AN ASSESSMENT OF STATUS AND DETERMINANTS OF FOOD SECURITY IN FEMALE-HEADED HOUSEHOLDS IN NAIROBI COUNTY, KENYA

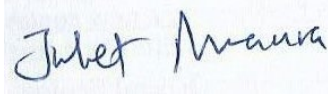**JULIET MUTHONI MWAURA**

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN SUSTAINABLE URBAN DEVELOPMENT (MSc-SUD)

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DECLARATION

This research project is my original work and has not been presented to any other university for examination

29/09/2022

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This research is hereby submitted with our approval as University of Nairobi supervisors

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DEDICATION

This project is dedicated to my loving parents, Franco and Martha Mwaura, for their prayers, support and love through my academic journey and to my younger sister Evelyn (Zoe) for her support and care during my education and in life.

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ABSTRACT

The global urban population is increasing in time and space and much of the urban population increase is in the developing world. A number of social, economic, environmental and spatial challenges accompanies the high rate of urbanization in sub-Saharan Africa. Among the emerging challenges is increasing household food insecurity, especially within the vulnerable groups of the urban population. One of these vulnerable groups is the female-headed households. As such, the study aimed at assessing food security in female-headed households in Nairobi. The objectives of the study were to examine the characteristics of female-headed households, to analyse the status of food security in female-headed households, and to assess the factors that determine food security in female-headed households. The study used secondary data from Hungry Cities Partnership (HCP) dataset. The study sub-population was all the 1,434 sampled households from the HCP Nairobi Household Survey dataset, from which all the 295 cases of the female-centered or female-headed households were selected for further analysis. The main variables that were analysed include age, marital status, migration status, level of education, and work status of the female household heads, as well as household size, monthly income, reliance on other food sources, household experience with unfavourable food prices, and food security conditions. Analysis of food security conditions was done using FAO's FANTA measures (Food and Nutrition Technical Assistance) to determine the households' food security and dietary diversity. Cross tabulations using SPSS were also done to determine relationships between study variables. The results show that majority of the female household heads in Nairobi are in their youthful generation (16-35 years), are unmarried, are migrants to Nairobi, have attained secondary level of school education, and are engaged in gainful employment, with the main source of income being self-employment. These results imply that young female headship of households is an emerging characteristic among urban households, especially in Nairobi. In addition, more women continue to join the rural-urban migration streams in Kenya. In terms of household characteristics, female-headed households in Nairobi have between 4 to 6 members, have a low monthly income of KES 10,000 and less, rarely relied on other sources of food (food transfers or growing food), and reported that they were affected by high and unaffordable process of food. Over half of the households stated that they experienced food insecurity in various degrees with 26.4% having a dietary diversity score of 0-4, showing lack of diversity in their diet. The study tested the hypotheses that female-headed households' food security is not influenced by household heads characteristics on the one hand, and household characteristics on the other hand. The results

indicate that the main determinants of food security in households headed by females in Nairobi are household monthly income, reliance on own grown food, reliance on food transfers from rural home and household experience of unaffordable food prices. The characteristics of household heads, i.e., age, marital status, migration status, level of education, and work status, do not have a significant effect on female-headed households' food security situation. The study recommends systematic implementation of the existing pro-poor policies and programmes that relate to employment creation, reduction of food prices and social security systems to the vulnerable groups. In addition, County governments to develop programmes that encourage, train and empower women and youth in urban centres to venture into sustainable urban farming practices as an economic enterprise within the small and micro enterprises (SME) sector of the urban economy.

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CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Food insecurity is a universal challenge that is experienced across many urban centres, especially in developing countries. According to Tawodzera et al. (2016), food insecurity in urban Africa is largely prevalent in low-income settlements and neighbourhoods and, as such, related to increasing urban population and urban poverty. The global population and the population of cities and urban centres in Africa is projected to increase in the long term (Crush & Frayne, 2010). Urbanization and the increasing poverty rate in many areas have made it difficult for households to access nutritious and culturally appropriate food. This is why it is important that policymakers and the private sector work together to address these issues. This issue is also contributing to the food crisis in Africa (WFP, 2020).

According to United Nations (2010), urbanization in Africa has led to increased food insecurity and undernourishment. Notably, the poor population has become vulnerable to high and unaffordable food costs, shortages of food, and inadequate diets, making them susceptible to urban food insecurity. This brings to the fore the issue of household income and their capabilities to purchase food, including such related factors as food prices, affordability, access to sources that provide safe and nutritious foods, access to refrigeration and storage, household size, income stability and household structure (Garret, 2000).

Food insecurity is also associated with inefficiencies in transportation and distribution of food (FAO, 2008), as well as livelihood security and social safety nets of an individual or a household. This means that people who are unemployed, have low education levels, as well as households with low incomes, low social capital and weak social networks, experience greater risk of being food insecure (Swift & Hamilton, 2001). This continued decline in formal and informal safety nets in urban areas means that food insecurity will continue to persist. Furthermore, changes in strategies in urban areas, which are increasingly insecure, will also lead to high food insecurity.

Gender differences in resource allocation, distribution and decision-making processes also affect household food security. It is established that women are a major contributor in ensuring

a household is food secure (Kweyu et al., 2019) because of their involvement in the household's food production, purchase and preparation. However, female-headed households bring another dynamic to the debate on household's food security. Female headship occurs because of various demographic and economic factors. According to Gupta & Buvinić (1997), these factors are migration of the spouse; marital disruptions such as in death, separation or divorce; and single motherhood status. In urban areas, some of these factors cause households headed by females to be susceptible to food insecurity because of lack of money to purchase food, basic necessities, and maintain a certain level of living.

1.2 Statement of Research Problem

Gender disparities in food security is larger among those who are poorer, less educated and those in urban areas (FAO et al., 2019). However, despite eliminating the factors of poverty, education and rural or urban setting, food security challenges are relatively higher in women than in men. This indicates that gender inequalities and discrimination limit the chances of women to have access to food even if they have similar education levels as men, live in similar residential settings and have equal income. Nevertheless, Broussard (2019) argued that gender differences in food security is influenced by gender differences in terms of education levels, incomes and social networks. This necessitates the need to have gender dynamics as a crucial aspect in understanding food security, especially in urban areas.

Gupta & Buvini (1997) found that households with female heads are more vulnerable to poverty and food insecurity. Furthermore, they have higher dependency ratios, lower incomes, access to fewer assets, fewer employment opportunities, and limited access to productive resources and technology. These forms of gender related economic inequalities exposes female-headed households to poverty, economic vulnerabilities, higher risks and fewer coping strategies.

According to Medeiros & Costa (2008), more females are joining the migration streams to the cities and their numbers are increasing according to various countries' urban sex ratios. This is what they conceptualized as 'feminization of poverty'. Higher rates of poverty among women is attributed to their lack of job opportunities, low and unfair wages and lower levels of education. These factors affect women's capabilities of food provision to their households and therefore increasing their food insecurity and poor child nutritional status (Kennedy & Pauline, 1992). According to Kantor & Wood (2012), women tend to face a number of challenges in

the labour market that may lead to shortfalls in productivity and therefore have a negative impact on the household members' livelihoods.

There is no doubt that urban livelihood uncertainty, poverty and the lack of safety nets are associated with food insecurity. In addition, gender dynamics are crucial in analysing urban food insecurity. Even though substantial literature exists on gender and food security, the focus has been on comparisons of females and males. The present study is an assessment of status and determinants of food security in female-headed households in Nairobi.

1.3 Research Questions
1. What are the socio-economic characteristics of female-headed households in Nairobi?
2. What is the status of food security in female-headed households in Nairobi?
3. What socio-economic characteristics of female-headed households in Nairobi determine their food security situation?

1.4 Research Objectives
1. To examine the socio-economic characteristics of female-headed households in Nairobi.
2. To determine the status of food security in female-headed households in Nairobi.
3. To assess the factors that determine food security in female-headed households in Nairobi.

1.5 Null Hypotheses
1. The state of food security in female-headed households is not determined by the household heads characteristics.
2. The state of food security in female-headed households is not determined by household characteristics.

1.6 Scope and Limitations
As explained in the methodology section, this study is based on Hungry Cities Partnership (HCP) database. As such, the thematic, geographical and methodological scope is limited to the scope of the wider HCP project, which conducted city-scale surveys on household food security in eight cities. These are Mexico City in Mexico, Kingston in Jamaica, Cape Town in South Africa, Windhoek in Namibia, Maputo in Mozambique, Nairobi in Kenya, Bangalore in India and Nanjing in China. This study uses the Nairobi database.

The limitations to the study were: 1) There was a lack of differentiation between type of settlement based on income levels, that is, upper, middle and low-income/slum settlement. Differentiations of their food security status based on this criterion was difficult; and 2) The HCP sub-locations sampled left out major slums in Nairobi County such as Mukuru, Korogocho, Dandora and Mathare due to security reasons when the survey was undertaken. These limitations however, did not affect the validity of the present study results.

1.7 Justification

Urban growth brings with it a number of challenges, including increased poverty food insecurity in urban areas. As such, relevant data and information is needed to guide the urbanization process by reducing the challenges and maximizing opportunities offered by the urban growth. Urbanization and climate change are increasing the importance of sustainable food systems in the development of cities. This is expected to contribute to the achievement of the Sustainable Development Goal 11. The goal aims to create a more just and inclusive society by improving the conditions of the urban population. The increasing urbanization in Nairobi County will contribute to the development of resilient and sustainable cities. This study aims to identify the key factors that contribute to urban food security. Besides gender dynamics, this study also explores what influences the food security state in households headed by women. Data and information generated from this study will be important in policy making for vulnerable urban communities, as well as contribute to the scientific discourse on urban food security, food planning and sustainable food systems.

1.8 Operational Concepts and Definitions

Household: A household consists of an individual or people residing in one home and with a common provision for food.

Household head: An individual recognized by other household members as having social or economic responsibility for the household.

Female-headed or female-centred household: A household headed by a female because of personal choice, abandonment, divorce, economic separation or death of a spouse.

Female household head: A female who is the head of a household and has both economic and social responsibility for the household.

CHAPTER TWO
LITERATURE REVIEW

The following aspects of the study are covered in the literature review: the concept and measures of food security; the status of food security in sub-Saharan African cities; the factors that influence food security in urban households; female-headed households and urban food security; research gaps; and theoretical and conceptual frameworks.

2.1 Concept and Measures of Food Security

According to FAO (2002), household food security occurs when a household is able to physically, socially and economically access sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life at all times (FAO, 2002). The focus is on physical availability, economic accessibility, nutritional utilization, and food stability over time. Food security can be analysed at the macro (national) or micro (household or individual) levels. Furthermore, it can be categorized as being chronic (persistent and long-term); transitory (temporary and short-term); and seasonal (cyclical and short-term) in nature (FAO, 2008).

According to Lele et al (2016), there are several indicators and ways of determining of household food security. However, the regularly used measures are the FAO-aligned Household Food Insecurity Access Scale (HFIAS), Household Food Insecurity Access Prevalence (HFIAP), Household Dietary Diversity Score (HDDS) and Months of Adequate Household Food Provisioning (MAHFP). HFIAS determines whether, within a certain recall period, a household experienced certain circumstances of food insecurity. HFIAP determines the different categories of food security (Swindale et al., 2007). HDDS determines the different groups of food consumed by a household (Swindale & Bilinsky, 2006), while MAHFP determines the number of months within a year where households are unable to meet their food needs (Bilinsky & Swindale, 2010).

These measures, however, have limitations in that they are difficult to make cultural comparisons and create cut-off points for categorizing households according to their food security levels. They also fail to capture food safety elements and there are various scenarios, different time reference periods and frequency responses are required (De Cock, 2012). In

addition, the methods also lock out the concept of food safety which is equally important in assessing food security. Other methods used to measure household food security include anthropometric measures of children and mothers, income and expenditure surveys, and coping strategy index. Based on these methods, a household might be termed as food secure, mildly food insecure, moderately food insecure, and extremely food insecure.

2.2 Urban Food Security in sub-Saharan Africa

According to FAO (2018), approximately one out of five people experienced chronic food insecurity in sub-Saharan Africa in 2017. The situation became worse in 2020 as 63% of the African population was food insecure, up from 54% in 2019 (WFP, 2020). This is despite substantial progress toward alleviating food insecurity in the region since 2000. High urban growth rates have increased the need for food supply in cities with the need for food aid being high due to the high incidences of famine and malnutrition (Glover, 2010). Chronic food insecurity occurs when households fail to meet their food consumption needs for longer periods of over six months. On the contrary, seasonal food insecurity is normally experienced during certain seasons such as drought, war, pandemics, among others. Even then, transitory food insecurity may occur when a household temporarily fails to meet their food needs because of a temporary shock like sudden loss of income or a job.

Insufficient and irregular income are the primary causes of food insecurity in urban areas as urban dwellers rely mainly on purchasing food and any decrease in their income or increase in prices of food affects food security status (Tacoli, 2017). It is also important to note that a large proportion of urban daily wage or monthly income goes to buying food. According to Tendall et al (2015), urban food poverty occurs because of rapid urbanisation, natural disasters, climate change, and inappropriate responses to food system changes. The urban food insecurity situation in Sub-Saharan African cities is currently predicted to be much worse due to COVID-19 pandemic which has resulted in many urban households losing their income sources and being more food insecure (WFP, 2020). The impact of COVID-19 pandemic and the subsequent containment and restriction measures were largely felt in the urban areas.

In Southern Africa, urban food insecurity is mainly rampant in low-income households. In a study of Cape Town, 72% of sampled households were food insecure (Battersby & Crush, 2014) due to poverty, increased food prices and high inflation rates. With South Africa being mainly urban and a majority of its population residing in urban areas, food insecurity has

become a main issue and a large percentage of the population consumes inadequate, nutritionally poor diets (Haysom, 2021).

In a 2008 study in low-income areas of Harare, 72% of the sampled households were severely food insecure and 2% food secure. This is comparable to a similar study in 2012 in the same areas where majority of households (63%) experienced severe food insecurity due to a number of economic factors (Tawodzera et al., 2016). In a 2005 study in Maputo, 71% of the sampled households were reported to be food insecure and 29% reported to be food secure (Raimundo et al., 2018). In Central Africa, most countries suffer from food insecurity due to recurrent conflicts, political instability, displacement and disruption of livelihoods. During conflicts, there is no food production and food distribution because the food supply and distribution is disrupted. Female-headed households, the displaced, refugees, and the urban poor, who have limited ability to purchase food and access to food through local markets, are the most affected populations (WFP, 2020).

In Eastern Africa, food insecurity is linked to food supply constraints, economic crisis, high food prices, income declines, and reduced agricultural harvests (WFP, 2020). For example, in Addis Ababa, Birhane et al (2014) found that 74.9% of sampled households experienced food insecurity and 9.6% reported to be food secure. Urban food insecurity was largely due to high prices of food, reduced household incomes, poverty, fluctuating food prices and dependency on purchased food. High levels of food insecurity were noted within low-income households and household heads with low education. More recently, climate change has joined the list of causes of food insecurity.

In Kenya, the urban population increased from approximately 12.4 million in 2009 to 14.8 million in 2019 with Nairobi having 29.6% of the urban population (KNBS, 2019). This has increased poverty and food insecurity in urban Kenya. Whereas urban households in Kenya prefer sourcing their food from informal food sources and vendors, formal supermarkets are commonly used in high, middle and low-income neighbourhoods (Ouma et al., 2013; Kimani et al., 2012). Ensuring that the informal food economy is sustainable in Kenya will help stabilize food prices to ensure food is affordable for the urban poor (FAO, 2012). The informal food economy in cities perform important functions of food supply and distribution, especially in the low-income neighbourhoods. They are major channels of affordable food to the poor

urban population. As such, street food vending is very common in most cities, including informal markets.

In a study of Kisumu (Kenya), 71% of sampled households that lived in poorer settlement areas were moderately to severely food insecure (Wagah et al., 2018). Higher incidences of food insecurity were also found among those who lived in peri-urban areas with high levels of informality and limited access to services. Due to poverty and reduced income, households were forced to allocate funds to other areas and therefore had reduced dietary diversity or consumed less food. In Nairobi, rapid urban growth continues to stretch the existing agricultural and food systems (Owuor et al., 2017). According to Owuor (2018), 29% of Nairobi's households are food secure and 71% experience various degrees of food insecurity. Households in the slums tend to be more disadvantaged because of poverty and lack of income to meet all their basic needs, mainly buying food (Sheikh Abdulla, 2011).

In a study of Korogocho and Viwandani slums of Nairobi, Kimani-Murage (2014) noted that 50% of sampled households in both areas were severely food insecure, with 64% in Korogocho and 33% in Viwandani. Only 15% of the households in both slums were food secure. Having access to a diversity of food groups was also difficult to achieve given the population's low-income (71% earned less than KES 10,000 monthly) and high unemployment rates. As such, most of the households depended on purchasing street foods or relying on school feeding programmes for their children.

2.3 Determinant of Food Security in Urban Households

In urban households, food insecurity may develop when members of the household lack skills, education or training necessary to obtain jobs and income to purchase food. It could also be because of lack of agricultural labour resources (Gillespie & Loevinsohn, 2003). Food secure households, according to Swift & Hamilton (2001), are those with sufficient food consumption and a minimal risk of food insecurity due to sustainable livelihood strategies. This is because they have a diverse range of employment options, as well as savings and assets that act as safety nets when they are food insecure. They are also able to retain food access even after suffering shocks.

Households' ability to access food through purchase or production determines their food security status (FAO, 2010). Households' income is the main determinant of this and has a

negative association with it. This can be evident when households are not able to buy food, as their purchasing power is limited due to lack of income. This primarily affects female-headed households and the urban poor (Headey & Fan, 2008). Income is significant since it is utilized to fund food purchases as well as non-food expenses such as asset accumulation for the household (Akinboade & Adeyefa, 2017). As such, food might be physically available in the market but people do not have the economic access to purchase the same. This leads to most people to opt for cheap unhealthy diets.

The household's head education status is also a determinant of food production, access and utilisation and therefore affects household food security (Drammeh et al., 2019). This is because education provides employment opportunities and hence improves the household income and access to food. In a study in Tshwane City, South Africa, 79% of sampled households where the household head was in employment were food secure, with only 11% being severely food insecure (Akinboade & Adeyefa, 2017).

Households' economic access to food also affects the households state of food security. This is attributed to high and unaffordable food prices, which forces the urban poor to reduce food consumption, substitute between food and other basic needs, cut back on purchases made and forgo nutritional value for sustenance (Tawodzera et al., 2016). This was evident in a study of Harare where about two-thirds of sampled households stated that they stayed without food because of high food prices (Tawodzera et al., 2016). The most common food types that the households went without include meat, fish, poultry, cereals and dairy products.

The age of the household head is another factor that determines food security status because it influences household's decision-making processes and the production of food (Drammeh et al., 2019). Khan and Gill (2012) discovered that as the household head gets older, food production decreases and the household food security decreases, in comparison to the younger household heads. However, in a study of Nsukka Metropolis (Nigeria), Arene & Anyaeji (2010) established that in households where the head was older, their probability of being food secure was high because of employment, savings and lower levels of consumption compared to younger household heads.

Food security has also been found to be influenced by household size. Very large households are far worse in food insecurity compared to smaller households due to their higher dependency

ratios (Tawodzera et al., 2016). The larger the number of people to feed in a household, the more the number of mouths to feed. Larger households are more likely to compete for the few resources available. As a result, they consume a less amount of food or eat less frequently, without regard for the quality of their diet (Jalil et al., 2015). However, if there are fewer dependants, the negative effects of food insecurity are reduced.

The household head's marital status also influences household food security status. When compared to non-married, the married are likely to be food secure (Akinboade & Adeyefa, 2017). Married household heads have more options of avoiding food insecurity since both spouses are more likely to contribute to obtaining food. However, due to their limited resources and support, the unmarried carry a heavier burden in achieving food security (Kaloi et al., 2005).

Lastly, reliance on food from the rural areas and own food production in the city are likely to improve urban households' food security status. According to Tawodzera et al (2016), households in Harare that had access to food rural homes experienced better food security status. Likewise, urban households engaged in urban agriculture in Kenya and Zambia were food secure than their counterparts who did not (Davies et al., 2020).

2.4 Female-Headed Households and Urban Food Security

Culturally, women are critical in achieving food security (Quisumbing et al., 1995). Evidence suggests that when women have an income, the income is most probably going to be spent on purchasing food for the children and the family (Brown, 2009). However, compared to men, women's access to food is limited because of discrimination through prejudicial regulations and laws, women's reduced role in making decisions on the usage of household assets, community norms that impose women with the burden of reproductive responsibilities and exclusion from male dominated job opportunities (Quisumbing et al., 1995). Women are, more often than not in charge of food production, buying of food, cooking food and making sure that the members of the household have eaten. They are also in charge of childbearing and childbearing.

Gender differences in ownership of assets, expenditure, income, resource control and consumption have been established as significant factors in households' food security (Gbenga, 2005). This is because of gender dynamic differences in access to resources and decisions over

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coping strategies, food production, consumption and nutrition (Ashagidibi et al., 2017). In Africa, the females are responsible for many food-related activities in the household, including food production, food purchasing and food preparation (Quisumbing et al., 1995). In addition, women have unequal rights to natural and physical capital, as well as lower incomes living standards (Ashagidibi et al., 2017).

Generally, households that are headed and managed by women are more vulnerable to food insecurity. As such, empowering women to participate in food systems governance guarantees their access to just, resilient and sustainable food systems (Njuki et al., 2021). Gupta & Buvinić (1997) argued that female-headed households experience more poverty and a higher dependency ratio. In addition, the large majority of women in urban areas tend to have low-income employment and income generating opportunities (Kennedy & Pauline, 1992). However, evidence suggests a positive relationship between household nutrition, livelihood, wellbeing and resilience when women are involved in household decision making (Chant, 2008).

In Kenya, women are expected to ensure that their households have food and nutrition security (Diiro et al., 2018). However, gender inequality can prevent them from fully participating in the development of their communities, as well as leading to increased food insecurity and poverty. Female households will typically spend a larger portion of their income on food. This is because women lack access to productive resources, which limit their ability to find gainful employment and income. This confirms the gender-poverty-food security nexus in many communities, especially in developing countries (Akadiri, 2017).

According to Frayne et al (2009), food security has a gender dimension that is important to explore further. For example, in a study of Lusaka, households that were headed by women were the most food insecure with lowest dietary diversity scores (Mulenga, 2013). The male heads reported a better access to food because of their higher incomes and better paying formal sector employment. This shows that not only do female-headed households have the most difficult time accessing food, but they also are more prone to nutrient deficiencies.

However, Birhane et al (2014) found no significant gender variations in food security among households in Addis Ababa. Furthermore, female heads act as a significant barrier to food consumption shortages, allowing their households to be food secure (Kweyu et al., 2019). In

other words, female-headed households prioritize improving their food security even though they are likely to perceive their households as food insecure even when they seem to be doing better.

2.5 Research and Knowledge Gaps

The following three main research gaps emerging from the literature review:

1) Research on gender and food security has mostly been on comparative analysis of female versus male headed households. The present study is an in-depth analysis of female-headed households in urban areas.

2) Not all households in urban areas have the same social and economic characteristics that warrants a general comparison by headship type. In the recent past, female-headed households in urban areas have depicted a more heterogeneous characteristic. As such, the dynamics of urban food security in female-headed households need to be better understood.

3) As urban growth continues in Sub-Saharan Africa, the major challenge will be the population living in poverty and food security. As a result, ongoing research is required to understand how urban food security is changing and what factors influence it, especially for urban communities who are more vulnerable.

2.6 The Theoretical Framework

The study applies the theory of food deprivation and entitlement by Amartya Sen, which states that famine (in this case, food insecurity) is caused by the lack of entitlement, which affects people's access to food (Sen, 1982). According to Sen, entitlement refers to combinations of services and goods that people can legally purchase. This is known as the endowment set. The failure of entitlement may include loss of labour participation because of poor health, lack of land, loss of employment and decline in wages. When people experience failure of food entitlement, they are deprived from sufficient food to enable them escape from hunger in the absence of non-entitlement transfers such as donations.

The theory argues that famine does not necessarily reduce food supplies. Instead, social and economic factors like poor distribution of food lead to starvation among certain groups of people in society such as the female-headed households. Furthermore, the ability to work is the only substantial asset that a person owns as it enables one to secure employment, which enables them to acquire food. In his 1986 article, Sen illustrated that food production is a less important source of income and entitlement in the developed countries (compared to Sub-Saharan Africa)

and there is an expansion of other production activities and better income sources (Sen, 1986). The theory advocates that legislators should pay more attention not just to alleviate immediate suffering but also on finding ways to replace the poor's lost income through maintaining stable prices for food and promoting public works projects, which gives people a regular source of income.

However, there are various limitations to this theory. For example, an individual's food consumption may fall below his or her entitlements because of ignorance, cultural considerations, fixed feeding habits or lack of interest in some food types. Furthermore, the theory focuses on starvation, which should be distinguished from deaths caused by famine because some of these deaths may be caused by epidemics (Elahi, 2006).

This theory is relevant to my work in that, in urban areas, where households mainly rely on buying food instead of growing it, their endorsement set which includes employment, income and food prices affect their food security conditions. For example, if there is a decline in wages or loss of employment with an increase in food prices, the affected households are faced with failure of food entitlement, which makes them prone to being food insecure.

2.7 The Conceptual Framework

According to the conceptual framework (Figure 2.1), high urban population growth rates being witnessed in Sub-Saharan Africa has brought with it a number of challenges, including poverty and food insecurity, with higher vulnerabilities being experienced among women and female-headed households. This situation can be explained in terms of female-headed households' capabilities and deprivations as determined by their limited access to entitlements, opportunities and productive resources. These forms of gender related economic inequalities exposes female-headed households to poverty, economic vulnerabilities, higher risks and fewer coping strategies. Female-headed households' capabilities and deprivations will in turn affect their food security status.

This study argues that there are disparities in food security within female-headed households. These disparities are brought about by different household characteristics. Variables of characteristics of household heads used in this study are age, marital status, migration status, education level and work status. On the other hand, the household characteristics are household size, household monthly income, household reliance on own grown food in Nairobi, household

reliance on food transfers from rural home and household experience of unaffordable food prices. The study analyses female-headed households' food security status in terms of food utilization, availability, stability and accessibility. Finally, the study advocates for an inclusive urban food systems governance that integrates gender dynamics.

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                        ┌──────────────────────┐
                        │  Urban Population     │
                        │      Growth           │
                        └──────────┬───────────┘
              ┌──────────────┐     │     ┌──────────────────┐
              │   Urban      │◄────┼────►│   Urban Food     │
              │   Poverty    │     │     │   Insecurity     │
              └──────────────┘     ▼     └──────────────────┘
  ┌───────────────────┐  ┌──────────────────┐  ┌──────────────────────┐
  │ Status of Food    │  │ Female-Headed    │  │ Determinants of      │
  │ Security          │  │ Households       │  │ Food Security        │
  │ • Availability    │◄►│ • Entitlements   │◄►│ • Characteristics    │
  │ • Accessibility   │  │ • Capabilities   │  │   of household       │
  │ • Utilization     │  │ • Opportunities  │  │   heads              │
  │ • Stability       │  │ • Access to      │  │ • Household          │
  │                   │  │   resources      │  │   characteristics    │
  └─────────┬─────────┘  └────────┬─────────┘  └──────────┬───────────┘
            └─────────────────────┼───────────────────────┘
                      ┌───────────▼────────────┐
                      │ Inclusive Urban Food    │
                      │ System Governance       │
                      └─────────────────────────┘
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Figure-2.1: The Conceptual Framework

Source: Author (2020)

CHAPTER THREE
THE STUDY AREA AND METHODOLOGY

This chapter outlines selected characteristics of the study area as well as the study methodology. The aspects of the study area include geographical location, geographical and historical perspectives, population dynamics, economic characteristics, and some aspects food systems in Nairobi city. Meanwhile, aspects of research methodology presented in the chapter include the study design, study sub-population and sub-sample, determination of study cases and variables, data analysis, and ethical considerations.

3.1 Physical Human Characteristics of the Study Area
3.1.1 Geographical and Historical Perspectives

Nairobi City County (Figure 3.1) is the study area. Nairobi is one of the 47 counties in Kenya, as well as being the capital city of Kenya. It covers an area of approximately 703.9 km^2 (KNBS, 2019) and is bordered to the south by Kajiado County, to the north and west by Kiambu County, and to the east by Machakos County. Due to over-bound expansion of Nairobi city, parts of the bordering counties form the larger Nairobi metropolitan planning area.
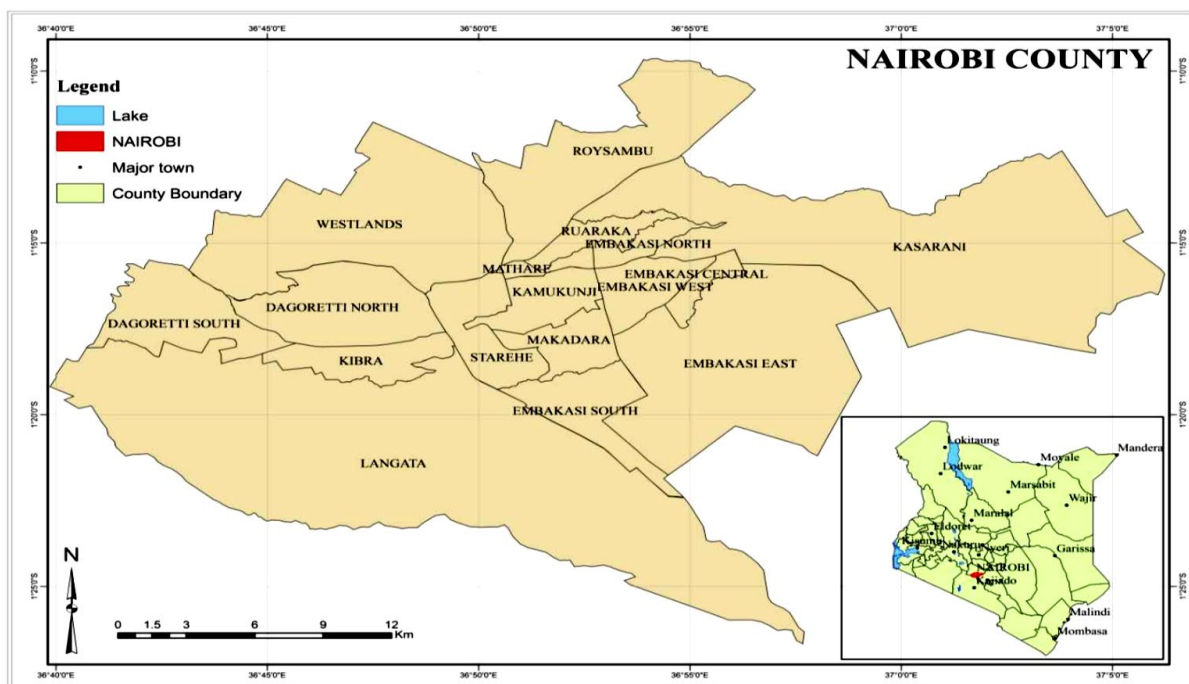
Figure-3.1: Nairobi City County

Source: Compiled by the Author (2020)

Historically, Nairobi was established as a transportation and administrative centre in 1899 and grew to become the capital city of Kenya 1905. As such, Nairobi has grown in time space to occupy its current geographical location (Owuor & Mbatia, 2012). As one of the counties in Kenya, Nairobi City County is divided into 11 administrative sub-counties, namely, Dagoretti, Kamukunji, Embakasi, Lang'ata, Kasarani, Kibra, Westlands, Makadara, Mathare, Starehe and Njiru.

3.1.2 Population Dynamics

According to Kenya National Bureau of Statistics, Nairobi has a population of 4.3 million people: 2.1 million females and 2.2 million males (KNBS, 2019). This population has increased from about 100,000 people in 1948 to about 1.4 million in 1989 and to about 3.2 million in 2009. Nairobi's population has increased largely due to urban-rural migration, expansion of urban boundaries, and more recently because of urban natural increase (Bocquier et al., 2009). In fact, Nairobi had the highest growth rates immediately after independence when African were allowed to migrate to the city. This triggered the urban-to-rural migrations witnessed during that period. Females have now joined the rural-to-urban migration stream to Nairobi, largely in search of education and employment opportunities, as well as joining family members (Owuor & Mbatia, 2012). Nairobi has 1.5 million households. The average household size in Nairobi is 2.9 persons (KNBS, 2019). In addition, about three-quarters (76%) of Nairobi's households are male-headed, while 24% are headed by females (KNBS, 2018).

3.1.3 Economic Characteristics

Nairobi accounts for 60% of Kenya's GDP (KNBS, 2019). Employment is a significant income source and a major determinant of economic and social results. Households that are mostly affected by unemployment are those that are faced with poverty (GOK, 2017). The average level of unemployment in Nairobi is estimated at 14.7%. However, female unemployment is higher than their male counterparts (Kenya, 2017). In Nairobi, the proportion of males that had reported to have some form of employment was 1.3 million compared to 781,389 women (KNBS, 2019).

According to Nairobi's County Integrated Development Plan (2017), 22% of the total population are living below the poverty line with the most affected categories of people being the disadvantaged and vulnerable groups such as people with disabilities, unemployed youth, women, those living in slums, the elderly, street families and street children, internally

displaced persons and orphans. Various economic, social and environmental factors have been associated with poverty in Nairobi. The economic factors are mainly lack of job opportunities, lack sufficient income to meet basic needs, increased prices of basic commodities and high cost of living (GOK, 2017).

Whereas there is a sizeable number of people in employment age (labour force) in Nairobi employed in both the public and private sectors, a large majority are employed in the informal sector or are unemployed. Those in the informal sectors are engaged in small-scale businesses, hawking, food vending, or are self-employed in the famous *jua kali* industries. The unemployment situation is made worse by continued migration and lack of formal employment opportunities in the public and private sectors (Owuor & Mbatia, 2012).

3.1.4 Nairobi's Food System

A significantly large area of land coverage is used for residential purposes (175.6 km^2), compared to the total land under urban agriculture (96.8 km^2). Land that was set aside for urban agriculture has been declining over the years as a large portion of it is being turned into land for residential and other purposes, thus making Nairobi city rely on the other counties to supply of food for the residents (GOK, 2017).

The main actors in the Nairobi's food systems are the farmers, transporters, wholesalers and retailers (Owuor et al., 2017). Food coming to Nairobi is largely produced in other counties of Kenya by farmers. The food is transported to the city and finds its way to the major wholesale outlets or is sold directly to retailers. Both formal and informal food retailers exist in Nairobi (Owuor, 2018). The major formal food retailers are the supermarket chains and food outlets. However, Nairobi has a number of informal food retailers in the city neighbourhoods. Various actors and intermediaries along the informal traditional value chains increase transaction costs and food prices, thus causing food to be unreachable for a large majority of poor households. Some of these households depend on urban farming so as to improve their food and income (GOK, 2017).

Crop production is mainly small-scale subsistence farming because of limited land to cultivate. The main crops grown are beans, maize and Irish potatoes, especially in peri-urban areas, mainly for consumption by the household and for sale (Owuor et al., 2017). The urban farmers employ innovative farming technologies such hanging gardens, vertical gardens, micro

gardening, roof top farming, container gardens, greenhouse farming and multi-storey gardens. Livestock keeping is also carried out in small scale with many farmers engaging in value addition.

3.1.5 Access to Housing and Water

The residential neighbourhoods in Nairobi are spatially segregated along socio-economic status inherited from the colonial racial spatial segregation (Owuor & Mbatia, 2012). As such, there are pockets of high-income residential neighbourhoods in the western parts of the city and low-income residential neighbourhoods in the eastern parts of the city. These two residential neighbourhoods are separated by the middle-income residential neighbourhoods. Housing is largely provided by the private rental units with very little of provision from Nairobi City County and national government. Because of the housing demand and supply forces and lack of affordable housing, Nairobi is characterized by a number of informal settlements such as Kibera, Mathare, Mukuru, and Korogocho.

A protracted water crisis has affected the entire city, but some areas are especially disadvantaged such as informal settlements and in the eastlands parts of the city, which is dominated by low-cost rental housing targeting lower income groups. Water is provided by Nairobi City Water and Sewerage Company. Even then, there are a number of privately-owned water vendors who provide water at very high prices. In essence, the cost of housing, water and transport in Nairobi affects food provisioning in many households (Owuor & Mbatia, 2012). Access to water is also essential for those practicing urban farming, as well as in other small-scale businesses.

3.2 Methodology

3.2.1 Study Design

This study adopted secondary analysis of existing database design. As such, the study uses the Hungry Cities Partnership (HCP) Project Nairobi Household Survey dataset (for more details see https://hungrycities.net/). Hungry Cities Partnership is an international network of cities and city-based partner organizations that focus on the relationships between urban food systems, informality, inclusive growth and rapid urbanization in Kingston (Jamaica), Mexico City (Mexico), Bangalore (India), Maputo (Mozambique), Cape Town (South Africa), Nanjing (China), and Nairobi (Kenya). The HCP Surveys collected data on households' food security;

food sources; household demographics; household data; social grants; and urban-rural linkages.

3.2.2 The Study Sub-Population and Sub-Sample

The study sub-population was all the 1,434 sampled households from the HCP Nairobi Household Survey dataset. Given that the present study's unit of analysis is households headed by females, all the 295 cases of the female-centered or headed households from the HCP Nairobi Household Survey were selected for further analysis. As such, this formed the study sub-sample of 295 female-headed households. The HCP Nairobi Household Survey, carried out in 2016 across the eight administrative divisions of Nairobi, determined its sampled households using a multi-stage random sampling procedure (for more details see Owuor, 2018). Table 3.1 provides a summary of the HCP Nairobi Household Survey sampling and the distribution of female-headed households' sub-sample for this study.

Table-3.1: Study Sub-Sample from HCP Nairobi Household Survey Dataset

Division	HCP Nairobi sampled sub-locations	HCP Nairobi sampled households	Sub-sample of female-headed households
DAGORETTI	Riruta, Kawangware and Kenyatta/Golf Course	313	57
KIBERA	South C, Karen and Lindi	144	40
EMBAKASI	Umoja, Embakasi and Komarock	317	61
MAKADARA	Hamza, Makongeni and Hazina	158	24
CENTRAL	Huruma, Pangani and Ngara East	200	37
KASARANI	Zimmerman and Roysambu	117	27
PUMWANI	Shauri Moyo, Uhuru and Bondeni/Gorofani	98	30
WESTLANDS	Highridge, Spring Valley and Kileleshwa	87	19
Total		**1,434**	**295**

Source: Owuor (2018)

3.2.3 Determination of Study cases and Variables

Data-driven approach was used to determine the study cases (households) and variables from the HCP Nairobi Household Survey dataset. The HCP Nairobi Household Survey dataset (in SPSS software) consists of 1,434 cases (households) and 1,318 variables. The present study generated a sub-sample of all 295 cases of female-headed households from the HCP Nairobi Household Survey dataset. This was determined using a combination of two variables from the HCP Nairobi Household Survey dataset. These were HHMF V12b (Household member relationship to household head) and HHMF V12c (Gender of household member). Table 3.2

gives a summary of these variables from the HCP Nairobi Household Survey dataset that were selected for analysis. The variables for analysis were selected based on the study objectives and variables.

Table-3.2: Study Variables from HCP Nairobi Household Survey Dataset

Study Variable	Source Variable
Household head characteristics	
Age	HHMF V12d: Household member's age at his/her last birthday
Marital status	HHMF V12e: Household member's marital status
Migration status	HHMF V12f: Where household member was born
Education level	HHMF V12j: Household member's highest level of education
Work status	HHMF V12k: Household member's work status
Household characteristics	
Size	HHF VCQ121a: Number of household members
Monthly income	HHF VDQ15a & b: Household income sources over the last month
Dependence on own grown food in Nairobi	HHF VBQ10a: Engagement in crop cultivation in the city
Dependence on food transfers from rural home	HHF VFQ24: Food transfers
Experience of unaffordable food prices	HHF VAQ4: Missing certain types of food because of its price or unaffordable food price
Food security status	
HFIAS and HFIAP	HHF VAQ1a-j: Frequency-of-occurrence questions on the household's food insecurity conditions in the past four weeks of the interview
HDDS	HHF VAQ2: Types of food household member consumed
MAHFP	HHF VAQ3a & b: Months when household had insufficient food

Source: HCP Nairobi Household Survey Dataset

3.2.4 Data Analysis

To accomplish the study objectives, a range of data analysis methodologies were used. First, the use of frequency distributions, summarized in tables and graphs. Second, the use of cross tabulations to determine relationships between variables. Third, the use of FANTA food security measures to determine the state of food security in the female-headed households. Fourth, the use of chi-square test in hypothesis testing. Some of these analytical techniques are further discussed in details.

3.2.4.1 Household's Food Security

Four household food security measures and indicators were used. These are 1) HFIAS to calculate the degree of household access to food; 2) HFIAP to calculate and determine the various categories of household food security in terms of prevalence; 3) HDDS to determine the different groups that households consume; and 4) MAHFP to determine the months a household had insufficient food. HFIAS scores range between 0 and 27, with 0 being food secure and 27 being severely food insecure. HFIAP is calculated from HFIAS. It categorizes households into four different levels of household food insecurity in terms of accessibility. MAHFP addresses the regularity and reliability dimension of food insecurity and captures the changes in the ability of the household to ensure regular food supply all year round (Swindale & Bilinsky, 2010).

These measures, however, had limitations in that they are difficult to make cultural comparisons and create cut-off points for categorizing households according to their food security levels. They also fail to capture food safety elements and there are various scenarios, different time reference periods and frequency responses are required (De Cock, 2012). Nevertheless, these limitations did not affect the reliability and validity of my results.

3.2.4.2 Determinants of Household Food Insecurity

Socio-economic variables of female household heads and female-headed households were cross tabulated with HFIAP to determine their associations. The SPSS outputs of cross tabulations as well as chi-square test outputs gave more information on factors that influence food security in the female-headed households. Two sets of cross tabulations were done: 1) cross tabulation of food security (dependent variable) and the characteristics of the female household heads (independent variables); and 2) cross tabulation of food security (dependent variable) and the household characteristics (independent variables). The characteristics of the household heads are marital status, age, migration status, level of education and work status. The household characteristics include household size, household income (without loans), household reliance on own grown food in Nairobi, household reliance on food transfers from rural home and household experience of unaffordable food prices.

3.2.4.3 Hypothesis Testing

The two study hypotheses on the difference between household characteristics and food security in female-headed households and the difference between household heads'

characteristics and food security in female-headed households were both tested using the chi-square test. Outputs were generated using SPSS software.

3.2.5 Ethical Considerations

The consent to use the HCP Nairobi Household Survey dataset was granted by the Nairobi HCP Coordinator under strict ethical considerations such as receiving only the requested cases and variables, confidentiality, use of data for academic purposes only, supervision of this study by the Nairobi HCP Coordinator and acknowledging the use of HCP Nairobi Household Survey dataset.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents and discusses the study results based on the three study objectives. The chapter has three main sections that focus on characteristics of households with female heads in Nairobi, their state of food security, and the factors that influence their household-level food security.

4.1 Characteristics of the Female-Headed Households

4.1.1 Household Heads Characteristics

4.1.1.1 Household Heads Age

The average age of the female household heads was 37.8 years. However, according to Figure 4.1, 51.2% of the heads were aged between 16 and 35 years. This indicates that most of the female household heads are in their youthful generation. In Kenya, a youth is described as any person who is between 18 and 34 years of age. On the other hand, 38.8% of the household heads were aged between 36 and 55 years, while 10% were aged 56 years and above. This conforms to Mwangi's (2017) study which found that female household heads in Kangemi residential neighbourhoods of Nairobi were relatively young with young families. Mwangi's (2017) study analysed the effect of poverty in female-headed households in Kangemi and the various strategies that they adopted. Furthermore, young female headship of households is an emerging characteristic among urban households, especially in Nairobi.
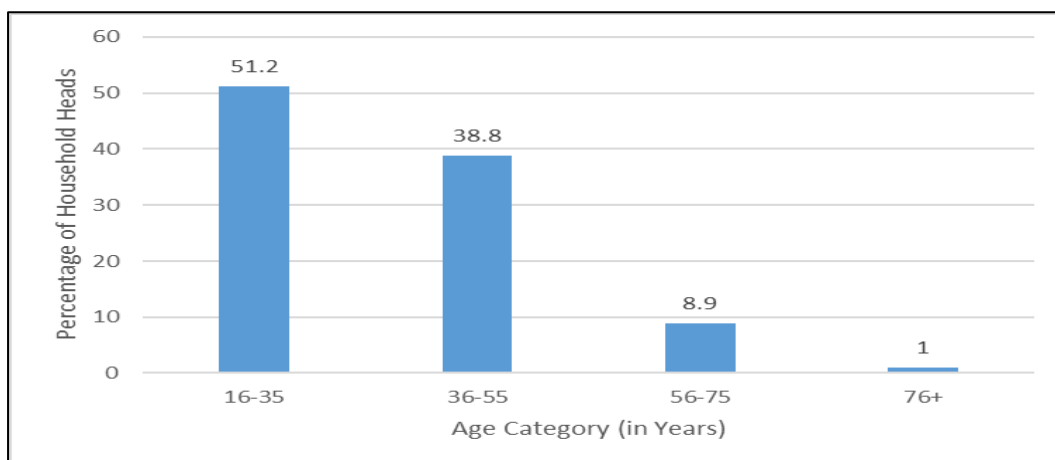
Figure-4.1: Age of Household Head

Source: HCP Dataset Analysis (2020)

4.1.1.2 Household Heads Marital Status

There were more (43.4%) female household heads who were unmarried compared to 19% who were married, 16.6% who were widowed, 13.2% who were separated, and 6.4% who were divorced. A smaller percentage (1.3%) of the female heads were either cohabitating or had been abandoned by their partner (Figure 4.2). This is similar to FAO (2002) results of an analysis of gender differences in the transitional economy of Hanoi in Vietnam, which found that the majority of female household heads are usually single and widowed. However, Kishor & Neitzel (1996) in their analysis of the status of women in 25 developing countries argued that a large proportion of female household heads are likely to be older widows rather than being single and unmarried. This can be explained by the fact that the current study focused on urban Africa as opposed to rural Africa.
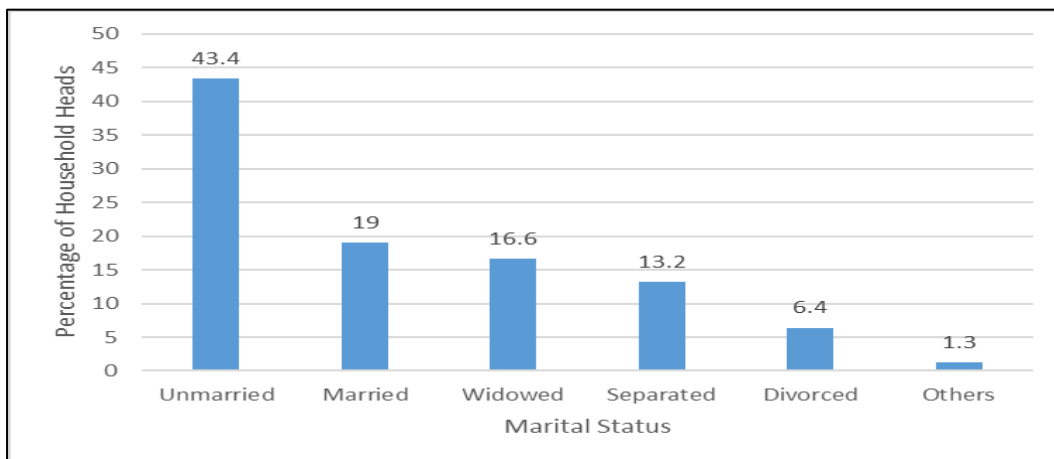
Figure-4.2: Marital Status of Household Head

Source: HCP Dataset Analysis (2020)

4.1.1.3 Household Heads Migration Status

More than two-thirds (69%) of the female heads were born in rural Kenya and, as such, migrated to Nairobi (Figure 4.3). This is in comparison to 23.5% of them who were born in Nairobi, 5.8% who were born in another urban area of Kenya, and 2% who were born in a foreign country. This is an indication that rural-urban migration continues to be a major contributor to urbanization process in Kenya. It also indicates that more women continue to join the rural-urban migration streams in Kenya, while also exposing the fact that urban natural increase is emerging as a contributor to the urban population.
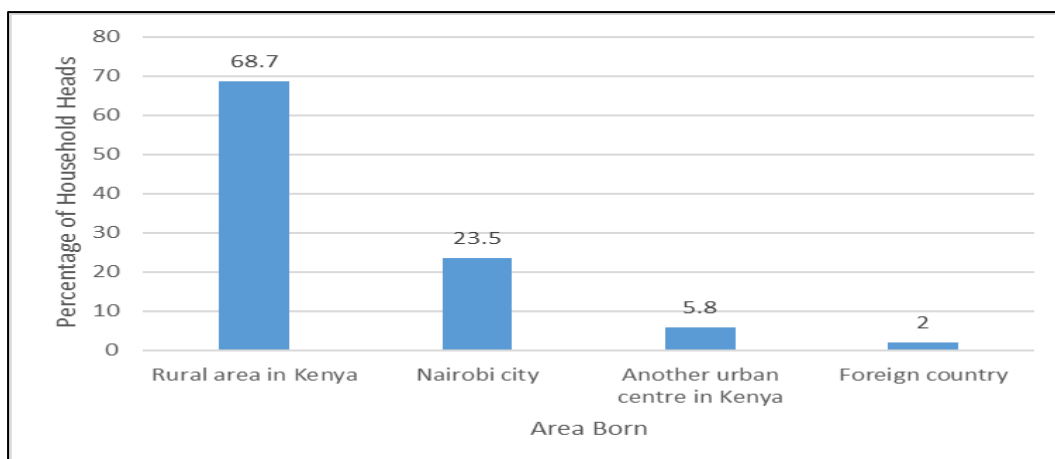
Figure-4.3: Migration Status of Household Head

Source: HCP Dataset Analysis (2020)

4.1.1.4 Household Heads Education Level

About three-quarters (73%) of the female household heads had attained secondary level of education and above (Figure 4.4). Out of these, 21.2% had post-secondary school qualifications, while 17.8% had attained university level of education. This shows that women, particularly in the urban areas, are more exposed to education opportunities with varying degrees. On the other hand, less than one-quarter (24%) of the female household heads had attained at least primary school certificate of education, out of which 3.4% had no formal schooling.

Figure-4.4: Education Level of Household Head

Source: HCP Dataset Analysis (2020)

4.1.1.5 Household Heads Work Status

Majority (85.4%) of the female household heads were engaged in some form of gainful employment by being self-employed (42.9%); working full-time (23.5%); or working part-time on a casual, on a contract, and/or on a seasonal basis (19%) (Figure 4.5). Only 8.8% of them were unemployed, while the others (5.7%) were pensioners, home makers and medically or physically unfit to work. The higher proportions of female household heads in labour force participation can be directly attributed to their higher proportions in higher levels of education. Chant & Mcilwaine (2016) in their book on cities, slums and gender in the global south explained that in rapidly urbanizing environments, women's opportunities to join labour forces are high, with entrepreneurship and employment being the main ways in which women participate in the urban labour market.
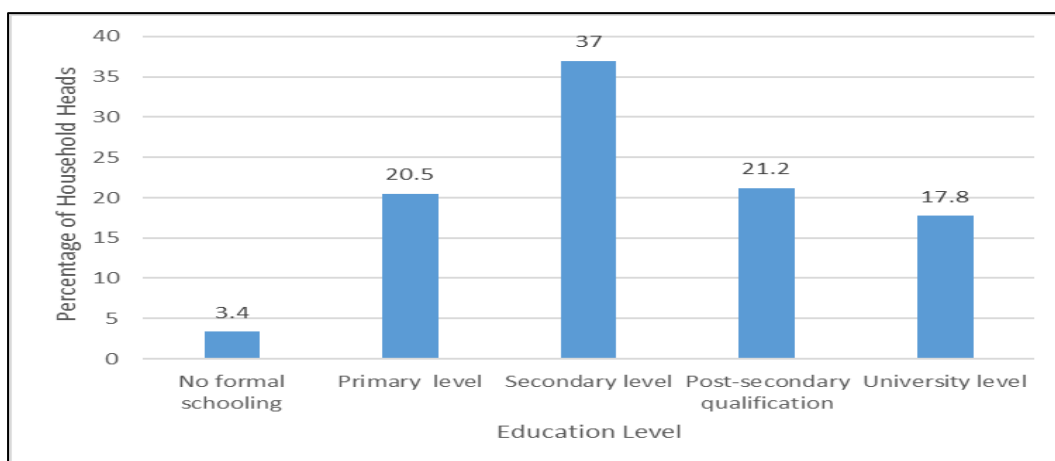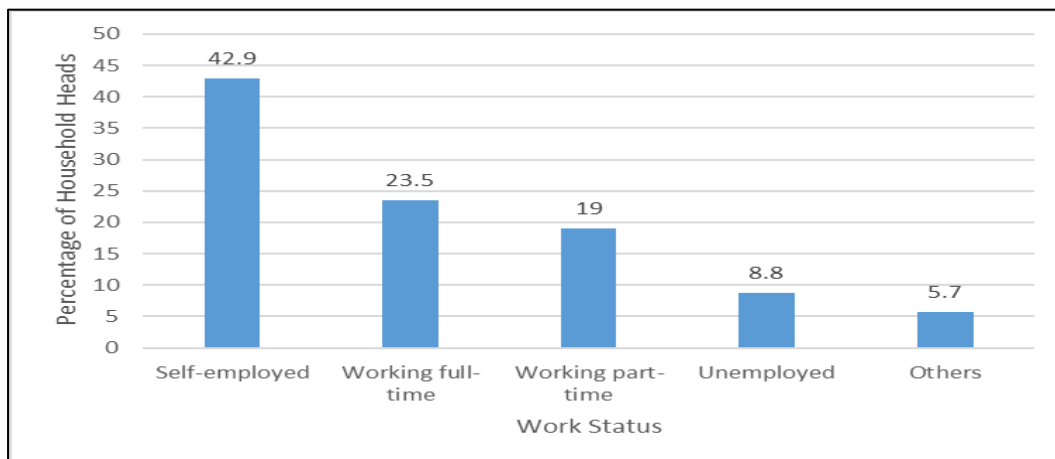

Figure-4.5: Work Status of Household Head

Source: HCP Dataset Analysis (2020)

4.1.2 Female-Headed Households Characteristics

4.1.2.1 Size of the Household Size

The mean size of the female-headed households was four members, while the maximum household size was 14 members. About half (49.6%) of the households had between four and six members, followed by 41.6% who had relatively fewer (1-3) household members (Figure 4.6). The rest of the households had relatively larger household sizes of seven and more members with a likelihood of higher dependency ratios. The decline in family size, according to Allendorf (2013), is because of industrialization, increased urbanization and an increase in education levels. Allendorf (2013) studied the relationship between family structure and health of young women in India.
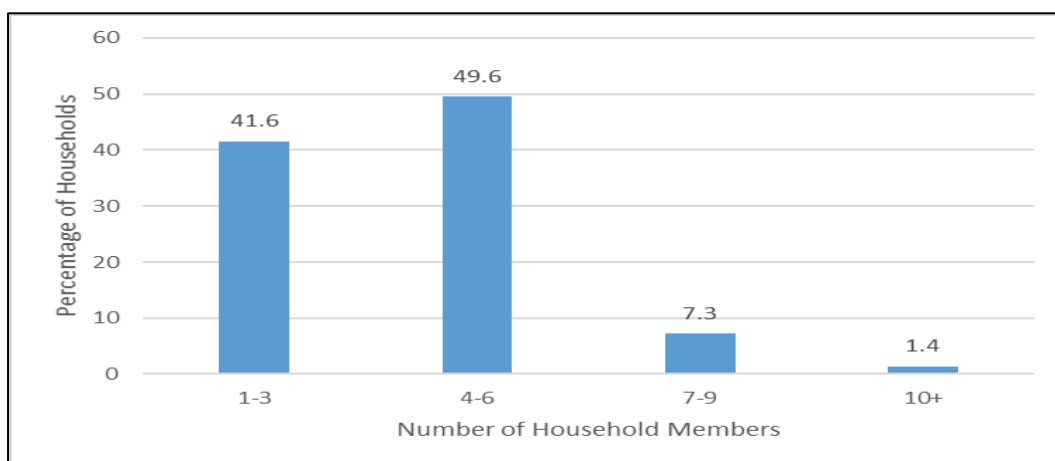
Figure-4.6: Household Size

Source: HCP Dataset Analysis (2020)

4.1.2.2 Household Monthly Income

Figure 4.7 presents a summary of the female-headed households' monthly income (without loans) based on the following income quintiles (in Kenya Shillings): (1) 10,000 and less; (2) 10,001-19,000; (3) 19,001-34,000; (4) 34,001-75,000; and (5) 75,001 and more. The results indicate that more than one-quarter (26.5%) of the households reported a monthly income of at least KES 10,000 with another one-quarter (25.9%) reporting a monthly income of KES 75,000 and above. The rest (47.5%) were distributed between a monthly income of KES 10,001 and KES 75,000.
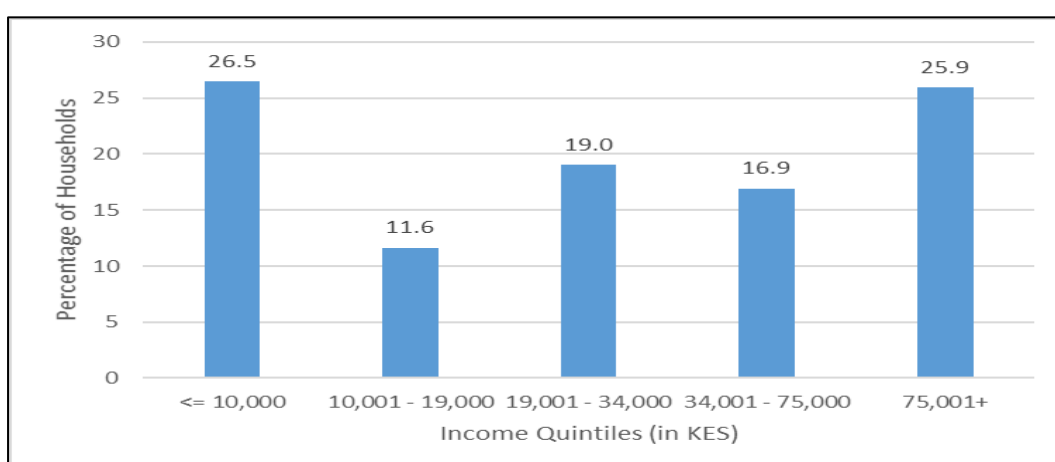
Figure-4.7: Household Monthly Income

Source: HCP Dataset Analysis (2020)

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The main sources of income in female-headed households was formal wage work (47.1%) followed by informal wage work (20%), formal businesses (13.6%), informal businesses (10.5%) and casual wage work (10.2%). A few households relied on formal loans from the banks (2%), cash remittances (1.4%), government social grants (1.4%), personal investments (1.4%), and informal loans (0.7%).

4.1.2.3 Household Reliance on Other Sources of Food

Besides relying on purchased food from formal and informal market outlets, urban households are known to have other sources of food such as growing own food through urban farming, as well as getting food transfers and remittances from the rural areas and/or homes through rural farming or other sources. The relevance of farming in urban areas is that it is additional food and income source, especially in the low income neighbourhoods of sub-Saharan African cities. Its importance has grown over time and space and has been well documented (Owuor, 2018). However, only 12.5% of the female-headed households grew their own food in Nairobi. The large majority (87.5%) of the households did not grow their own food in Nairobi due to lacking space or land, skills, interest, and time. Slightly more than one-third (39.3%) of the female-centered households depended on food transfers from rural homes or relatives. Food sourcing from rural areas increases urban poor households' food accessibility, availability, and nutrition security.

4.1.2.4 Household Experience of Unaffordable Food Prices

According to Figure 4.8, more than half (59%) of households with female heads experienced missing a particular food item owing to high and unaffordable prices of food supplies at varying frequencies. For example, 25.2% reported that they experienced unaffordable food prices in a month, 14.1% in a week, 15.9% several times a week, and 3.4% on a daily basis. On the other hand, 41.4% of the female-headed households reported that they never experienced missing a particular food item as a result of cost. Birhane et al. (2014) established that 65% of households in Addis Ababa reported that food shortages that result from high food prices were the primary cause of insufficient food consumption. In other words, high and unaffordable food prices hinder household intake of healthy and nutritious food, thus contributing to household food insecurity. Furthermore, the urbanites rely more on food purchases and thus vulnerable to market and food price forces. Birhane et al. (2014) analyzed the effect of high prices of food on household food insecurity in Addis Ababa.
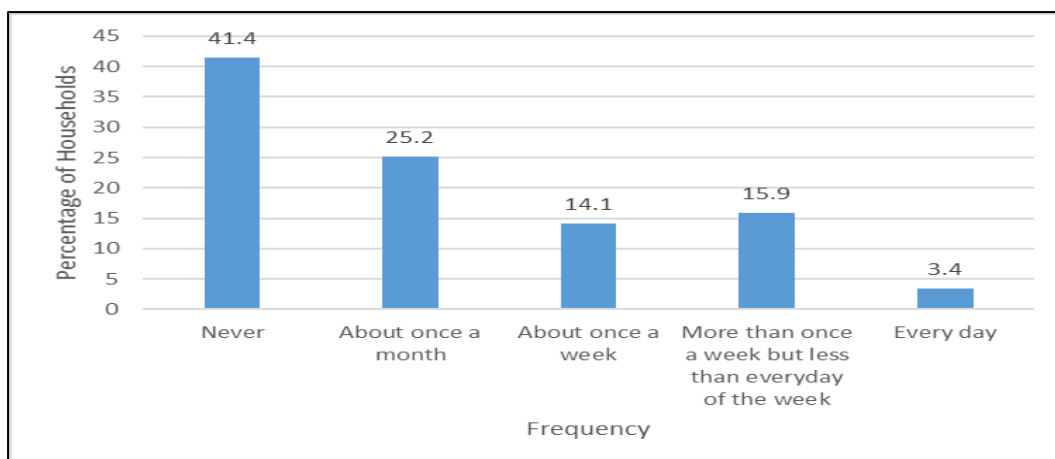
Figure-4.8: Household Experience of Unaffordable Food Prices

Source: HCP Dataset Analysis (2020)

4.2 Food Security in Female-Headed Households

4.2.1 Household Access to Food

Household access to food was measured in terms of HFIAS scores (Figure 4.9). The results reveal that the mean HFIAS score for the female-headed households was 11. This indicates that households headed by females experience lower degrees of food insecurity, with 64.1% having low scores of between 0 and 7 and 3.5% having high scores of between 20 and 27.
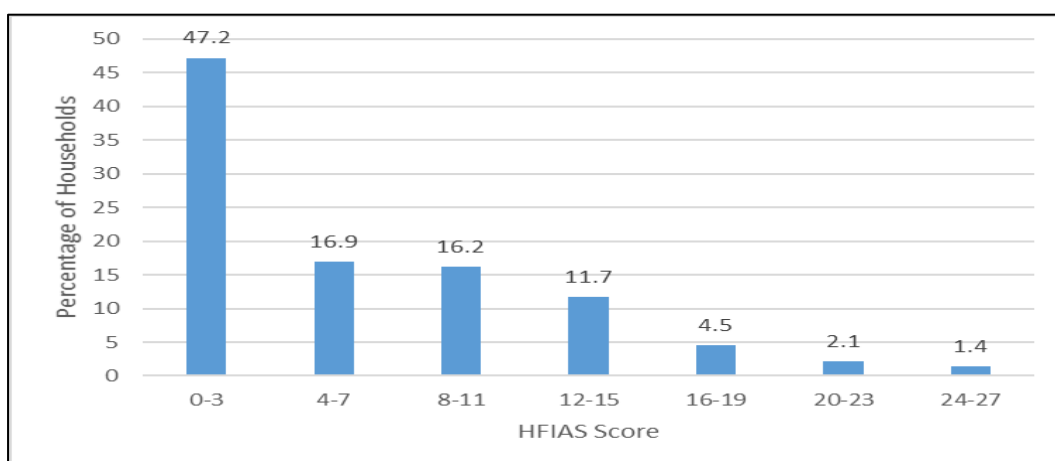
Figure-4.9: Household Food Insecurity Access Scores

Source: HCP Dataset Analysis (2020)

While comparing food security in Nanjing city and Maputo city households through a gendered perspective, Riley & Caesar (2017) found that female-headed households in Maputo were more food insecure than those in Nanjing, with a mean HFIAS scores of 7.65 and 1.05, respectively. However, these mean HFIAS scores are far lower than the results of the Nairobi study (mean

of 11). The differences can be attributed to the different socio-economic conditions of the three cities.

4.2.2 Household Incidence to Food Insecurity

Household incidence to food insecurity was measured through Food Insecurity Access Prevalence (HFIAP). According to Figure 4.10, the large majority (72.7%) of the households headed by females in Nairobi experienced food insecurity at varying degrees. For example, 15% of the households experienced mild food insecurity, 29% experienced moderate food insecurity, and 28.7% experienced severe food insecurity. On the other hand, slightly above one-quarter (27.3%) of the female-headed households in Nairobi reported that they were food secure.
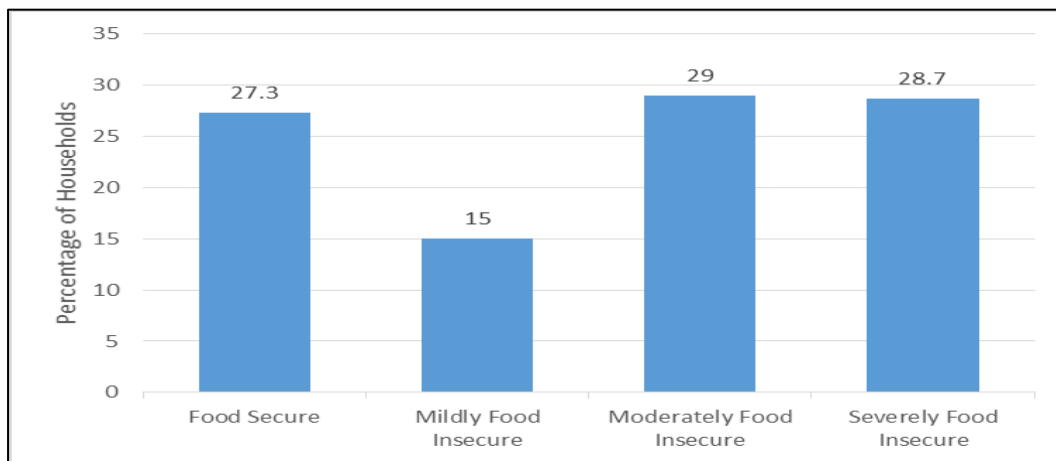
Figure-4.10: Household Food Insecurity Access Prevalence Categories

Source: HCP Dataset Analysis (2020)

These results are consistent with Dodson et al. (2012) study results from Southern African cities, which reported higher proportions of food insecure female-headed households.

4.2.3 Household Dietary Diversity

Household dietary diversity was measured through determining the Dietary Diversity Scores (HDDS). The mean dietary diversity score was 6.02, signifying a moderate and reasonable dietary diversity for female-headed households in Nairobi. However, 26.4% of the female-headed households recorded a HDDS of between 0 and 4, showing relatively poorer diversity in their diets (Figure 4.11). Consumption of different types off foods in a household is

dependent on income and affordability of the food type. As such, prices of food will definitely affect a household's food dietary diversity.
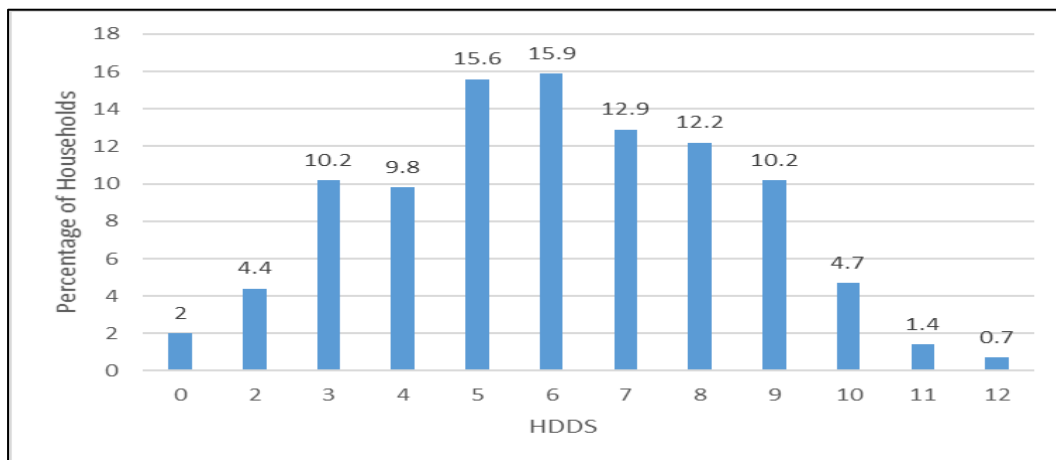
Figure-4.11: Household Dietary Diversity Scores

Source: HCP Dataset Analysis (2020)

The most common food groups that were consumed by a majority (94.2%) of the female-headed households was cereals and food made from grains (ugali, bread, chapatti, pasta or rice). This was followed by vegetables (77.3% of the households); sugar and honey (69.5%); condiments, coffee and tea (65.1%); milk and milk products (cheese and yoghurt) (59%); oil, fat and butter 50.8%; and fruits 49.8%. Other less consumed food groups included meat and poultry (35.6%); roots and tubers such as potatoes, beetroot and carrots (31.9%); eggs (23.7%); and fish, either fresh or dried (12.9%).

4.2.4 Household Food Stability

Household food stability was measured through determining the household's MAHFP indicator (Figure 4.12). The mean MAHFP was 10.9, indicating that most of the female-headed households did not report any food shortages in the previous 12 months of the interview. According to Figure 12, majority (60%) of the households had the whole year without any lack of food. However, 40% stated that there were some months during a year, i.e. 12 months period, that they lacked enough food to eat. For example, 36% of the households had between 7 and 11 months in which they had adequate food provisioning, while 4% had less than 7 months of adequate household food provisioning. In their study of food poverty in Kisumu, Wagah et al. (2018) attributed such seasonality to adequate food provisioning to increasing urban poverty and food prices.
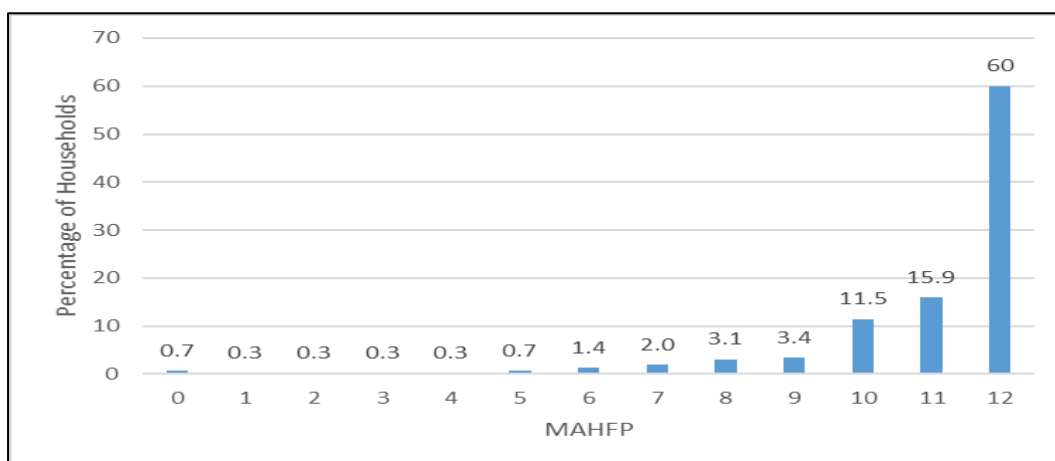
Figure-4.12: Months of Adequate Food Provisioning

Source: HCP Dataset Analysis (2020)

4.3 Determinants of Female-Headed Households State of Food Security

4.3.1 Food Security and Household Heads Characteristics

Table 4.1 gives the results of cross tabulations between status of household food security (dependent variable) and household heads characteristics (independent variables). The state of food insecurity was measured in terms of Food Insecurity Access Prevalence (HFIAP), while household heads characteristics were measured in terms of age, marital status, migration status, level of education, and work status. For ease of interpretation, the HFIAP food insecurity categories of 'mild' and 'moderate' food insecure were merged into a new category called 'mild and moderate' food insecure.

The results indicate that food security was relatively higher in households in which the female head was aged 16-35 years (32.4%), was married (28.6%), was born in rural Kenya (29%), had attained up to secondary education (27.8%), and was working (29.3%). On the other hand, severe food insecure households was common where the female head was aged 56 years and above (34.5%); was either divorced, separated or widowed (32.7%); was born in rural Kenya (30.5%); had attained up to secondary education (30.2%); and was not working (32.6%).

The proportion of households headed by females experiencing mild and moderate food insecurity was relatively higher in households in which the female head was aged 35-55 years (50.9%), was married (46.4%), was born elsewhere (65.2%), had attained up to university education (49%), and was not working (29.3%).

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Table-4.1: Food Security and Household Heads Characteristics

Household heads characteristics	Percentage of households		
	Food-Secure	Mild and moderate food-insecure	Severe food-insecure
Age			
16-35 years (n=148)	**32.4**	39.9	27.7
36-55 years (n=112)	21.4	**50.9**	27.7
56+ years (n=29)	27.6	37.9	**34.5**
Marital status			
Unmarried (n=127)	28.3	44.9	26.8
Married (n=56)	**28.6**	**46.4**	25.0
Divorced, separated or widowed (n=110)	25.5	41.8	**32.7**
Migration status			
Born in Nairobi city (n=69)	27.5	46.4	26.1
Born in rural Kenya (n=200)	**29.0**	40.5	**30.5**
Born elsewhere (n=23)	13.0	**65.2**	21.7
Education level			
Up to primary (n=70)	27.1	47.1	25.7
Up to secondary (n=169)	**27.8**	42.0	**30.2**
Up to university (n=51)	25.5	**49.0**	25.5
Work status			
Working (n=249)	**29.3**	43.0	27.7
Not working (n=43)	16.3	**51.2**	**32.6**

Source: HCP Dataset Analysis (2020)

In a study of female-headed households in Sodo City, Ethiopia, Abo & Kuma (2015) suggested that as female heads of household get older, their contribution to household food security decreases. In other words, age reduces their productive potential in stimulating their household's capacity to overcome food insecurity. A study by Kaloi (2005) in Kisii, Kenya, also observed that household head's marital status affects household's food security. The studies found that households with married household heads had a higher likelihood to be more food secure than those households with unmarried or widowed household heads. In Dodoma, Tanzania, Duda et al. (2018) found that compared to non-migrant households, which had a single source of income and were more food insecure, migrant households are more likely to engage in multiple sources of income, and as such, had higher levels of household food security. Another study by Kweyu et al. (2019), on gender differences in household food security in Kenya, found that higher levels of education were linked to an improvement in household heads' knowledge and inventiveness, enabling them to acquire useful resources. Lastly, in a study in Ghana, Annim & Frempong (2018) found that those who were employed

were able to get an income and thus provide food for their households and as such were more food secure than those not working.

4.3.2 Food Security and Household Characteristics

Table 4.2 provides the results of cross tabulations between status of household food security (dependent variable) and household characteristics (independent variables) of the female-headed households. Food insecurity was measured in terms of HFIAP, while the household characteristics were measured in terms of household size, household monthly income, household reliance on own grown food in Nairobi, household reliance on food transfers from rural home, and household experience of unaffordable food prices. For ease of interpretation, the HFIAP food insecurity categories of 'mild' and 'moderate' food insecure were merged into a new category called 'mild and moderate' food insecure.

The results indicate that food security was relatively higher in households with 7 and more members (32%), in households with a monthly income of KES 75,001 and above (54.2%), in households which rely on own grown food in Nairobi (45.7%), in households which do not rely on food transfers from rural home (31.1%), and in households which never experienced unaffordable food prices (54.2%). On the other hand, severe food insecurity was more likely to be experienced in households with 7 and more members (40%), in households with a monthly income of KES 10,000 and less (50%), in households which do not rely on own grown food in Nairobi (30.6%), in households which do not rely on food transfers from rural home (33.9%), and in households which experience unaffordable food prices almost every day (53.6%).

The proportion of households headed by females experiencing mild and moderate food insecurity was relatively higher in households with between 4 and 6 members (50.4%), in households with a monthly income of KES 34,001-75,000 (62.5%), in households which do not rely on own grown food in Nairobi (45.6%), in households which rely on food transfers from rural home (57.8%), and in households which experience unaffordable food prices about once a week (51.2%).

According to Kweyu et al. (2019), food insecurity in various areas of Kenya's western and eastern regions was more likely to occur in a large household because the large food requirements present a significant burden of providing for more household members.

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Consequently, the likelihood of food insecurity increases with household size. On the other hand, household food and nutritional security are affected by household income (Kawarazuka & Béné, 2010). Islam et al. (2018) noted that as income increases, households become more food secure. However, women's participation in labour force reduces their available time for household activities such as providing nutrition for their children.

Table-4.2: Food Security and Household Characteristics

Household characteristics	Percentage of households		
	Food-secure	Mild and moderate food-insecure	Severe food-insecure
Household size			
1-3 members (n=118)	27.1	41.5	31.4
4-6 members (n=141)	24.8	**50.4**	24.8
7+ members (n=25)	**32.0**	28.0	**40.0**
Household monthly income			
KES 10,000 and less (n=50)	10.0	40.0	**50.0**
KES 10,001–19,000 (n=22)	18.2	54.5	27.3
KES 19,001–34,000 (n=36)	8.3	61.1	30.6
KES 34,001–75,000 (n=32)	12.5	**62.5**	25.0
KES 75,001+ (n=48)	**54.2**	37.5	8.3
Household reliance on own grown food in Nairobi			
Yes (n=35)	**45.7**	37.1	17.1
No (n=252)	23.8	**45.6**	**30.6**
Household reliance on food transfers from rural home			
Yes (n=116)	21.6	**57.8**	20.7
No (n=177)	**31.1**	35.0	**33.9**
Household experience of unaffordable food prices			
Never (n=120)	**54.2**	38.3	7.5
About once a month (n=72)	13.9	50.0	36.1
About once a week (n=41)	2.4	**51.2**	46.3
Almost every day (n=56)	1.8	44.6	**53.6**

Source: HCP Dataset Analysis (2020)

4.3.3 Hypothesis Testing

The study formulated the following two hypotheses, which were tested using the chi-square test:

1) Food security in female-headed households is not determined by the household heads characteristics.

2) Food security in female-headed households is not determined by household characteristics.

Table 4.3 provides the hypothesis testing output of the analysis between state of food security in female-headed households and household heads characteristics. The table reveals that each of the characteristics of the household heads and state of food security are independent of each other and, as such, there is no enough evidence from the sample data to reject the first null hypothesis based on the p-values at 0.05 level of significance. In other words, the p-values are greater than the chosen level of significance of 0.05. As such, characteristics of household head do not determine female-headed households food security.

Table-4.3: Pearson Chi-Square Test of Household Heads Characteristics

Household heads characteristics	Value	Degrees of freedom	Significance (2-sided)	Level of significance
Age	5.242	4	.263	0.05
Marital status	1.492	4	.828	0.05
Migration status	5.702	4	.223	0.05
Education level	1.176	4	.882	0.05
Work status	3.135	2	.209	0.05

Source: HCP Dataset Analysis (2020)

On the other hand, table 4.4 presents the hypothesis testing output of the analysis between state of food security in female-headed households and household characteristics. The table reveals that except for household size, each one of the other household characteristics (household monthly income, household reliance on own grown food in Nairobi, household reliance on food transfers from rural home, and household experience of unaffordable food prices) and household food security are not independent of each other and, therefore, we reject the second null hypothesis based on the p-values at 0.05 level of significance.

Table-4.4: Pearson Chi-Square Test State of Household Characteristics

Household characteristics	Value	Degrees of freedom	Significance (2-sided)	Level of significance
Household size	5.411	4	.248	0.05
Household income	49.465	8	**.000**	0.05
Household reliance on own grown food in Nairobi	7.977	2	**.019**	0.05
Household reliance on food transfers from rural home	14.815	2	**.001**	0.05
Household experience with unaffordable food prices	98.665	6	**.000**	0.05

Source: HCP Dataset Analysis (2020)

In other words, the p-values are less than the chosen level of significance of 0.05. As such, food security in female-centered households is determined by household characteristics of female-headed households in Nairobi. In particular, the state of food security in female-centered households is determined by the household monthly income, household reliance on own grown food in Nairobi, household reliance on food transfers from rural home, and household experience of unaffordable food prices.

CHAPTER FIVE
SUMMARY OF RESEARCH FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Research Findings

5.1.1 Characteristics of Female-Headed Households

5.1.1.1 Household Heads Characteristics

A majority of the female household heads in Nairobi are in their youthful generation (16-35 years), are unmarried, are migrants to Nairobi, have attained secondary level of school education, and are engaged in gainful employment. These results imply that young female headship of households is an emerging characteristic among urban households, especially in Nairobi. In addition, more women continue to join the rural-urban migration streams in Kenya, while also exposing the fact that urban natural increase is emerging as a contributor to the urban population. Furthermore, women, particularly in the urban areas, are more exposed to education opportunities than their rural counterparts. The higher proportions of female household heads in labour force participation can be directly attributed to their higher proportions in higher levels of education.

5.1.1.2 Household Characteristics

Female-headed households in Nairobi have between 4 to 6 members, have a low monthly income of KES 10,000 and less, rarely relied on other sources of food (food transfers or growing food), and reported that they were affected by high and unaffordable process of food. The household members are not necessarily children but may constitute other relations or kinship, especially in households where the household head is unmarried. Whereas, the majority of female-headed households earn low monthly incomes of KES 10,000 and less, a large proportion of them earn above KES 34,000 and are engaged in formal and informal employment, including formal and informal businesses, and casual wage work. Reliance on urban farming is largely affected by lack of land and interest, while reliance on food supplies from rural area is affected by frequency of visiting the rural home. Lastly, urban households rely more on purchased food items and are, therefore, vulnerable to market and food price forces.

5.1.2 The State of Food Security in Female-Headed Households

Female-headed households in Nairobi have varying degrees of food insecurity with very few households being food secure. This is in addition to the fact that a majority of them do not rely on other food sources (food transfers from rural areas or growing their food) to supplement their food access and availability. Even then, most of the households had a relatively good food diversity and rarely suffered from food shortages. In summary, majority of the female-headed households in Nairobi experience lower but varying degrees of food-insecurity; moderate and reasonable dietary diversity; and a relatively good household food stability throughout the year in terms of MAHFP measure. The common food groups consumed by majority of the female-headed households are cereals, vegetables, sugar, coffee and tea, milk, oil, and fruits, while the less consumed food groups are meat and poultry, roots and tubers, eggs, and fish.

5.1.3 Determinants of Female-Headed Households Food Security

5.1.3.1 Food Security and Household Heads Characteristics

Food security is relatively higher in households in which the female head is aged 16-35 years, is married, is a migrant to Nairobi, has attained up to secondary education, and is working. On the other hand, households which are severe food insecure are common where the female head is 56 years and above, is either divorced, separated or widowed, is a migrant to Nairobi, has attained up to secondary education, and where the household head is not working. However, hypothesis testing shows that food security in female-headed households in Nairobi is not determined by the household heads characteristics.

5.1.3.2 Food Security and Household Characteristics

Food security is relatively higher in households with 7 and more members, in households with a monthly income of KES 75,001 and above, in households which rely on own grown food in Nairobi, in households which do not rely on food transfers from rural home, and in households which never experienced unaffordable food prices. On the other hand, severe food insecurity was more likely to be experienced in households with 7 and more members, in households with a monthly income of KES 10,000 and less, in households which do not rely on own grown food in Nairobi, in households which do not rely on food transfers from rural home, and in households which experience unaffordable food prices almost every day. However, despite these variations, hypothesis testing revealed that the main factors that determine food security in female-headed households in Nairobi are household monthly income, household reliance on

own grown food, household reliance on food transfers from rural home and household experience of unaffordable food prices.

5.2 Conclusion

According to the constitution of Kenya, food is a basic right to all Kenyans. It is, therefore, central that households have access to nutritious food and that they are able to make informed decisions regarding their consumption. Furthermore, the global Sustainable Development Goal 2 is intended to end all forms of malnutrition, and ensure that everyone has access to safe, and nutritious food by 2030. However, there is no denying that there is a growing worry over food insecurity in sub-Saharan African cities, particularly among the most vulnerable populations such urban poor households. Additionally, compared to households with a male head, female-headed ones are likely to experience food insecurity because of various household characteristics and economic factors.

Food security in general and urban food insecurity, in particular, is a key challenge that needs to be studied and urgently addressed in sub-Saharan Africa due to the increasing number of people living in cities and the emergence of new nutrition transition experiences, as well as the rise in food-related non-communicable diseases. Existing research has revealed that a number of social and economic factors, and in the recent past climatic factors, determine a household's susceptibility to food insecurity at varying degrees. The social and economic factors include the household structure, income, and headship. A deeper analysis confirms that household income is one of the main determinants of urban food insecurity.

This is largely because, in an urban set up and regardless of household headship, households need income (money) to achieve the four dimensions of security. In other words, food security in urban areas is influenced by food purchase. This is mainly influenced by household income, consumption patterns, education status and the nature of decision making on food purchases (Kalansooriya et al., 2020). Household income is also related to experiences of unaffordable food prices. The lower a household's income, the more vulnerable they are to urban food insecurity. The low-income earners in urban centres cannot afford the ever-increasing food prices. In addition, urban farming and food transfers from rural areas is emerging as a significant food source and better nutrition to many urban households.

Although the characteristics of household sizes and household heads are not significant factors that can influence the food insecurity in female-headed households in Nairobi, policies should be focused on improving the state of food insecurity of these households by increasing income generating activities and reducing the cost of food.

5.3 Recommendations

5.3.1 Recommendations to Policy Makers

1. The national government to invest in and fully implement the existing pro-poor policies and programmes that relate to employment creation, reduction of food prices and social security systems to the vulnerable groups. The vulnerable groups should include the poor female-centred households who are severely affected by high and unaffordable food prices and market forces and who have limited livelihood and income sources.

2. County governments to integrate urban food production in their urban planning and development policies in order to promote and encourage urban food production at the household, residential neighbourhoods and urban scales. It is encouraging to note that Nairobi City County is implementing the Nairobi City County Food System Strategy which aims at increasing urban food production, enhancing stable food supply and incomes in Nairobi, reducing food loses, and maintaining a better welfare of food consumers.

3. County governments to develop programmes that encourage, train and empower women and youth in urban centres to venture into sustainable urban farming practices as an economic enterprise within the small and micro enterprises (SME) sector of the urban economy.

4. Both national and county governments to strengthen gender responsive policies, laws, and programmes to equitably address women's equal rights to access land and resources for urban farming in Nairobi.

5.3.1 Recommendations to Future Researchers

1. Given the recent experience from COVID-19 pandemic, there is need for further research on the negative impacts of COVID-19 on urban female-centred households state of food security in order to increase their resilience in future global pandemics.

2. There is also need for further insights on urban food insecurity in urban poor female-headed households. This category of female-headed houses are the most vulnerable to economic vagaries and high and unaffordable food prices.

3. Given the fact gender is both male and female, there is need for further insights on urban food insecurity in male-headed households, especially in the poor neighbourhoods of the city.

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