants of rural HDD in South Africa, Taruvinga et al., (2013a) found that female headed HHs had higher DD scores than male headed HHs. To explain this observation, Dahal et al., (2022) points that females have high regard to purchase of nutritious foods compared to male headed HHs. Other socio-demographic factors that have influence on DD include marital status, area of residence, religion and ethnicity.

Socio-economic factors

Income: Widely regarded as a key ingredient in increasing the purchasing power of HH and thus fueling the accessibility component of food security, income level has intricate relationship with HDD and nutrient intake adequacy. Improved income status has been shown to influence DD positively (Parappurathu et al., 2015; Taruvinga et al., 2013a). Increased income literally signifies more access to

variety of foods as a result of increased purchasing power. Moving away from increasing accessibility to diverse foods, income also increases HH food production by improving disposable income to farm inputs, labor and subsidiary technology which results into adequate and diverse production of food thus more availability of food. Evidence show that, with less income, DD and calorific intake becomes inadequate among households (Mishra & Ray, 2009). Under these circumstances some of the HHs will not be in position to afford the rising cost of healthy foods and for others this will mean reducing the quantity of food consumed as a coping strategy.

Education: Whereas the importance of better education in providing employment opportunity and thus improving household income is never doubted, educations impact on health and nutrition has come into the forefront of many international agendas. Crucial to HH nutrition is the mother's education status. As reported by Hassan, (2017), HHs with higher maternal education have better nutritional quality compared to households with low educated mothers. Other scholars argue that with improved maternal education, there is improved micronutrient adequacy and anthropometry of pre-school children (Bras & Mandemakers, 2022; Jacques, 2011; Saleem et al., 2014). The positive association between education and quality nutrition could be attributed to increased health awareness, nutrition education and better decision making on dietary intakes.

Land size and ownership: With nutrition sensitive agriculture showing a promising result in fight against malnutrition and hunger, casual pathway of how inputs used in agricultural production affects nutrition should also be given focus. In such scenarios, farm productivity which is dependent on land becomes directly linked to HH consumption. According to David and Grobler, (2019a), land as an input of production forms indirect pathway between diet and nutrition. Increased land size may contribute to more available space for production of variety of foods and rearing of animals thus improving nutrient intake and household income (Zanello et al., 2019). Interestingly, another positive association between land ownership by women and improved dietary intake has provided a clue of the positive role of land in improving nutrition outcomes by improving cultivation of more nutrient dense foods (De Pinto et al., 2020). Kumar et al., (2020) argues that land ownership by women brings women empowerment which translates into healthy dietary outcomes in children. On the same positive note, a study revealed that if access to land by women is increased, income and credit accessibility as well as HH social capital is improved and thus purchasing power of the HH increases (Nguyen & Le, 2023). However, Harris, (2020) and Gillespie et al., (2019) posited that despite its positive association with food security, HDDS shows no relationship with land ownership.

CHAPTER THREE: METHODOLOGY

Introduction

This chapter presents information about the study setting, study design, study population, sampling and sampling procedure, data collection and method of data analysis.

Study setting

Palabek refugee settlement, located in Palabek Ogilli subcounty in Lamwo district was established in 2017 to receive South Sudan refugees and has an estimated population of 65,496 refugees and asylum seekers (UNHCR, 2022). It is comprised of 9 zones divided into various blocks (Auma et al., 2023). The settlement is approximately 80 kilometers from Gulu city and approximately 346km from Kampala city. It borders South Sudan to the north, Gulu to the south and Moroto to the east. This refugee settlement was chosen because of high GAM of 8.2% and high prevalence of anemia of 62.9% (UNHCR, 2021).

Study design

A quantitative research method was employed to answer the research questions since it was scientific and can be related to the specific objectives. Cross sectional study design was used because the researcher wants to collect data from the population at one point in time. Data was collected using face to face interview and semi-structured questionnaire.

Study population

The study population comprised of refugee households and the primary targets of the study were women. The reason for choosing the women as the primary target participants was because they are involved in both production and preparation of food and thus reliable data could be obtained from them. The inclusion criteria included adults responsible for preparation of food and who consented to participate in the study.

Sample size determination

The sample size was calculated using the Yamane formula (1973).

$$n = \frac{N}{1 + N(e)^2}$$

Where n = total sample size

N =equals the total population of Palabek refugee settlement reported to be 65,496 (UNHCR, 2021)

e = the sample error margin at 95% confidence interval, which is 0.05 for this study.

A total of 398 participants was selected.

Sampling technique

Multistage sampling method was used to locate the study participants in the study area. Palabek refugee settlement was first purposively selected due to its high prevalence of GAM at 8.2% and anemia at 62.9% (UNHCR, 2021). Simple random sampling was then used to select zones to ensure equal chance of being selected. Lastly HHs were selected using systematic random sampling as HHs are arranged in blocks. During this process (systematic sampling), the first HH was selected randomly while the remaining HHs were selected at fixed intervals.

Data collection instruments

Questionnaire

Data was collected using semi structured questionnaires involving face to face interviews. Structured questionnaires were used to collect data on respondent socio- demographic and socio-economic data such as HH size, education level of the HH head, occupation of the HH, marital status, presence or absence of home gardens, the respondents age, distance to the market, HH livelihood sources, and age of the HH head. A dietary assessment using a 24-hour recall method was used to capture different type of foods consumed by the household in relation to the sources of food.

Questionnaire administration

Data was collected by the Principal Investigator (PI) with the aid of 10 research assistants. The researcher administered the introductory letter and consent letters to the responsible person for preparation of food the previous day. Data was only be collected from participants who consent to participate in the study.

Assessment of household dietary diversity

HDD was assessed using 24-hour recall. Food groups consumed over the previous day were evaluated based on recommendations from Kennedy et al., (2011). At each time in data collection, open recall of food groups consumed on previous 24-hour was done since this made the respondent to be more involved and not be inclined to mention foods not consumed by the HHs the previous day (Gupta, 2019). This food groups included (roots and tubers, cereals, pulses, legumes, oils and fats, vegetables, fruits, meat, eggs, milk and milk products, sugar and sweets, beverages and alcohol). Each food group was assigned a score of 1 if consumed or 0 if not consumed. The HDD was calculated as the sum of scores equal to the number of food items consumed.

Comparative contribution of food acquisition sources to household dietary diversity

A dietary assessment using a 24-hour recall method was used to assess the relative contributions of own food production, market purchase and relief donations. Respondents were asked to provide data on foods their HHs have consumed the previous 24 hours as well as the sources of the food.

Determinants of household dietary diversity

Data was collected using face to face interviews on demographic and socio -economic characteristics. Participant characteristics such as age, gender, marital status, house hold size, education level of the household head and index woman were collected using semi-structured questionnaires. Additionally, respondents were asked to provide data on household income, occupation of the household head, distance to the market, expenditure on food and ownership of assets such as land and poultry.

Recruitment of research assistants

Prior to data collection research assistants with background in nutrition data collection and those who are fluent in Acholi and Dinka language were recruited and trained. The training focused on the objectives of the study, skills of interviewing as well as ethical issues to be followed in data collection. The research assistants were trained only to interpret questions but not assist the respondents in giving responses. During the training focus was given to complete mastery of the content and questionnaire clarity. Each question was explained to the research assistants and questions arising were tackled until satisfaction.

Pretesting of questionnaire

Pretesting of the questionnaire was conducted among ten respondents in zones not selected to establish the accuracy and clarity of the questionnaire and to identify ambiguous, misleading questions. Wrongly interpreted questions were revised in accordance with findings of pretesting. During the pretesting, efforts were made to check for consistency in interpretation of questionnaire. The test-retest method was used to test the consistency of the questionnaire in producing the same results. Ten respondents from zones not selected for the study with similar characteristics to the study area were interviewed two times within a space of one week using the same questionnaire. A comparison was then made between the answers that will be obtained from both interviews. The pre-test respondents were made to give feedback concerning the questionnaire. Results from the pre-test were used to add any additional information that might be lacking in addition to the above stated aims.

Data analysis

Data was checked for completeness, consistency and was cleaned, coded, entered and analyzed using SPPS for window version 20.

Socio demographic and socio-economic data

Socio-demographic and socio-economic data such as sex, age education status, marital status education level, occupation of the household head was analyzed using descriptive statistics. Central tendencies such as frequencies, mean and proportions and Measures of dispersion such as Standard Deviation were used to summarize the data.

Determinants of household dietary diversity

Poisson regression was used to analyse the factors influencing HDD. The HDD was considered as the dependent variable while the independent variable were the respondent characteristics. Differences were considered significant when the p value is < 0.05 at confidence interval of 95%.

Given that the HDD is a count variable that can take values between 1 and 12 and is not normally distributed, a Poisson Regression Analysis was used because it assumes that the mean and variance of the dependent variable are equal (Muhammad, 2023). In Poisson models, the estimated coefficients were interpreted as semi-elasticities, that is the coefficient estimate described how the number of food groups consumed changed when explanatory variable changes by one unit (Gujarati & Porter, 2009).

Contributions of food acquisition sources to household dietary diversity

To examine how the three-food acquisition sources contributed to HDD, line graphs were generated to represent pattern profiles. For each food acquisition strategy, the profiles illustrate the proportion of HHs that consumed a food item regarding a food group. Relative strength of the food acquisition strategies were determined using Poisson regression since the HDDS are count data at significance level of 0.05.

Descriptive statistics were used to analyse the HDDS. The HDDS was calculated from the consumption of the 12 food groups including; roots and tubers, cereals, pulses, legumes, oils and fats, vegetables, fruits, meat, eggs, milk and milk products, sugar and sweets, beverages and alcohol (Roma et al., 2009). Each food group was assigned a score of 1 if consumed or 0 if not consumed, the house holds dietary diversity scores (HDDS) was calculated as the sum of scores equal to the number of food items consumed. The HDDS was classified on three categories as lower for 0-3, medium for 4-5, and higher for 6-12 scores (Kennedy et al., 2011). Data was presented inform of percentages and tables.

Ethical consideration

To conduct the study in Uganda, a research ethical clearance certificate was obtained from Gulu University Research Ethics Committee (GUREC) and the permission was thought from the Office of the Prime Minister (OPM) to conduct the study in Palabek Settlement Camp.

During the study, participants were informed about the purpose of the study, potential benefits and the fact that the study poses no harm. They were also assured that any information obtained from them will be kept confidential. Respondents were requested to sign or thumb print an informed consent form signifying that they willingly participated in the study.

Dissemination of results

After collecting and analyzing the data, the results was shared through the Texila University online Learning Management System (LMS) for archiving, assessment and grading. The investigator has also planned to publish the study results in the Texila International Journal for Public Health and to disseminate the summary of the findings and final report to the various stake holders including; the Ugandan Ministry of Health (MoH), Lamwo District Health Office (DHO), OPM in Lamwo district, UNICEF, World Food Program (WFP), and all key nutrition Civil Society Organizations (CSOs) operating in Palabek Refugee Settlement.

CHAPTER FOUR: STUDY FINDINGS

4.0 Introduction

This section presents the findings of the study in line with the study objectives.

4.1 Socio-demographic and socio-economic characteristics

Table 1: Sociodemographic Characteristics of the respondents

Characteristics	Levels	Frequency	Percent
Gender of the household head	Male	271	68.1%
	Female	127	31.9%
Age of the household head	Below 18	2	0.5%
	18 - 30	137	34.4%
	31-45	184	46.2%
	46 and above	75	18.8%
Marital status	Married	301	75.6%
	Separated	25	6.3%
	Divorced	11	2.8%
	Single	17	4.3%
	Widowed	44	11.1%
Occupation of the household head	Not employed	202	50.8%
	Employed	10	2.5%
	Small scale trading	33	8.3%
	Casual labour	127	31.9%
	Farming	26	6.5%
Education level of household head	Never went to school	163	41.0%
	Primary	161	40.5%
	Secondary	66	16.6%
	Tertiary	8	2.0%
Household size	Small (1-4)	146	36.7%
	Medium (5-10)	229	57.5%
	Large (> 11)	23	5.8%
Religious affiliation of the household head	Catholic	101	25.4%
	Moslem	12	3.0%
	Protestant	146	36.7%
	Anglican	45	11.3%
	Seventh day Adventist	25	6.3%
	Others	69	17.3%
Household head participation in agriculture	No	34	8.5%
	Yes	364	91.5%
Access to agricultural land	Yes	320	80.4%
	No	78	19.6%

Acres of agricultural land	Less than 1 acre	267	67.1%
	Above 1 acre	53	13.3%
People Earning Income	None	348	87.4%
	Less than 2	50	12.6%
	3 to 4	0	0.0%
	5 to 6	0	0.0%
Average household income per month (UGX)	Mean (SD)	135,250	0.0%
Presence of kitchen garden	Yes	288	72.4%
	No	110	27.6%
Main source of income	Sale of crops	25	6.3%
	Sale of animals	4	1.0%
	Casual labour	166	41.7%
	Brewing alcohol	18	4.5%
	Small scale business	70	17.6%
	Hand crafts	15	3.8%
	Petty trade	10	2.5%
Presence of kitchen garden	Yes	296	74.4%
	No	102	25.6%
Source of household food	Own production	66	16.6%
	Market purchase	28	7.0%
	Gifts/donation	304	76.4%
Distance to the market (km)	Less than 1km	196	49.2%
	More than 1 km	202	50.8%

More than half, 271 (68.1%) of the households were male headed. Most,184 (46.2%) of the household head had ages ranging from 31-45 and only 2 (0.05) were below 18 years. In regards to marital status, majority, 301 (75.6%) of the respondents were married while only 17 (4.3%) were single. When asked about the occupation of the household head, approximately half ,202 (50.8%) of the respondents reported that their household heads were not employed,127 (31.9%) were occupied in casual labor while only 10 (2.5%) were employed in formal sector. The proportion of household heads that never attended school, 163 (41.0%) was approximately the same as those who attended primary level of education, 161 (40.5%). In regards to participation in agriculture, 364 (91.5%) of the respondents reported that their households participated in agriculture whereas the 34 (8.5) did not. Of the 320 (80.4%) households that had access to land, 267(83.4%) of the respondents reported less than 1 acre while only 53 (16.6%) had land above one acre. Findings from the study also indicated casual labor 166 (41.7%) as the most important source of income. Most 288 (72.4%) of the households have kitchen garden. Overall, on average households earn UGX 135,240.

4.2 Household dietary diversity (HDD)

This section provides information on consumption patterns of different food groups by the households during the previous 24-hour period. It further details the HDD categories and how own food production contributed to consumption of different food groups.

4.2.1 Household Dietary Diversity Scores (HDDS)

Table 2: Mean HDDS contributed by Own Food Production, Market Purchase, Food Donations, Other food Sources and All Food Sources Combined

	N	Minimum	Maximum	Mean	Std. Deviation
Own Food Production	398	0	5	2.38	.930
Market Purchase	398	0	6	1.60	1.196
Food Donation	398	0	3	.92	.702
Other Food Sources	398	0	1	.15	.356
All sources Combined	398	2	9	5.05	1.236
Valid N (listwise)	398				

Overall, the mean HDDS of the respondents interviewed(n=398) was 5.05 with a standard deviation (SD) of 1.236. This means that the respondents interviewed reported consuming on average a total of 5 different food groups on the day or night before the interviews. The standard deviation of 1.236 indicates that there is very high variability in the HDDS of the HHs interviewed. Most of the HHs interviewed consumed food groups acquired from Own Food Production, followed by Market Purchase, then Food Donations and with Other Food Sources contributing the least as indicated by the mean HDDS of 2.38, 1.60, 0.92, and 0.15 (SD of 0.930, 1.196, 0.702 and 0.356) respectively. The standard deviation of 0.930 in the HDDS contributed by own food production indicates a moderate level of dispersion around this mean, suggesting that there are notable differences in the amount of food produced by different respondents of this study. The standard deviation of 1.196 in the HDDS contributed by market purchase is relatively high, meaning there is considerable variation in market purchasing habits among the respondents interviewed but its pronounced compared to own food production. The standard deviation of 0.702 in the HDDS contributed by food relief suggests that there is some variability in the amount of food received through donations, but it is less pronounced compared to own food production and market purchases. The standard deviation of 0.356 in the HDDS contributed by other foods sources indicates that there is very little variability around this average, meaning that most participants use only a small amount from other food sources. The data reflect a primary reliance on all sources combined, and the variability in each source suggests differences in personal circumstances, resources, and preferences among the participants.

4.2.2 Consumption of different food groups by households

Table 3: Proportion of households that consumed distinct food groups the previous 24 hours

Food Group	N	HHs that Consumed Distinct Food Groups the Previous 24 Hours	Proportion of HHs that Consumed Distinct Food Groups the Previous 24 Hours
Cereals and Grains	398	380	95.5%
Roots and Tubers	398	48	12.1%
Pulses/Nuts	398	219	55.0%
Vegetables	398	340	85.4%
Fruits	398	193	48.5%
Meat	398	6	1.5%
Fish	398	40	10.1%
Eggs	398	8	2.0%
Milk and Milk Products	398	2	0.5%
Oils/Fats	398	324	81.4%
Sugar/Sweets	398	73	18.3%
Condiments/Spices	398	376	94.5%

Nearly all (95.5%) of the households consumed cereals/grain in the previous 24 hours preceding the survey. Condiments (94.5%) and oil/fats (81.4) were also consumed by majority of the HHs as indicated by figure 1 below. Consumption of vegetables was also high (85.4%) while fruits were consumed moderately. Animal sourced proteins (meat, fish and eggs) were consumed by very few HHs (1.5%, 10.1% and 2.0%). As indicated by the figure, only 2 (0.5) HHs consumed milk and milk products.

4.2.3 Categories of household dietary diversity scores

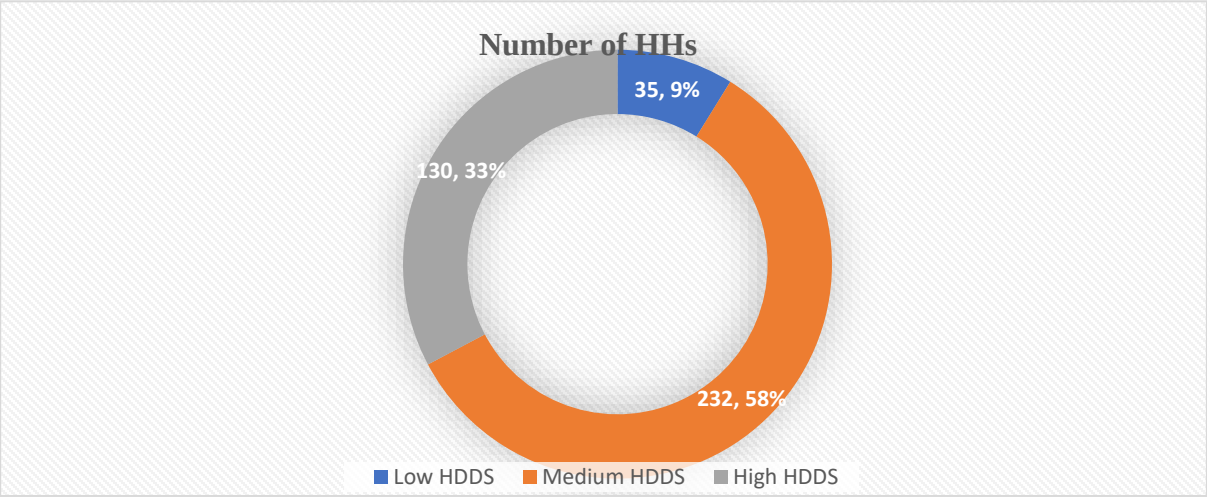

Figure 2: HDDS Categories

Based on the number of food groups consumed, households were categorized as having low dietary diversity (less than 3 food groups), medium dietary diversity (4 and 5 food groups) and high dietary diversity (6 and above) (Gina Kenedy, 2010). Figure 2 indicates that most (58.0%) of the households consumed 4-6 food groups thus fall in medium dietary diversity while very few (9.0%) of the households consumed less than three food groups and hence fall in low dietary diversity while the proportion of households that consumed more than 6 food groups and therefore high dietary diversity points at 33.0%.

4.2.4 Proportion of households consuming distinct food groups from own food production, market purchase, food donations, and other food sources.

To explore how own food production, market purchase and food donations contributed to different HDDS food groups, bar graph was generated to illustrate the proportion of households that consumed a distinct food group from the respective food sources under investigation. For these results, sugar/sweets, fats and oils were not included. Figure 3 below shows that households consumed different food groups in different proportions. Own food production contributed greatly to dietary intake of vegetables and spices/condiments of the households the previous 24 hours while the proportion of households who consumed roots/tubers from their own harvest was moderate. The proportion of households that consumed cereals/grains, fruits, meat, eggs and milk/milk products from own food production was very few. Market purchase contributed greatly to the dietary intake of sugars/sweets, fish and meat; moderately to oils/fats, eggs and fruits and very minimally to cereals and grains, pulses/nuts, roots and tubers, vegetables, and condiments/spices. No HH consumed milk and milk products from market purchase. Food donations contributed moderately to the dietary intake of cereals and grains, oils/fats, and roots and tubers; very minimally to pulses/nuts and; none to vegetables, fruits, meat, fish, eggs, milk and milk products, sweets/sugars and condiments/spices. Other food sources (gathering) only contributed to 31% of fruit consumption.

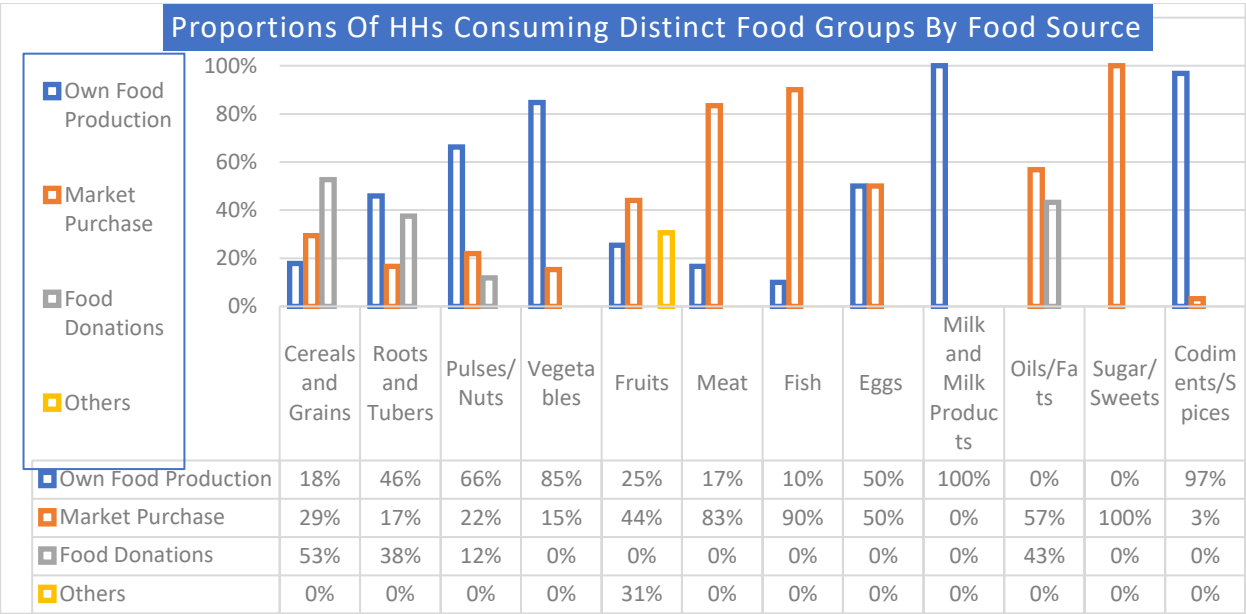

Figure 3: Contribution of food sources to dietary consumption of different food groups

4.2.5 Influence of own food production, market purchase, food donations, and other food sources on HDDS

Table 4: strength of association between own food production, market purchase, food donations, and other food sources with household dietary diversity

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Wald Chi-Square	df	Sig.	Lower	Upper
	Lower	Upper					
(Intercept)	.625	.1041	.421	.829	36.096	1	.000
Own food Production	.190	.0246	.141	.238	59.481	1	.000
Mark purchase	.191	.0205	.150	.231	86.274	1	.000
Relief Donations	.196	.0372	.123	.268	27.702	1	.000
Other sources	.197	.0600	.080	.315	10.798	1	.001
(Scale)	1(a)						

Dependent Variable: household dietary diversity
Model: (Intercept), Own food Production, Market purchase, Relief Donations, Other source
a Fixed at the displayed value.

The researcher further sought to investigate the strength of association between own food production, market purchase, food donations, and other food sources with HDD using simple Poisson regression which is presented above. The Poisson Regression Analysis results indicate that all the independent variables (Own food production, Mark purchase, and Relief donations, and other sources) are statistically significant predictors of HDD, with p-values (0.000, 0.000, 0.000, 0.001) less than 0.05. The coefficients

for each variable are positive, suggesting that increase own food production, market purchase, food donations, are associated with increases in HDD.

4.2.6 Predictive factors of household dietary diversity

Table 5: Poisson regression model for predictors of household dietary diversity

Risk factors	Coef	Std.Error	Wald statistics	P value	95% CI	
(Intercept)	1.658	0.1352	150.481	**0.000*****	1.393	1.923
Gender of the household head						
Male	Ref					
Female	0.017	0.0302	0.301	0.583	-0.043	0.076
Occupation of household head						
Farming	Ref					
Not employed	-0.045	0.0531	0.709	0.400	-0.149	0.059
Casual labour	0.013	0.0479	0.077	0.782	-0.081	0.107
Employed	0.006	0.1113	0.003	0.958	-0.212	0.224
Small scale trading	0.055	0.0579	0.894	0.344	-0.059	0.168
Education level of household head						
Tertiary	Ref					
Secondary	-0.163	0.1047	2.436	0.119	-0.369	0.042
Primary	-0.216	0.1062	4.143	**0.042****	-0.424	-0.008
Secondary	-0.256	0.1053	5.921	**0.015****	-0.463	-0.050
Household head participation in agriculture						
No	Ref					
Yes	0.099	0.0542	3.321	0.068*	-0.007	0.205
Access to agricultural land						
No	Ref					
Yes	0.182	0.0545	11.123	**0.001*****	0.075	0.289
Acres of agricultural land						
Above 1 acre	Ref	.	.	.	.	.
Less than 1 acre	-0.102	0.0410	6.140	**0.013****	-0.182	-0.021
Presence of kitchen garden						
Yes	Ref					
No	-0.095	0.0378	6.265	**0.012****	-0.169	-0.021
Access to hired land						
Yes	Ref					
No	0.002	0.0334	0.004	0.948	-0.063	0.068
Monthly expenditure on food (Ugx)	-2.924E-7	2.3275E-7	1.578	0.209	-7.486E-7	1.638E-7
Average household income per month (Ugx)	3.612E-7	1.2351E-7	8.555	**0.003****	1.192E-7	6.033E-7

Note Significance: ***p < 0.01, **p < 0.05, *p < 0.1; Coef: Coefficient; CI: Confidence interval; Ref: Reference category; Likelihood ratio-chi-squared (LR-Chi-2(34.029), (p =0.003).

Table 5 above demonstrates the results of Poisson regression for predictors of HDD. Independent variables were considered significant at $p<0.05$. After controlling for all other factors that affect HDD in the estimation, the results indicate that education level of the HH head, access to agricultural land, presence of kitchen garden, acres of agricultural land and average HH income per month had significant effect on HDDS. Specifically, the results indicate that the education level of HH head had a negative but significant effect on HDDS. HHs reporting attendance of primary and secondary school by the HH head were associated with reduced frequency of HDDS compared to HH heads with tertiary education whereas HH heads with secondary education were not significantly different from those with tertiary education in terms of frequency of HDDS. Furthermore, the results indicate that HHs who had access to agricultural land were associated with increased frequency of HDDS compared to HHs with no access to agricultural land. Similarly, HHs with less than 1 acre of agricultural land were associated with reduced frequency of HDDS compared to those with more than 1 acre. HHs reporting absence of kitchen garden were associated with reduced frequency of HDDS compared to those with access to kitchen garden. Also, there was increase in frequency of HDDS for every HH reporting increase in monthly HH income.

CHAPTER FIVE: DISCUSSION OF RESULTS

5.0 Introduction

This chapter discusses the findings of the study in comparison to the findings from findings from the related studies across the globe.

5.1 Household dietary diversity

5.1.1 Household dietary diversity scores (HDDS)

HDDS is a key indicator of food security, and reflects the economic access to consumption of different food groups(Ike et al., 2015). It's a reflection of dietary quality and adequacy(Faber et al., 2016). This means that increase in HDDS is an indication that families are accessing and consuming nutrient dense diets and hence will have positive health outcomes. Findings from this study elicited that 33% of the HHs had high dietary diversity, 58% had medium dietary diversity and 9% had low dietary diversity. On average, the Overall, the mean HDDS of the respondents interviewed (n=398) was 5.05 which indicates that they consume about 5 food groups per day. This demonstrates that HHs in this study have moderate access to diverse diets. This is likely because most of the HH heads are not employed and have low access to income from other sources which reduces the HH food purchasing power and renders them to depend mostly on food relief donations and limited farm supplies. These results differ with those form Syrian refugee settlement where most HHs were found to be consuming average of 3 food groups a day (Abou-rizk et al., 2022). The difference may be due to the difference in geographical locations, levels of humanitarian relief aid and availability of land for own food production. Our study however did not measure the individual dietary diversity and was therefore un able to draw inference on dietary adequacy.

5.1.2 Food groups consumed by households in the previous 24 hours

Cereals, condiments/spices and oil/fats were consumed by higher proportion of the HHs a day preceding the survey. Same observations were made by (Abou-rizk et al., 2022) and (Henjum & Caswell, 2019) among the asylum seekers in Norway and Syrian refugees. This is possibly because refugees mostly depend on the food relief rations which mostly contain cereals and oils (O'Connor et al., 2016). In addition, high consumption of cereals might also be due to tradition as many cereals especially sorghum and maize form the staple food of most of the tribes in this study area. It should be remembered that, the study populations comprised mainly of South Sudanese refugees who are still deeply rooted in traditional culture and tradition (Mannion et al., 2022). Additionally, this food group is most times available in the market as its price is not usually high thus easily accessed by the HHs. Bruyn et al., (2021) opines that, most poor and vulnerable population direct much of their expenditure on cereals. On the same note, FAO,

(2020), reported that cereals/grains form the main diet of the vulnerable population. Cereals are rich source of energy and dietary fiber. Apart from playing very important physiological and biochemical roles in digestion, Huang et al., (2015) reported that dietary fiber from cereals offer more protection than fibre from fruits and vegetables against cardiovascular diseases. However, diets purely rich in cereals limits bioavailability of nutrients due to presence of phytates. Additionally, consumption of starchy cereals predisposes the population to the risk of nutrient inadequacies. This discovery highlights the increasing complexity and debate surrounding food system transformation towards healthy and nutritious diets and production of calorie dense foods among vulnerable population. Hence, it is imperative to disseminate knowledge among the population regarding production and consumption of diverse food groups.

Oils/fats are vital macronutrients for energy density and they are useful for absorption of carotenoids and fat-soluble vitamins (A, D, E and K), though they should be consumed in minimal amount given their negative health impact such as increased cardiovascular diseases and increased risk of metabolic syndrome components. Spices offer positive health outcome. However, if consumed in excess amount, it may pose detrimental effect to the body. A study in Accra showed that excess intake of spices and condiments may result in conformational modification in food which may pose health risks(Gadegbeku et al., 2014). Therefore, it would be beneficial to provide practical guidance on consumption of such food group.

With reference to vegetables and fruits, the results indicate that, vegetables were highly consumed by the HHs. This is probably due to ease of access/ production of this food groups such as using kitchen gardens and gathering from wild species. This finding while aligning with studies of (Henjum & Caswell, 2019) also suggests progress towards WHO's recommendation of regular vegetable consumption in eliminating micronutrient deficiencies and prevention of non-communicable diseases. Continuous awareness and community nutrition education outreach programs should reinforce this positive finding. Whereas WHO recommends consumption of 400g of fruits and vegetables per day (Pastori, 2023), findings from this study while not capturing quantity of fruit intake show low consumption of fruits. The findings in this study are similar to study in Algeria among Saharawi refugees(Morseth et al., 2017)

This could be due to the low-income status of the HHs and seasonal nature of fruits. Study by Gurmu et al., (2019) indicates that, fruits are expensive and thus can only be afforded by few HHs. The low consumption could also be attributed to poor market infrastructures within the refugee settlements

especially cold chain refrigeration. As reported by Schiavo & Aubert, (2020), proper market infrastructures are necessary to enhance consumption of diverse food groups by increasing availability, affordability and food safety. Additionally, the low level of education of the HHs could have impacted the level of knowledge on the benefits of consumption of fruits. Lack of knowledge has been found to reduce consumption of fruits and vegetables by 27 percent controlling for other factors (Alston et al., 2022). This phenomenon is supported by the current study where the proportion of HHs that attended tertiary education was low at 6% compared to those who never went to school reported at, 40.8% (Table 2). Fruits are rich source of vitamins and minerals. Consequently, inadequate dietary intake of fruits is a public health concern. According Mozaffarian et al., (2003), 14% of intestinal cancer deaths, about 11% and 9% mortality related to cardiovascular diseases and stroke respectively, have been attributed to low intake of fruits and vegetables. This suggests that there is a need to raise awareness among the population regarding the nutritional value of various food categories. This can be achieved through the implementation of nutrition education and awareness campaigns, aimed at promoting the consumption of nutritious food and use of social behavioral change communication strategy.

On the other hand, Animal sourced foods (meat, eggs, fish milk and milk products) were the least consumed food groups by the HHs. This statistic is a cause for concern, as it indicates a notable deficiency in essential amino acids and bioavailability of essential micronutrients. This result is unsurprising as these food groups are considered expensive and thus not affordable by majority of the HHs. According to Bruyn et al., (2021), very few rural people spend their money on animal sourced proteins given their low socio-economic status. Similar to this current study finding, Abou-rizk et al., (2022) posited that refugee HHs in Lebanon consumed relatively low animal sourced foods. While there are continuous calls to switch to consumption of plant-based protein, animal proteins are rich in first-class proteins containing all the nine essential amino acids required for growth. Additionally, they contain higher bioavailability of essential micronutrients (zinc, iron, vitamin A, calcium) required for positive health outcomes in children and women of reproductive age(Khamis et al., 2019). For example, lack of iron is a risk factor for anaemia in women of reproductive age and children culminating into increased risk of infection and developmental delay in children while in females of reproductive age, pregnancy complications are direct manifestation. Improving income of the HHs by increasing income diversification as well as distribution of poultry and small animals such as rabbit would be beneficial.

5.1.3 Contribution of own food production to House Hold Dietary Diversity

The study elicited that HHs interviewed had an average HDDS of 2.38, i.e. 2-3 food groups a day as a result of consuming foods acquired through own food production alone. This means own food production contributed almost a half of the food groups consumed by the HHs interviewed a day. Moreover, the study indicated a positive significant relationship ($P < 0.05$) between own food production and HDD; An indication that increase in own production among the study group would lead to increase in the access and consumption of diverse diets. The results are in agreement with the findings from Aisa where increase in agricultural production was found to significantly contribute to increased dietary diversity (Christiaensen & Martin, 2018; Jayne et al., 2011). This because farming if done diversely can lead production and consumption of a variety of foods including fruits and will also contribute to food security since the same food can generate income that can be used to buy a variety of foods that will enhance intake of nutrients and subsequently leading to nutrient adequacy and positive health outcomes (Olney et al., 2009). On the contrary, findings from a study conducted in Uganda and Sri-Lanka found over reliance on own food production as a main cause of low dietary diversity because of over productions of staples with limited variety as well as sale of produce in markets (Muggaga et al., 2022; Weerasekara et al., 2020). This later gets diverted away from purchase of foods for consumption (Koppmair et al., 2016).

5.1.4 Contribution of Market Purchase to House Hold Dietary Diversity

The study found that HHs interviewed had an average HDDS of 0.9, i.e. 1 food group a day as a result of consuming foods purchased from the market alone. This indicates less dependence by the HHs interviewed on the market purchase for daily consumption. This is likely because of low levels of education, low-income levels, high dependence on relief rations and long distances to the markets. However, market purchase had a positive significant relationship ($P < 0.05$) with HDD; An indication that increase in purchase of foods from the market is associated with increase in the access and consumption of diverse diets. The results are in agreement with the findings from Malawi and America where market purchase led to a significant increase in dietary diversity (Luckett et al., 2015; Sibhatu et al, 2015). This study findings disagree with the findings by Herforth & Ahmed, (2015) who opined that income and market inequalities undermine its suitability in rural settings where people over rely on peasant farming and market infrastructures are not well developed. The difference could have been because of the different contexts like access to markets, levels of engagement in own food production, food relief and access to land.

5.1.5 Contribution of Food donations to House Hold Dietary Diversity

The study found that HHs interviewed had an average HDDS of 1.6, i.e. 1-2 food groups a day as a result of consuming foods from relief donations. In addition, the study found a positive significant relationship between food donations ($P < 0.05$) with HDD; An indication that increase in food relief donations is associated with increase in the consumption of diverse diets. While these results are in agreement with the findings of (Devereux, 2012) who found out that Food Aid plays critical role in reducing hunger and malnutrition in both emergency and non-emergency settings, they disagree with Matilsky et al., (2009), Kirwan & Mcmillan, (2007), O'Connor et al., (2016), and Levinsohn & McMillan, (2007), all of whom opined that Food Aid is not a sustainable way to enhance food security and nutrient adequacy and can worsen the problem of hunger and malnutrition because they offer monotonous diets low in diversity. In addition, the findings among the Palestinian refugees indicated that food donations offer no guarantee for long term solution to inadequate intake in refugee settings (Abdeen et al., 2007). While another study by Kristjansson et al., (2016) indicated that food aid had little or no improvement in nutrition status noted among children in the supplementary program and those that improve have high rates of relapse. This difference could have been because food relief aid in Palabek refugee settlement is complemented with own food production, cash for food programs and livelihood programs which enables these respondents to acquire additional food groups through market purchase. It is therefore very important to ensure that humanitarian relief programs for refugees integrate livelihood farm activities to empower the communities to have access to finance and produce easily accessible nutritious foods that can supplement those from relief aid.

5.1.6 Factors associated with household dietary diversity

Findings from this study indicate that education level of the HH head, access to agricultural land, presence of kitchen garden, acres of agricultural land and average HH monthly income had significant effect on HDDS. Specifically, the results indicate that the education level of HH head had a negative but significant effect on HDDS. HHs reporting attendance of primary and secondary school by the HH head were associated with reduced frequency of HDDS compared to HH heads with tertiary education. This result shows the importance of higher education in HHs since attaining tertiary education was associated with improved HDDS. This implies that promotion of adult literacy education and consistent advocacy for children's education is paramount in improving HDDS. In this study, HH heads that did not attend school and those who attended only primary were many thus low numbers of HHs with higher HDDS. Previous study in Tanzania has equally demonstrated that primary education was associated with low

dietary diversity scores(Taruvinga et al., 2013). Attaining higher level of education may result into increased chances of formal employment hence improved income for purchase of diverse food groups. As reported by (Ansem et al., 2017), HHs with higher maternal education have better nutritional quality compared to HHs with low educated mothers. This could be attributed to increased health awareness, nutrition education and better decision making on dietary intakes.

Furthermore, HH participation in agriculture was positively and significantly associated with increased HDDS. Consistent to the study of Sibhatu et al., (2015) who found higher HDDS among rural HHs participating in agriculture, this result demonstrate the prominent role of agriculture among vulnerable communities in nutrition. Statistics from this study concur with this opinion as descriptive statistics result indicate 92.4% of HH participation in agriculture. Increasing food availability, accessibility and affordability have been viewed as the potential pathways through which agriculture is connected to nutrition (Ivanic & Martin, 2008; Pingali et al., 2017; Swinnen & Squicciarini, 2012). To enhance agricultural production, provision of improved seed varieties, training of HHs in conservation agriculture and continuous improvement of market and road infrastructures by partners implementing livelihood programs in the refugee population could be a motivating factor to improve agricultural production.

Results of this study also indicated that HHs with less than 1 acre of agricultural land were associated with reduced frequency of HDDS compared to those with more than one acre. This suggests that cultivation of small size of land is associated with consumption of few food groups while large land cultivation is associated with consumption of high number of food groups. According to (David & Grobler, 2019), land as an input of production forms indirect pathway between diet and nutrition. Increased land size may contribute to more available space for production of variety of foods and rearing of animals thus improving nutrient intake and HH income which may be used for purchase of diverse nutritious food groups such as fruits and vegetables. Increased access to land by women improves income and credit accessibility as well as HH social capital and thus purchasing power of the HH increases resulting into more economic access of diverse food groups (Nguyen & Le, 2022). Contrary to this finding, Gillepsie et al., (2019) revealed that, no significant relationship between land access and ownership and nutrition outcome exists. This contradiction may suggest impact of size of land on HDDS may be context specific and that the production diversity is more important than size of land in improving HDDS. Reforming refugee land policy by increasing the size of land, negotiating for reduced rental prices and having clear cut user documents on rental land with host communities should be advocated for by UNHCR and human right advocacy bodies. Additionally, training involving use of appropriate land

conservation mechanisms such as minimum tillage, mulching among others should continuously be extended to farming HHs.

Given the protracted nature of refugee settlements and increased vulnerability to food insecurity, there is need to explore other means of food diversification strategies to ensure balanced diet. With low cost, low maintenance and minimum space required, kitchen garden represents one of the most viable options for crop diversification. Consistent with other studies, finding from this current study indicate that presence of kitchen garden had positive significant effect on HDDS of the HHs. This could be due to consumption of diverse food groups and poultry from the kitchen garden as well as increase in purchasing power of the HHs brought by improved income from the sale of crops and animals. Encouraging HHs to continue cultivating diverse crops and rearing of animals in the kitchen garden, extending upgraded technology to the HHs and offering knowledge to the HHs will be of great importance to fulfil the nutritional needs of the refugee population.

Lastly, monthly HH income had positive and significant effect on HDDS. Increased income literally signifies more access to variety of foods as a result of increased purchasing power. Additionally, this could also be due to increased disposable income on farm inputs, labor and subsidiary technology which improves agricultural production resulting into production of more diverse food group. Corroborating to this study, Parappurathu et al., (2015) found that with improved income, dietary diversity of HHs increases while evidence show that, with less income, dietary diversity and calorific intake becomes inadequate among HHs (Mishra & Ray, 2009).

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapters summarizes the conclusions and recommendations drawn from the study.

6.1 Conclusions

Although, own food production had a greater contribution towards the HH dietary diversity of the study population, all the three acquisition strategies had a significant positive association with the HH dietary diversity. This indicates a primary reliance on all sources combined, and the variability in each source suggests differences in personal circumstances, resources, and preferences among the participants efforts. Emergency and development programs should therefore target all the three food acquisition strategies to increase HH dietary diversity.

In regards to determinants of HH dietary diversity, findings from this study indicate that education level of the HH head, access to agricultural land, presence of kitchen garden, acres of agricultural land and average HH monthly income had significant effect on HDDS. Therefore, given the prevalence of malnutrition across a predominantly poor and vulnerable refugee population with limited source of livelihood who usually practice subsistence farming to counteract reduced food rations, the findings from this study clearly indicates why understanding the link between agricultural productivity and nutrient consumption is important. These results will assist policy makers and agencies in designing and implementing effective nutrition intervention programs to tackle the prevailing nature of undernutrition in refugee settings.

6.2 Recommendations

6.2.1 Recommendations for policy

UNHCR and humanitarian partners implementing nutrition programs in refugee settlements should negotiate for land reform policy especially where large unused land exist within the host community. This will increase land accessibility and hence more production of foods. Livelihood programs involving rearing of small animals should be promoted by agencies to increase intake of animal sourced foods. To address micronutrient inadequacy, policies should focus on production of crops rich in vitamin A, zinc, iron and calcium such as carrots, amaranths, beans, sweet potatoes, sorghum and simsim among others. Intervention programs should incorporate market access as one of the strategies of food access. This should be backed up by improving income diversification of the HHs by identifying small scale

enterprises to boost income which would be used for purchasing other nutritious foods not obtained from own produce.

6.2.2 Recommendations for further research

Future studies should focus on: Assessing nutrient intake adequacy of the HHs and incorporating anthropometric measurement to determine nutrition status of children 6-59 months HHs and relating it to own food production.

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APPENDICES

Appendix I: Informed Consent for Household Interview

Title of the study: Contribution of own food production, market purchase and food donations to household dietary diversity among refugee households Palabek Settlement, Uganda.

Principal Investigator: Opio Julius

Institution: Texila American university

Introduction: Hello my name is Opio Julius and I am a student of Texila American University. I would like to invite your HH to participate in a study that is looking at Contribution of own food production, market purchase and food donations to HDD among refugee HHs living in this settlement. This study is privately sponsored by Mr Opio Julius.

Who will participate in the study? The study will be carried out by the Principal Investigator and 5 research assistants or 4 data enumerators.

Procedure: The study plans to ask questions about socio-demographics, sources of income and HH food consumption for about 30 minutes.

Risk /discomfort: No HH member will face any form of injury or pain by being subject to this study. You will not receive any cash assistance by being interviewed. This interview will take your time to attend to house hold needs. Taking part in this study is totally your choice. You can decide to not participate or if you do participate you can stop taking part in this study for any reason. If you agree to participate, we will ask you some questions about your family. Before we start to ask you any questions, we will ask you to give us your verbal consent.

Benefits: Participating in this study will fetch no financial benefits. Refreshment inform of soda or water will be provided. The data that you will provide during this study will be used to provide recommendations for improvement of the nutrition situation in your community.

Privacy and confidentiality: Be assured that any information that you will provide will be kept strictly confidential. You can ask me any question that you have about this survey before you decide to participate. If you do not agree with information provided to you regarding this study, do not declare your consent on this form.

If you have any issues regarding to your rights and participation in the study, please contact the chairperson, Gulu Regional Referral Hospital (GRRH) research ethics committee, …… on Tel …… or Email ……. Thank you.

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. 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 am voluntarily agreeing to participate.

Name of the participant …….

Signature/or thumbprint of the participant …….

Date……...

Name of the interviewer …….

Signature of the interviewer …….

Date …….

Appendix II: Questionnaire

Section 1: Household Socio-Demographics and Economic Questionnaire

Instruction:

A: Household Profile/Structure

House hold ID ……...

Date……

Zone ……

Village……

Name of the house hold head…….....

How many people live in this household (including yourself)? ……

Please can you name the members present in the household?

Name	Age	Gender	Relationship to household head

B: Household Socio- Demographics and Socio- Economic Questionnaire

INSTRUCTION: Circle the letter(s) corresponding to the correct response(s). Record the appropriate is (are) missing from the response category where applicable.

S/N	**Questions**	**Response**	**Codes.**
1	Sex of the household head	A Male B Female	1 2
2	Age of the household head in years	A Below 18 B 18-30 C 31-45 D 46 and above	1 2 3 4
3	Marital status	A Married B Separated C Divorced D Single E Widowed	1 2 3 4 5
4	Occupation of the household head	A Not employed B Employed C Small scale trading D Casual labour E Farming	1 2 3 4 5
5	Education level of household head	A Never went to school B Primary C Secondary D Tertiary	0 1 2 3
6	House-hold size (people who usually eat from the same house)	A Small (1-4) B Medium ((5-10) C Large (>11)	1 2 3
7	Religious affiliation of the house-hold head	A Catholic B Muslim C Protestant (Anglican)	1 2 3

		E Seventh day Adventist G Others specify	4 5
8	Does household head participate in agriculture	A No B Yes	1 2
9	Does your household have access to agricultural land?	A No B Yes	1 2
10	If yes how many acres of agricultural land?	A Less than one acre B Above one acre	1 2
11	How many people earn income from your household?	A None B Less than 2 C 3 to 4 D 5 to 6	0 1 2 3
12	On average how much do your household earn in total per month from your income generating activities?		
13	What is the main source of income for this household?	A Sale of crops B Sale of animals C Casual labour D Brewing alcohol E Small scale business F Salaried job G Hand crafts H Petty trade	1 2 3 4 5 6 7 8
14	Do you have kitchen garden?	A No B Yes	1 2
15	What is the most common way in which this household obtain food? (select all that apply)	A Own production B Market Purchase C Food donations D Other (specify)	1 2 3 4
16	What is the distance of your house to the market?	A Less than a kilometre. B Greater than 1 km	1 2

Section 2. Household Dietary Diversity and Food Source Questionnaire

INSTRUCTIONS. Could you please tell us whether the any of the items in the listed foods groups was consumed yesterday? Also indicate what the main sources are? (use codes provided).

Ask line by line

Food item	Was the food item consumed by the household in the past 24 hours? **0 - No** **1 - Yes**	What was the main source of food? **Use the food Source Codes** **1 Own production** **2 Market Purchase** **3 Food donations** **4 Other (specify)**
CEREALS AND GRAINS (rice, bread, sorghum, millet, maize chapati)		
ROOTS AND TUBERS (potato, yam, cassava or other tubers)		
PULSES/NUTS (beans, cow peas, lentils, cowpeas, peanut, ground nuts, sesame, sunflower or any other)		
VEGETABLES (dodo, cowpeas leaves, spinach, Sukuma wiki, egg plants, okra, pumpkin leaves, tomatoes, or any other vegetable		
FRUITS (mangoes, papaya, peach apricot, banana, apple, guava or any other fruit)		
MEAT (organ meat such as liver, kidney, heart) report meat consumed in large quantity not as condiment**)**		
FISH (Report only fish eaten in large quantities not as condiments**)**		
EGGS		
MILK AND MILK PRODUCTS (fresh milk, yoghurt, cheese)		
OIL/FATS (vegetable oil, palm oil, Shea butter or any other)		
SUGAR AND SWEETS (sugar, honey, jam, pastries (sugary drinks).		
CONDIMENTS/SPICES (tea, coffee, salt, garlic, tomato, baking powder).		

END. Thank you very much

Appendix III: Work Plan

Table 6: Table showing the Work Plan for the Research

S/N	Activity	November 2023 to December 2023	January 2024				February 2024		Responsible Person
			WK 1	WK 2	WK 3	WK 4	WK 1	WK 2	
1	Developing research proposal								Researcher
2	Getting the proposal approved								Researcher
3	Data Collection								Researcher and Research assistants
4	Data analysis								Researcher
5	Preparation of the final report								Researcher
6	Dissemination of results								Researcher
7	Submission to University Authorities								Researcher

Source: Developed by the Researcher