

AMERICAN UNIVERSITY OF BEIRUT

CONSUMPTION OF FRUITS AND VEGETABLES IN THE
TIME OF COVID - 19 PANDEMIC AMONG ADULT
REFUGEES IN KYAKA II SETTLEMENT IN UGANDA

by
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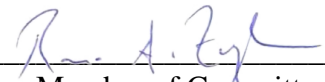
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ABSTRACT

OF THE THESIS OF

Micheal Ssegawa

for

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Major: Food Security

Title: Consumption of Fruits and Vegetables in the Time of COVID - 19 Pandemic among Adult Refugees in Kyaka II Settlement in Uganda.

Introduction: The COVID-19 pandemic has affected the world in many unprecedented ways, inter alia, threatening the food and nutrition security of vulnerable populations, particularly those living in low-to-middle-income countries (LMICs). Considering the ripple effects of the pandemic, it was expected to worsen the global consumption of fruit and vegetables (FV) which was generally low. FV are important because they provide micronutrients and diversify diets which is vital in the prevention of noncommunicable and communicable diseases, including COVID-19. Refugees are among the groups most vulnerable to food insecurity and poor dietary intake. The pandemic ravaged refugee livelihoods most likely exacerbating their FV consumption. However, little is known about the consumption behavior and prevailing factors influencing FV consumption among refugees in LMICs. This study aimed to explore changes in FV consumption among adult refugees in Kyaka II settlement in Uganda and to identify factors influencing their consumption behaviors during the pandemic.

Method: A qualitative descriptive study design with an embedded quantitative approach was conducted in the present study. The qualitative design included focus group discussions (FGDs) with refugees from the Kyaka II settlement and semi-structured interviews with key informants (KI) (representatives from governmental and non-governmental entities). Data collection was conducted over two time periods (October 2021 and January 2022). First, a sixty-item questionnaire was completed by the refugees, prior to taking part in the FGDs; and questions included sociodemographic data, food security status, and food consumption behaviors of refugees. Descriptive statistics from the short survey were presented as means and standard deviations for continuous variables and as frequencies and proportions for categorical variables. FGDs and key informant interviews (KIIs) were analyzed using content analysis and later triangulation of findings from FGDs and KII were conducted.

Results: A total of 12 FGDs were conducted (n = 68 refugee participants) and semi-structured interviews were completed with 11 KIs during the study period. Results from the short questionnaire showed that most of the refugees reported a low FV consumption and 88% were moderately to severely food insecure. A total of five categories with 31 emergent subcategories were noted based on the content analysis from the FGDs with refugees and interviews with KIs, respectively. The five main categories included 1) general patterns of FV purchasing and consumption behavior, 2) change in FV

consumption during the pandemic, 3) facilitators of FV consumption, 4) barriers to FV consumption and 5) recommendations were noted with and. The major barriers to FV consumption expressed by refugees and KI were limited land access, low income as a result of cuts in food aid, COVID-19-related effects on the livelihoods of refugees and the local food supply. On the other hand, major facilitators to FV consumption were the perceived immune-boosting role of FV coupled with FV campaigns led at a national level. Recommendations offered by refugees and KIs to address some of the key challenges of FV consumption and improve food insecurity of refugees in Uganda included increased investment in agricultural training, knowledge empowerment, and access to land could

Conclusion: The consumption of FV among refugees in Uganda is inadequate and decreased during the pandemic due to socio-economic and COVID-19 related challenges. However, opportunities to avert this consumption crisis are present. Future research is needed to explore mechanisms of how to harmonize land access and use rights with self-reliance strategies to ensure food security and sustainable livelihoods.

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ABBREVIATIONS

FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussions
FIES	Food Insecurity Experience Scale
FV	Fruits and Vegetables
GoU	Government of Uganda
IPC	Integrated Food Security Phase Classification
KI	Key Informant
KII	Key Informant Interview
MoH	Ministry of Health
NCDs	Non-Communicable Diseases.
NGO	Non-Governmental Organization
OPM	Office of the Prime Minister
RWC	Refugee Welfare Council
UBOS	Uganda Bureau of Statistics
UNHCR	United Nations High Commission of Refugees
WFP	World Food Programme
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

Fruits and vegetables (FV) are universally recognized for their role in human nutrition as vital sources of vitamins, minerals, phytochemicals, and dietary fiber (McGuire, 2011; Slavin & Lloyd, 2012). Despite the considerable promotion of FV consumption, the acceptable consumption of FV is generally low worldwide with low- and middle-income countries (LMICs) having over 75% of their populations eating fewer than the recommended five servings of FV daily (Miller et al., 2016). By 2015, the availability of FV in sub-Saharan Africa was 248g/person per day (Mason-D'Croz et al., 2019) while in Uganda, it was 310.68 g/person per day by 2019 (Uganda Bureau of Statistics, 2020), quantities below the recommended availability of FV of 400g/person per day by the World Health Organization (WHO) and Food Agriculture Organization (FAO) (Mason-D'Croz et al., 2019). The low consumption of FV has been attributed to a combination of factors including modernization, urbanization, food environments, cultural norms, household income, market prices, and household preference (Mehio Sibai et al., 2010; Ruel et al., 2005).

The WHO (2002) recognizes that inadequate FV consumption is a major independent factor that increases the risk of non-communicable diseases (NCDs). Inadequate FV intake is estimated to cause around 2.7 million deaths annually of which 11% are attributed to stroke and 31% to ischemic heart disease throughout the world (Ruel et al., 2005).

In Uganda, 1 in 3 of all deaths was attributed to NCDs in 2016 (WHO, 2018). The prevalence of diet-related NCDs is increasing in many LMICs partly because of a “nutrition transition”, a movement away from the consumption of traditional plant-based diets that are rich in legumes and FV to more processed and westernized dietary patterns that are characterized by the high consumption of meats, oil, sugar, and salt (Dixon et al., 2004; Sibai et al., 2010). Furthermore, the nutrition transition is associated with the triple burden of malnutrition characterized by the concurrent existence of overweight/obesity, undernutrition, and micronutrient deficiencies or obesity ((Johnston et al., 2014; Mehio Sibai et al., 2010). Many African countries are still grappling with under-nutrition and multiple micronutrient deficiencies, including iron, iodine, zinc, and vitamin A, while the prevalence of overweight and obesity has been increasing dramatically (Gegios et al., 2010; Wells et al., 2020).

One of the subpopulations in LMICs facing the triple burden of malnutrition are refugees because of migration, nutrition transition, and continuous dependence on host governments and international aid agencies for their food security(Grijalva-Eternod et al., 2012). Their diets tend to be monotonous or financial assistance provided is insufficient, which in some ways limits dietary diversity (ibid). Migration is often associated with acculturation whereby integration of refugees into host communities leads to the adoption of similar lifestyles and consumption behaviors including energy-dense diets and physical inactivity (Popkin & Gordon-Larsen, 2004). Consequently, refugees who were once deficient in proteins and micronutrients may switch to energy-dense and nutrient-poor diets which increase vulnerability to diet-related NCDs without fully eradicating undernutrition (Ghattas, 2014; World Bank, 2019). Besides, destination countries may lack traditional fruit and vegetables thus increasing the intake of processed foods which

may lead to the development of diet-related NCDs (Berggreen-Clausen et al., 2021; Gichunge, 2013; World Bank, 2019).

1.2 Food Insecurity of Refugees in Uganda

Among the refugee-hosting countries in the world is Uganda, which now has the highest refugee population in Africa over 1.5 million (UNHCR, 2022c). These refugees are predominately from South Sudan, the Democratic Republic of Congo (DRC), Somalia, and remaining from Burundi, Rwanda, Eritrea, Sudan, and Ethiopia. Refugees are resettled in 14 settlements across with Kyaka II being the fifth most populous while other refugees prefer urban areas across the country (UNHCR, 2022b). Uganda continues to experience a simultaneous influx of refugees escaping wars, persecution, and droughts (UNHCR, 2022b). 80% of the entire refugee population are women and children whose nutritional status is often poor, particularly among the new arrivals (UNHCR, 2022c).

Malnutrition is rife in many refugee settlements in Uganda (IPC, 2020). The World Food Programme (WFP) and United Nations High Commissioner for Refugees (UNHCR) conducted a Food Security and Nutrition Assessment (FSNA) in 2017 which indicated that consumption of nutritious foods including FV was low below the recommended intake levels. In 2020, the WFP and the United Nations High Commission of Refugees (UNHCR) reduced the General Food Assistance (GFA) from 100% to 70% in Uganda due to funding shortfalls (WFP, 2020c). This coupled with the COVID-19 pandemic restrictions and other transient effects on food security caused some refugees to adopt negative coping strategies such as reducing and skipping meals, borrowing food and money, and engaging in illegal activities to cope among many others (IPC, 2020; WFP, 2020a). Currently, food insecurity is driven by COVID-19 control measures and

their ripple effects in the refugee settlements and host communities. It is projected that acute malnutrition is likely to worsen or remain at the current level (poor) in most of the refugee settlements in Uganda. According to the Integrated Food Security Phase Classification (IPC) Acute Malnutrition scale, Kyaka II refugee settlement is expected to deteriorate from Phase 2 (Alert level of acute malnutrition) to Phase 3 (Serious level of acute malnutrition) (IPC, 2020). The main contributing factors to acute malnutrition include very poor quality and quantity of food, high food insecurity, lack of access to a diversified diet, and poor meal frequency resulting from low food availability and access (IPC, 2020).

Despite this increasing burden of malnutrition, the prevention and control of NCDs and micronutrient deficiencies can be achieved in part through improved intake of FV due to their low caloric content and high nutrient density (Slavin & Lloyd, 2012; WHO, 2002, 2005).

CHAPTER 2

REVIEW OF LITERATURE

This chapter begins by examining the effects of the pandemic on global and national food security with an emphasis on refugees. The chapter reviews some literature on refugees and their current food security and FV consumption and why it is important to explore their consumption during the pandemic. This is followed by the role fruits and vegetables play in human nutrition. Next, the chapter discusses the historical and current consumption trends of FV followed by the commonly cited facilitators and barriers to FV consumption.

2.1. COVID-19 pandemic and its effects on food consumption.

The COVID-19 pandemic has been and is still the most important challenge across the globe since March 2020 when the WHO declared the disease a pandemic. Not only has the pandemic caused loss of lives but also caused disruptions in the global systems including the food system and its outcomes such as food security (Savary et al., 2020).

The crises induced by the COVID-19 pandemic have influenced food security and nutrition via indirect or/and indirect pathways, throughout 2020 (Jordan et al., 2021). Direct pathways included trade and transport limitations and interruption of agricultural livelihoods, while indirect pathways included school and school feeding program closures, limited access to health and nutrition services, and reduced remittances (Jordan et al., 2021; Nchanji & Lutomia, 2021). The economic and physical access to sufficient and nutritious food has been challenged especially for already vulnerable groups and countries (UNICEF, 2021). A multi-country survey conducted in 82 countries among

adults found out there was a price increase in staple foods (cereals and legumes) because of “stockpiling” and “bulk buying” which was an obstacle to food acquisition. Dietary quality and diversity were also reported to have decreased with some variation in regions (Jordan et al., 2021).

Another global survey that included 1,047 respondents reported unhealthier dietary eating patterns including compulsive eating, snacking, and increased frequency of main meals during lockdown (Ammar et al., 2020). Lockdowns have been associated with sedentary lifestyles, which could have increased the risk of NCDs, and the overall health impacts of COVID-19 lockdowns could become vivid in the long term (Jordan et al., 2021). In addition, self-isolation and social distancing measures are all keys to curbing the spread of the virus, although at the same time these policies have had ripple and unintended consequences on an individual life and food security especially food access and utilization (Aman & Masood, 2020). For instance, the act of staying at one’s home has direct and indirect effects on one’s health, including changes in dietary habits, sleeping patterns, and physical activity (ibid). Furthermore, other pandemic-related effects such as layoffs and unemployment have decreased the purchasing power of individuals to spend their savings on nutritious foods (Litton & Beavers, 2021). Several studies have illustrated that grocery shopping was reduced to avoid exposure to the virus which eventually reduced the buying of perishable goods (Chenarides et al., 2021).

In East Africa, the emergency of the COVID -19 pandemic happened at the start of the long rains (FAO, 2020). Like in many countries in the region, the government of Uganda restricted human movements which caused a shortage in farm labor and limited access to agricultural inputs (FAO, 2020). While the transportation of agricultural products was not limited in any way, the stay-at-home policies caused post-harvest losses

for rural farmers thus income losses. The informal food markets in Uganda were closed which disrupted food supply systems, especially for fresh products (Agamile, 2022; FAO, 2020). On one hand, market closures limited opportunities arousing fear among farmers who decreased production eventually reducing their income. On the other hand, a shortage in supply caused food price hikes. Given that 70% of the Ugandan population is engaged in farming in direct and direct ways, many households in rural and urban areas experienced an increased prevalence of food insecurity (Agamile, 2022; Uganda Bureau of Statistics (UBOS), 2020). However, it is noteworthy that food security was improving with more lifting of the COVID-related restrictions (Agamile, 2022).

2.2. COVID-19 pandemic and its impact on FV consumption

Like all previous shocks and natural disasters, among the many notable changes occurring in the food system is the change in food consumption patterns particularly the consumption of FV since they require special labor, storage, and logistics in their supply chain (Darnton-Hill & Cogill, 2010; Harris et al., 2020). Previous studies on different shocks have documented temporary impacts on FV producers leading to FV price fluctuation and eventually consumption (Block et al., 2004; Darnton-Hill & Cogill, 2010; Harris et al., 2020). Research has shown that these shocks have affected disproportionately the diets and livelihoods of marginalized populations compared to populations with economic or social capital, further worsening inequity (Carducci et al., 2021; Goldin & Muggah, 2020; Kansiime et al., 2021). A case in point, a nutritional surveillance study on the effects of drought and financial crisis of 1997 in Indonesia found dramatic declines in fruit and dark green leafy vegetable consumption whose impacts

were substantial for poor households since vegetables provided two-thirds of children's nutritional requirement of Vitamin A (Block et al., 2004).

Derek Headey and Marie Ruel (2020) highlighted a few mechanisms through which the pandemic was expected to affect vulnerable groups. As a result of income losses related to lockdowns, de-globalization, freezing of food safety nets, and food market disruptions, a decline in dietary diversity would be expected in LMICs through decreasing demand for FV and animal-based foods, which are rich sources of essential micronutrients in the diet. Malnutrition was expected to increase stemming from the failure of healthcare services to allocate resources to a range of nutrition-specific programs including micronutrient supplementation as well as adolescent, preconception, and maternal health and nutrition (Derek Headey & Marie Ruel, 2020).

Jafri et al. (2021) noted that the evidence of the negative impacts of the pandemic was overwhelming globally nonetheless, there was still a lack of documentation of the implications on food security including availability, accessibility, utilization, and coping strategies.

2.3 Refugees in the time of the Pandemic

2.3.1 Global refugee situation

In recent times, worldwide violent conflicts and natural disasters have forcibly displaced a record number of people either in a group or as individuals from their homes searching for refuge in another place in their country or across borders (UNCHR, 2018). By the end of 2020, forcibly displaced people were over 82.4 million, of which 26.4 million were considered refugees (UNHCR, 2020b). According to the 1951 convention definition, a refugee is “someone unable or unwilling to return to their country of origin

owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion (UN General Assembly, 1950).” Refugee definition was broadened by the Organization of African Unity (OAU) in the article I(2) of the 1969 Convention to “apply every person who, owing to external aggression, occupation, foreign domination or events seriously disturbing public order in either part or the whole of his country of origin or nationality, is compelled to leave his place of habitual residence in order to seek refuge in another place outside his country of origin or nationality” (Bond Rankin, 2005).

A global picture of the situation of refugees can illustrate the problem of displacement worldwide. Guerra et al. (2019) point out that there is an increasing flow of population migration to other countries which revives the issue of vulnerabilities that refugees may face in short, mid, and long terms such as food, and access to public services, education, health, and work. Thus, it is vital to map in the scientific literature the implications of forced migration on the food and nutrition security of refugees (Guerra et al., 2019). Southcombe (2007) noted that upon arriving in a new country, refugees are likely to face numerous challenges that increase the risk of food insecurity, including poverty and unemployment, restrictive visa conditions, compromised health, language barriers, social exclusion, and high household expenses related to resettlement.

According to FAO (2021b), food insecurity is “when people lack regular access to enough, safe and nutritious food for normal growth and development and an active and healthy life.” Food insecurity has multifactorial causes including unavailability of foods, insufficient purchasing power, logistical challenges, or inadequate use of food at the household level (FAO, 2021b). Many studies have indicated that refugees experience food insecurity before migration and unfortunately arrive in host communities in a poor

state of health and nutrition (Gallegos et al., 2008; Southcombe, 2007). As a result, the coexistence of obesity and malnutrition has been prevalent among Sub-Saharan African refugees in host countries such as Australia (Southcombe, 2007).

Migration is a global phenomenon that may contribute to the changes in the health and dietary patterns of refugees before and after arriving in a host country (Guerra et al., 2019). Migration is normally accompanied by dietary acculturation, a process whereby immigrants adopt the eating habits of the host country (Guerra et al., 2019; Mannion et al., 2014). A review of studies examining the association between acculturation and diet was negative showing a poor dietary intake (Ayala et al., 2008). This negative association has been highlighted in different community-based studies showing a decline in fruit and vegetable intake (Gregory-Mercado et al., 2006; Sharma et al., 2004). The scientific literature shows that the change in diet among newly arrived immigrants is dependent on economic and time restrictions, fluency in the local language, and social support, among other factors (Ayala et al., 2008; Dharod et al., 2011). The available literature on dietary acculturation among refugees is predominately based on studies conducted in large urban centers in the United States and Australia (Mannion et al., 2014).

2.3.2 Pandemic and its effect on refugees

While the rest of the world has managed to curtail the coronavirus pandemic through vaccination and recover from its impacts, the 82 million refugees and displaced people were disproportionately affected by the containment measures of the pandemic and are still economically constrained (UNHCR, 2022a). Reports show several COVID-19-related impacts such as the reduced presence of aid agencies in some locations,

increased poverty among refugees, inability to pay food or rent, and adoption of negative coping strategies (IFRC, 2021; UNHCR, 2021c).

At the outset of the pandemic in 2020, donations to the WFP declined with the emergence of the pandemic, due to the latter's effect on the global economy (WFP, 2020b). In addition, the UNHCR (2021c) indicated that reductions in food rations were of significant percentages depending on country resources due to funding shortfalls. In Uganda, the IPC acute malnutrition analysis of refugee settlements in Uganda indicated a deterioration of food security in 2020 due to the pandemic and WFP's massive cuts in food rations by 30% (IPC, 2021). Not only was there insufficient food but also there is a shortage of food variety, specifically the fruits and vegetables that are vital in providing essential micronutrients (IPC, 2021). According to UNHCR, refugees also adopted negative coping mechanisms including survival sex and child marriage during the pandemic due to loss of livelihoods and food aid cuts (UNHCR, 2021a). Manirambona et al. (2021) believed that such paucity would certainly have effects on refugees around the world in unprecedented ways considering that majority of refugees depended on humanitarian assistance to meet their essential food requirements. The resultant inaccessibility of "adequate and affordable food" would increase the vulnerability of refugees to extreme hunger and starvation (Mannion et al., 2014).

2.3.3 Food Security of Refugees

Food security has been traditionally defined by four dimensions (availability, accessibility, utilization, and stability) until recently two dimensions - agency and sustainability - were proposed to be added by the High Panel of Experts (HLPE, 2020). In simple terms, availability is mainly concerned with the food supply chain.

Accessibility addresses incomes, expenditure, markets, and prices in food. Utilization is focused on food preparation, nutrition education, water, sanitation, and health programs (WASH). Stability is connected to the resilience of the food system to shocks such as extreme climate, political instability, or economic factors (unemployment, food price inflation). Agency emphasizes individual or group empowerment through knowledge, access, and control of resources. Sustainability focuses on the preservation of the ecological system which interacts with the social and economic system to support a sustainable food system for future generations (FAO, 2006a; HLPE, 2020).

While the “right to adequate food” is formally recognized in many countries and indicated in FAO’s mandate and strategic objectives, many countries are still grappling with malnutrition and/or micronutrient deficiencies which disproportionately affect the health of vulnerable populations including refugees (FAO, 2011). The right to food in food insecure settings including refugee camps/settlements might be protected in the settlements; however, it was realized in Kenya that the grotesque socioeconomic inequalities and political exclusion of people suffering from food insecurity continue to threaten the right to food. (Réseau africain pour le droit à l’alimentation & FoodFirst Information and Action Network, 2020). Such scenarios cause vulnerability to famine and hunger (ibid).

Generally, poor nutritional status is linked to severe or moderate iodine deficiency during pregnancy, vitamin A deficiency due to low fruit and vegetable consumption, and deficiencies of zinc, selenium, and other micronutrients that affect many people in certain areas (FAO & WHO, 1992). As such, several outbreaks including beriberi, pellagra, and scurvy have occurred among refugees and other deprived populations globally (ibid). Before migration, refugees are usually burdened by diseases

including nutritional deficiencies and infectious diseases (Tiong et al., 2006). Findings from an epidemiological study on newly arrived African refugees in Australia indicated that the patients had undiagnosed and untreated health problems. The study concluded that the most common ones were NCDs (Tiong et al., 2006).

2.3.4. Refugee Status – Uganda Context

Uganda is widely celebrated for its most progressive and generous refugee policy in the world which is upheld in the 2006 Refugees Act and 2010 Refugees Regulations (Sharpe & Namusobya, 2012). Uganda's Refugees Act has some distinguishing elements: First, the right to work, free movement, and place of residence; second, land ownership for refugees to practice agriculture within the settlement; and third is the integration of refugees into the host community through the provision and access to social services (education and health) and the market (Sharpe & Namusobya, 2012; World Bank, 2016). Currently, Uganda has the highest refugee population of 1.5 million refugees on the African continent, making it among the top hosting countries (first in Africa and third globally) (UNHCR, 2022b; World Bank, 2019). Uganda has a long history of hosting refugees which dates back to 1942 after World War II when Uganda hosted many Europeans displaced by the war including 7,000 Polish and Italian prisoners of war, and assorted Allied detainees from the Allied side (Lwanga-Lunyiigo, 1993). These refugees were resettled in different camps across the country.

Displacement of people happens for several different reasons however, many refugees resettled in Uganda by the government are normally a product of tumultuous neighboring countries escaping the civil unrest in South Sudan and ethnic violence in the

Democratic Republic of Congo. Some have lived in refugee settlements for many years (UNHCR, 2020a; World Bank, 2013).

The 2020 joint report by WFP, UNHCR, and the Government of Uganda (GoU) showed that the large refugee flows into Uganda put a strain on the humanitarian system resources. It has been a challenge for WFP to allocate donor funds to sufficiently support and cover all food assistance needs (WFP et al., 2020). Except for Extremely Vulnerable Individuals (EVI)/households, refugees are expected to gradually become self-reliant over time with a reduction in food assistance. However, evidence shows that many households on reduced food rations or none have not achieved self-reliance (WFP et al., 2020).

2.3.5. FV Consumption among Refugees in Uganda

Broadly speaking many households in Uganda including refugees consume monotonous and unvaried diets leading to macro-and micronutrient deficiencies, predominantly in young children, adolescents, and pregnant/lactating women (Harvey et al., 2010; Ministry of Agriculture and Animal Industry & fisheries & Ministry of Health, 2005). The Global Hunger Index (2019) also reported that dietary diversity and micronutrient-rich foods are low in the typical diet in Uganda

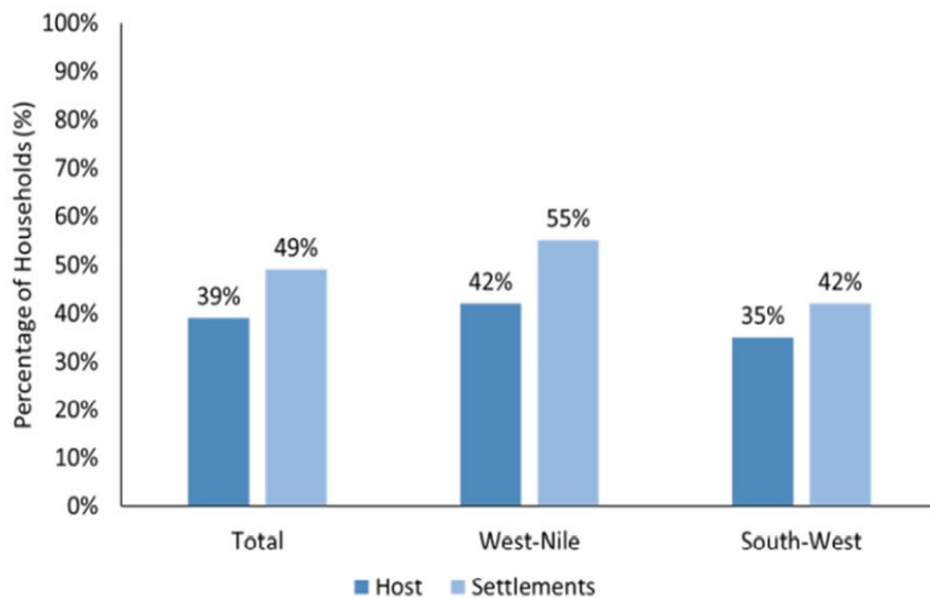
Similarly, monotonous diets have been observed among refugee settlements as refugees have often been consuming cereals, pulses, and vegetable oil supplied by the WFP with hardly any access to fresh fruits or vegetables (MoH et al., 2020; Wageningen University & Research Uganda, 2018).

In Uganda, refugees normally receive food assistance as in-kind food assistance or mixed modality of food and cash, but a minority receive cash alone. In some

settlements, households receive cash assistance between 17,000 and 45,000 Ugandan Shillings (UGX) per person monthly depending on their refugee status (WFP et al., 2019). In settlements receiving food rations, households receive maize grain or flour, beans, fortified oil, Super Cereal, and iodized salt (WFP et al., 2019). Detailed analysis by WFP showed that the food ratio provided 45 percent of vitamin B12, 26 percent of calcium and iron, and 38 percent of iron for their nutritional requirements. As part of the Post Distribution Monitoring (PDM), WFP et al. (2019)'s cash utilization analysis for refugees revealed that households that received cash more frequently consumed pulses and fruit as well as doubled the frequency of their sugar intake.

In 2018, the WFP and UNHCR assessed the Fill the Nutrient Gap (FNG) in refugee settlements in the West Nile and Southwestern region. The FNG report findings indicated that the consumption of nutritious food in the refugee settlements was low, which for the most part was attributed to the availability and price of food commodities within the settlement (WFP et al., 2019). However, discordance has been reported in the data from different refugee settlements. For instance, the data revealed that most of the refugee households (76 percent and 81 percent in West Nile and South-West regions, respectively) had an acceptable food consumption score. However, other indicators of food security showed that dietary diversity in households was very low with 18 percent in West Nile and 13 percent in South-West achieving a High Dietary Diversity Score (≥ 6 food groups) (WFP & UNHCR, 2018). The same data showed that many households (host community and refugee) reported not consuming nutritious foods including vegetables, fruits, meat, eggs, fish, and milk during the last seven days as shown (see Figure 1). Rates were higher among refugee households than in host community households.

Figure 1. Households of the host community and refugees not consuming nutritious foods.



Source: WFP et al. (2019)

In another study that evaluated the Nutrition and Income Generation Intervention (NIGI) project carried out in the Omugo refugee settlement and the host community in West Nile in Uganda, results showed that households who took part in the NIGI produced more FV both in terms of quantity (kgs) and varieties in addition to earning more income (Glaser et al., 2021). Besides, results showed that participants were twice as likely to consume vegetables as the control population. Households growing crops reported a mean increase of 0.4 in the dietary diversity (Glaser et al., 2021).

Another study analyzed the change in the food and nutrition status before and after the pandemic among 417 refugees and 216 host community members in northern Uganda (Brigham et al., 2021). The main findings of the study showed that there was a deterioration in food security in both refugees and host communities but more pronounced in refugees in terms of reduced food diversity, food quantity, increased food

prices, and lowered purchasing power. Among the coping strategies identified were early and forced marriages among refugee girls due to lack of income or access to food. Brigham et al. (2021) also observed a sale of food rations to diversify their diets, for example, one of the refugees reported selling 25% of the rations to get onions and tomatoes from the market.

In Uganda, access to land plays a key role in dietary diversity, food security, and calorie intake and the GoU and UNHCR have used the land as an approach to empowering refugees to become self-reliant (Betts et al., 2019; Frank, 2014). According to Betts et al. (2019), 80% of the refugee households that arrived before 2012 in the Nakivale settlement had access to land, and the regression analysis revealed that the more land refugees had, the better their dietary diversity and food security outcomes due to “kitchen gardens” plots. Similarly, there is anecdotal evidence that refugees in Kiryandongo settlement (one of the refugee settlements in Uganda) that have access to land have been able to supplement their food needs with quick maturing varieties of leafy vegetables ranging from cabbages, bitter tomato, eggplant, and jute mallow (Afedraru, 2021).

There are a number of parallel narratives surrounding food consumption and Self Reliance Strategy (SRS), that promotes self-reliance for refugees. UNHCR defines “self-reliance as a situation where refugees are enabled ‘ to gain the economic and social ability to meet essential needs on a sustainable and dignified basis”(UNHCR, 2005). SRS is not only indicative of the progressive refugee policy but also the unwillingness of donors to continue to fund humanitarian programs which entail food aid that was cut as evidently seen during this pandemic. The concept of Self Reliance was developed together by the Office of the Prime Minister (OPM) and UNHCR following evidence of self-sufficiency

in food production among refugees (GoU & UNHCR, 2004). By 1995, WFP and GoU started to phase out food assistance and such achievements in settlements like Kiryandongo acted as a precursor to what eventually became the “Self-Reliance Strategy” for districts hosting refugees (GoU & UNHCR, 2004). Exploring the available food security opportunities and obstacles in the local contexts might be instrumental in further guiding SRS vis-a-vis FV. The promotion of kitchen gardens is another intervention by the NGO World Vision to supplement food rations with vegetables (World Vision, 2019). Despite these auspicious examples, policies of SRS have failed to show clear results, with the continuous dependence of virtually all refugees on food aid (WFP, 2020a), the fact that 80% of refugees in Uganda are living below the poverty line of \$1.90 (FAO & OPM, 2018), and widespread malnutrition among settlement-based refugees in Uganda (WFP et al., 2019).

2.4. Health Benefits of Fruits and Vegetables

Fruits and vegetables and their benefits are often discussed collectively concerning their nutritional value, but each color of fruit and vegetable is a combination of unique nutrients that provide important nutrition for health (FAO, 2015; Slavin & Lloyd, 2012). FAO and WHO are the two leading organizations in the global initiative called “Promotion of Fruit and Vegetables for Health” (PROFAV) and in 2015, FAO’s report on the Pacific regional workshop made the following general implications of the different FV colors (FAO, 2015): The purple/blue color of FV is linked to antioxidant properties and can reduce cancer, stroke, and heart disease risk factor. Examples include beetroot and eggplant. Red FV can decrease cancer risks and improves the health of the heart; tomato, watermelon, radish, and red grapes are good examples. Orange/yellow-

colored FV signifies carotenoids that improve vision as observed with carrot, lemon, and pineapple. Brown/white FV such as banana, garlic, onion, and ginger contain phytochemicals with antiviral, antibacterial properties, and potassium. In addition, the green-colored fruits and vegetables have phytochemicals with anti-cancer properties that are also found in green-colored FV such as green apples, broccoli, spinach, green pepper, lettuce, and cucumber among others (Barrett et al., 2010; FAO, 2015).

Eating the recommended amounts of FV offers multiple benefits including long life, psychological wellbeing, cardiovascular health, reduced risk of cancers, and weight management (FAO, 2015).

a) *longer life*: A nutritional study in 10 countries in Europe found that individuals that consumed enough FV had a longer life compared to people who did not (Leenders et al., 2013).

b) *Improved mental health*: Conner conducted a study on 171 low FV consuming young adults aged 18-25 years to establish a link between FV consumption and reduced risk of anxiety and depression (Conner, 2017). They found that FV provided psychological well-being even though it was in short term.

c) *Cardiovascular Health*: A large number of studies that included those from various geographical locations have asserted an inverse relationship between FV intake and risk of coronary heart disease and stroke (Aune et al., 2017; Collese et al., 2017; Miller et al., 2016).

d) *Lower cancer risk*. Findings from cohort and case studies since the 1990s that investigated the risk of cancers and diets high in FV showed that different FV protect against cancers of the mouth, pharynx, esophagus, lung, stomach larynx, pancreas, breast, and bladder (International Agency for Research on Cancer, 2003).

e) *Weight management.* The risk of ill-health and death increases with an increase in body mass index (overweight and obesity) (International Agency for Research on Cancer, 2003). Conversely, several cohort studies indicated a reduced risk of obesity and adiposity among people that consume FV (Ledoux et al., 2011; Schwingshackl et al., 2015).

f) Prevention and control of micronutrient deficiencies. Micronutrient deficiencies lead to a spectrum of diseases ranging from micronutrient deficiency diseases to chronic diseases (Prinzo & de Benoist, 2002; Tulchinsky, 2010). For example, vitamin A deficiency can lead to night blindness and xerophthalmia whereas deficiency of iron can cause anemia, vitamin C deficiency causes scurvy, vitamin B3 deficiency leads to pellagra, and vitamin B1 deficiency results in beriberi (Stuetz et al., 2011). Many studies have established the relationship between the intake of FV and the low prevalence of chronic diseases, a disease burden common among refugees before and after resettlement (Oyebode et al., 2014; Wang et al., 2016; Wang et al., 2014; Yun et al., 2012). Thus, preventing and treating nutritional deficiencies will be less costly than managing NCDs (FANTA-2, 2010)(FANTA-2, 2010).

2.5. Historical and current FV consumption trends.

Despite the long-established benefits of FV, the global consumption of FV is still below the WHO's recommended amounts (400g/capita/day) considering the FAO food balance data spanning from 1961 to 2018 (FAO, 2021a). In this analysis, the used definition of fruit and vegetable follows that used by WHO and in the FAO food balances; it does not include legumes and pulses (such as lentils and beans) or starchy roots and tubers (the likes of potatoes, cassava, among others).

Over the last 50 years (1961 -2018), the global average consumption of fruits (on an availability basis) has gradually increased from 33.75 kg/capita/year (92.4g/capita/day) to 98 kg/capita/year (248.5g/capita/day) (FAO, 2021a). Throughout this entire period, high-income countries have had a higher fruit consumption than LMICs. Within these LMICs, the highest intakes were observed in northern Africa and the Middle East, and the lowest in other sub-Saharan Africa and parts of Asia. As of 2018, the global availability of FV ranged from 200.41 kg/capita/year to as low as 4.89 kg/capita/year in Burkina Faso in Africa.

Considering the same food balance spanning from 1961 to 2018, the average vegetable consumption (based on availability and excluding vegetable oils) has increased from 63.72 kg/capita/year to 101 kg/capita/year (FAO, 2021a). Consumption of vegetables has been generally higher than consumption of fruits despite the great degree of variability in regions. The consumption is highest in parts of Asia, MENA, and southern Europe. Currently, intakes range from 363.42 kg/capita/year in China to 6.57kg/capita/year in Chad. Globally, the average availability of vegetables is increasing (FAO, 2021a). In 1965, only 17% of the global population met the WHO dietary recommendation of fruits and vegetables (=400g/day); by 2015, the percentage had increased to 55% of the global population (Mason-D'Croz et al., 2019a). Generally, there has been a tremendous increase in FV consumption worldwide (FAO, 2021). This improvement is partly attributed to economic development which is increasing resources to feed the global population (Mason-D'Croz et al., 2019). Also, advancements and changes in agriculture practices have enabled tremendous increases in food production through productivity increases, and less dependence on seasons (Kearney, 2010). A case in point is the Green Revolution.

The reviewed studies have shown a considerable increment in consumption of FV in countries over the last 50 years nonetheless most of the populations do not meet these recommendations globally (Miller et al., 2016). Low consumption is a global challenge affecting both high- and low-income countries: A systematic review of literature by Kalmpourtzidou et al. (2020) revealed that only 7 percent of countries in Africa, 7 percent in the Americas, and 11 percent in Europe reach, on average, 240g/capita/day of vegetables and only 20% of the population in LMICs reach the recommended 5 servings of fruits and vegetables daily. The average consumption of vegetables is approximated at 190g/day and 81g/day of fruits globally; and there is a consensus that the lowest fruit and vegetable intake is in parts of Africa and the Pacific Islands and the highest vegetable intake excluding vegetables is in East Asia (Afshin et al., 2019; Kalmpourtzidou et al., 2020; Micha et al., 2015). This low intake is largely attributed to political instability and low economic development (Mason-D'Croz et al., 2019).

Consumption of FV in sub-Saharan Africa is particularly low (Amao, 2018) and it is of particular concern considering the population growth projection from 0.8 to 1.9 billion by 2050 and the likelihood of its population consuming below the 400g/day (Mason-D'Croz et al., 2019) These headline findings have been supported by several studies examining FV consumption among various countries in sub-Saharan Africa. In South Africa, a study of 3,480 adults aged 50 years and above found that 68.5 percent did not eat enough fruit and vegetables. The multivariate analysis showed that the intake was more disproportionate among Black African or Colored men with low educational as well as socioeconomic status (Peltzer & Pengpid, 2012). In Benin, school-going adolescents in private and public schools in Cotonou consumed on average only 97g/capita/day of

fruit and vegetables as compared to the generally recommended intake of 300 g for fruits and 150–225 g for vegetables for this age group (Nago et al., 2012). Furthermore, a 2019 national survey conducted on the Ugandan adult population has shown that most adults do not meet the recommended minimum requirements for FV consumption, with just over 1 in 10 adults meeting the recommended minimum 5 or more servings of fruits and/ or vegetables per day in a typical week (Kabwama et al., 2019).

2.6. Facilitators and Barriers to Fruits and Vegetable Consumption

2.6.1. Facilitators

It is crucial to understand the factors that positively influence the consumption of FV to help improve nutritional outcomes. According to Yeh et al. (2010), the commonly cited facilitators include availability, serving methods, the ability to produce one's own FV, and perceived health benefits at an individual level. Yeh et al. (2010) also argue that some facilitators may counteract specific barriers (i.e., preprepared/packaged fruit and vegetables to address time and convenience barriers) while other facilitators have a complex association with barriers. For example, cultural/ social support and norms can be perceived as a facilitator or a barrier (Yeh et al., 2010).

1) Accessibility

One way of understanding accessibility can either be a good route to improved nutrition or a barrier, meaning that context is important (Betts et al., 2019). Food access is one of the pillars of food security which means the different mechanisms individuals can obtain the available food. Accessibility of food can be achieved through various or a combination of ways such as home production, stocks, purchase, barter trade, gifts, borrowing, or food aid (FAO, 2006b).

2) Self-Efficacy

Bandura (1977) defined self-efficacy as “a person’s particular set of beliefs that determine how well one can execute a plan of action in prospective situations.” Kreausukon et al. (2011) stated that self-efficacious individuals easily achieve goals through “planning and behavioral initiative”. There is a consistent association between self-efficacy and consumption of fruit and vegetables and according to Kreausukon et al. (2011), individuals with a high “dietary self-efficacy” eat a lot more FV than others. Yeh et al. (2008) showed that self-efficacy can become evident in various areas, such as unfamiliarity with available FV and confidence in cooking. In the case of refugees, a study conducted in the U.S. examined the barriers and facilitators to a healthy lifestyle which included the consumption of fruits and vegetables among refugees. Results of the focus group discussion reported they ate FV to “stay healthy” and this was a common theme among refugees (Meng et al., 2018).

3) Social Support

Various ways of social support are mentioned in the literature on healthy eating; however, family support is the most frequently cited form of social support for individuals (Eikenberry & Smith, 2004; Yeh et al., 2008). Eikenberry and Smith (2004) also found that eating as a family influenced the intake of FV compared to solitary living which was a common barrier to healthful eating among low-income communities in Minnesota, USA. Churches also provide social support as indicated in a study by (Yeh et al., 2008) whereby churches served FV for their members. A qualitative study that involved interviewing sub-Saharan African refugees resettled in the US about their food security reported that social network support helped them in relocating grocery stores and finding culturally appropriate foods (McElrone et al., 2019).

3) Health Beliefs

A qualitative survey exploring the relationship between attitudes and consumption attempted to illuminate the attitudes of residents of Washington State concerning the nutritional and food safety beliefs around FV and the barriers to FV consumption (Dittus et al., 1995). This study used Health Belief Model (HBM) as a conceptual framework to understand views that influence FV intake. The HBM postulates the key motivator of health-related behavior of an individual is the suspicious belief of a health risk and concern (Hayes & Ross, 1987). The results of the study showed benefits of FV consumption were positively correlated to preventive action to reduce the risk of cancer, nutrition concerns, and engagement in health behavior which is consistent with the precept of HBM. A baseline study by Subar et al. (1995) found that 41% of the participants who followed the "Five-A-Day" program reported that FV was important in cancer prevention. Dittus et al. (1995) concluded that individuals who consumed a lot of FV were more aware of the health benefits of consuming FV than those with lower levels of FV. Huang (2014) examined the barriers and enablers of food security among refugees in Canada. From this study, the health benefits of FV were identified as an important factor in a healthy diet.

Other reported facilitators include nutrition education (Dittus et al., 1995), community-based programs, proficiency in the indigenous language (Wood et al., 2021), cooking skills, friendly communities, and frequent contact with health professionals (Amstutz et al., 2020).

2.6.2. Barriers to FV Consumption.

The gap between the common and recommended consumption of fruits and vegetables in the population has led researchers to explore the barriers different populations face. (Yeh et al., 2010) pointed out that barriers might be factors at the macro-level or micro-level such as FV availability, cost, food environment/shopping practicalities, taste preferences, and food preparation time, respectively. These factors cut across different demographics including race, age, sex, and socioeconomic status (Neumark-Sztainer et al., 2003; Yeh et al., 2008).

1) Cost of food

The high cost of FV is the most prevalent factor mentioned in many studies that negatively influences food consumption (Afshin et al., 2019; Darmon & Drewnowski, 2015; Rao et al., 2013). A systematic review and meta-analysis carried out by Miller et al. (2016) showed that food cost affected not only affected consumption in LMICs but also in high-income countries. Miller and colleagues carried out the Prospective Urban Rural Epidemiology (PURE) study that recruited 57,254 adults between the age of 35–70 years from 18 countries with a range of income levels. They found that households in LICs and LMICs spent approximately 50% of their income on food while households in HICs spent 13% of their income (Miller et al., 2016). With such a high proportion of household income dedicated to food expenditures, households might be expected to prioritize the purchase of more affordable foods and reduce expenditures on more expensive foods such as FV.

2) Lack of availability and accessibility of FV.

Availability and accessibility dimensions of food security involve physical accessibility to food in addition to having adequate resources (entitlements) that always

allow individuals to meet their food needs (FAO, 2006b). However, refugees are often resource-poorer than the general population, a condition that complicates their health and diet (Patil et al., 2008).

For minority or mixed segments of a population in the USA, environmental studies indicate that there is less availability of healthy foods (Baker et al., 2006) and fewer FV stores in their neighborhoods (Hosler et al., 2008). In Uganda, several factors such as limited knowledge about FV benefits and the commercialization of agriculture were reported to contribute to the low availability of FV (Peltzer & Pengpid, 2012). WFP reports that refugees in Uganda that have access to land normally grow staple foods such as sorghum, corn, millet cassava, and nutritious, fresh foods including vegetables and legumes nevertheless, yields are poor (WFP et al., 2019).

3) Practicalities of shopping.

The logistics required to purchase fresh produce may disincentivize consumers from grocery shopping (Anderson et al., 1998). Logistics including distance might be challenging in a rural setting given the sparse population of refugee settlements. According to d'Errico et al. (2022), refugees are often resettled in remote and deprived parts of the countries where agricultural livelihoods are common. In Uganda, the same study showed that the positive effects of market creation in rural areas were very localized in that the access to food markets became difficult when the distance between the host community and refugees' households increased by more than 5 km.

4) Preparation Time

Lack of time is another impediment to FV consumption although more perceived as a vegetable issue than from fruits (Landry et al., 2020; Yeh et al., 2010). Study findings from focus groups involving primary ethnic groups in the USA (Africans, Hispanic and

Caucasian) revealed that long working hours and preparation time for vegetables deterred participants from eating FV daily (Yeh et al., 2010). Another study by Patil and her colleagues revealed that newly arrived refugees were constrained by low incomes and many responsibilities and as a result, refugees were compelled to work long hours or work in shifts (Patil et al., 2008). Patil et al. (2008) hypothesized that time constraints lead to a shift away from micronutrient-rich foods such as FV to convenience food that requires a shorter preparation time.

5) Taste/Preference

There is ample evidence that taste can be a barrier and predictor of FV consumption (Kasprzak et al., 2021; Krebs-Smith et al., 1995; Yeh et al., 2010). Yeh et al. (2010) reported that in some people and cultures, tastes and preferences followed meal patterns. For instance, a qualitative study by Dixon et al. (2004) observed that respondents in Australia aged 50 to 64 years who reported low vegetable intake perceived that eating vegetables was meant for only evening meals and such consumption readily limits the increase in FV consumption.

Other studies have reported more barriers that include media social norms, advertisements that promote unhealthy eating and the marketing of unhealthy food (Pham et al., 2007; Yeh et al., 2008), the preference for prepackaged foods (Yeh et al., 2008), and food safety concerns arising from the use of agrochemicals (Dittus et al., 1995). Furthermore, Findings from another study among school-going adolescents in Benin also indicated that a lack of nutrition education is a barrier to their consumption level (Nago et al., 2012).

In summary, all reviewed evidence before this study shows that the problem of low FV consumption is still persistent in many countries and more so, exacerbated by the

pandemic crisis. This plight is likely to have worsened the food security of refugees including FV consumption. Given the role of FV in human nutrition, further understanding consumer perceptions, barriers, and facilitators that influence FV intake might help address the micro and macro factors to improve the FV intake in refugee populations. Besides, relatively little research has been published on the consumption of FV, particularly in this current pandemic, among refugees in Uganda. WFP et al. (2019) also recognizes that there is a paucity of data on the availability, seasonality, and cost of micro-nutrient-rich foods in refugee settlements in Uganda.

2.7. Problem Statement

Refugees are one of the vulnerable groups who are not only at a high risk of infectious diseases but also diet-related NCDs. Refugees settling in camps often suffer from hunger and malnutrition due to a lack of healthy and nutritious foods (Cumber et al., 2018). Refugees are also often constrained by little or no land on which to practice farming necessary to produce nutritious foodstuffs such as FV. In addition, food aid (in-kind or cash) provided by humanitarian actors can be insufficient to sustain refugees over the long term, especially for refugee families with children (Cumber et al., 2018; Nisbet et al., 2022). With the emergence of the COVID-19 pandemic, refugees are among the vulnerable groups whose lives and livelihoods have been ravaged directly and indirectly through the ripple effects of the pandemic. The pandemic sent shock waves through the food system which stressed global food security when examined in the four conventional dimensions; availability, accessibility, utilization, and stability (Zurayk, 2020). There have been disruptions in the global supply chain, trade restrictions in major food-exporting countries, loss of livelihoods, and decreased purchasing power leading to

negative coping strategies and poor nutrition (ibid). Due to travel restrictions and lockdowns in different countries, reports showed a shift in food purchasing and consumption behavior of people globally including panic buying and purchasing of processed and nonperishable foods that are calorie-dense, less nutritious, and unhealthy (World Bank, 2021). The COVID-19 pandemic and other related mitigation plans, and restrictions caused price spikes in fresh produce like FV mainly driven by a shortage in supply. Some of the secondary effects of the pandemic are still prevailing and may exacerbate the preexisting low consumption of FV in Uganda as indicated by Kabwama et al. (2019), particularly among the most vulnerable population groups.

To our knowledge, there are no studies that have evaluated the FV consumption among adult refugees in Uganda, even though refugees account for over 1.5 million people in Uganda. Thus, this study seeks to explore the perceptions, assess the determinants, and behavior of FV consumption among refugees during the pandemic. The beliefs and values which influence the consumption of FV will also be investigated. An understanding of the consumption of fruits and vegetables can be used to guide context-specific interventions for refugees and their needs.

2.8. Significance of this Study

There is evidence that the consumption of FV decreased due to the negative ripple effects of the pandemic disrupting the food supply chain (Kansiime et al., 2021). However, recent reports indicate an increase in demand for locally grown fruits and vegetables in Kenya and Uganda (EUTF, 2020; Kansiime et al., 2021; Vegetable Growers News, 2020). This pandemic could be a window of opportunity to improve the status quo and in this context, FV intake. Therefore, the findings of this study can be used to guide

agricultural and public health nutrition policies and interventions geared toward the improvement of the food availability and access to FV among residents of the Kyaka II settlement in an attempt to improve their food consumption behavior and nutritional status.

2.9. Research Aim and Objectives

2.9.1. Aim

To explore the consumption behavior and changes in FV consumption among adult refugees, identifying factors influencing their consumption choices, the importance of FV, and assessing the food consumption behavior before and during the COVID-19 pandemic.

2.9.2. Specific objectives

1. To explore the FV purchasing and consumption behaviors among adult refugees in Kyaka II settlement during the pandemic.
2. To examine the motives for and barriers to FV consumption among adult refugees during the pandemic.
3. To capture stakeholders' views on refugees' FV purchasing and consumption behaviors during the pandemic.
4. To devise context-specific recommendations for the promotion of FV consumption during the pandemic.

CHAPTER 3

METHODOLOGY

In this chapter, the methodology used in the study is presented in the following areas: research design, ethical considerations, study area, sampling strategies, data collection procedures, research techniques, and data analysis.

3.1. Research design

The study employed a qualitative study design with an embedded quantitative approach. Embedded design is a variant of a mixed-methods approach where one dataset is subservient in the methodology (Creswell, 2003). In this study, the quantitative dataset was secondary and supportive of the qualitative data. One of the advantages of having both methods is that they provide a fuller picture as findings from either method can add a new dimension to what is known about the topic (Denscombe, 2014). The qualitative approach used focus group discussions with refugees and semi-structured interviews with KIs as the research tools for data collection while quantitative research used a questionnaire with only refugees. A qualitative method was appropriate for this study because it attempted to develop insights into people's beliefs, experiences, perceptions, and attitudes in a given cultural setting (Clissett, 2008). This has the advantage of obtaining the views of participants in a specified time and context (ibid). Focus Groups (FGs) are suitable for collecting subjective perspectives from study participants and getting a collective understanding of the phenomenon of interest (ETA, 2008). The use of FGs was complemented by interviews of KIs (NGO representatives) to help in the triangulation of study findings (Denscombe, 2014).

3.2. Ethical considerations.

Ethical approval for this research was obtained from the Social and Behavioral Sciences Institutional Review Board at the American University of Beirut before the data collection. In addition, an introduction letter was sought from the OPM granting the researcher permission to conduct field research in the refugee settlement. A copy of this letter was left at the office of the settlement commandant. The aim and objectives of the research were communicated to participants prior to securing their oral/written consent from refugees and KIs, respectively. The graduate student opted for oral consent for refugees because of the vulnerability of refugees and the researcher's uncertainty about their literacy level. Besides, oral consent presented a minimal risk to the participants. No deception was used and participation in the research was voluntary; participants were informed of the option to decline to respond to any question at any time during the research. The researcher reassured the participants of their privacy and confidentiality with strict anonymity which had to be maintained. No personal identifiers were collected at the time of data collection or at the time of the analysis to conceal the study participants' identities.

3.3. Study Area and Sampling Strategies

3.3.1. Study Area

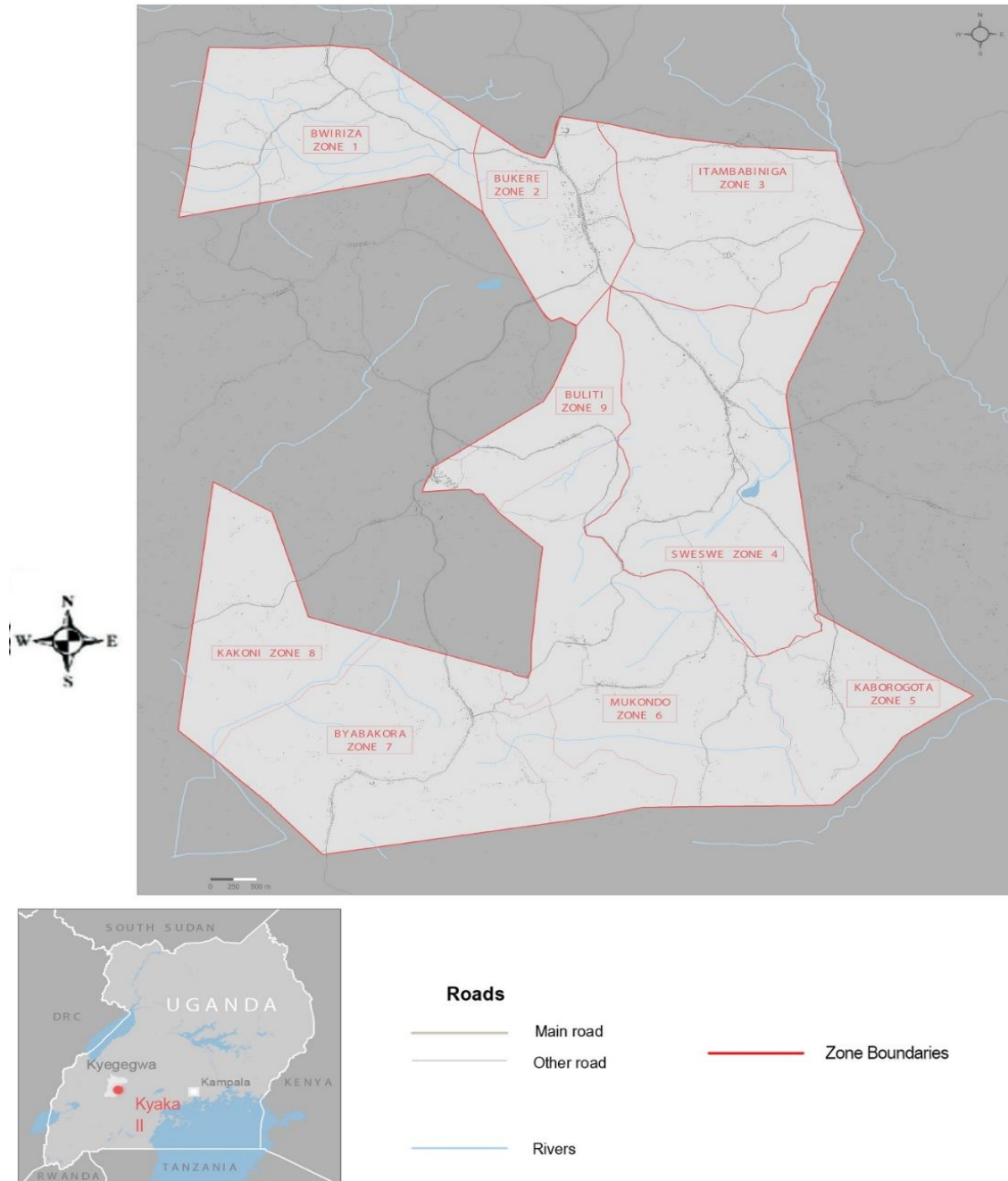
The research was carried out in Kyaka II Refugee Settlement, a rural area in Kyegegwa district located in the western region of Uganda. Kyaka II Refugee Settlement covers an area of 81.5 square kilometers spread between the three sub-counties of Kyegegwa, Mpara and Ruyonza (Danish Refugee Council, 2018). The settlement is on an elevation of 1400 meters on average, situated in a valley with abundant rainfall, even

during the dry season. The area has fertile soils, suitable for the production of a variety of crops including maize, beans, groundnuts, and green vegetables (UNHCR, 2018). Kyaka II refugee settlement was originally established in 1983/1984 to host Tutsi refugees from Rwanda. In 1992, the settlement reopened to receive more Rwandans and in 2005/2006, there was an influx of Congolese refugees. Refugees were later removed from Kyaka I to Kyaka II in 2008 after the closure of the former that year (Danish Refugee Council, 2018). Kyaka I land was given to Human Energy (U) Ltd, a private developer to grow ‘pongami’ used for the production of biofuel however there has been encroachment on the land due to its ineffective use of it by the investor (Onok, 2022). Since 2008, there are reports by informants about the sporadic arrival of asylum seekers and urban refugees mainly from Kampala who undergo refugee status determination before settling in Kyaka II (Danish Refugee Council, 2018). According to Office of the Prime Minister statistics as of March 2021, Kyaka II refugee settlement is hosting 124,030 refugees. The settlement has largely Congolese (95%), but also significant numbers of refugees from Rwanda (2.9%) and Burundi (2.1%) making the refugee population multiethnic and multilingual (UNHCR, 2021b). More than half of this population are children under the age of 18 years (Ibid). The settlement comprises nine zones; Sweswe, Buliti, Bukere, Mukondo, Ntababiniga, Kakoni, Bwiriza, Byabakora, and Kaborogota, four of which are semi-urbanized and well-established centers (Bukere, Byabakora, Mukondo, and Sweswe center) (Ministry Of Water And Environment, 2019; UNHCR, 2021b). The settlement has over 14 primary schools, one secondary school, one vocational training institute, and 30 Early Childhood Development (ECD) centers, 2 health centers, 9 health outposts, and one Specialized hospital still under construction (Ministry Of Water And Environment, 2019).

Besides, the settlement has a piped water system, electricity and road networks especially in the centers (Ministry Of Water And Environment, 2019)(Ministry Of Water And Environment, 2019). Data collection mainly took place in Bukere and Sweswe zones highlighted in figure 2. Besides, the majority of the population and nationalities are located in these two centers making those zones ideal for data collection.

This specific refugee settlement was selected because it has a multiethnic and high population of which 42% are adults aged between 18-59 years (UNHCR, 2021b)(UNHCR, 2021d). Also, Kyaka II settlement exemplifies the Ugandan government's efforts in promoting self-reliance by giving refugees access to land to build homes and cultivate gazetted government-owned land as food rations decrease over time. Land conflicts between refugees and nationals are rare since Ugandans are not entitled to use Kyaka II land. Each refugee household is allocated a plot size of 30 x 30 meters (Danish Refugee Council, 2018). Nearly 80% of the Kyaka II refugees who have an occupation (26.2% of the total population) are agriculturalists with the majority practicing crop and vegetable production (UNHCR, 2021).

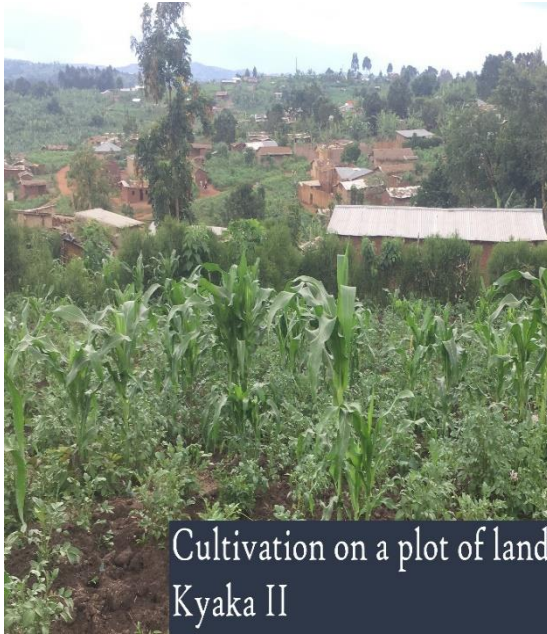
Figure 2. Map of Kyaka II Settlement in Kyegegwa District, Uganda.



Source: MapAction et al. (2018)

Figure 3. Images of Kyaka II settlement showing infrastructure and landscape.





3.3.2. Sampling and Recruitment

For Refugees. Purposive convenience sampling was used to recruit refugee participants. The inclusion criteria for refugees were age above 18 years and English-speaking. The researcher opted for both in-person or focus group discussions over the phone with the participants depending on the status quo at the time of data collection in the settlement i.e., restrictions in the settlement, transport limitations and prevalence of COVID-19 in the settlement. The process was facilitated by a Refugee Welfare Council 1 (RWC) member working in Kyaka II settlement. Any RWC member is either an elected or nominated refugee through a process organized by the Office of the Prime Minister (OPM) and he/she works voluntarily under the supervision of the OPM. The RWC member helped provide access to refugees in the settlement. The RWC member contacted refugees in the settlement about the research study and shared the contact details of the graduate student with interested participants who later reached out to him directly. In addition, the graduate student ensured that the RWC member was not involved in any

means in the implementation of the NGO activities or provision of services to beneficiaries to avoid undue coercion or influence when recruiting participants for the study. Furthermore, the RWC member physically guided the researcher through, and his presence made the refugees feel willing to participate, open, and comfortable answering questions in discussions since the RWC member was a fellow refugee in the research process. For in-person meetings, focus groups were comprised of three to nine refugee participants at most to ensure compliance with the public health guidelines. On the days of FGDs, the moderator (graduate student) and RWC member met the participants at a private and quiet place within the settlement. Participants were phone-called at the agreed time prior to the meeting times. The graduate student facilitated the discussions. For face-to-face meetings, questionnaires were distributed before the discussions began and the graduate student ensured that each participant filled them privately. In the case of the virtual FGDs, an electronic questionnaire was sent to the participants on their preferred platform mainly WhatsApp. Considering that some refugees had no smart phones or laptops, the graduate student requested the RWC to organize groups (4-5) of refugees so that he could make a phone call and discuss with them when they are in a group but NOT on individual basis. Participants that had smartphones shared with those without smartphones to enable them fill in the questionnaire before beginning of the FGD. Each FGD took approximately 20 - 60 minutes and it was done using a focus group guide prepared for this study (see Appendix 2).

Recruitment of key informants (KI). The recruitment used a snowballing technique whereby the researcher with the help of RWC identified the KI after which requested the first subject/ acquaintance to nominate other people who might be knowledgeable about the research topic. Also, this process enhanced the researcher's

bona fides and credibility (Denscombe, 2014). The ‘seed’ (humanitarian organization representative) contacted other KIs including humanitarian workers, who were interested in taking part in the study. The seed provided the graduate student with contacts of interested KIs who were called and formally invited to participate in the study. The researcher made appointments with the individuals and obtained permission to be interviewed at a convenient time via a phone call. The researcher opted for interviews over the phone using a semi-structured interview guide given that the NGO representative was busy and engaged in the cash distribution in the settlement at the time of data collection.

3.4. Data Collection

Data collection was conducted over four months between late 2021 and early 2022. FGDs with refugees along with the completion of a questionnaire were conducted during October 2021 and January 2022, whereas the KIIs were conducted during October 2021. The second round of FGDs was done to allow the graduate student to apply more techniques of qualitative research and assess the change in the food security status since the season had changed.

For refugee participants, an oral consent form was obtained from the participants before conducting the discussions after the study objectives were clearly stated. Participants were assured that participation is voluntary and withdrawal or refusal to participate in the study would not involve any penalty or loss of benefits to which the subjects are otherwise entitled. Refreshments were offered for in-person FGDs while an incentive of 5,000 Ugandan shillings was given to each participant with whom the graduate student discussed over the phone. Before audio recording, permission was also

secured to record. Password protection was used to prevent unauthorized access to all transcripts and voice recordings on the computers.

3.4.1. Questionnaire.

Prior to the initiation of the FGDs, refugee participants were assisted in completing a questionnaire comprised of 60 questions (see Appendix 1). The questionnaire provided good details about demographics, food consumption (FIES and FCS), and FV consumption that aided in understanding the socioeconomic background and food security status of the refugee participants.

Demographic and socioeconomic characteristics of individual refugees included the following variables: gender, age, nationality, marital status, duration in Uganda, highest education level, employment type, income level, and sources.

Food Insecurity Experience Scale (FIES): The questionnaire also comprised the FIES which reflects the prevalence of food insecurity experience of the individuals or households using a 12-month reference period. It consists of eight questions on the occurrence and frequency of food insecurity experiences because of resource constraints (Cafiero et al., 2018). This particular version adds follow-up questions to capture the degree to which these conditions associated with food insecurity are a further result of the COVID-19 crisis as linked up by the respondent (Cafiero, 2020). To calculate the FIES score per individual, a standard scoring procedure was used whereby a raw score of 0 was assigned to the respondent if his/her answer to any specific question was “no” and a score of “1” if the answer was “yes.” However, if a respondent wished to not answer “Yes” or “No” to any of the questions, a response of “Don’t Know or “Refused” was recorded. The range of total FIES scores were from 0 to 8, with higher scores indicating

higher individual food insecurity levels. The total scores were used to categorize individuals into four levels of food insecurity (food secure with raw scores=0, mildly FI with raw scores = 1-3, moderately FI with raw scores = 4-6, and severely FI with raw scores = 7-8) depending on the number of affirmative responses to questions according to the FIES measurement and indicator guide (Cafiero, 2020).

Food Consumption Score (FCS): The questionnaire asked respondents about the individual consumption frequency of eight different food groups based on a seven-day recall period to calculate their FCS. The FCS is an indicator that captures the dietary diversity, energy, and nutrient density of the food that individuals eat with a higher composite score representing a higher dietary diversity and consumption frequency of different food groups among individuals or households (WFP, 2009). The calculation of FCS for each individual was computed and later classified into three groups based on the following: poor (0 to 21), borderline (21.5 to 35), and acceptable (>35) as per the pre-established thresholds (WFP, 2009).

Fruits and Vegetable (FV) Consumption: FV consumption had three outcome variables used in previous studies (Seidu et al., 2021). The first variable fruit consumption came from the question “During the past 30 days, how many times per day did you usually eat fruits?” The multiple-choice responses were: (I did not eat fruits during the past 30 days =1; Less than one time per day =2; 1 time per day=3; 2 times per day = 4; 3 times per day=5; 4 times per day = 6; and 5 or more times per day=7). These responses were classified into “Inadequate fruit consumption” for respondents whose responses were 1 time per day or less in the past 30 days and adequate for the remaining responses (consumption of fruits at least 2 times per day). The second vegetable consumption came from the question “During the past 30 days, how many times per day did you usually eat

vegetables?”. The multiple-choice responses were: (I did not eat vegetables during the past 30 days =1; Less than one time per day =2; 1 time per day=3; 2 times per day = 4; 3 times per day=5; 4 times per day = 6; and 5 or more times per day=7). These responses were classified into “Inadequate vegetable consumption” for respondents whose responses were 1 time per day or less in the past 30 days and adequate for the remaining responses (consumption of fruits at least 2 times per day). The third outcome variable adequate FV consumption was obtained from the dichotomized outcomes in Fruit and Vegetable consumption respectively. The respondents having either or both adequate fruit and vegetable consumption were reported to have adequate FV consumption while those who had both inadequate fruit and vegetable consumption were recategorized as having inadequate FV consumption. The WHO recommendations (five servings/person/day) for FV consumption were used as a basis for the FV consumption classification (Seidu et al., 2021; WHO, 2003).

3.4.2. Focus Group Discussions (FGDs).

After the completion of the questionnaires, refugees were gathered in the home of one of the refugees or a site of their convenience within the camp to conduct the FGDs. Each FGD consisted of 4 to 10 participants and was conducted in one of the participant’s homes for a duration of up to 60 minutes using an FGD guide (see Appendix 2). A semi-structured interview guideline was used for the focus groups and interviews. The development of the interview guide was based on interview questions from the literature review, local experiences, and observations (Wang, Min, Harris, Khuri, & Anderson, 2016; Yeh et al., 2008). Questions regarding food consumption are often centered on

purchase habits, consumption frequency, and supply channels for the studied food product (Harrington, 2016; Seidu et al., 2021; Sijtsema et al., 2013)

At the beginning of FGDs, the graduate student introduced himself and explained the guidelines of the discussion. All discussions were in English. An interview script was used to guide the interviews. Questions addressed potential logistical, financial, or cultural barriers of FV intake that existed among the Kyaka II refugees and the effect on their purchasing behaviors, including their food choices. Probes were used during the discussions for clarity purposes as well as to elicit more responses from refugee participants. The graduate student used the same questions in both two data collection periods and once data saturation was reached, data collection was concluded.

3.4.3 Key Informant Interview (KII).

Written consent was signed by all KIs to ensure voluntary participation and confidentiality. All interviewees were informed about their right to refuse to answer any questions. All the interviews were done individually over the phone using an interview script (see Appendix 3) that included questions concerning their views about purchasing and consumption behavior of FV of refugees and their recommendations. The permission to audio-record the interview was secured from participants before the start of the discussion. All interviews lasted for an average of 20 minutes. KIs included two food vendors and nine representatives from humanitarian NGOs namely Danish Refugee Council (DRC), Uganda Red Cross, Adventist Development and Relief Agency (ADRA), Alight Uganda, International Rescue Committee (IRC), and African Women and Youth Action for Development (AWYAD).

3.5. Data Analysis

3.5.1. Qualitative analysis.

The conventional approach to content analysis was used to qualitatively analyze the data (Hsieh & Shannon, 2005). The FGDs and interviews' voice recordings were transcribed using intelligent verbatim transcription and anonymized. Intelligent verbatim transcription is the level of transcription that involves light editing by omitting stammers, stutters, and fillers like 'um', laughter, and pauses from the transcript while preserving the meaning of the message (Eppich et al., 2019). The graduate student corrected grammar and deleted inappropriate words during transcription. The identifiers were omitted during the transcription. All transcripts were in English. After finishing, lines were read while listening to the recording, and corrected any grammar mistakes and broken sentences, but emotions and pauses were lost in the process. During the transcription, each FGD participant and KI was given a unique ID such as P01 or KI01. This was done to de-identify each audio to protect the participant's identity. As for codes from the FGDs or interviews, the source of the quote was shown by the number of the FGD/KI interview and the unique ID of the participant, for example, FGD 01 P04 or KI03. Using content analysis, data was analyzed qualitatively at the same quantified (Grbich, 2013).

Data analysis was done in phases. In phase 1, the graduate student read carefully each transcript highlighting text that described FV consumption behaviors. The initial stage of the coding was descriptive line-by-line coding of the transcripts. In phase 2, after coding 4 transcripts, the graduate student decided on a coding framework. He then used the coding framework to analyze the remaining transcripts, adding new codes when encountered. Phase 3, once all transcripts were coded, the research team reviewed and

discussed codes and their relationships. Some codes were combined while others were sub-categorized. In phase 4, the hierarchical structure was finalized, and a table of categories and sub-categories was developed including frequency counts capturing the number of occurrences codes were cited by each participant for each of the following categories: FV consumption behavior during the pandemic, facilitators and barriers to FV consumption and recommendations. In addition, illustrative quotes were included. Sub-categories were reviewed to ensure saturation. Phase 5, the findings were presented in a tabular form followed by a synthesis of the results. These findings were substantiated with direct quotes from interviewees and FGD participants.

3.5.2. Quantitative analysis.

Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 26 software. Basic descriptive statistics were conducted. Results were presented as frequencies and percentages for categorical variables and mean and standard deviation for continuous variables.

3.5.3. Integrated analysis.

Findings from the questionnaire, FGDs, and KIIs were integrated using a contiguous narrative approach whereby the presentation of quantitative findings preceded the qualitative findings. The results were further discussed for concordance, discordance, and expansion. The research team evaluated the integration of results. Data was manually analyzed.

CHAPTER 4

RESULTS

This chapter shows the main findings of the data gathering stage that seek to answer the overarching research question posed in this thesis: What is the consumption behavior and changes of FV consumption among adult refugees; factors influencing their consumption choices, the importance of FV, and food consumption behavior during the pandemic. To fulfill this primary objective, the analysis focused on meeting the four objectives as follows.

4.1. Questionnaire Results.

Results from the questionnaire provided demographic and socio-economic characteristics of the focus group participants in the Kyaka II settlement. It also looked at the available resources for livelihoods and food security such as agriculture, food assistance (cash and in-kind), land, and other sources. The questionnaire survey included questions related to the effect of the COVID-19 pandemic on the food and nutrition security status of refugee participants.

4.1.1. Demographic and socioeconomic characteristics of FGD refugee participants.

A total of 12 FGDs with Kyaka II settlement refugees were conducted within the current study. All participants in the FGDs (n = 68) completed the questionnaire prior to joining the discussion. On average, each focus group had 6 participants. Descriptive characteristics of the study sample, including socio-demographic data and livelihood sources, are presented in Table 1.

The FGDs included 52 male and 16 female participants. Most refugee participants were Congolese (n=58), with Rwandans (n=8), and Burundians (n=2) being the lowest in the national representation. Approximately 65% (n=44) of the participants were single, and the remaining (n=24) were married. The average stay in Uganda of the refugee participants in our study was 9.5 ± 5.8 years. Two-thirds of the participants (n=43) were educated at the primary and secondary levels of formal education. Half of the refugee participants were employed either full (n=18) or part-time (n=20), and the majority were farmers and the remaining casual workers. The largest income group was refugee participants who earned less than 50,000 Ugandan Shillings, which is equivalent to 14.1 US dollars per month. Participants reported diverse income sources with more than half (n=36) depending on savings and cash/food assistance and cash and/or food vouchers from humanitarian agencies or the remaining from agricultural and non-agricultural casual labor.

Table 1. Demographic and socioeconomic characteristics of refugees in the total sample.

Variables	n (68)	Summary measure (%)
Gender		
Male	52	76.5
Female	16	23.5
Age in years (Mean \pm SD)	24.78 (\pm 4.29)	
Nationality		
Congolese	58	85.3
Rwandan	8	11.8
Burundian	2	2.9
Marital Status		

Single	44	64.7
Married	24	35.3
Years in Uganda (Mean ± SD)	9.50 (±5.804)	
Highest education attained		
Illiterate	1	1.5
Below Primary school	11	16.2
Primary and Secondary school	43	63.2
Technical diploma	8	11.8
University degree	5	7.4
Employment		
Full time	18	26.5
Part time	20	29.4
Unemployed	30	34.1
Occupation		
Farmer	21	30.9
NGO worker (Volunteer and social worker)	9	13.2
Merchant	5	7.3
Student	3	4.4
Teacher	3	4.4
Hairdresser/barber	3	4.4
Other (constructor, motorcyclist, tailor, carpenter)	7	17.5
Individual monthly income		
less than 50,000 Ugandan shillings (~\$ 14)	35	51.5
50,001 (\$ 14.2) – 100,000 Ugandan shillings (~\$ 28)	20	29.4
more than 100,000 Ugandan shillings (~\$28)	13	19.1
Income sources in the last 12 months		
Agricultural waged labor	6	8.8
Cash, Debts/ Food voucher from humanitarian agencies	20	29.3
Crop Sales	18	26.5
Non-agricultural casual labor and Gifts from family relatives, or remittances	5	7.44.4

Savings	19	2830
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4.1.2. Food Insecurity Experience Scale.

Findings from the present study showed that the prevalence rates of mild, moderate, and severe food insecurity among refugee participants who took part in our FGDs were (n =7, 10.3%), (n=13, 19.1%), and (n=47, 69.1%), respectively except for one participant who was food secure, as per the FEIS (Table 2). Food insecurity among refugee participants by gender and nationality was also presented in Table 4.2. More than 70% of the participants responded affirmatively to 8 FIES questions and they also attributed the severity of their food experience to COVID-19. Based on the follow-up question that assessed the effect of the COVID-19 crisis, the majority of the participants reported severe experiences within the past four weeks with varied frequencies of the experiences although sometimes (3 -10 times) was the one most reported response for the last three questions concerned with experiencing hunger (Appendix 4).

Table 2. Food insecurity status of refugee participants by gender and nationality in the study sample (n = 68)

FIES†	Affirmative responses (yes)	%	Gender		Nationality		
			Male (n=52)	Female (n=16)	Congolese (n =58)	Rwandan (n = 8)	Burundian (n = 2)
Food secure	1	1.5	1	0	1	0	0
Mild FI	7	10.3	5	2	7	0	0
Moderate FI	13	19.1	12	1	12	1	0
Severe FI	47	69.1	34	13	38	7	2

† FIES is a proxy indicator of food security based on 8 questions that seek that food consumption behavior and experiences linked to challenges of accessing food because of a lack of resources over the last 12 months (Cafiero, 2020)

4.1.3. Food Consumption Score.

Over 70 %of the refugee participants in the FGDs had an acceptable food consumption score (≥ 42 as s shown in (Table 3). The results (of the main sources of food groups) revealed that most of the refugee participants bought most of their food items with cash (See appendix 5).

Table 3. Food Consumption Score of refugee participants.

Food Consumption Status (FCS)†	N	%
Poor FCS (< 21)	5	7.4
Borderline FCS (21.5 to 35)	14	20.6
Acceptable FCS: > 35	49	72.1

†FCS is another proxy indicator of food security that seeks the consumption frequency of eight different food groups based on the last seven days (WFP, 2009)

4.1.4. Assessment of refugees' attitudes towards FV consumption and purchasing.

All refugee participants in the FGDs agreed that it was healthy to consume FV although the majority of the respondents (72.1%) reported a decrease in fresh FV when the pandemic emerged. These findings were later corroborated by the perceptions about FV and how the emergence of the pandemic decreased the availability and accessibility of FV.

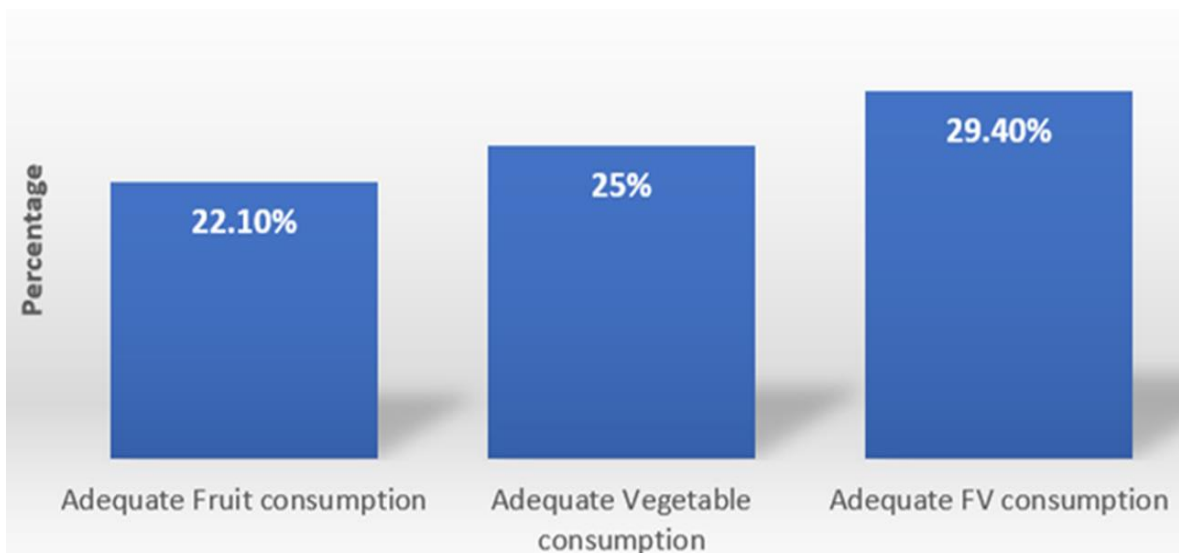
The rate of adequate fruit consumption was 22.1% while that of adequate vegetable consumption among the refugees was 25%. Moreover, 29.4% of the refugees ate adequate FV, as illustrated in Figure 3. The majority of the participants purchased the FV from the open/local market, of which 35.3% purchased once in the week while 32.4% purchased monthly. Most participants (80.9%) had access to land to plant FV as outlined in Table 4.

Table 4. FV purchasing and consumption behavior of refugees.

Frequency of purchase of fruits and vegetables	n	%
More than once a week	20	29.4
Once a week	24	35.3
Once a month	22	32.4
Never	2	2.9
Place of purchase of FV		
Open market	59	86.8
Farm	8	11.8
Borrowing from friends and family	1	1.5
Eating FV is very healthy for me.		
Strongly agree	53	77.9
Agree	13	19.1
Disagree	0	0
Somewhat disagree	2	3
Perceived change in the amount of fresh FV since the beginning of the pandemic		
Increased	16	23.5
Decreased	49	72.1
No change	3	4.4
Rate of fruit consumption in the last 30 days		
Adequate (≥ 2 times per day)	15	22.1
Inadequate (≤ 1 time per day)	53	77.9
Rate of vegetable consumption in the last 30 days		
Adequate (≥ 2 times per day)	17	25
Inadequate (≤ 1 time per day)	51	75
Rate of FV consumption		
Adequate (at least an adequate fruit and/or vegetable consumption)	20	29.4
Inadequate (inadequate FV consumption)	48	70.6
Land access		

Yes	55	80.9
No	13	19.1

Figure 3. Prevalence of adequate FV consumption among refugee participants.



4.2. Qualitative Results.

Findings from the content analysis showed that five categories with thirty-three sub-categories emerged from the 12 FGDs and 11 KIIs, as reported in Table 4.5. The following table summarizes emerging categories and subcategories of FV consumption behavior, barriers, and facilitators during the pandemic.

Table 5. Summary of the categories and subcategories.

Categories	Subcategories
1-General patterns of FV consumption and purchasing behavior	- Local market and garden identified as the main sources of FV; 2 Most frequently consumed FV; 3- Seasonality; 4- Preparation and consumption; 5- Upbringing /Culture; 6- Preference and

	taste; 7- Land use for vegetable production and income-generating projects
2-Change in FV consumption during the pandemic	1-Decrease in FV consumption during the pandemic; Increase in FV consumption, and No change.
3-Facilitators of FV consumption	1-Health Benefits; 2- Accessibility; 3- Availability of FV; 4- Farming skills and capacity building.
4-Barriers to FV consumption	1- Loss of livelihood; 2- Reduction in cash assistance; 3- Lack of economic/physical access to FV; and 4- Taste.
5-Recommendation to FV consumption	1-Availability (access to land, capacity building, agricultural support, incentive at the producer level), 2- Accessibility (increase in cash assistance, provision of infrastructure and financial literacy); 3- Utilization (education on food nutrition, safety, and value addition); 4- Stability (job creation, a call for more humanitarian organizations aiming at improvement of FV intake, resettlement of newly arrived refugees and self-reliance strategy); 5- Agency (cooperatives and lead farmer initiatives).

Table 6. Table showing categories, subcategories, and their frequency including quotes.

Categories	Sub-categories	No of refugees citing it across all FGDs	No of KIs citing it across	Illustrative Quotes

			all KIIs	
I -General patterns of FV consumption	1-Local markets and gardens identified as the main sources of FV	47	-	“For fruits, we get them from the market, but vegetables mostly we get them from gardens during rainy seasons where we go to various places, and we get there, dodo (Amaranthus).” (FGD 1 P01)
	2- Most consumed FV (Sombe ¹ , cabbage and jackfruit ²)	60	-	“My favorite vegetable, dodo cabbage, and cassava leaves what is called sombe. On side of fruit, we generally get the mangoes here and jackfruit.” FGD 2 P08
	3- Seasonality	20	-	“During the rainy season, vegetables like dodo are very common then in the dry season, we mostly depend on the watermelon.” (FDG 11 P62)
	4- Preparation and consumption			
	Fruits are eaten raw after washing, and vegetables are often cooked,	56	6	“Fruits majorly are taken in their raw form. When it comes to the vegetables, you can fry them or boil them” (FGD 5, P23) “In the case of vegetables, they cook them. Fruits like mangoes... There are a lot of mangoes, and avocados so, there is no need for cooking.” KI05
	Mother as a main food preparer.	8		“For me at home, I can say my mother. For preparing the food, she uses firewood to prepare.” FGD 9 P44
5-Upbringing /Culture	3	1	“Yes, for sure our background because at home, we have that habit to plant at our homes some vegetables because it's not every time that you can get money and go to the market to buy vegetables.” (FGD 3 P10)	
6- Preference and taste	5	2	“Remember Congolese, they eat almost everything you know be it animals, snakes. They always bring to market fruits and vegetables. Almost all foods are delicious to them.” KI10	

¹ Sombe is delicacy made from cassava leaves commonly consumed by some easy African countries including DRC, Burundi, and Rwanda

² Jack fruit is a tropical fruit with thick, yellow flesh and edible seeds and pods.

	7-Land use for vegetable production and income-generating projects	-	3	“These small plots, mainly they use them for vegetable production. They have also involved themselves in the production of vegetables and for them to be able to earn a living.” KI03
II- Change in FV consumption Facilitators to FV consumption	8- (Decrease in FV consumption during the pandemic.	56	-	“The consumption on my side was reduced due to a lack of money.” (FGD 2, P05)
	Increase in FV consumption	7	-	“For me now, I take many fruits compared to before.” FGD 9 P46
	No change)	5	-	“I told you I’m a fisherman. I didn’t see any significant changes before and after. I could access those fruits and vegetables in our ways.” FGD 11 P62
III-Facilitators	9- Health Benefit (Perceived immune and energy-boosting benefits of FV, and FV campaigns)	68	-	“According to me, the minister of health was encouraging people to eat fruits because they are the ones that are helping to fight the COVID.” (FGD 1 P04) “I can say to take a fruit is very good. Because they give us energy.” (FGD 9 45) “I was watching the TV and they told us that eating vegetables and these fruits normally help us to defend ourselves against a virus. John, you help me. They told us that we should take lemon and ginger. Is ginger a fruit?” (FGD 5, P17)
	10-Accessibility /Affordability of FV Hunger	1	4	“Fruits whenever the rain starts in this season, you find that they are very many at cheap prices.” KI10 “The market prices are not so high as I told you here, most people resorted so much to digging so, the vegetables and fruits are not that expensive.” KI01
	11-Availability of FV (Fertile soil and good weather, seasonality, Low production costs of FV, Host community as a source of FV purchased in the market	-	10	“Here, we have fertile soils, it always raining even right now as we are talking, it's still drizzling outside.” (KI01) “Nationals always feed us most times and here the food is plenty. It always comes from neighbors.” KI10

	12-Farming skills and capacity building	-	2	<p>“I know these people can do their digging and stuff and it can be a solution that can help them out in earning something and everything.” KI01</p> <p>“The agricultural officers. They've been training. They have given them inputs as well.” KI03</p>
IV. Barriers to FV consumption during the pandemic	13-Loss of livelihoods	28	-	<p>“I used to access fruits and vegetables by buying them. Most of the challenge is low income since I no longer have a job. (FGD 1 P01)</p>
	14-Reduction in cash assistance	25	1	<p>“There's been a change. Before they used to support us with 29,000 (\$8.2) of cash distribution, but right now it is 13,000 (\$3.7). So, that is a very big change and that one reduces our fruit consumption because the money is also reduced.” (FGD 9 P41)</p>
	15-Lack of economic/physical access to FV (FV price inflation, travel restrictions, market closure.)	39	-	<p>“When they heard that they are needed by many people after the pandemic, the sellers had to increase the prices.” (FGD 5, P20)</p> <p>“Because of this lockdown, the vehicles were not moving which decreased our consumption of fruits because we don't get them enough.” (FGD 6, P26)</p> <p>“Because even you know that when the covid comes. The government closed the market.” (FGD 10 P50)</p>
	16-Limited availability of FV (Perishability of fruits, Limited land access/Land fragmentation, Pests and diseases, Lack of Knowledge about FV cultivation, Inaccessibility of pesticides, Lack of seeds and fertilizers, Unfavorable climate conditions, Lack of interest in farming especially among refugees with no prior experience in farming,	37	11	<p>“Markets were closed. You had nowhere to sell the goods hence rotting of our goods materials” (FGD 8 P37)</p> <p>“If could find that by the time you eat these fruits and vegetables, they have already rotten just because you went to the market once and bought in bulk.” (FGD 5, P19)</p> <p>“The main barrier would be land. You see these new arrivals; they don't have much land compared to those old refugees.” KI02</p> <p>“They are reducing on our land to give it to give a part of our land to those newcomers. So, it's reducing on our</p>

	Urbanization in the settlement restricting agricultural activities)			<p>property where we can be putting our fruits and vegetables.” FGD 12 P67</p> <p>“Another view is that naturally, diseases and pests are unstoppable. We find it difficult to prevent this and they've generally contributed a negative effect on the fruits and vegetable supply.” (FGD 5, P23)</p> <p>“For me, I think that some of us don't know how to plant them, make them, and do things like that.” (FGD 7, P31)</p> <p>“For now, or after the crisis, there is no movement to buy those pesticides to spray on the vegetables and fruits.” (FGD 8 P39)</p> <p>“Maybe seeds and fertilizers”</p> <p>KI02</p> <p>“Sometimes, the weather is not favorable. Either there is too much rain or too much sunshine depending on...but both extremes are not good.”</p> <p>KI03</p> <p>“Like these ones from Congo, some of them said they had never handled the hand hoe in their lives. They don't want to do some farming around here. That's not my work, that's my not my profession.” KI03</p> <p>“Most people do not dig for the reason being, it is the developing trading center we have within here. Most time, the commandants are like, we don't want people to do farming, we only want people to settle in these places.” KI10</p>
	17-Antisocial behavior (Theft, Resistance from refugees towards FV programs, Corruption)	-	2	<p>“There are people who have major thieves stealing people's property and things in the garden.” (KI01)</p> <p>“Maybe resistance from the community. Not everyone will welcome the idea and also corruption within the facilitators, they might swindle the funds.” KI02</p>
	18-Preference/Dislike of GMOs from National Agricultural	-	1	<p>“The papaws you see, that is NAADS (Papaws from National Agricultural Advisory Services). We don't have African papaws growing</p>

	Advisory Services (NAADS)			like that. Those customers come and they say these are not sweet.” KI10
V.Recommendations	Availability			
	18-Access to land	22	-	“More so, the refugees should be guaranteed that the portion that ‘they’ (government) have given you as yours, no more reducing it so that (refugees) can plan for it well knowing that it is theirs.” (FGD 5, P19) “If ‘they’(refugees) could also speak to them and maybe ask them to allocate some piece of land that is slightly bigger than what is they are offering at the moment because honestly, 30 by 30ft is very small, but at least if we could make it, maybe 30 by 60ft or 50 by 50ft.” (KI03)
	20-Capacity building (Education and training on the FV benefits and production in small spaces, Kitchen gardens)	28	5	“One, to first train the refugees on the better farming methods or improved farming methods mainly on new backyard farming or kitchen gardens” (KI03)
	21-Agricultural Support/ Provision of FV seeds	1	10	“Then also introduce or avail them with some improved seeds that are high yielding, and which take a short period to mature.” (KI03)
	22-Incentive at the producer level		1	“To give gifts to those who do well.” (FGD 8 P38)
	Access			
	23-Increase in cash assistance /Increase in funding. Job creation	31	1	“Take an example of WFP, there is a need to increase on nineteen thousand (\$ 5.4) to a certain figure of number so that people can use the money to purchase.” (FGD P05) “They should provide the other type of work like tailoring to help those refugees to get money. After getting that money they have earned, they buy those fruits so that they can improve on fruit consumption.” (FGD 1 P04)
	24- Creation of Infrastructure (Establishment of more fruit markets,	-	3	“If we had some organized place, a central place where everyone can be able to identify. If you go to this place and be able to get such and

	Construction of organized marketplaces for agricultural produce, Construction of roads)			such foods that I need. That would be good other than you, producing at your home and no one knows whether you have something that you are selling at home” KI03 “If maybe the government could support and work on the roads in the settlement, so maybe this one can also attract the other people from the host communities to come to a settlement and buy or even the refugees can ease on their mobility. They can move their produce from the garden to the marketplace.” KI03.
	25-Financial literacy	1	1	“The demand characterizes that day. That kind of mindset must be changed. Financial literacy is needed. They have to be oriented and taught.” KI11
Utilization				
	26-Education on food Nutrition, safety and value addition	4	1	“The other thing maybe is also training them on the value addition. How can we add value to our products like now the tomatoes? There is somewhere I saw someone selling two or three tomatoes, but when they are packed in a good container which also attracted someone to buy. I think they can also support these people to have their food to stay for some time without going bad.” KI03 “As everybody has said it's money but clearly I think we need to be aware of nutrition facts or nutrition skills.” (FGD 9 P44)
FV Stability				
	27-Self-Reliance Strategy (SRS)		1	“It's high time that these refugees are trained on becoming self-reliant than relying on only NGO supplements or any benefit from the NGO program because we don't know how tomorrow is going to be.” KI08
	28-A call for more humanitarian organizations aiming at the improvement of FV intake	10	-	“According to me, they can increase the organizations which can come in and provide those fruits. They can supervise refugees on the way

				they can plant them.”(FGD 1 P04)
	29-Relocation of newly arrived refugees	-	1	“The new arrivals should be taken in another camp so that we can get more land to work.” FGD 11 P58
	Agency			
	30-Cooperatives	2	-	“You find that there is a group of 30 people and they come out with something, and they give that group like a little money. They support them, you find that the business can continue well.” (FGD 9 P42)
	31-Lead farmer initiatives	-	1	“Refugees can take the initiative of joining groups whereby they come up with a lead farmer. The lead farmer gets knowledge from ADRA or any other NGO and sets up a nursery bed. The rest of the farmers of the POCs (People of Concern) benefit from both nursery beds and they go and set up their small gardens around their compound.” KI08

4.2.1. Category 1. General patterns of FV consumption and purchasing behavior.

Local markets and gardens as the main FV sources. Two-thirds of the refugee participants obtained their FV from the local market and garden, “For fruits, we get them from the market, but vegetables mostly we get them from gardens during rainy seasons where we go to various places, and we get there, dodo (Amaranths).” (FGD 1 P01).

Most consumed FV. The most frequently consumed vegetables among refugee participants were Sombe (cassava leaves) and cabbages while jackfruit was the most highly consumed fruit by refugees. “My favorite vegetable, dodo cabbage, and cassava leaves what is called sombe. On side of fruit, we generally get the mangoes here and jackfruit.” (FGD 2 P08).

Seasonality. Some refugees mentioned a variation in seasons influencing their FV intake. Many vegetables are available in the rainy season while in the dry season, they

become scarce. During the rainy season they were also highly available and accessible as stated by the FGD discussants: “During the rainy season, vegetables like dodo are very common than in the dry season, we mostly depend on the watermelon.” (FDG 11 P62).

Preparation and consumption. Most of the refugees ate their fruits raw and reported that they observed proper sanitation. Many of the refugees also liked to cook their vegetables. Half of the key informants echoed a similar finding. One key informant said, “In the case of vegetables, they cook them. Fruits like mangoes... There are a lot of mangoes, avocados so, there is no need for cooking.” (KI05). Mothers were identified as key players in this role of cooking vegetables. “For me at home, I can say it is my mother. For preparing the food, she uses firewood to prepare.” (FGD 9 P44).

Upbringing/Culture. Some FGD participants attributed their upbringing to their consumption of FV. According to one of the key informants, FV contributed significantly to their food basket considering that they had land for cultivation: “Congolese are so much used to fruits and stuff. First, the fruits grow on their own and vegetables, the food we cook, we put a lot of vegetables.” KI01.

Preference and Taste. Taste is another determinant mentioned by some of the refugees and key informants. Refugees reported a preference for adding FV to their diet as appetizing. One key informant described refugees specifically Congolese as people that nearly eat everything brought in the market including wild animals: “Remember Congolese, they eat almost everything you know be it animals, snakes. They always bring to market fruits and vegetables. Almost all foods are delicious to them.” (KI10).

Land use for vegetable production and income-generating projects. According to some key informants, land allocated to refugees was majorly used for subsistence farming which also enabled them to earn a living.

4.2.2. Category 2. Change in Consumption during the pandemic.

Throughout the pandemic, majority of refugee participants have noticed changes in their consumption, whether it was for the better or worse.

Decrease in FV consumption. Many refugees observed a reduction in their consumption since the start of the pandemic. Many refugees pointed to financial constraints as the leading cause: “The consumption on my side was reduced due to a lack of money.” (FGD 2, P05)

Increase in FV consumption. In contrast, a few refugee claimants reported an improvement in their consumption. For example, one FGD discussant compared his consumption before and during the pandemic and he realized he was taking more fruits.

No change. Refugees whose consumption remained the same were the least in number. One of the refugees attributed the constancy in FV consumption to the nature of his work which allowed them to move and access markets. “I told you I’m a fisherman. I didn’t see any significant changes before and after. I could access those fruits and vegetables in our ways.” (FGD 11 P62)

4.3.3. Category 3. Facilitators to FV intake.

Health benefit. When refugee participants were asked why they ate FV during the pandemic, all refugees stated health-related reasons as the main drivers that influenced their FV intake. For example, they said they had been enlightened that FV would boost their immunity, particularly against the coronavirus, while others said FV would give them energy. “According to me, the Minister of Health was encouraging people to eat fruits because they are the ones that are helping to fight the COVID.” (FGD 1 P04). FV campaigns were also cited to be influencing their FV intake. “I was watching the TV and

they told us that eating vegetables and these fruits normally help us to defend ourselves against a virus. John, you help me. They told us that we should take lemon and ginger. Is ginger a fruit?" (FGD 5 P17).

Accessibility of FV. Economic accessibility of FV was the least reported facilitator among the refugees and yet reported by nearly half of the key informants. The key informants claimed that some refugees produced their own FV as a strategy: "The market prices are not so high as I told you here, most people resorted so much to digging so, the vegetables and fruits are not that expensive." (KI01).

Availability of FV. Almost all key informants reported high availability of FV as a result of fertile soils and reliable rainfall. The rainy season was identified as the season where the FV supply was high making the FV affordable. "Fruits whenever the rain starts in this season, you find that they are very many at cheap prices." (KI10). They that the host community was providing most of the FV as stated by one of the key informants, "most times and here the food is plenty. It always comes from neighbors." (KI10)

Farming skills and capacity building. Another finding from a few key informants was that the refugees were trained and given agricultural inputs increasing their capacity and ability to produce FV and increase their intake. "The agricultural officers, they've been training. They have given them inputs as well." (KI03)

4.4.4. Category 3. Barriers.

Loss of livelihood. Both low income and job loss can affect refugees' access to FV. The pandemic negatively affected the livelihoods of a few refugees as stated by one

of the refugee participants: “I used to access fruits and vegetables by buying them. Most of the challenge is low income since I no longer have a job.” (FGD 01 P01)

Reduction in cash assistance. Several refugees discussed how the World Food Programme reduced their cash assistance and how this affected their intake. As noted by one of the refugees, the cash assistance was decreased from assistance from \$8.2 to \$3.7 which eventually affected their purchasing power: “There's been a change. Before they used to support us with twenty-nine thousand (\$8.2) of cash distribution, but right now it is Thirteen thousand (\$3.7). So, that is a very big change and that one reduces our fruit consumption because the money is also reduced.” (FGD 9 P41).

Lack of economic/physical access to FV. More than half of the refugees expressed a lack of access to FV both in economic and physical terms. As a result of the pandemic, some refugees noted that the FV sellers had hiked the prices of FV as the demand was high. “When they heard that they are needed by many people after the pandemic, the sellers had to increase the prices.” (FGD 5, P20). Other refugees mentioned the restrictions on vehicles that transported FV into the settlement and how they reduced the supply of FV. “Because of this lockdown, the vehicles were not moving which decreased our consumption of fruits because we don't get them enough.” (FGD 6, P26). Markets are key access areas for FV however emergency of the pandemic forced the government to close them to curtail the spread of COVID-19. “Because even you know that when the COVID comes. the government closed the market” (FGD 10 P50).

Limited availability. This was another frequently mentioned barrier across all FGDs and KIIs. The limited availability was expressed in different forms as follows. Some refugees (consumers and marketers) were concerned about the shelf life of FV when bought in bulk or in their marketplaces since markets were closed. Land is one of

the factors of production and several of the refugees complained about the lack of access to land. In addition, the limited land was also divided into smaller plots to accommodate newly arrived refugees. One refugee said, “They are reducing on our land to give it to give a part of our land to those newcomers. So, it's reducing on our property where we can be putting our fruits and vegetables.” (FGD 12 P67). Pest and diseases were also reported to affect the production of FV consequently affecting the FV supply. Lack of production and preparation knowledge was another influencer that negatively affected availability. Inaccessibility of agricultural inputs such as pesticides, seeds, and pesticides were mentioned by some refugees and key informants as another limiting factor of FV production. One of the key informants perceived climate being as being extreme which is there are times when it either rained or shined exceedingly. This was unfavorable to the production of FV. Other issues such as lack of interest in farming among refugees unfamiliar with farming and urbanization in the settlement were disincentives to engage in FV cultivation. “Most people do not dig for the reason being, it is the developing trading center we have within here. Most times, the commandants are like, we don’t want people to do farming, we only want people to settle in these places.” (KI10).

Antisocial behavior. Quite a few key informants reported that there was antisocial behavior including theft and corruption. They said there were thieves stealing people’s property and crops from their gardens. Some said there were uncooperative refugees toward FV intake programs as well as corruption among the facilitators (NGOs) of such programs: “Maybe resistance from the community. Not everyone will welcome the idea and corruption within the facilitators, they might swindle the funds.” (KI02).

Preference/Dislike of GMOs from National Agricultural Advisory Services (NAADS). Only one KI specified preference as a barrier given his experience in FV

vending. Refugees noticed taste differences between local varieties of FV and genetically modified FV which were perceived as less tasty: “The papaws you see, that is NAADS. We don’t have African papaws growing like that. Those customers come and they say these are not sweet.” (KI10).

4.2.5. Category 5. Recommendations.

These findings were typically divided into food security dimensions outlined in table 4.5.

1-Availability dimension.

Access to land. Having access to land was a frequently raised recommendation among refugees. They needed own land portions permanently so they can do their agricultural work uninterruptedly hence increasing their FV intake: “More so, the refugees should be guaranteed that the portion that they have given you as yours, no more reducing it so that they can plan for it well knowing that it is theirs.” (FGD 5, P19). Some key informants said there was a need to be allocated slightly bigger pieces of land so they would increase their production of FV and hence increase their intake: “If they could also speak to them and maybe ask them to allocate some piece of land that is slightly bigger than what is they are offering at the moment because honestly, 30 by 30ft is very small, but at least if we could make it, maybe 30 by 60ft or 50 by 50ft.” (KI03)

Capacity building. Both refugees and key informants recommended education and training programs on FV. They said that many were ignorant about FV production and its benefits: “There must be mass sensation about the production of vegetables and fruits and their benefits to others. We have few here but other people from within the camp, are ignorant about this.” (FGD 1 P01). They needed training on better farming

methods. “One, to first train the refugees on the better farming methods or improved farming methods mainly on new backyard farming or kitchen gardens” (KI03)

Agricultural support. Most key informants as well as one refugee said that refugees needed to be given improved and high-yielding seeds. “Then also introduce or avail them with some improved seeds that are high yielding, and which take a short period to mature.” (KI03). They also said the refugees needed to be supplied with farm tools. “You give them facilities to use like watering cans, hoes, and those things.” (KI04).

Incentives at the producer level. One key informant said that the best-performing refugees needed to be rewarded as a means of encouraging and motivating others.

2-Accessibility dimension.

Increase in cash assistance. A common view amongst the refugees and one of the key informants was to increase cash assistance to enable them to cater for all their needs which would in the long run also increase their FV intake. “Take an example of WFP, there is a need to increase on 19,000 [USH] (\$ 5.4) to a certain figure of number so that people can use the money to purchase.” (FGD P05).

Job creation. Some refugees felt that being employed and earning a stable income would help them buy FV and improve their intake: “They should provide the other type of work like tailoring to help those refugees to get money. After getting that money they have earned, they buy those fruits so that they can improve on fruit consumption.” (FGD1 P04).

Creation of infrastructure. There was a suggestion of creating more fruit markets and improving the roads in the settlements to ease access to FV. As one refugee said, “My recommendation is maybe to create more market for those fruits.” (FGD5,

P18). While for the interviewee when asked for a recommendation said, “If maybe the government could support and work on the roads in the settlement, so maybe this one can also attract the other people from the host communities to come to a settlement and buy or even the refugees can ease on their mobility. They can move their products from the garden to the marketplace.” (KI03).

Financial literacy. One refugee and one key informant considered teaching the refugees how the management of their finances to overcome the hand-to-mouth existence: “The demand characterizes that day. That kind of mindset must be changed. Financial literacy is needed. They have to be oriented and taught.” KI11.

3-Utilization dimension.

Education on food, nutrition, safety, and value addition. Only a small number of refugees and key informants thought about the necessity of training in nutrition or food safety: “As everybody has said it's money but clearly, I think we need to be aware of nutrition facts or nutrition skills.” (FGD 9 P44) and value addition as a way of increasing their utilization of the food including FV. “The other thing maybe is also training them on the value addition. How can we add value to our products like now the tomatoes? There is somewhere I saw someone selling two or three tomatoes, but when they are packed in a good container which also attracted someone to buy. I think they can also support these people to have their food to stay for some time without going bad.” (KI03).

4-Stability dimension.

Self-reliance strategy. This view was mentioned by one of the key informants as the key to refugees being independent of the food aid: “It's high time that these refugees are trained on becoming self-reliant than relying on only NGO supplements or any benefit from the NGO program because we don't know how tomorrow is going to be.” (KI08).

A call for more humanitarian organizations aiming at the improvement of FV intake. Some refugees suggested more presence of organizations with an interest in FV promotion programs. As one refugee respondent put it, “According to me, they can increase the organizations which can come in and provide those fruits. They can supervise refugees on the way they can plant them.” (FGD 1 P04).

Relocation of newly arrived refugees. It was also suggested that new refugees should be taken to other settlements so that they could have enough space to do farming and produce FV: “The new arrivals should be taken to another camp so that we can get more land to work.” (FGD 11 P58).

5-Agency dimension.

Cooperatives. A small number of refugees mentioned a need for support in terms of funds so they can smoothly run their business projects: “You find that there is a group of 30 people and they come out with something, and they give that group like a little money. They support them, you find that the business can continue well.” (FGD 9 P42).

Lead farmer initiatives. Talking about this issue, one key informant suggested that refugees could join groups and get representatives who would be trained and equipped to train and equip the rest of the group: “Refugees can take the initiative of joining groups whereby they come up with a lead farmer. The lead farmer gets knowledge from ADRA or any other NGO and sets up a nursery bed. The rest of the farmers of the POCs (People of Concern) benefit from both nursery beds and they go and set up their small gardens around their compound.” (KI08).

Overall, these results give vital insights into the consumption behavior and determinants of FV. These results also indicate a decline in consumption of FV given the overwhelming barriers compared to the facilitators.

CHAPTER 5

DISCUSSION OF FINDINGS

This chapter discusses the results from the previous chapter in comparison to the literature review and other research on FV consumption. The present study aimed to explore the FV consumption behavior and changes, identify facilitators and barriers influencing the consumption of adult refugees, as well as seek context-specific recommendations for the promotion of FV consumption during the pandemic.

Our study findings showed that almost two-thirds of the refugee participants in the present study were experiencing severe food insecurity as per the FIES scale. On the contrary, FCS showed that more than two-thirds of the refugees had acceptable food consumption scores. This discordance may be attributed mainly to three issues. Firstly, the different reference periods of the indicators whereby the FCS was based on the past seven days while the FIES was based on the last 12 months' recall period. Secondly, the data collection periods (October 2021 and January 2022) coincided with the week of cash assistance distribution. Cash assistance was distributed in the last week of the month. It is likely that the cash distributed improved on the FCS for those specific weeks in which the data was collected. Data collection in the middle of the month would have been ideal rather than towards the end of the month when cash distribution commences. Thirdly, another possible explanation for the stark contrast is the use of both FIES and FCS in the same survey. According to Cafiero (2020), failure to separate FIES from food consumption causes confusion among respondents.

Findings from the FGDs and the quantitative questionnaire showed that all refugees in the present study acknowledged the importance of FV to their health. Nevertheless, the rate of FV consumption was inadequate and refugees reported in their

FGDs that their consumption declined during the pandemic due to several factors. Most refugees stated that low income was the immediate cause of the decline in FV consumption. However, the root cause was the reduction of cash assistance at the onset of the pandemic. This reduction directly affected the income of refugees since most of the refugees showed food aid as one of the main sources of income. Another factor for low intake mentioned included food supply chain limitations during the pandemic that interrupted access to FV in the local markets in Uganda. In line with the literature, similar factors impacted peoples' buying power and accessibility of FV (Jordan et al., 2021; Litton & Beavers, 2021; UNICEF, 2021). This low consumption of FV is reported particularly in sub-Saharan Africa (Amao, 2018), and was also noted in our study context even before the pandemic: The national representative survey done in Uganda in 2019 concluded that the FV consumption of many adult Ugandans was low (Kabwama et al., 2019).

Other factors associated with the FV consumption behaviors of refugees, as per the study findings, were seasonality, considerations related to FV preparation, preferences, and taste. Refugees reported eating most vegetables (amaranths and cabbages) during the rainy season and fruits such as mangoes and jackfruit in the dry season. Previous studies report that different seasons determine the consumption of some food groups including FV (Nago et al., 2012). Seasonality is one of the well-known contributors to dietary diversity (Abizari et al., 2017; Hjertholm et al., 2019) nevertheless, very few studies in Uganda to date have addressed the changes in FV availability with seasons which our study has highlighted. Different parts of the world consume and prepare FV differently but commonly, fruits are consumed as fresh, and vegetables are popularly eaten as salads, cooked as side dishes with meat, fish, and as savory dishes

either fresh or cooked (Desai & Salunkhe, 1991; Pennington & Fisher, 2009). Like other studies, most refugees in our study ate their fruits fresh in raw form while the vegetables were cooked. However, the preparation of cassava leaves, the most commonly consumed vegetable among refugees, was unique since it involved pounding in the preparation. Mothers were considered gatekeepers of the FV consumption in our present study, which appears to be supported by previous findings (Wansink & Kranz, 2013). Another predictor of FV intake was taste which was associated with culture. Our study revealed that refugees' meals were accompanied by a lot of vegetables as appetizers, and it was habitual to have FV in their food baskets either from their gardens or markets. Both taste and social norms are well-established influencers of food consumption (Neumark-Sztainer et al., 2003; Yeh et al., 2008).

The facilitators of FV consumption mentioned were health benefits, availability, accessibility, and farming skills which are all consistent with the literature and extensively described in previous qualitative research (Yeh et al., 2008; Yeh et al., 2010). Nonetheless, the notion of health benefit in our findings was overly expressed and in a variety of forms: immune and energy-boosting, and FV campaigns. The belief that FV increased immunity against the coronavirus causing COVID-19 was more pronounced since vaccines were not readily available in Uganda at the time of data collection. Immune boosting has been a phenomenon correlated with the pandemic, accompanied by many preventative and curative strategies and beliefs (Razzaque, 2020). Besides, the suspicious belief of a health risk and concern is postulated by the Health Belief Model as a key motivator of health-related behavior (Hayes & Ross, 1987). The refugees also asserted that publicity of FV benefits by the Ministry of Health and media outlets played a huge role in increased FV intake. Our findings also show a positive change in attitude towards

FV. A review of the literature showed that public awareness through campaigns and advertisements was evident during the pandemic (Althubaiti, 2022; Ministry of Health, 2020; Saud et al., 2020). Dittus et al. (1995) concluded that individuals who consumed a lot of FV were more aware of the health benefits of consuming FV than those with lower levels of FV. There is consensus about the difficulty in changing personal consumption behavior and cultural preferences due to the propensity of people to eat what they are accustomed to (Hendrie et al., 2019; Kartari et al., 2021; Löwe et al., 2019). However, Kartari et al. (2021) empirical findings from China, Turkey, and Portugal indicated an increase in FV intake across cultures suggesting that COVID-19 altered eating patterns thus promoting healthy eating. Accessibility was the least discussed facilitator among the refugees yet discussed by almost half of the key informants. This may be because many refugees faced a decline in their purchasing power during the pandemic whereas the key informants believed refugees were engaged more in farming to increase their physical access to FV. This finding is supported by one of the key informants who asserted that refugees had farming skills through capacity building. Refugee farmers were trained and given seeds. It implies that further investments in fruit and vegetable production are likely to contribute to improved diets. Surprisingly, the availability of FV was reported as a facilitator by only more so, nearly all the key informants who claimed that fertile soil and abundant rainfall increased FV production thus improving intake. However, KIs found that the intake was better in the rainy season because of high yields of FV translating into affordable FV prices for the refugees. This finding of perceived availability is reported as a measure of the influence of FV consumption (Yeh et al., 2010).

Our study findings also highlighted barriers to FV consumption among refugees living in the Kyaka II settlement in Uganda during the pandemic. Among the main barriers were the loss of livelihoods, reduction in cash assistance received from WFP, land fragmentation, limited land access, and the COVID-19 restrictions on food supply at the beginning of the pandemic. These factors categorically affected the availability and accessibility of FV. Low income resulting from job losses was reported to considerably affect their FV intake. Low income was further compounded by WFP's gradual reduction in cash assistance from roughly \$11 to \$4 per month directly resulting from limited funding of WFP by international donors who also experienced economic slowdowns during the pandemic (WFP, 2020c). Other COVID-19 related effects that were reflected on by study participants and that were in line with the published literature include FV price inflation, travel restrictions, lockdowns, and market closures that affected the access to healthy diets including FV (World Bank, 2021; Zurayk, 2020). The demand for FV increased the cost. The high cost of FV is frequently mentioned in many studies to negatively influence food consumption (Afshin et al., 2019; Livingstone et al., 2020; Yeh et al., 2008). In Uganda, the price of FV was high during the initial weeks of the lockdowns in 2020 however prices have been fluctuating throughout the pandemic partly due to seasonality (Kinyanjui et al., 2021).

Availability of FV was another barrier to FV intake among refugees. However, availability was reported as a facilitator by KIs showing discordance between the perception of refugees and KIs about FV availability. Key informants believed that good climate favored FV production in the Kyaka II settlement and more so food provision from the host community. On contrary, refugees mentioned challenges of limited land, FV perishability, pest and diseases, and expensive pesticides as barriers. Different

scholars have reported availability as a barrier to FV consumption while others as motivators depending on the setting (Livingstone et al., 2020; Yeh et al., 2008). Dijkxhoorn, de Steenhuijsen Piters, Brouwer, Hengsdijk, and Tichar (2021) argue that perishability of FV increases price uncertainty in the market, a challenge that appeared in our findings. Land access was a stumbling block for the production of FV. Not only was allotted land small as highlighted by both KIs and refugees but also fragmented to accommodate new refugees. There is evidence of a reduction in plot sizes and less land availability over the years with increasing numbers of refugees in settlements (Betts et al., 2019). Studies also show land tenure as a disturbing social and political dynamic leading to the unsustainable livelihood of refugees which eventually affects food security (Kaiser, 2006). In Uganda, access to land plays a key role in dietary diversity, food security, and calorie intake according to Betts et al. (2019) A considerable number of refugee participants were farmers, and among their challenges were widespread pests, and limited supply of pesticides, and climate extremities. Grosrenaud et al. (2021) report similar challenging conditions in agriculture which collectively have led to low yields during the pandemic. Given that Uganda's agriculture is rainfed, increased variability in rainfall and temperature extremes have left some areas in Uganda vulnerable to severe food shortages over the last 15 years (Watuleke, 2015). An increase in urbanization is another challenge which is also mentioned by one of the interviewees. According to WHO (2003), urbanization is negatively correlated to the availability of FV because growing towns/cities tend to increase the distance between people and primary food production areas. Consequently, this affects also access to nutritious diets. In our study, this urbanization was also perceived as a repressive policy against agricultural production due to increasing trade and other non-agricultural businesses. The influx of refugees is driving

the urbanization in the settlement and many refugees preferred to live close to family and friends. Corruption within agricultural support projects involving the NGO facilitators was commented on by one interviewee. There have been investigative reports about fraud allegations and irregularities concerning food aid, misappropriation of relief items, and misuse of government land among high-level officials in Uganda (Monitor, 2021; The Guardian, 2020).

The preference for fruits was uncommonly mentioned in our study yet in other studies conducted in similar settings, it was one of the key determinants of FV consumption (Gichunge, 2013; Yeh et al., 2008; Yeh et al., 2010). Refugee participants in the present study preferred local varieties to GMOs which limited both FV sales in the market and consumption. Wunderlich and Gatto (2015) reported mixed but skeptical views about GMOs with food safety concerns being the main concern.

Our study revealed several recommendations by both refugees and key informants which were aligned with food security dimensions.

Availability. Refugees overwhelmingly highlighted two issues to improve their FV availability namely land access and capacity building. These were seen as perhaps a key to better livelihoods in farming communities. Interestingly but unexpectedly, no key informants suggested access to land but rather focused only on capacity building. Uganda is characterized as a model country that gives land rights to refugees, but our findings indicated deficiency still in this area. In line with literature on Uganda's policy of integrating refugees, Uganda has not properly addressed land negotiations and access including the physical plan of the settlement (Kaiser, 2006; World Bank, 2016). From our study, long-term access to land should be considered as it improves food security and dietary diversity as shown by Betts et al. (2019) whose study revealed positive food

security outcomes. One of the suggestions to reduce land fragmentation was the relocation of newly arrived refugees to incentivize established refugees productively utilize their spaces for agricultural production. In addition, capacity building through agricultural training, giving incentives, and provision of inputs for production was recommended. For example, Betts et al. (2019) also revealed that training refugees on how to utilize small spaces known as kitchen gardens proved to improve food security. Similarly, World Vision has done pilot projects of kitchen gardens in the backyard of each refugee' house in Kyaka II to supplement food rations with vegetables and improve livelihoods (World Vision, 2019).

Accessibility. Increasing cash assistance for the refugees was a paramount recommendation. Given the decreasing financial aid offered by international donors, refugees were proportionally affected by funding shortfalls (WFP, 2020c). Cash programs are widely reported to have a positive influence on resilience and improved welfare (Premand & Stoeffler, 2020). Another factor that is likely to improve FV intake is infrastructural improvements such as markets and especially the construction of rural roads. Like Kyaka II, most refugee settlements are established in rural and remote locations therefore, improving the road network not only reduces transaction costs but also improves market accessibility which in turn improves diet diversity among smallholder farmers (World Bank, 2020).

Utilization. Nutrition education of FV was also critical to refugees and KI. Some participants commented on value addition which not only improves shelf life, and price of FV but also ensures food safety. A coping review done by Nisbet et al. (2022) reveals that nutrition education programs were among the most prevalent food security intervention in developed destination countries, a nutrition gap developing host countries

like Uganda can fill. In addition, the value addition of agricultural produce can be included in the livelihood strategies to transition to self-reliance

Stability. A call for more aid agencies was also highlighted, and this comes after the suspension of some humanitarian organizations due to non-compliance with Uganda's regulations and laws (d'Orsi, 2020). It seems to be a dilemma because reports show the crisis of refugees worsening because of the massive influx of Congolese and the pandemic (d'Orsi, 2020; Nilepost, 2022). Self-reliance was highlighted in the interviews. This strategy is included in Uganda's refugee policy as a mechanism to gradually take refugees off the food aid and transition them to agriculture in agricultural settlements (Betts et al., 2019; Svedberg, 2014). From the interviews, it had not been realized yet that food aid has been dwindling since 2020. Self-reliance policy in Uganda is largely met to orient refugees to subsistence agriculture within the settlement (Berke & Larsen, 2022; FAO & OPM, 2018)(Berke & Larsen, 2022; FAO & OPM, 2018) therefore self-reliance and land use rights are inextricable. Relocation of refugees to other settlements was also recommended however, it is documented that new arrivals in host communities have negative implications for food security through labor market disruptions and resource degradation such as land and deforestation (FAO, 2013; Ruiz & Vargas-Silva, 2017).

Agency. Some refugees believed that cooperatives would work as channels for empowering refugees and offering them a competitive edge for their products. In Turkey, an ongoing cooperative increased the resilience of refugee women during this pandemic through a continuation of the cooperative's activities such as agricultural production and drying of FV (UNHCR & Global Compact on Refugees, 2022). Existing literature also shows numerous social and economic benefits of agricultural cooperatives despite their slow revival in Uganda (Ferguson & Kepe, 2011; Kwapong & Korugyendo, 2010; Wedig

& Wiegatz, 2018). Lead Farmer Initiative was another identified channel for capacity building of refugees interested in farming. According to Tsafack et al. (2015), lead farmers gain knowledge from experts and disseminate this knowledge to other farmers as well as monitor any group's ongoing projects. There is conclusive evidence in Cameroon that almost all study participants in the lead farmer initiative improved their income status due to better yields related to the acquisition of new agricultural techniques (Tsafack et al., 2015).

It is worth noting that the above findings are not considering the more recent developments with the war in Ukraine and its impact on food security globally and locally, as that all happened later after the completion of data collection in January 2022. Further studies are needed to assess the more recent changes in the food security status and food consumption behaviors of refugees in light of the ongoing war in Ukraine.

5.1. Strengths and limitations.

The strength of this study includes the multiethnicity of the refugee participants. This research painted a picture of the food insecurity and the effects of the COVID-19 pandemic on FV consumption. The findings can be used to generate hypotheses on how the pandemic impacted FV among refugee populations. The content analysis was reviewed by a team of qualitative research experts who have previous extensive experience with refugees from other settings and contexts. In addition, the graduate student the key data collector has a strong understanding of the local context and environmental conditions.

That said, it is proper to acknowledge that, it is quite impossible to eliminate the risk associated with operational limitations and human error. The following are some of the limitations and assumptions.

Inability to speak English hindered some adult refugees from participating and that may have limited the graduate student's ability to recruit refugees who may be even more vulnerable to food insecurity perhaps also negatively affecting access to resources and services due to the language barrier. The purposive - convenience approach limited our ability to use maximum variation. Females were less represented in our study for the following reasons; sometimes, FGDs were carried out at night after the end of work for many refugees. However, it could have deterred some women from participating given that they are responsible for cooking for their families and other chores. The other reason is that some women were shy to participate in the research study. We cannot eliminate the risk of reporting bias, as refugees may have responded favorably to some aspects of the questions raised during the focus groups and may have under and/or overreported their food intake because of several reasons such as short memory and expectation of personal benefits. Reporting the kind and amount of food consumed is a challenging cognitive task given that the memory can be liable or affected by the most recent FV intakes. The data was collected during the period when refugees were receiving cash assistance which likely influenced your FCS results upwards. Moreover, this coincidence also limited the time availability of KII which could have affected the ability of KIs to provide thorough feedback on certain questions. The cash assistance had been reduced at the onset of the pandemic and further reduction was expected in the following months.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion.

This study explored the consumption behavior and determinants of FV consumption of refugees during the COVID-19 pandemic in Uganda. Results show evidence of severe food insecurity and a low intake of FV among refugee participants. The food insecurity and FV low intake were attributed to the socio-economic and COVID-19 related challenges that included food supply limitations, reduced cash assistance, loss of income, and chronic land restrictions. Some of the secondary effects of the COVID-19 pandemic are still lingering and might further threaten the food security of refugees in Kyaka II settlement. Besides, existing land policies and regulations might not allow the implementation of some aspects of the self-reliance strategy in such agricultural settlements like Kyaka II. On the other hand, the study also highlighted the perceived health benefits of FV coupled with FV consumption campaigns as the main facilitators of FV consumption among refugees during the pandemic. Dietary behavior is inherently complex and multifaceted. However, the pandemic crisis somewhat changed the attitude among refugee participants toward more FV consumption although it was generally inadequate. Such anecdotal evidence about the positive behavioral change indicates the effectiveness of FV campaign awareness.

6.2. Recommendations.

Further research needs to be done to find the correlation between the consumption of different FV and variation in seasons. As highlighted, the availability of FV in the

different seasons was crucial in improving food security in the sample refugee population. The mechanisms of how to harmonize the self-reliance strategy and land access and rights to achieve sustainable livelihoods are missing and need to be investigated.

From the technical perspective, further investments in training and knowledge about kitchen gardens can fill the gap between the supply and demand of FV as well as ensure livelihoods for households. The GoU and NGOs can promote lead farmer initiatives through their extension services as another mean to promote food security. Considering the influx of refugees in Uganda, the GoU and UNHCR could put into consideration possible ways of relocating new refugees to other settlements or establishing new settlements to improve land accessibility to already settled refugees. Provided the relocation strategy is viable and comprehensively planned, it might help in the realization of self-reliance and improvement in food security outcomes wherever refugees can find better entitlements.

APPENDIX 1

Questionnaire for Refugees

Title of Research Study: Consumption of Fresh Fruits and Vegetables in the time of COVID - 19 pandemic among Refugees in Kyaka II Refugee Settlement in Uganda.

Principal Investigator: Dr. Lamis Jomaa

Graduate Student: Micheal Ssegawa

ID Number:

Date:

Section 1 Demographic and Socio-economic status

	Question	Answer
1	Gender	a- male b- Female
2	Age	
3	Nationality	a- Congolese b- Rwandese c- Burundian d- South Sudanese e- other, specify_____
4	Marital status	a- Single b- Married c- Divorced d- Widowed
5	How long have you been in Uganda?	
6	What is the highest education level that you have reached?	No a- schooling /Illiterate b- Able to read and write c- Primary and Secondary School d- Technical diploma

		e- University degree
7	Employment?	a- Yes 1- Full Time 2- Part Time 3- Unemployed a- No
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8	If yes, what type of work do you do?	
9	Personal income per month	a- less than shs 50, 000 b- shs 50,001 – shs 100,000 c- more than shs 100,000
10	What are the sources of income of your household in the last 12 months? (Please choose all applicable answers)	Crops sale Livestock sale Assets sale Savings Debts Agricultural waged labor Non-Agricultural casual labor Gifts from family, relatives, or remittances Cash/ Food vouchers from humanitarian agencies Other, specify.....
Section 2. Assessment of Fruits and Vegetables attitude, consumption and purchasing behavior		

11	Eating fruit and vegetables is very healthy for me	a- Strongly agree b- Agree c- Somewhat agree d- Somewhat disagree e- Disagree
12	Has the amount of fresh fruits and vegetables changed since the beginning of the pandemic?	a- Increased b- Decreased c- No change
13	During the past 30 days, how many times per day did you usually eat vegetables? Examples: carrots, cucumber, peppers, (chili pepper, green pepper other peppers.), onions, garlic, leafy greens (amaranths, lettuce, sukuma wiki), tomatoes, eggplants, etc.	a- 5 or more times per day b- 4 times per day c- 3 times per day d- 2 times per day e- 1 time per day f- Less than one time per day g- Never
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14	During the past 30 days, how many times per day did you usually eat fruits? Examples: mangoes, citrus fruits (lemons, oranges), papaya, pineapple jack fruits, avocados, melons, and guava.	a- 5 or more times per day b- 4 times per day c- 3 times per day d- 2 times per day e- 1 time per day f- Less than one time per day g- Never
15	Frequency of purchase of fresh fruits and vegetables	a- more than once in a week b- one time in a week c- once in a month d- never

16	Source/ Place of purchase of fruits and vegetables	a- open market b- Borrowing from friends and family c- farm d- other places, specify
17	Do you have access to land to plant your fruits and vegetables?	a- Yes b- No

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Individual Food Consumption Score

18- How many days over the last 7 days did members of your household eat the following food items, prepared and/or consumed at home, and what was their source?

Food Group	Examples	In the last 7 days, the number of days items consumed	What was the main source of the food item in the past 7 days (see codes below)
Main Staples	Maize, maize porridge, rice, sorghum, millet pasta, bread, cereals, cassava, plantains and potatoes		
Pulses and nuts	Beans, peas, groundnuts, and seeds		
Vegetables	Tomato, onion, okra, and cabbage.		
Fruits	Banana, oranges, mango.		
Meat and Fish	Beef, goat, poultry, pork, eggs, and fish.		
Milk	Fresh milk, Yogurt, infant formula, powdered milk.		
Sugar	Honey, sugar and sugar products.		
Oil	Oil, fat and butter.		

Adapted from: World Food Programme (WFP) (2009). Emergency Food Security Assessment Handbook - second edition. https://documents.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp203246.pdf?_ga=2.225821458.960944950.1625595979-1210779649.1623937012

Food source codes	Main food sources
1	Own production
2	Bought with cash
3	Bought on credit
4	Exchanged /borrowed
5	Received as gift
6	Food assistance from WFP
7	Food assistance from charity
8	Hunting/gathering/fishing

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Section 3 FOOD INSECURITY EXPERIENCE SCALE; Individually Referenced. Now I would like to ask you some questions about food:			
Q1	During the last 12 months, was there a time when you were worried you would not have enough food to eat because of a lack of money or other resources? (if “Yes”, go to question Q1a, otherwise go to question Q2)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q1a. Was this specifically due to the COVID-19 crisis?	0 No 1 Yes	98 Don’t Know 99 Refused
	Q1b. Did this happen in the past 4 weeks (30 days)?	0 No 1 Yes	98 Don’t Know 99 Refused

Q2	During the last 12 months, was there a time when you were unable to eat healthy and nutritious food because of a lack of money or other resources? (if “Yes,” go to question Q2a, otherwise go to question Q3)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q2a. Was this specifically due to the COVID-19 crisis? (go to question Q2b)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q2b. Did this happen in the past 4 weeks (30 days)? (then go to question Q3)	0 No 1 Yes	98 Don’t Know 99 Refused
Q3	During the last 12 months, was there a time when you ate only a few kinds of foods because of a lack of money or other resources? (if “Yes”, go to question Q3a, otherwise go to question Q4)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q3a. Was this specifically due to the COVID-19 crisis? (go to question Q3b)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q3b. Did this happen in the past 4 weeks (30 days)? (go to question Q4)	0 No 1 Yes	98 Don’t Know 99 Refused
Q4	During the last 12 months, was there a time when you had to skip a meal because there was not enough money or other resources to get food? (if “Yes,” go to question Q4a, otherwise go to question Q5)	0 No 1 Yes	98 Don’t Know 99 Refused

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	Q4a. Was this specifically due to the COVID-19 crisis? (go to question Q4b)	0 No 1 Yes	98 Don't Know 99 Refused
	Q4b. Did this happen in the past 4 weeks (30 days)? (go to question Q5)	0 No 1 Yes	98 Don't Know 99 Refused
Q5	During the last 12 months, was there a time when you ate less than you thought you should because of a lack of money or other resources? (if "Yes," go to question Q5a, otherwise go to question Q6)	0 No 1 Yes	98 Don't Know 99 Refused
	Q5a. Was this specifically due to the COVID-19 crisis? (go to question Q5b)	0 No 1 Yes	98 Don't Know 99 Refused
	Q5b. Did this happen in the past 4 weeks (30 days)? (go to question Q6)	0 No 1 Yes	98 Don't Know 99 Refused

Q6	During the last 12 months, was there a time when your household ran out of food because of a lack of money or other resources? (if “Yes,” go to question Q6a, otherwise go to question Q7)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q6a. Was this specifically due to the COVID-19 crisis? (go to question Q6b)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q6b. Did this happen in the past 4 weeks (30 days)? (if “Yes,” go to question Q6c, otherwise go to question Q7)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q6c. How often did this happen? (go to question Q7)	2 Rarely (1 or 2 times) 3 Sometimes (3-10 times) 4 Often (more than 10 times) 98 Don’t Know 99 Refused	
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Q7	During the last 12 months, was there a time when you were hungry but did not eat because there was not enough money or other resources for food? (if “Yes,” go to question Q7a, otherwise go to question Q8)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q7a. Was this specifically due to the COVID-19 crisis? (go to question Q7b)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q7b. Did this happen in the past 4 weeks (30 days)? (if “Yes,” go to question Q7c, otherwise go to question Q8)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q7c. How often did this happen? (go to question Q8)	2 Rarely (1 or 2 times) 3 Sometimes (3-10 times) 4 Often (more than 10 times) 98 Don’t Know 99 Refused	
Q8	During the last 12 months, was there a time when you went without eating for a whole day because of a lack of money or other resources? (if “Yes,” go to question Q8a, otherwise END)	0 No 1 Yes	98 Don’t Know 99 Refused
	Q8a. Was this specifically due to the COVID-19 crisis? (go to question Q8b)	0 No 1 Yes	98 Don’t Know 99 Refused

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	Q8b. Did this happen in the past 4 weeks (30 days)? (if “Yes,” go to question Q8c, otherwise END)	0 No 1 Yes	98 Don’t know 99 Refused
	Q8c. How often did this happen? (END)	2 Rarely (1 or 2 times) 3 Sometimes (3-10 times) 4 Often (more than 10 times) 98 Don’t Know 99 Refused	

Adapted from: FAO. 2020. Using the Food Insecurity Experience Scale (FIES) to monitor the impact of COVID-19. Rome. <https://doi.org/10.4060/ca9205en>

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APPENDIX 2

Focus Group Script for Refugees.

Facilitator's welcome, introduction, and rules [25 minutes]

Hello,

Welcome and thank you all for coming. You have been asked to participate as your viewpoint is important. I appreciate your time.

As you all agreed to participate in this discussion, I am going to read you the consent form orally and give each of you a short questionnaire to fill out before we start our discussion. If you need any help, let me know.

Please help yourself to some refreshments.

Hello again. My name is Micheal Ssegawa. I am a graduate student pursuing a master's degree in Food Security at AUB. In this discussion on the consumption of fresh fruits and vegetables, we want you to talk about your personal experiences and perceptions, consumption behavior, and recommendation to improve your fruit and vegetable intake. Please note that your participation in this discussion, and any answers or inputs you provide, do not in any way influence access to or the receipt of humanitarian assistance and programs. Please give your opinion with full transparency; all names will be kept anonymous. We would appreciate it if you would refrain from discussing the comments/responses outside of this session. Our discussion will take about 60 minutes at the most. You can withdraw from the discussion at any time.

Ground rules for in-person meetings [2 minutes]

The most important rule is that you observe COVID-19 Standard Operation Procedures (SOPs) that is; keep a distance of about 2 meters and keep your masks on.

During the discussion, one person speaks at a time. You might be tempted to jump in when someone is talking but please wait until he/she has finished.

There are no right or wrong answers.

There is no particular order to be followed for speaking.

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If you do have something to say, please do so. There are many participants in the group and we must obtain the views of each of you.

Respect opposing the views of other people in the group.

Does anyone have any questions? (answers)

Focus Group Discussion Questions.

Icebreaker

Why don't we go around and briefly introduce ourselves?

Probe: *(Who are you? How long have you been in Uganda?)*

Thank you. May I voice record the discussion to facilitate its recollection? (if yes, switch on the recorder)- OK, let us begin.

Food security and Livelihood assessment

1. How do you make a living at the moment?

Probe: *(Are you working in agriculture, service sector? etc.)*

2. How are you currently obtaining your food?

Probe: *(consumption from own stock, work for food, food aid, from relatives and friends?)*

3. Has the situation changed since the start of the pandemic? If yes, how has it changed? How have you been adapting to these changes (probe: new sources of livelihood/income? Assistance? Coping mechanisms, etc.)

FV attitudes

4. Why do you think you need to eat fruits and vegetables?

5. What are the preferred causes of fruit and vegetable consumption before and after the pandemic outbreak?

Probe: *(Was health or cost one of the key factors before and after the pandemic?)*

FV purchasing and consumption behaviors.

6. How do you access your FV?

Probe: *(Are they from the market, food assistance/fresh FV vouchers, own Production? Other sources?)*

7. What kind of fruits and vegetables are usually available in the settlement?

Probe: *(Ask for examples, seasonality of various fruits)*

8. What are your main fruit and vegetable purchases and consumption

9. What are the common food preparation and cooking practices of FV?

Probe: *(Are the fruits and vegetables eaten raw, prepared as juices or as a stew, and is responsible for the purchases and preparation?)*

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10. Can you describe your current fruit and vegetable consumption in comparison to your consumption before the pandemic?

Probe: *(Assume they are different: Were the changes favoring or limiting the consumption of FV? What are the reasons behind this change? What are the implications of that change?)*

Facilitators and Barriers

11. What are the most important reasons you eat fruits and vegetables during this pandemic? Probe: *(is it because of health benefits, FV campaigns, taste, family upbringing ?)*

12. Before the pandemic, were there any different factors that influenced your FV consumption?

13. What are the challenges caused by the pandemic that has influenced your consumption of FV as compared with the pre-crisis situation?

Probe: *(is it income, ethnicity, knowledge, tradition/culture, or other reasons?)*

14. Are there any restrictions on land ownership of lands and assets in the settlement? Did this change during the pandemic? If yes, how?

Probe: *(Who has access to land? Who owns the land?)*

15. Has there been any change in the general food assistance since the outbreak of the pandemic? If yes, how did it affect your FV consumption?

Recommendations

16. What can be done new or more to help you as a refugee to include

fruit and vegetables in your/household's food basket?

17. Would any of you like to share anything else with us? (closing question)

Thank you again for sharing your opinions with me.

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APPENDIX 3

Key Informant Interview Guide

Introduction

Thank you for allowing me to meet with me today. My name is Micheal Ssegawa, I am a graduate student at the American University of Beirut.

As you know we are working on a thesis to explore the consumption of fruits and vegetables by refugees in the Kyaka II refugee settlement in the time of the pandemic.

I would like to talk to some of the stakeholders who can give me their viewpoint on what foods refugees tend to eat and where they think fruits and vegetables fit in the whole picture. All we well know, frequently eating fresh fruits and vegetables is important for peoples' health but we also acknowledge that there are many challenges refugees face in accessing affordable and acceptable quantities of fruits and vegetables as well as barriers specifically related to covid – 19 pandemic.

I would like to hear your thoughts about some of the challenges refugees face in this settlement. I will use what you say to help identify opportunities for FV consumption that may be improved through policy, research, and investment.

The interview will be audiotaped so that I can remember exactly what you said. But please remember that everything we discuss is confidential. We take all the information given to me and aggregate it in a summarized form, no personal identifiers will be linked to specific comments collected for this project. This interview will take no more than 45 minutes.

Before we begin, I read the consent form with you and I will be happy to answer any questions you may have about the study. Once you indicate your consent, the voice recorder is turned on and the interview begins.

Interview questions

1. Please tell us a little about your role at Kyaka II refugee settlement and how long have you been working with refugees in this settlement?
2. In general, what are the challenges posed by COVID-19, and in what ways have the lives, health, and livelihoods of refugees been impacted?
3. What are the main qualities or attributes refugees recognize concerning their food? (e.g., tasty, strength-giving, filling, healthful, expensive, prestigious). Do these judgments about food vary according to age, gender, or ethnic subgroup?
4. What do you think are the major food challenges facing refugees in the settlement? Probe: (*what were the challenges before covid? If any, have they worsened, or are refugees dealing with new challenges?*)
5. How do fruits and vegetables fit into the food basket and usual diet of the refugees? Probe: (*what is your perception of attitudes of refugees toward fruits and vegetables? What are some common practices in food preparation and cooking?*)

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6. In your own opinion, do fruits and vegetables present a core component in their diet? If so, why? If not, why?
7. Are there changes in the general food assistance that have occurred since the outbreak of the pandemic? if yes, what are they?
Probe: (*Who are the major aid actors in the settlement? What modality is used? Were*

there any changes in the modality?)

8. What is the availability and accessibility of affordable and quality fruits and vegetables in the refugee settlement. Probe: *(what are the commonly purchased FV? How are the market's prices? Are the FV accessible? Is accessibility to land improving food security?).*

9. What suggestions do you have for the humanitarian actors who wish to promote and increase fruit and vegetable intake among refugees?

Probe: *(what do you think we need to address? Have the NGOs tried to promote FV before? What do you think will be the main barriers and facilitators with this program?)*

10. Do you have anything else to add?

Thank you again for agreeing to be interviewed.

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APPENDIX 4

FIES and results of the follow-up questions that captured the degree to which these conditions associated with food insecurity were a further result of the COVID-19 crisis as linked up by the respondent.

Item	Affirmative responses (%) n=(68)	Due to COVID-19 crisis (%) n=(68)	Happen in past 30 days (%) n=(68)				
Worried	58 (85.3)	53 (77.9)	51 (75)				
Healthy	60 (88.2)	51 (75)	54 (73.5)				
Fewfoods	63 (92.6)	52 (76.5)	54 (79.4)				
Skipped	56 (82.4)	47 (69.1)	50 (73.5)	Frequency of experiences			
Ateless	57 (83.8)	49 (72.1)	51 (75)				
				Rarely (1 or 2 times)	Sometimes (3-10 times)	Often (> 10 times)	Don't know
Ranout	49 (72.1)	39 (57.4)	41 (60.3)	13 (19.1)	19 (27.9)	8 (11.8)	1 (1.5)
Hungry	53 (77.9)	42 (61.8)	47 (69.1)	10 (25)	16 (40)	4 (10)	1 (1.5)
Wholeday	50 (73.5)	43 (63.2)	41 (60.3)	20 (29.4)	15 (22.1)	6 (8.8)	0

APPENDIX 5

FCS and Main Sources of the Food groups

Food group	Main food Source						
	Own production	Bought with cash	Bought with credit	Exchanged/borrowed	Food assistance from WFP	Received as gift	Hunting/gathering/fishing
Staples	4 (10)	41(60.3)	15(22.1)	2 (2.9)	5 (7.4)		1(1.5)
Pulses	3(4.4)	46(67.6)	11(16.2)	4 (5.9)	3 (4.4)		1 (1.5)
Vegetables	4 (5.9)	54(79.4)	8 (11.8)		2(3)		
Fruits	3 (4.4)	57 83.8)	6(8.8)		2(3)		
Meat and fish		45(69.1)	17(25)	2 (2.9)		1 (1.5)	1 (1.5)
Milk	2 (2.9)	51(75)	10(14.7)		3(4.4)	2 (2.9)	
Sugar		56 (82.4)	8(11.8)	1 (1.5)	3(4.4)		
Oil		48(70.6)	11(16.2)	1 (1.5)	8(11.8)		

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