FOOD SECURITY STATUS, DIETARY PRACTICES AND NUTRITIONAL STATUS OF PEOPLE LIVING WITH HIV AND AIDS IN HOMABAY TOWN, KENYA

NYAMUNSI NAOM MOKONO (BSc. Biochem)
H60/10900/2007

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE FOOD, NUTRITION AND DIETETICS IN THE SCHOOL OF APPLIED HUMAN SCIENCES OF KENYATTA UNIVERSITY

SEPTEMBER, 2015
DECLARATION

This is my original work and has not been presented in any other university for award

Signature........................................ Date........................................

Nyamunsi Naom Mokono (BSc) – H60/10900/2007
Department of Food, Nutrition and Dietetics

We confirm that the work reported in this thesis was carried out by the candidate under our supervision.

Signature........................................ Date........................................

Peter M. Chege (PhD)
Department of Food, Nutrition and Dietetics
Kenyatta University
Nairobi, Kenya

Signature........................................ Date........................................

George O. Rombo (PhD)
Department of Food, Nutrition and Dietetics
Kenyatta University
Nairobi, Kenya
DEDICATION
To my loving mum for her tireless support and dedication throughout the study period
ACKNOWLEDGEMENT

I am indebted to Dr. Peter Chege for enlightening feedback and unwavering support that gave me focus and reason to complete this project. I acknowledge that Dr. George Rombo for constant support and guidance during the different stages of this project. I also wish to acknowledge the entire staff at the Department of Food, Nutrition and Dietetics for their support and contribution during my research. I express sincere gratitude to Dr. Sophie Ochola and Dr. Margaret Wagah for invaluable contributions and guidance during proposal development. I remain forever grateful to the Homa Bay MSF France and MOH staff, the research assistants and Mr. Osoro for assisting in data collection and analysis. To my husband Job and daughters Phoebe and Zippy, thank you for your love, patience, support and encouragement throughout the study period. Not forgetting parents Josiah, Esther, Peterson and Brothers Jeremiah and Joash, Sisters Lydiah, Wilter, Beatrice and Ruth. I thank all for great sacrifice and prayers.
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OPERATIONAL DEFINITION OF TERMS

Food Security - in this study it refers to a dietary diversity score of ≥4 food groups.

HIV and AIDS affected households - households currently living with one or more adult(s) who are infected with HIV and AIDS.

Household - people living under one roof and eating from same pot.

Household Dietary Diversity Score (HDDS) - a categorization of the number of food groups consumed by a household in previous 24 hours and a household with consumption of ≥4 food groups out of 12 food groups was considered adequate.

Nutritional status – in this study Body mass index (BMI) was used to indicate nutritional status whereby BMI of ≥18.5 to 24.99 was considered normal, <18.5 was considered underweight, ≥25 to 29.99 was overweight and ≥30 was considered as obese.
## ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>ART</td>
<td>Antiretroviral Therapy</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CRA</td>
<td>Commission of Revenue Allocation</td>
</tr>
<tr>
<td>DDS</td>
<td>Dietary Diversity Score</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>FANTA</td>
<td>Food and Nutrition Technical Assistance</td>
</tr>
<tr>
<td>FEWS NET</td>
<td>Famine Early Warning System Network</td>
</tr>
<tr>
<td>FGD</td>
<td>Focus Group Discussion</td>
</tr>
<tr>
<td>FSAU</td>
<td>Food Security Analysis Unit for Somalia</td>
</tr>
<tr>
<td>FSDP</td>
<td>Food Security District Profile</td>
</tr>
<tr>
<td>GOK</td>
<td>Government of Kenya</td>
</tr>
<tr>
<td>HDDS</td>
<td>Household Dietary Diversity Score</td>
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<tr>
<td>HFIAS</td>
<td>Household Food Insecurity Access Scale</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>IFRC</td>
<td>International Federation of Red Cross</td>
</tr>
<tr>
<td>IPC</td>
<td>Integrated Food Security Phase Classification</td>
</tr>
<tr>
<td>KAIS</td>
<td>Kenya AIDS Indicator Survey</td>
</tr>
<tr>
<td>KARI</td>
<td>Kenya Agricultural Research Institute</td>
</tr>
<tr>
<td>KNBS</td>
<td>Kenya National Bureau of Statistics</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health (Kenya)</td>
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<td>MT</td>
<td>Metric Tons</td>
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</table>
NACC - National AIDS Control Council
OVCs - Orphans and Vulnerable Children
PLWHA - Person/people living with HIV and AIDS
RCS - Red Crescent Societies
ROK - Republic of Kenya
SES - Socio-economic Status
UNAIDS - United Nations Programme on HIV and AIDS
UNICEF - United Nations Children’s Fund
UNSCN - United Nations Standing Committee on Nutrition
USAID - US Agency for International Development
WFP - World Food Programme
WHO - World Health Organization
ABSTRACT

The HIV and AIDS prevalence in Kenya is 7.2%. HIV and AIDS affect the livelihoods of the PLWHA and consequently their food security status. The country’s food security relies heavily on its agricultural production. Food insecurity that influences dietary practices affects about 12% of Kenyans in urban households and the presence of HIV and AIDS worsens the situation. There is limited data available on the magnitude of food insecurity among PLWHA in Kenya and the effect on dietary practices and nutrition status. The main objective of this study was to assess the food security, dietary practices and the nutritional status of PLWHA aged 18-55 years in Homa Bay town in Kenya. The study used a cross-sectional analytical study design that allowed for the collection of both quantitative and qualitative information at one point in time. The study adopted a sample of 333 PLWHAs that was drawn from a population of about 723 PLWHAs in Homa Bay town and its immediate outskirts. Homa Bay town was divided into five and from the list obtained from the clinic; proportion to size method was used to allocate the sample to each village. Systematic random sampling method was used to select the sample in each village at an interval of 3. A structured questionnaire was used to collect data on demographic and socio-economic characteristics, food security status, dietary practices and anthropometry. A focus group discussion guide was used to collect more information. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 15.0. Analysis comprised of descriptive statistics such as mean, percentages and frequencies. Chi square test was used to assess relationships between categorical variables while Pearson correlation analysis to establish the strength of association between non-categorical variables. Nutri-survey was used to analyze dietary intake data from the 24-hour recall. Body Mass Index (BMI) calculator was used to convert anthropometric measurements to BMI. T-test for independent samples was used to determine if there were significant differences between the study variables for males and females. Significance levels were determined at 95% confidence interval where a p-value of <0.05 was considered significant. Qualitative data was summarized, coded and analyzed to establish emerging themes. This study found out that 27.4% of the study population were food insecure as indicated by household dietary diversity score (HDDS) of <5. The mean HDDS was 4.72±0.11, which is an indicator of low nutrient intake. The intake of energy, fat and selected micronutrients namely iron, zinc, vitamin A, B6 and C was inadequate for >20% of respondents. About 19.6% were undernourished (BMI <18.5). Results show that, 6.8% of the respondents self-reported to have been affected by malaria, 0.6% by tuberculosis and 2.5% by pneumonia in the two weeks preceding the study. There were significant relationships between HDDS and energy (p=0.042), HDDS and micronutrients intake (p<0.05), energy intake and BMI (p=0.029) as well as the relationship between HDDS and BMI (p=0.015). Results also showed significant relationships (p<0.05) between the intake of vitamin A, vitamin C, iron and zinc and absence of illness. The study noted moderate food insecurity (27.4%) which correlated with poor dietary practices and poor nutritional status. The study recommends scaling up of food and nutrition security interventions in the region by the government and other stakeholders.
CHAPTER ONE: INTRODUCTION

1.1 Background information

The human immunodeficiency virus and acquired immune deficiency syndrome (HIV and AIDS) pandemic is a global crisis with adverse consequences. In 2013 Thirty five million people were estimated to be living with HIV globally and about 2.3 million people were newly infected with HIV (UNAIDS, 2013a). Sub-Saharan Africa remains most affected by the scourge with an estimated 24.5 million people living with HIV and AIDS (PLWHA) (WHO, 2014; UNAIDS, 2013a; UNAIDS 2013b). According to the KAIS report (2012), the HIV and AIDS prevalence in Kenya is about 5.6% down from 7.2% in 2007. The same report showed that higher percentages (6.5%) of PLWHA are urban residents while 5.1% reside in rural areas. Poverty and poor living conditions among the urban poor compound the HIV and AIDS situation (NACC, 2014; Amuyunzu-Nyamongo & Taffa, 2004).

Food security is an issue of global concern and in the past various targets to achieve a food secure population have been set. The most prominent is the goal to reduce the number of hungry people by halve by 2015, which is also contained in millennium development goals (MDGs). This far this goal is yet to be achieved and according to FAO, IFAD and WFP (2014), the rate of progress towards halving the hungry populations is slow for comfort. Currently about 805 million people globally are food insecure and face chronic hunger (FAO, IFAD & WFP, 2014). About 98% of them live in developing countries (Meade & Stacey, 2013). Kenya is one of the developing countries whose food security is challenged; in 2009, the government declared hunger a national disaster (Bruas, 2009).
Currently, the integrated food security phase classification shows that Kenya’s food security is stressed (IPC Phase 2) (FEWS NET, 2014). Reports further show that over 10 million Kenyans are chronically food insecure and over 30% of these require emergency food aid (KARI, 2012; ROK, 2011).

Unpredictable climatic changes characterized by floods and persistent droughts have been the major causes of food insecurity in Kenya. Other accentuating factors include: - overdependence on maize as a staple food, unsustainable national food reserves, cattle rustling, livestock diseases, political violence/insecurity, high food prices, injustices in land acquisition and ownership, high prices of fertilizer and other farm input and HIV and AIDS leading to emergencies in several parts of Kenya (FEWS NET, 2013; Nzuma and Ochola, 2010; ROK, 2012). The food security situation has seen Kenya maintain unreasonably high malnutrition indicators in the recent past. General data shows that malnutrition levels among PLWHA tend to follow food insecurity patterns (ROK, 2008). Given the dearth of literature, the current rates of malnutrition for adults are approximated to range between 18% and 65% based on several independent studies in several parts of the country (ROK, 2008).

Food security is severely affected by the dynamic shocks that HIV and AIDS imposes (USAID, 2008). Infection of a productive member reduces income and the ability of a household to access food (Crush et al., 2010). HIV and AIDS has dominantly compounded the food security situation in Kenya. Poor households with PLWHA especially in urban areas are exposed to reduced food access, high food prices, poor living and health conditions. Such conditions impact negatively on food and nutrition security (Kimani-Murage et al., 2010; Brevet, 2009). Household food insecurity has
been observed to influence the dietary practices of household members. In acute food insecurity situations, adults are affected more than the children since they are required to reduce the amount and frequency of food consumption (Sunguya et al., 2014). The situation in chronic food insecurity may be worse as household members move to severe coping strategies such as skipping meals and sleeping hungry to spare food for the future (Belachew et al., 2013; Farrell, 2013).

Poor dietary practices affect the nutritional status of household members negatively. Inadequate dietary intake, for instance, is associated with high risk for morbidity, poor physical and health outcomes (Nyansikera, 2010; Palermo et al., 2013). HIV&AIDS and related untreated opportunistic infections coupled with poor dietary practices lead to poor nutritional status among children and adults (Chege, 2010; World Bank, 2007). Low nutrition knowledge, poor attitudes and practices would lead to negative dietary practices which consequently affect the nutritional status of individuals from otherwise food secure households (Farrell, 2013; Nti, 2008; Quigley, Taylor & Scragg, 2007).

The Government of Kenya and UNICEF have been undertaking nutrition interventions to alleviate undernutrition among PLWHA. The interventions include food by prescription programs conducted at comprehensive care clinics (CCC) which aim at meeting caloric and protein requirements and iron and folate supplementation for children aged less than five years, lactating and pregnant mothers. The AMPHATH supplementation program in Western Kenya also aims at enhancing caloric, protein and micronutrient adequacy among PLWHA. HIV and AIDS is a
factor that accentuates food insecurity hence to reduce the number of deaths from HIV and AIDS and the number of new infections, the government of Kenya has scaled up HIV and AIDS programs. Some of the programs in place and with significant results include male circumcision, HIV education, testing and counselling, HIV care and treatment services and prevention of mother to child transmission of HIV (KAIS, 2012; KNBS & ICF Macro, 2010). The Government of Kenya has also identified good nutrition as a key component of the national response to the HIV and AIDS epidemic and together with other stakeholders; it has various programs geared towards improving the food security of PLWHA and affected persons.

Homa Bay County has HIV and AIDS prevalence of 27.1% (NACC, 2013), far above the national HIV and AIDS prevalence of about 5.6% (KAIS, 2012). The County often also reports poor food production and increased harvest losses (Onyango, 2014; Awour, 2012; UN-Habitat, 2010). Deterioration in the food and nutrition security of the people of Homa Bay town is highly likely because of regular water shortages, poor sanitation and hygiene owing to poor planning of some urban sections (UN-Habitat, 2010). Poor water and sanitation services have also contributed to disease such as malaria, cholera and typhoid; which manifest in ways that adversely affect nutritional status. High unemployment and poverty levels may also be sustaining the HIV and AIDS, food and nutrition insecurity cycles (CRA, 2011).
1.2 Statement of the problem

Taking into consideration that HIV and AIDS has adverse effects on the health and nutrition status of PLWHA, it is important to address the factors that sustain its cycle. Food insecurity is one of the major factors that hamper the efforts geared towards fighting HIV and AIDS. The unique effects of HIV and AIDS on the households’ food security status may not be adequately understood hence actions may be inappropriate and non-specific. Unfortunately, there is dearth of literature on the food and nutrition security status of PLWHA in Kenya and hence addressing food insecurity and its underlying causes remains an elusive subject. Also, food security status influences the dietary practices. Since there are other factors that are associated with HIV, the relationship between food security status and dietary practices is not well documented. The nutrition status is influenced by the dietary practices adopted. However, this may not always be the case, since infections have also been documented as a factor that affects nutrition status. In this view, there exists minimal information on how dietary practices affect nutrition status among PLWHAs. The study sought to address these gaps by assessing household food security status and how it relates to dietary practices and consequently to nutrition status among PLWHA in Homa Bay town. Such insights will add to existing knowledge and are valuable for action towards improving the food security of PLWHA by program implementers.

1.3 The purpose of the study

To assess household food security status, dietary practices and nutritional status of people living with HIV and AIDS (18-55 years old) in Homa Bay town. 
1.4 Specific objectives of the study

1. Establish demographic and socio-economic characteristics of people living with HIV and AIDS
2. Determine the dietary practices among people living with HIV and AIDS
3. Determine nutritional status of the people living with HIV and AIDS
4. Determine the morbidity patterns of the people living with HIV and AIDS
5. Assess food security status of households with people living with HIV and AIDS
6. Assess the relationship between food security status, dietary practices, morbidity patterns and nutritional status of people living with HIV and AIDS

1.5 Study hypothesis

H0₁: There is no significant relationship between the dietary intake and nutritional status of people living with HIV and AIDS in Homa Bay town

H0₂: There is no significant relationship between the morbidity patterns and nutrient intake of people living with HIV and AIDS in Homa Bay town

H0₃: There is no significant relationship between the household food security status and dietary intake of PLWHA in Homa Bay town

1.6 Significance of the study

This study has generated information that indicates how HIV has impacted on food security. The role played by food security in influencing the dietary practices has also
been studied. The study findings show the relationship between dietary practices and nutritional status. The generated information adds to the existing body of knowledge in the field of nutrition and dietetics. The results are useful to stakeholders in food security to developing appropriate strategies geared towards the improvement of general livelihoods and food safety nets of PLWHA. Findings are useful in the generation of new policy and improve existing policies geared towards reducing the effects of HIV and AIDS on food security. The findings of this study are useful to stakeholders in food security to scale up research in HIV and AIDS contexts.

1.7 Delimitations of the study

This study focused on adults in affected/infected households who were on ART as those not on ART may have a difference in immune system. This study did not focus on PLWHA with chronic health conditions as this would aggravate the nutrition status. The study was carried out in Homa Bay town hence results of this study may only be generalized to similar set-ups (urban areas).

1.8 Limitations of the study

Some of the PLWHA included in the study would be on intervention programs other than food that would be pivotal to their basic income hence their food and nutritional security status would be different from the rest of the respondents who were not in such programs.
1.9 Assumptions

The study made the assumption that PLWHA attending sessions at the MOH/MSF clinic of Homa Bay District Hospital were not on food interventions; MOH/MSF staff confirmed that food by prescription and related programs were on hold awaiting entry of a new non-governmental organizational which would roll out the programs.

1.10 Conceptual framework

This study was based on a conceptual framework of factors influencing household food and nutritional security status (Fig.1.1). In an adult HIV and AIDS leads to decreased production and income, it exerts a burden on other sources of livelihood hence reducing availability and access to adequate food by a household and ultimately food insecurity. Stigmatization forces PLWHA to seek treatment far away from home hence increasing health costs. Further reduction in income leaves most of the PLWHA torn between meeting health costs and their food requirements. PLWHA have increased nutrient needs, reduced access to adequate food leads to low dietary intake that causes malnutrition (Castleman et al., 2004).
Figure 1.1: Conceptual framework of factors influencing household food and nutrition security. Adapted and modified from Morris (1999) and FSAU (2005)

Food security and good dietary practices at household level translate to good individual nutritional status. Inadequate dietary practices lead to an increase in opportunistic infections and decreased adherence to drug regimen (Anema et al., 2009; Ivers et al., 2009). Some of the opportunistic infections affect nutrient intake and utilization hence leading to poor nutritional status (Weiser et al., 2011).

Apart from household food security and appropriate dietary practices, good health seeking behaviour(s) have a pivotal role in achievement of good nutritional status among PLWHA by ensuring prevention of opportunistic infections, adherence to ART therapy and slowing progression of HIV&AIDS (Hailemariam, Bune & Ayele, 2013).
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The state of food insecurity in the world report of 2013 shows that currently about 842 million people in the world are food insecure, 98% of who reside in developing countries (FAO, IFAD & WFP, 2014). In Sub-Saharan Africa over 214 million people are food insecure and hungry (Bremner, 2012; FAO, IFAD & WFP, 2014). Africa is also home to the highest number of PLWHA; in 2013 about 24.7 million people and so far, the region had the highest number of new HIV infection, about 1.8 million people (WHO, 2014). In Kenya about 12% of the population is food insecure; the food produced locally can only feed 88% of the people in the country (Dietz et al., 2014). High food prices and high tax on basic food items have been the fuelling factors to food insecurity especially in urban households (FEWS NET, 2013). Other major factors causing food insecurity include unpredictable climate manifesting in form of droughts and/or floods and failure by the Government to implement some of the National Food Policies (KARI, 2012; Nzuma & Ochola, 2010).

2.2 Demographic and socio-economic factors of people living with HIV and AIDS

Demographic factors such as age, sex and marital status determine the household food security status as well as the individual nutritional status. A study conducted in Uganda by Nanziri (2006) showed that adults aged 39 years and above had better diets in terms of quantity and quality compared to the younger ones. This can probably be explained by the fact that productivity increases with age; adults in advanced age brackets make better agricultural and production decisions (Amaza et
al., 2009). Most studies show little or no difference in the food security of females and males. However, women and girls are vulnerable to HIV infection than men because of their subservient nature as perceived biologically, socio-economically and socio-culturally (Gillespie & Kadiyala, 2005). Findings of a study conducted in Zambia (2007) using the HDDS showed that female headed households were more food secure as compared to male headed households. Further research conducted in Ghana showed association between food security and marital status (Aidoo, Mensah & Tuffour; Dauda, 2010).

Socioeconomic factors such as household income level, number of assets, housing conditions, education and occupation affect the household food security. Studies conducted in Zambia, Rwanda and Uganda respectively among PLWHA showed that households with more income or more assets and better housing, water and sanitation conditions were more likely to have better food security status (Harris et al., 2010; Sirotin et al., 2012 and Bukusuba, Kikafunda and Whitehead, 2010). Further studies carried out in Ethiopia and Sri Lanka showed that higher education correlated with better food security status since the more educated people were likely to engage in better income opportunities (Tiyou et al., 2012; Jayawardena et al., 2013). This study assessed how socio-economic factors affected food security in Homa Bay town.

2.3 Overview of food security situation in relation to HIV and AIDS

Food security refers to when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious foods for an active and healthy life
Food security is a multidimensional concept; four dimensions have been elaborately discussed; availability, access, utilization and stability (Napoli, 2011). Food availability refers to when there is enough food of appropriate quality, supplied through domestic production, imports and food aid (World Summit, 1996). Food access refers to the ability of a household or individual to access adequate resources that can be used to obtain appropriate food required for a nutritious life (FAO, 2008; World Summit, 1996). Food utilization is achieved when individuals access safe and nutritious food to meet their physiological needs; this includes aspects of sanitation, clean water and health care, feeding practices, food preparation and food storage (Napoli, 2011; FAO, 2008). Food stability refers to the ability of household or individual to access appropriate amounts of food at all times (FAO, 2008; World Summit, 1996).

HIV and AIDS and food security interact in a bidirectional manner; HIV and AIDS fuels food insecurity and on the other hand food insecurity exacerbates HIV and AIDS infections (Weiser et al., 2011). These linkages often have short and long term effects on the affected population; short term effects include reduced labor and production and loss of income while on the long term there is erosion of assets, loss of livelihoods and diminished ability to take care of the sick and vulnerable individuals (Gillespie & Kadiyala, 2005). Figure 2.1 describes the bidirectional relationship between HIV and AIDS and food security.
Figure 2.1: Bidirectional relationship between HIV and AIDS and food security, Adapted from Save the Children and Oxfam 2002 (cited in FAO 2003)

Food security and HIV and AIDS are becoming increasingly entwined in a vicious cycle; food insecurity makes people susceptible to HIV infection while HIV and AIDS increase vulnerability to food insecurity (Fox, 2012). Poverty and hunger may drive people especially women to prostitution and place them at risk of sexual exploitation by those who control access to resources hence at a higher risk of contracting HIV and AIDS (Murray & Achieng, 2011; Chen, 2013). Violence against women, early marriages and traditions such as wife inheritance, which is common in Homa Bay Kenya increases women’s vulnerability to HIV and AIDS. In cases of violence or coerced marriage set-ups, women’s power and ability to negotiate the conditions of sexual intercourse and the extent to which they feel able to discuss their serological status with others and seek social support is reduced hence compromising their individual and household food security status (Gillespie & Kadiyala, 2005; AMREF USA, 2014).
Orphans and vulnerable children are also at risk of food insecurity and in cases where they are left to fend for themselves they can be very vulnerable to HIV infection. Research shows that households with more than one orphan are more food insecure as compared to those with only one orphan or no orphans at all (Juma et al., 2013). About 16,000 out of the approximate 650,000 orphans in Kenya reside in Homa Bay District (AMREF USA, 2014); most of these orphans display signs of serious poverty and food insecurity such as lack of decent clothes and staying without food at school during lunchtime (Kiragu et al., 2012).

Mobility is another marker for enhanced risk of HIV infection; when people move in search of opportunities, single people move or families are split up, often as a consequence of poverty, the likelihood of their engaging in risky sexual practices tends to increase (Kwena et al., 2013; Drimie et al., 2009). Based on where the PLWHA decides to migrate to, mobility affects food security both in the rural and urban areas. In most cases most PLWHA have a tendency to go back to the rural; this leads to a decline in remittances and also places a greater burden on rural households’ food security (Allison & Seeley, 2004). In a new limelight, the PLWHA may migrate to urban areas hence worsening the food insecurity status of the urban households (Crush et al., 2010). If PLWHA remain in urban places they may be unable to pursue other food security avenues, including urban agriculture and may not benefit from social safety nets eminent in the rural; their food security and of those in rural is then compromised (Crush, et. al., 2006; Crush et al., 2010).
There is growing concern over the food security of people living in urban areas because HIV and AIDS prevalence is higher in the urban areas and there is increased food insecurity. The high cost of living combined with poverty and factors such as increasing food prices and medical costs due to HIV&AIDS lead to compromise of quality, quantity and dietary diversity of meals consumed hence malnutrition (Wagah; 2012; Crush et al., 2010; Gillespie, 2006). Inadequate food intake has adverse effects on PLWHA; drug adherence is reduced, opportunistic infections increase and there is accelerated progression to full blown disease or death (Gillespie, 2008).

Despite the seriousness of the vicious cycles between HIV and AIDS and food insecurity, there are gaps in the bid to break the linkages between HIV and AIDS and food insecurity in Kenya. First, most programs and interventions on food and nutrition security in Kenya have been directed to rural areas (Nzuma & Ochola, 2010) and second, there is limited data concerning the food security and nutritional status of PLWHA in urban areas of Kenya. As such there is need to step up research and food and nutrition interventions among PLWHA in urban areas of Kenya as well as the need to quantify the magnitude of food insecurity and malnutrition in HIV and AIDS contexts. This study assessed the food and nutrition security status of households with PLWHA in Homa Bay town which is an urban area in Kenya. The information is relevant to stakeholders in food security and HIV and AIDS fields; they will come up with specifically tailored programs, policy, curriculum and activities for improving the food security of PLWHA in urban areas.
2.4 Food security assessment methods

Food security assessment is done through various methods such as the household economy approach (HEA), food stocks and harvests estimates, demographic and health surveys, the 24 hour recall, household food insecurity access scale (HFIAS) and household dietary diversity score (HDDS). The HDDS, HFIAS and 24-hour recall were covered in this study.

2.4.1 Household dietary diversity score

The HDDS is a food security tool which assesses the total number of food groups eaten in the previous 24 hours by any household member at home, including food prepared at home but eaten outside (Swindale and Bilinsky, 2006). It captures consumption patterns employed by different groups of people and change of those patterns in different conditions; this information has implications for mitigating deleterious changes in diet during shocks (FAO, 2008a). The method has been validated and used in non-HIV (Sirotin et al., 2012; Hoddinott & Yohannes, 2002) and HIV contexts (Harris, et al., 2010; FAO, 2008; Zambia, 2007) and was found to correlate with per-capita caloric availability, and household per capita consumption which are measures of food access. The HDDS can also be used to identify the food insecure, monitor changes in food security and micronutrient adequacy and assess the impact of interventions on household food access (Ogundari, 2013; Rawat et al., 2013). Ruel (2002) documents relationship between dietary diversity, nutrient adequacy and child growth; studies in Mali and Kenya showed a linear relationship between the three as dietary diversity scores increased (Ruel, 2002).
The HDDS was used to measure the impact of HIV on food security in Lusaka, Zambia (2007) in an HIV context. Results from the study showed that households of higher SES were more likely to have a HIV+ head and there was weak evidence that the households had higher HDD scores (8.3) whereas the HIV- households had HDD scores (7.6). More households with a HIV+ head were food insecure but food insecurity was not significantly associated with HIV status or sex of household heads (Zambia, 2007). These results compare and contrast those of a study conducted in the same region by Harris et al. (2010) which showed that households of higher SES were more likely to have HIV- heads (P=0.037) but the study found no association of sex and HIV status with DDS just like the earlier study.

2.4.2 Household food insecurity access scale

The HFIAS assesses challenges of households in accessing food in the preceding 30 days (Coates, Swindale & Bilinsky, 2007; Saaka & Osman, 2013). The HFIAS is strongly associated with HDDS; higher dietary diversity is associated with greater food access (FAO, 2008a). HFIAS identifies consumption patterns that household employ including negative coping strategies such as going to bed hungry. The HFIAS measures poverty in food access and can illuminate the implications various coping strategies have on the nutritional status of PLWHA (Alcaraz & Zeller, 2007; Bukusuba et al., 2007). While HDDS shows the variety of foods/food groups household members consume and changes across seasons (Nti, 2011; FAO, 2008a). The HFIAS can also be compared over seasons and across locations (FAO, 2008a; UNSCN, 2008). Such information will be of importance to program implementers in food and nutrition security. The next section will discuss the 24-hour recall.
2.4.3 The 24 hour recall

The 24-hour recall is a quantitative method of assessing the dietary intake of household members over the previous 24-hour period (Geffen, 2003; FAO and WHO, 1996). The method relies on the memory of the respondents whereby they are expected to recall all the foods and beverages they consumed in the previous 24 hours (Thompson & Subar (in Coulston et al., 2008). After listing the foods and drinks, the method by probing elicits further information on whether the food/drink was consumed during main meals or as a snack, the ingredients of dish and method of preparation (Perez-Escamilla & Segall-Correa, 2008).

Further, the method seeks information on quantities of foods prepared and those served by the respondents; how much they consumed and if there were any leftovers. Information on number of meals provides insight on the adequacy of household macronutrient intake (Chege, 2012; Swindale & Ohri-Vachaspati, 2005). While exact quantities of food consumed are used to obtain the percentage of household members who meet their minimum daily caloric and nutrient recommendations (Sharkey et al., 2012; Swindale & Ohri-Vachaspati, 2005).

This study used the HDDS to assess the food security status of households with PLWHA, the 24 hour recall to get information on amount of Kilocalories, vitamin A, B complex and vitamin C, iron and zinc consumed as well as number of meals consumed per day; these two constitute dietary practices. The HFIAS was used to provide additional information on experiences or conditions that households faced in
accessing food as well as coping strategies they employed in times of food shortages. Such information is beneficial to various food security and HIV&AIDS stakeholders to improve the food security status, dietary practices and consequently the nutritional status of PLWHA.

2.5 Dietary practices and nutrition status of people living with HIV and AIDS

Good dietary practices at household level have been observed to translate to good household and individual nutritional status (Ndaru, 2013; Ndahi, 2010). Dietary practices are inclusive of several components such as adequate dietary intake in terms of quantity and quality, number of meals consumed in a day, frequency of foods consumption, dietary habits and behaviours; consumption of the recommended amounts of macronutrients and micronutrients coupled with the standard meal intake per day and frequent intake of variety of foods often translates to good nutritional status (Chege, Kuria & Kimiywe, 2010; Belachew et al., 2013). WHO (2003) recommends that PLWHA consume slightly higher amounts of energy, fat and protein as well as micronutrients such as iron, zinc, vitamin C, Vitamin A and selenium for optimal health benefits.

The PLWHA also need to consume small but more frequent meals in a day with increased food variety so that they can meet their increased nutrient needs (Chinnock, 2011); three standard meals (breakfast, lunch and dinner) at least three snacks distributed in between the standard meals (FANTA, 2001). Good dietary habits such as choice of healthy and not junk foods or alcoholic drinks, good hygiene and
sanitation in food preparation, handling and storage also constitute good dietary practices and play an important role on the nutritional status of PLWHA (Mbochi, 2011; Farrel, 2013).

Various studies show that PLWHA are vulnerable to poor dietary practices because of their disease status; the PLWHA participate less in food production, they fetch little income and their medical costs are high and exert pressure on household income (Hailemariam et al., 2013; Gillespie and Kadiyala, 2005). Further PLWHA in urban areas have other urban expenses such as house rent, electricity and water bills which are often given priority leading to a compromise in the quantity and quality of diets consumed by household members (Wagah, 2012; Crush et al., 2010). In addition, various parts of Homa Bay County are affected by low food production and as such residents of Homa Bay town and other areas often face food shortages when food imports are delayed or in low supply (Onyango, 2014; Awour, 2012; FSDP, 2005). This study assessed dietary practices in Homa Bay town with an aim to fill the gap that PLWHA in urban areas often consume certain foods/food groups infrequently, consume diets low in quantity and quality and take less number of meals in a day.

2.6 Morbidity Patterns among people living with HIV and AIDS

HIV&AIDS in an individual often increases chances of getting opportunistic infections whose presence is often compounded by inadequate dietary practices and failure to seek appropriate medical attention or absence of the medical services (Mupere et al., 2012; Rawat, et al., 2013a). Opportunistic infections such as malaria
or the form in which they manifest for instance as diarrhea, fever and vomiting have negative effects on nutrient intake, absorption and utilization leading to poor nutritional status (Weiser et al., 2011; Gitika, 2014). Presence of untreated infections coupled with inadequate dietary practices lead to poor nutritional status among PLWHA and together they have been observed to have negative effects on adherence and response to ART which leads to quick progression of HIV&AIDS and high mortality risk among PLWHA (Tiyou et al., 2012; Sicotte et al., 2014)

Factors such as poor urban planning and poor water and sanitation services complex the morbidity situation of Homa Bay town since the residents are regularly exposed to diseases such as malaria, typhoid and cholera (UN-Habitat, 2010). This study determined the morbidity status of the PLWA in Homa Bay town to fill the following gaps; whether the PLWHAS were highly exposed to opportunistic infections, whether the PLWHAs had good health seeking behaviours and whether the presence of the opportunistic infections was due to inappropriate dietary practices.

2.7 Association between HIV and AIDS and nutritional status

Nutritional status is broadly defined as the current body status of an individual or population as influenced by the intake and utilization of nutrients. Apart from intake of nutrients, other factors such as the diet quality and quantity, physical health, age, sex and lifestyle also influence nutritional status (Adamu, Adjei & Kabuga, 2012; Onyango et al., 2012). The link between food insecurity, malnutrition and HIV and AIDS in both adults and children is well established. Malnutrition is accentuated by HIV and AIDS and in itself malnutrition weakens the immunity of PLWHA, quickens
progression of disease (Hailemariam et al., 2013; Magadi, 2011). It is important that as HIV prevention and mitigation programs are rolled, parallel programs focussing of HIV and AIDS risk reduction and impacts management be in place; such programs would include nutrition interventions (Yager, Kadiyala & Weiser, 2011).

Unfortunately, very few studies have been conducted to quantify the magnitude of malnutrition among PLWHA. ROK (2008), documents that undernutrition of PLWHA is the biggest concern as far as malnutrition is concerned. Data from UNICEF nutrition interventions documents that the prevalence of undernutrition among adults living with HIV in Kenya varies between 15 percent and 65 percent (ROK, 2008). In Homa Bay, the data available shows the nutritional status of the general population as indicated by a Multiple Cluster Indicator survey conducted in the area in 2011; about 37% of the under fives were stunted, 17% underweight and 4% wasted (KNBS & UNICEF, 2013). There is a dearth in literature concerning the malnutrition levels of PLWHA as such, this study sought to get information on malnutrition levels among PLWHA in Homa Bay town.

2.8 Summary of literature review

Literature reviewed shows that food insecurity is a big problem in households with PLWHA. HIV and AIDS, food insecurity and malnutrition intertwine in vicious cycles and separating one from the other would be difficult. Efforts to improve the household food security in HIV&AIDS contexts should therefore apply such lens that all the three must be addressed as one.
There is limited information on the food and nutrition insecurity situation in households with PLWHA in Kenya and Homa Bay town; the literature review has revealed that the effect of HIV and AIDS on the households’ food security status is not adequately covered. There is also minimal information on how food security influences the dietary practices. The relationship between dietary practices and nutrition status among PLHWA is not well covered by existing literature.
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research design

The study adopted a cross-sectional analytical design to assess the food security status in households with adults (18-55 years old) living with HIV and AIDS. This design is useful to collect information at one point in time, thereby describing the population as it is. The study design is justified as it allowed for random selection of a representative sample hence bias was reduced and results can be generalized to other populations. The analytical part of the design allowed for the test of hypothesis and also the comparison of variables (Schoenbach, 1999). The design also allowed for collection of both quantitative and qualitative data.

3.2 Research variables

3.2.1 Independent variables

The independent variables in this study were; food security status as measured by the household dietary diversity score (HDDS), dietary practices (number of meals, frequency of food consumption and amount of nutrients consumed), demographic factors (sex and marital status), socio-economic factors (monthly income, education, occupation and expenditure on food) and morbidity patterns.

3.2.2 Dependent variables

The dependent variable was nutritional status of the respondents as depicted by BMI.
3.3 Study area

Homa Bay town is located in Asego Division, Homa Bay County in Nyanza Province. The town has a population of approximately 56,297 of which 75% are urban and semi-urban residents (UN-Habitat, 2010). Majority of people are employed in informal sector and as a result Homa Bay is one of the poorest districts in Kenya, with over 44.1% of its population living below the poverty line (CRA, 2011).

The case of Homa Bay is worth investigating as statistics show that Homa Bay County has been insufficient in food production and majority or residents rely on food imports and a few on food aid (Onyango, 2014; Awour, 2012). The situation is made worse by lack of proper storage facilities and poor road network resulting in heavy post-harvest losses (Food Security District Profile, 2005; Datta & Njuguna, 2009).

The study area is justifiable as Homa Bay County has HIV and AIDS prevalence of 27.1% (NACC, 2013). This is above the national prevalence, hence making it a HIV and AIDS hot spot. Cultural beliefs, wife inheritance, early marriages and narrow economic activities in the community are some of the factors that have contributed to high infection rates in the district (ROK, 2009; ROK, 2005). The town is also characterized by poor water and sanitation services which often contribute to diseases such as malaria, cholera and typhoid; which manifest in ways that adversely affect nutritional status of those affected (UN – Habitat, 2010).
3.4 Study population

3.4.1 Target population

This study targeted adults aged 18-55 years, a group at prime age, sexually active with high mortality rates due to HIV and AIDS (KAIS 2012; KNBS & ICF Macro, 2010). Adults this age are most productive and their sickness or death affects the household food security (Futoshi et al., 2007; Yamano & Jayne, 2003).

3.4.2 Accessible population

The research team was able to access the target population aged 18-55 years who were enrolled in MOH/MSF program at Homa Bay District Hospital.

3.4.3 Inclusion criteria

This study included all adults (18-55 years old) living with HIV and AIDS who were enrolled in MOH/MSF program at Homa Bay District Hospital and with proof of receiving ART treatment at time of the study. The PLWHA on ART have a compromised immune system and are affected most by inadequate dietary intake hence at risk of developing drug resistance and accelerated death; residents of Homa Bay town or immediate surroundings for at least six months (Kimani et al., 2013; Nyamogoba et al., 2012) so that their current food security status is inclined towards conditions of the town.
3.4.4 Exclusion criteria

Households having PLWHA who had other chronic health conditions such as diabetes, cancer to avoid non-specific results; before enrolment as a participant in the study, individuals meeting other inclusion criteria underwent a medical history session at the MOH/MSF clinic to ascertain that they were free of other chronic illnesses.

3.5 Sample size determination

The sample size was computed using a formula by Fisher et al. (1983).

\[ n = \frac{t^2 \cdot pq}{d^2} \]

Where: 
- \( n \) = the desired sample size (if the target population is greater than 10,000),
- \( t \) = the standard normal deviate at the required confidence level (from statistical tables at 95% = 1.96),
- \( P \) = proportion of target population estimated to have characteristic being measured (in this case HIV and AIDS prevalence was estimated at 27% as provided by NACC, 2013),
- \( q = 1 - p \)
- \( d \) = the level of statistical significance (for this study is 0.05)

Therefore for this study: 
\[ n = (1.96)^2 \cdot (0.27) \cdot (1-0.27)/ (0.05)^2 = 303 \] households
The sample size of 303 was increased by 10% to cater for non-response making it 333. In this study, a sample of 321 was used.

3.6 Sampling procedure

Cluster sampling was used to group Homa Bay town into five villages which this study considered as clusters (Magenta Book, 2004). To get a representative sample, all the villages were selected. The villages are; Sofia, Makongeni, Township, Shauri Yako and Nyalkinyi. A list of 723 PLWHAs provided by the MOH/MSF staff from hospital records was then used to allocate participants to each village by use of proportion to size method such that from Township which had the largest population of 149 PLWHA sample of 69 was selected and from Nyalkinyi which had the smallest population of 137 a sample of 62 was selected and the method was repeated to get a representative sample from the other villages. Systematic random sampling technique was used to select the participants in each village at an interval of 3 (Olsen & St. George, 2004). For instance in township, person number two on the list of PLWHA was selected then at an interval of 3 the fifth, eighth and so on until a sample of 69 was reached. Similar procedure was repeated in the other four villages.

3.7 Data collection tools

The main research tool was a structured questionnaire administered by the interviewer (Appendix II). The questionnaire was used to collect data on demographic and socio-economic factors, food security, dietary practices, morbidity and nutritional status. A focus group discussion guide (FGD) (Appendix III) was also used: one for men and
one for women to collect more information about food security, dietary practices and nutrition status. The two tools were translated into Dholuo language (Appendices II and III in translated format).

3.8 Pre-testing of data collection tools

The questionnaire was pre-tested at Kendu Bay town to ensure accuracy and clarity of questions; it was given to a sample of 33 (10% of 333) PLWHA selected from Kendu Sub District Hospital, sharing the same characteristics as the study sample but who would not be part of the main study sample. The pre-testing sample included 20 PLWHAs: 10 men and 10 women for the separate focus group discussions. After the pre-testing process, the tools were then adjusted accordingly to ensure that all the tools were clear and all the data needed was collected.

3.8.1 Validity and reliability

3.8.1.1 Reliability

To test reliability of the questionnaire, the test re-test method was used whereby the questionnaires were administered to the sample of 33 and then repeated on the same sample after 1 week. Results of the two sessions were compared to see how similar the answers on the same questions from the same individual were and the reliability coefficient was 0.81. Questions with the greatest inconsistency were revised accordingly.
3.8.1.2 Validity

Content validity was determined by using a panel of three food security experts; a food security analyst from FAO, a nutritionist from MOH/MSF clinic and a Nutrition lecturer from Kenyatta University. The three were requested to assess the structure and relevance of content and identify vague questions and gaps in the questionnaires (Orodho, 2004). The tools were revised accordingly based on the inputs of the three experts.

3.9 Training of the research team

Seven research assistants with at least a bachelor’s degree in foods and nutrition or closely related courses were trained for three days on the purpose and objectives of the study, various data collection techniques; administration of questionnaires, sampling of households and on self presentation before the actual data collection exercise (Appendix IV). The training was conducted by the principal investigator assisted by two nutrition staff. During training emphasis was laid on the questionnaire clarity and mastery of the content; each question was explained to the research assistants and all arising questions tackled until the trainers were satisfied that everyone understood the questions similarly. The research assistants were also trained on anthropometric measurements and mastery was ensured through role play. Three research assistants who portrayed great skill in anthropometry were mandated to conduct the measurements during actual data collection, assisted by the other team members.
3.10 Data collection procedures

The questionnaires were administered with the questions asked in the order in which they occurred. The questionnaire was made up of three sections; the demographic, socio-economic part and the dietary intake part which was conjoined with the anthropometry section (Appendix II). The questionnaire was translated into Dholuo which is the common language in the study area. In Appendix II, several methods namely, the household dietary diversity score, the 24 hour recall, food frequency questionnaire (FFQ) and the household food insecurity access scale (HFIAs) were used to collect dietary data. The methods were complementary to each other; each method collected a piece of different information that when put together gave a clear understanding of study objectives.

The demographic section (Appendix II) involved collecting vital statistics on the respondent’s sex, age and marital status. The socio-economic section sought to elicit information on education, occupation, monthly income and amount spent on food. A 9-item HFIAS scale with 27 responses, that elicited information on poverty in food access and coping strategies households employed during food shortage in the previous 30 days prior to the interview day also gave part of the socio-economic data. HFIAS was used to assess feelings of anxiety and uncertainty about food supply and reduction in the variety and quantity of food consumed. It was administered twice in each sampled household.
Food security assessment was done by use of household dietary diversity score (HDDS). The HDDS consisted of 12 food groups (Swindale & Bilinsky, 2006). It was used to assess the variety and quality of diet consumed by a household; by summing the number of food groups eaten by household members in the 24 hours prior to the interview into scores. It also assessed dietary diversity whereby a household with <4 food groups was classified as food insecure and households that consumed ≥5 food groups as food secure (IPC Global Partners, 2012; Zambia, 2007). It was repeated twice in the sampled households.

The 24-hour recall was used to collect information on food and drink intake in the previous 24-hours; the tool was administered twice in each sampled household on non-consecutive days assigned randomly; to increase accuracy of data collected and representativeness of respondents’ diets (Thompson & Subar (in Coulston et al., 2008; Frongillo & Nanama, 2006; FAO and WHO, 1996). The study used the interactive 24-hour recall which allows for estimation of food sizes and quantities unlike the traditional 24 hour recall that is based on strict measurements (Rosalind & Elaine, 2008). For this reason, assorted cups, plates, spoons and bowls were used as visual aids to assist the respondents to accurately approximate the amount of food consumed at each meal. In some cases respondents provided their own utensils in order to understand the food sizes they consumed; these were standardized using water in a calibrated jar before use (Swindale & Ohri-Vachaspati, 2005). In case of fruits and other edibles consumed raw such as carrot and sugarcane, samples were collected from the local market to assist respondents’ approximate size of fruit taken.
To approximate the weight (g) of the individual foods consumed, the South African Food Photo manual that is believed to increase accuracy in weight approximation was used (Steyn et al., 2006). The manual has photos of approximated food sizes and their respective quantity conversions in grammage; during the study actual food sizes were compared to those in the photos and respective quantities assigned. The gram equivalents were used to show amounts of nutrients the respondents consumed. RDA percentage of major macronutrients and micronutrients was also calculated to show adequacy of respondent’s diets; specifically kilocalories, fats, proteins, vitamins A, B and C, iron and zinc were of interest in this study because they are important to the health of PLWHA (WHO, 2003).

A seven day food frequency form was used to collect information on the frequency of consumption of the locally available foods (identified at the market and households). A list of 42 commonly consumed foods from was made and the respondents were asked to state the number of days they consumed each of the foods in a week. Consumption of a food group at least thrice a week was considered regular intake while less than three days consumption was irregular (Ahmed et al., 2008; Dahl, Mæland & Bjørkkjær, 2011; Chege, 2012).

Sunbow Bathroom scales (SM-RTZ-114, made in China) were used for weight measurement; they were calibrated to zero and after the respondents take off any heavy clothing, the weight readings were taken, at precision 0.1kg. Height was taken using stature height meters (2M, made in China); the height meters were fixed to a higher firm service and then calibrated to zero, the respondents were made to stand
perpendicular to the base of the height meters with their arms and legs straight and heads raised above their chin. The height was then taken by pulling the tape onto the respondent’s head and reading the measurement corresponding to the red tape of the scale, at precision 0.01cm. Three readings were taken for both weight and height and averages calculated; Body Mass Index (BMI) was computed using the weight and height average measurements. Body Mass Index is a nutritional index that can show that an individual or population is at risk of being malnourished or is already malnourished; the index can show the underweight and obese populations (WHO, 2013b). WHO (1995) cut-offs for BMI were used; <18.5 denoted underweight, 18.5 - 24.99 normal nutritional status, ≥25.0 – 29.99 denoted overweight and ≥ 30 denoted obesity. Body mass index was chosen as a method of assessing nutritional status because it has been proven to be highly sensitive with specific results, give results that can be reproducible and is fairly cheap and fast to conduct (CDC, 2011: WHO 1995).

Two FGDs for both men and women were conducted; each FGD had a sample of 10 PLWHA who were randomly selected from the five villages during the study. The FGD guide was translated into Luo language (Appendix III). Two separate FGDs for males and females were conducted so as to obtain gender specific information that would explain some variations in quantitative data.

3.11 Data analyses

All questionnaires were checked daily for completeness and accuracy. Data was coded, cleaned and entered using Ms-excel software. Using the Statistical Package for
Social Sciences (SPSS) version 15.0, frequency and mean of continuous and discrete data was computed; presented as percentages for demographic and socio-economic data. Data from the 24 hour recall was entered into and analysed by the Nutri-survey 2009 software for amount of energy, vitamin A, vitamin C, iron and Zinc consumed; this information was used to get the percentage of recommended daily allowances (RDA) for each nutrient respectively. BMI Calculator was used in determining the body mass index (BMI) which was used to assess the nutritional status of PLWHA. WHO (1995) cut-offs were used to determine the nutritional status of the Homa Bay population.

After ensuring that all data was entered correctly, further analysis was done using SPSS software; Pearson Product-Moment correlation was used to establish the relationship between non-categorical variables; HDDS and dietary intake, dietary intake and BMI. Chi square tests were also done to show associations between categorical variables. T-test for independent samples was used to determine if there were significant difference between the dietary diversity scores, dietary practices, nutritional status and morbidity patterns of males and females. Significance levels were determined at 95% confidence interval where a p-value of <0.05 was considered significant.

Qualitative data was summarized, coded and analyzed to establish emerging themes. Themes were further organized into coherent categories (Taylor-Powell & Renner, 2003) that explained part of the study findings as per the major objectives of the
study; socio-economic factors, food security status, dietary practices and morbidity patterns.

3.12 Ethical considerations

This research was approved by the Kenyatta University Graduate School (Appendix V) and an ethical clearance was obtained from the Ethical Review Committee of the same institution (Appendix VIII). A research authorization (Appendix VI) and permit (Appendix VII) was then obtained from the National Commission for Science, Technology and Innovation. The participants consent was also sought prior to the study (Appendix I) and participants were assured of their confidentiality and were also informed that data collected from them was solely for the purposes of the study; the principal investigator ensured that all protocol was observed as promised to the participants. The research purpose and objectives were well explained to the participants, community leaders and respective administrators.

Further, the respondents were assured that the information they gave would be treated with utmost care, respect and confidentiality and will be used solely for statistical purposes of the study. No names or other personal information would be revealed in any verbal or written reports of results to community members or other relevant users of study findings. Respondents were assured that they would be located at household level through the telephone or physical directions they gave to the principal investigator (no direction seeking from neighbors) to avoid suspicions that would reveal HIV&AIDS status to community members.
Respondents were also informed that the study was voluntary and they would withdraw at any time or decline to answer some questions especially if they felt uncomfortable to do so or their rights are infringed. Respondents were made aware of the risk of participating in the study; that their health status information would leak but were assured of high professionalism from the research team to maintain utmost confidentiality in access of patients’ data, use of information, data collection and dissemination of findings. Respondents were also aware that they stood a chance to be the first beneficiaries of programs that would be rolled out in the region as a result of recommendations of this study.
CHAPTER FOUR: RESULTS

4.0 Introduction

The findings of the study are presented in this section as per the objectives. The demographic and socio-economic factors, dietary practices, food security status, food access experiences, morbidity patterns and nutritional status are described.

4.1 Study population and distribution

The study targeted a sample size was 333 but a sample of 325 was accessible. Results are reported for 321 households as 4 questionnaires were rejected due to incompleteness.

Table 4.1: Distribution of study population per village

<table>
<thead>
<tr>
<th>Village</th>
<th>N</th>
<th>%</th>
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<tbody>
<tr>
<td>Sofia</td>
<td>66</td>
<td>20.6</td>
</tr>
<tr>
<td>Makongeni</td>
<td>63</td>
<td>19.6</td>
</tr>
<tr>
<td>Township</td>
<td>69</td>
<td>21.5</td>
</tr>
<tr>
<td>Shauri Yako</td>
<td>65</td>
<td>20.2</td>
</tr>
<tr>
<td>Nyalkinyi</td>
<td>58</td>
<td>18.1</td>
</tr>
</tbody>
</table>

4.2 Demographic characteristics of the respondents

4.2.1 Age distribution of the study population

Age is of importance because it is a determinant of socio-economic status that in turn determines the food security status. The study population ranged from age 18 to 55 years. As shown in Table 4.2, the age bracket of 25 to 34 years had the highest
population (41.5%) followed by 27.1% of people aged 35 to 44 years. A minority of the PLWHA were aged between 18 and 24 years (10.6%) and 55 years (3.4%).

Table 4.2: Demographic characteristics of the study population

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>34</td>
<td>10.6</td>
</tr>
<tr>
<td><strong>25-34</strong></td>
<td><strong>133</strong></td>
<td><strong>41.5</strong></td>
</tr>
<tr>
<td>35-44</td>
<td>87</td>
<td>27.1</td>
</tr>
<tr>
<td>45-54</td>
<td>56</td>
<td>17.4</td>
</tr>
<tr>
<td>&gt;55</td>
<td>11</td>
<td>3.4</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>91</td>
<td>28.3</td>
</tr>
<tr>
<td>Female</td>
<td>230</td>
<td>71.7</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>243</td>
<td>75.9</td>
</tr>
<tr>
<td>Single</td>
<td>13</td>
<td>4.1</td>
</tr>
<tr>
<td>Widowed</td>
<td>50</td>
<td>15.6</td>
</tr>
<tr>
<td>Divorced</td>
<td>4</td>
<td>1.3</td>
</tr>
<tr>
<td>Separated</td>
<td>10</td>
<td>3.1</td>
</tr>
</tbody>
</table>

4.2.2 Gender of study respondents

Gender forms a basis upon which various aspects of life are defined, among them is food security. The study population was made up of more females (71.7%) than males (28.3%) as shown in Table 4.2. In terms of proportion, this study reported slightly higher figures for females (7.2%) and extremely low percentage of males (2.8%).

4.2.3 Marital status of the respondents

Marriage is often linked to stability and it’s often assumed that most married people would have better food security than those who are not. In this study majority (75.9%) of the respondents were married and 4.1% single as shown in Table 4.2 but 15.6% were widowed, 4.4% separated/divorced. The findings of this study differed from
those of a Multiple Cluster Indicator Survey conducted in Homa Bay County in 2011 which showed that 65.5% of the residents were married, 21.8% were single, 2.2% divorced/separated and 10.6% widowed (KNBS and UNICEF, 2013) and results of the national demographic survey (KDHS) which indicated that 51.5% of Kenyans were married, 36.7% were single, 6.2% divorced/separated and 5.2% widowed (KNBS & ICF Macro, 2015).

4.3 Socio-economic characteristics of the respondents

4.3.1 Education level of respondents

Education does not directly influence food security but it affects the level of decision making regarding food availability and access. As shown in Table 4.3, a majority of the respondents (60.9%) had a primary level education while 30.4% had some secondary level education. About 1.9% of the respondents had no formal education. Only 7.0% of the respondents had post-secondary education. From the FGDs, the respondents cited back dated cultural beliefs such as early marriage among females as the main reason for low education attainment in the community. The fact stated by the respondents on early marriages is confirmed by Multiple Indicator Cluster Survey (MICS) of 2011 results which showed that 25% of adolescent girls were married or in a union and that 58% of females aged 20-49 years confirmed having been married before attaining 18 years of age (KNBS & UNICEF, 2013).

4.3.2 Occupation of the respondents

Occupation determines the household socio-economic status which in turn affects the food security status. In this study majority of respondents (45%) as shown in Table 4.3 were self employed (business, fishing and farming). About 19.5% were in
informal employment and 11.3% in formal employment. The average unemployment rate was 23.9%. Segregation of data by gender showed that fewer (9.7%) females than males (15.4%) were employed in the formal sector in Homa Bay and that 25.3% females compared to 23.3% males were unemployed. It emerged from FGDs that majority of the respondents were in self employment because of discrimination in job acquirement and during employment by colleagues upon discovery of their HIV&AIDS status. These findings on discrimination and stigmatization of PLWHA are confirmed by those of MICS of 2011 which showed that only 16% of those interviewed in Homa Bay County showed acceptance to PLWHA both in care provision and as recipient of services from PLWHA (KNBS & UNICEF, 2013).

4.3.3 Household monthly income

Income earned by a household is an important determinant of food access. Income refers to the total household returns fetched by household members in form of salary, wages or sales from small scale enterprises. Table 4.3 shows that most of the households (48.6%) had a monthly income of about Kshs. 3000 (30 USD) or less. About 15.9% of the households had a monthly income of less than Kshs. 6000 (60 USD) and only 6.8% earned more than Kshs. 15,000 (150 USD). A few households (12.9%) reported zero income; the principal researcher verified zero income by probing the households further and confirming presence of food aid items such as maize, sorghum and beans and non-food items that were donated by local CBOs, relatives and friends. As confirmed from FGD, the main reason for low income was unemployment.
Table 4.3: Socio-economic characteristics of study population

<table>
<thead>
<tr>
<th>Socio-economic characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monthly household income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kshs</td>
<td>US Dollars</td>
<td></td>
</tr>
<tr>
<td>&lt;3000</td>
<td>≤30</td>
<td>190</td>
</tr>
<tr>
<td>3001-6000</td>
<td>&gt;30 – 60</td>
<td>49</td>
</tr>
<tr>
<td>6001-9000</td>
<td>&gt;60 - 90</td>
<td>25</td>
</tr>
<tr>
<td>9001-12000</td>
<td>&gt;90 – 120</td>
<td>19</td>
</tr>
<tr>
<td>12001-15000</td>
<td>&gt;120 – 150</td>
<td>5</td>
</tr>
<tr>
<td>15001- ≤50000</td>
<td>&gt;150 - ≤500</td>
<td>20</td>
</tr>
<tr>
<td>&gt;50,001</td>
<td>&gt;500</td>
<td>1</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Primary</strong></td>
<td></td>
<td>195</td>
</tr>
<tr>
<td>Completed secondary</td>
<td></td>
<td>97</td>
</tr>
<tr>
<td>Certificate</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Diploma</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>University</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td></td>
<td>125</td>
</tr>
<tr>
<td>Casual worker</td>
<td></td>
<td>62</td>
</tr>
<tr>
<td>Civil servant</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Private sector</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>Farmer</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Fishing</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

*1 USD=100 KES

4.3.4 Assets ownership

Assets are an important marker of households’ socio-economic position. This study considered the ownership of fourteen assets; Television (TV), fridge, radio, phone, bicycle, motorcycle, Digital Video Disk (DVD), car and sofa set that are considered important by urban residents. Other assets assessed included livestock, poultry and farm size owned. The assets were arranged in form of a scale and a maximum of one assigned for each asset the respondent gave an affirmative answer as owned. The scale was further classified into quintiles based on percentage of assets owned; ownership of ≤24% of assets was classified as lower socio-economic class, ≥25 to ≤49% as lower upper, 50% as middle, ≥51 to ≤74% as upper lower and ≥75 to 100%
as Upper class (Booysen et al., 2005). Data classification was supported by findings of studies conducted by McKenzie (2004) and Mbochi (2011) whereby households with the highest number of assets were considered of upper socio-economic class or the richest. The number of assets owned decreased with socio-economic class as shown in Figure 4.1.

![Mean household asset ownership by socio-economic group](image)

**Figure 4.1: Mean household asset ownership by socio-economic group**

### 4.4 Dietary practices among respondents

Dietary practices looked into included the number of meals consumed by respondents on a day prior to the study, frequency of meal consumption per week and nutrient intake.
4.4.1 Number of meals taken by the respondents

The information on number of meals was generated from the 24 hour recall. The focus was on the number of meals and snacks consumed. Majority of the respondents (76.3%) consumed three meals a day, about 17.8% had two meals a day and only 0.6% had five meals a day (3 main meals and 2 snacks). On average the study population consumed a mean of 2.89±0.03 meals as indicated in Table 4.4. Only a few respondents (25%) consumed one or two snacks a day; the main reason being to spare food for the next meals as indicated by FGD results.

<table>
<thead>
<tr>
<th>Number of meals</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>57</td>
<td>17.8</td>
</tr>
<tr>
<td>3</td>
<td>244</td>
<td>76.3</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>5.3</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Mean meals/day</td>
<td></td>
<td>2.89±0.03</td>
</tr>
</tbody>
</table>

4.4.2 Amounts of energy and nutrients consumed by respondents

The 24 hour recall was used to collect information on all foods and drinks the respondent consumed in the previous 24 hours (day before the interview).

More than half (>50%) of the respondents consumed the required recommended daily allowances (RDA) for energy, protein, fat, vitamins A, vitamin B complex, vitamin C, iron and zinc (Table 4.5). More females were observed to meet their RDA for all the named nutrients than males; great disparities between the sexes were noted in the consumption of energy, protein, vitamin B₂, iron and zinc. Of concern were the notably low percentages of vitamin C and fat intake by both genders; due to low
consumption of fruits and vegetables as well as high prices as noted in the FGDs. About 19.82% and 33.33% of female and male respondents respectively had energy intake that was less than the RDA (Table 4.5). On average 26.6% of the study population failed to meet their minimum caloric requirements. One way ANOVA test results showed that there was no significant difference in the dietary intake between the lower and upper socio-economic groups.

Table 4.5: Mean nutrient consumption by the study group in the last 24 hours

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>actual intake</th>
<th>RDA (for PLWHAs)</th>
<th>% adequate</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (Kcal)</td>
<td>3049.62±86.74</td>
<td>Female 2000</td>
<td>80.18</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>2823.88±138.4</td>
<td>Male 2200</td>
<td>66.67</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>102.02±3.62</td>
<td>Female 46</td>
<td>90.75</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>90.96±4.92</td>
<td>Male 56</td>
<td>77.01</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>64.10±3.92</td>
<td>Female 67</td>
<td>62.11</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>56.63±3.70</td>
<td>Male 73</td>
<td>58.62</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Vitamin A (RE)</td>
<td>1877.39±83.47</td>
<td>Female 500</td>
<td>93.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>1687.35±139.8</td>
<td>Male 600</td>
<td>85.06</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Vitamin B1/T(mg)</td>
<td>2.53±0.09</td>
<td>Female 1.1</td>
<td>87.67</td>
<td>0.079</td>
</tr>
<tr>
<td></td>
<td>2.28±0.13</td>
<td>Male 1.2</td>
<td>78.16</td>
<td>0.09</td>
</tr>
<tr>
<td>Vitamin B2/R (mg)</td>
<td>1.63±0.05</td>
<td>Female 1.1</td>
<td>99.12</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>1.44±0.08</td>
<td>Male 1.3</td>
<td>57.47</td>
<td>0.087</td>
</tr>
<tr>
<td>Vitamin B6/N (mg)</td>
<td>3.31±0.10</td>
<td>Female 1.3</td>
<td>95.15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>2.98±0.16</td>
<td>Male 1.3</td>
<td>82.76</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Vitamin C(mg)</td>
<td>83.98±9.25</td>
<td>Female 100</td>
<td>68.28</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>75.79±6.79</td>
<td>Male 100</td>
<td>59.77</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>15.73±0.42</td>
<td>Female 18</td>
<td>91.63</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>14.49±0.67</td>
<td>Male 8</td>
<td>71.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Zinc(mg)</td>
<td>20.25±0.66</td>
<td>Female 9.8</td>
<td>85.02</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>18.15±1.06</td>
<td>Male 14.0</td>
<td>63.22</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

(References for the RDAs include: - WHO, 2003; FAO &WHO, 1996; Food and Nutrition Board dietary guidelines)
4.4.3 Food consumption patterns of the respondents

A seven day food frequency form was used to obtain information on how often the respondents consumed various foods in a week. The study found that cereals were most regularly consumed (6 or more days); 56% of the respondents consumed cereals up to seven days (Table 4.6).

Table 4.6: Food consumption patterns by respondents

<table>
<thead>
<tr>
<th>Food group</th>
<th>Frequency of consumption per week</th>
<th>≤2days</th>
<th>3-5days</th>
<th>≥6days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Cereals</td>
<td>12(3.7)</td>
<td>129(40.3)</td>
<td>179(56.0)</td>
<td></td>
</tr>
<tr>
<td>Tubers/roots</td>
<td>293(91.6)</td>
<td>27(8.4)</td>
<td>0(0.0)</td>
<td></td>
</tr>
<tr>
<td>Green vegetables</td>
<td>leafy 253(79.0)</td>
<td>67(21.0)</td>
<td>0(0.0)</td>
<td></td>
</tr>
<tr>
<td>Other vegetables</td>
<td>201(62.9)</td>
<td>78(24.3)</td>
<td>41(12.8)</td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td>319(99.7)</td>
<td>1(0.3)</td>
<td>0(0.0)</td>
<td></td>
</tr>
<tr>
<td>Meats</td>
<td>311(97.2)</td>
<td>9(2.8)</td>
<td>0(0.0)</td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td>320(100.0)</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>273(85.3)</td>
<td>41(12.8)</td>
<td>6(1.9)</td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td>310(96.9)</td>
<td>10(3.1)</td>
<td>0(0.0)</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>254(79.4)</td>
<td>50(15.6)</td>
<td>16(5.0)</td>
<td></td>
</tr>
<tr>
<td>Oils and fats</td>
<td>115(35.9)</td>
<td>139(43.4)</td>
<td>66(20.7)</td>
<td></td>
</tr>
<tr>
<td>Sugars</td>
<td>68(21.2)</td>
<td>176(55.0)</td>
<td>76(23.8)</td>
<td></td>
</tr>
</tbody>
</table>

The consumption of sugars was second and oil/fat use third with majority (>43%) of respondents consuming the foods three to five days in a week. Eggs, fruits, meats, legumes, vegetables and roots/tubers were the least consumed foods with majority of respondents (>97%) reporting a consumption of less than 3 days in a week as shown in Table 4.6. FGDs confirmed that low local production and high costs were main reasons why fruits and vegetables were rarely consumed. Meats were infrequently consumed partly because of cultural beliefs that favor intake of fish and also due to high costs. According to the FGD responses, infrequent consumption of legumes and
eggs was mainly associated to poor attitude and low education (for instance beans are associated with absolute poverty or hunger).

4.5 Food security status of respondents

The HDDS was used to obtain data on food groups consumed by households in the previous 24 hours; the food groups were then summed into scores which were used to provide information on food security status. The mean HDDS score was 4.72±0.11, implying that majority of the households consumed less than 5 food groups out of 12. There was no household that consumed all the food groups. Cereals were consumed by all households (100%). This was followed by oils/ fats and vegetables at 88.5% and 87.2% respectively. Eggs, meat and fruits were the least consumed food groups at 6.5%, 13.4% and 24.2% respectively (Figure 4.2); FGD results confirmed low local availability, high market prices, cultural beliefs, poor attitudes and low education as the major reasons for the low consumption.

Figure 4.2: Percentage of household consuming various food groups
Based on HDDS, this study found that more than half of the households (72.6%) were food secure since they consumed 5 food groups or more while 27.4% of the households were food insecure having a consumption of ≤4 food groups (Table 4.7).

Table 4.7: Prevalence of food insecurity by HDDS

<table>
<thead>
<tr>
<th>Food security status by HDDS</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food secure (≥5 food groups)</td>
<td>233</td>
<td>72.6</td>
</tr>
<tr>
<td>Food insecure (≤4 food groups)</td>
<td>88</td>
<td>27.4</td>
</tr>
</tbody>
</table>

4.6 Food access experiences and coping strategies among the respondents

The household food insecurity access scale (HFIAS) was used to collect information on the experiences and coping strategies that households employ during times of food shortage or absolute lack of food. Information was collected in a period of 30 days prior to the day of interview.

Table 4.8: Food insecurity access experiences and coping mechanisms

<table>
<thead>
<tr>
<th>Food strategy</th>
<th>experience/ coping</th>
<th>No (%)</th>
<th>Rarely (%)</th>
<th>Sometimes (%)</th>
<th>Often (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear to lack enough food</td>
<td>68(21.1)</td>
<td>116(36)</td>
<td>83(25.8)</td>
<td>55(17.1)</td>
<td></td>
</tr>
<tr>
<td>Failed to eat preferred foods</td>
<td>57(17.7)</td>
<td>107(33.2)</td>
<td>92(28.6)</td>
<td>66(20.5)</td>
<td></td>
</tr>
<tr>
<td>Reduce food varieties</td>
<td>65(20.2)</td>
<td>99(30.7)</td>
<td>92(28.6)</td>
<td>66(20.5)</td>
<td></td>
</tr>
<tr>
<td>Eat foods you really didn’t want</td>
<td>55(17.1)</td>
<td>99(30.7)</td>
<td>96(29.8)</td>
<td>72(22.4)</td>
<td></td>
</tr>
<tr>
<td>Eat smaller portions of food</td>
<td>65(20.2)</td>
<td>111(34.5)</td>
<td>73(22.7)</td>
<td>73(22.7)</td>
<td></td>
</tr>
<tr>
<td>Reduce eating times in a day</td>
<td>66(20.5)</td>
<td>103(32)</td>
<td>83(25.8)</td>
<td>70(21.7)</td>
<td></td>
</tr>
<tr>
<td>No food at all</td>
<td>127(39.6)</td>
<td>103(32.1)</td>
<td>66(20.6)</td>
<td>25(7.8)</td>
<td></td>
</tr>
<tr>
<td>Slept unsatisfied</td>
<td>97(30.1)</td>
<td>121(37.6)</td>
<td>64(19.9)</td>
<td>40(12.4)</td>
<td></td>
</tr>
<tr>
<td>Gone hungry day and night</td>
<td>194(60.4)</td>
<td>88(27.4)</td>
<td>28(8.7)</td>
<td>11(3.4)</td>
<td></td>
</tr>
</tbody>
</table>
Majority of the households (over 80%) experienced mild or moderately severe conditions as shown in Table 4.8; feared to lack enough food, failed to eat preferred foods, reduced varieties, ate foods they really didn’t want, ate smaller portions of food and reduced eating times in a day. Over 60% of the households reportedly had no food at all or slept unsatisfied while 39.6% had gone hungry day and night; indicating more severe conditions.

4.7 Nutritional status of respondents

This study used BMI to collect nutritional status information. The BMI calculator software was used to determine the BMI of the respondents. Classification of BMI was based on WHO (1995) recommendations. The study found out that 19.6% of the population had a BMI <18.5 hence were classified as malnourished. Majority (66%) of the respondents were found to have normal nutritional status with a BMI of between 18.5 and 24.99. About 11.2% of the respondents were overweight and only 3.1% of the respondents were obese (Figure 4.3).

![Figure 4.3: Nutritional status of the respondents](image)
4.8 Morbidity patterns of the respondents

Data on main illnesses was presented in this section as reported by the respondents and verified from the health records. Malaria was the main illness of concern affecting 76.8% of the respondents; respondents in the FGDs said that the malaria prevalence was high because Homa Bay region is naturally prone to malaria (highly endemic), low ownership and usage of mosquito nets by adults. Pneumonia came in second at 2.5% and T.B third at 0.6% (Table 4.9).

Table 4.9: Illness and health services seeking

<table>
<thead>
<tr>
<th>Illness/Medical help</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness in last two weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>177</td>
<td>55.3</td>
</tr>
<tr>
<td>Main illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>242</td>
<td>76.8</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>8</td>
<td>2.5</td>
</tr>
<tr>
<td>T.B</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Others (typhoid, herpes zoster, asthma and other allergies)</td>
<td>14</td>
<td>4.4</td>
</tr>
<tr>
<td>Signs and symptoms of main illnesses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>11</td>
<td>3.5</td>
</tr>
<tr>
<td>Cough</td>
<td>38</td>
<td>12.1</td>
</tr>
<tr>
<td>Headache</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td>Vomiting</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>Fever</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Received medication (last 2 weeks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>203</td>
<td>64.2</td>
</tr>
</tbody>
</table>
Other illnesses such as asthma, typhoid, herpes zoster and allergies affected 4.4% of the respondents. Data on symptoms of the main illnesses namely, diarrhoea, loss of appetite, vomiting, fever, headaches and cough was collected. This is because the symptoms have been observed to affect nutrient intake, absorption and utilization hence affecting the nutritional status of the sick individuals (Chege et al., 2010; Weiser et al., 2011). Diarrhoea affected 3.5% of respondents who majorly reported having malaria and typhoid. Loss of appetite was reported by 1.9% respondents who had malaria and cough among 12.1% of respondents with T.B, asthma, pneumonia and allergies. About 64.2% sought treatment in health facilities while 35.8% despite being ill never sought any treatment; the main reason identified from FGDs being stigmatization at local health centres hence they seek medical attention far from home whereby high transport costs are involved.

4.9 Comparison of DDS, dietary practices and nutritional status by gender

The DDS, dietary practices and Nutritional status for men and women were compared using t-test.

<table>
<thead>
<tr>
<th></th>
<th>Male (N=86)</th>
<th>Female(N=233)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDS</td>
<td>4.91±0.20</td>
<td>5.02±0.13</td>
<td>0.068</td>
</tr>
<tr>
<td>Number of meals</td>
<td>1.04± 0.05</td>
<td>4.18± 0.03</td>
<td>0.063</td>
</tr>
<tr>
<td>Amount of Kcal consumed</td>
<td>6.98±177.09</td>
<td>11.94±74.08</td>
<td>0.061</td>
</tr>
<tr>
<td>BMI</td>
<td>6.68± 0.56</td>
<td>11.45±0.24</td>
<td>0.064</td>
</tr>
</tbody>
</table>

The T-test results showed that there were no significant differences in the mean DDS, number of meals, amount of Kcal and BMI between male and female (P>0.05) (Table 4.10).
4.10 Relationship between study variables

This section presents information on the associations and relationships between study variables. Such information gives insight on how demographic (marital status and gender) and socio-economic (income, education, occupation and expenditure on food) variables relate with food security status, Kilocalories intake and morbidity patterns to bring out a clearer picture and understanding on the study.

4.9.1 Relationships between demographic characteristics and food security status, energy intake and morbidity patterns

Table 4.11: Relationships between demographic, socio-economic factors and variable

<table>
<thead>
<tr>
<th>Demographic/socio-economic factor</th>
<th>Food security status</th>
<th>Energy intake</th>
<th>Morbidity patterns (presence of illness)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chi-square ($\chi^2$)</td>
<td>p-value</td>
<td>Chi-square ($\chi^2$)</td>
</tr>
<tr>
<td>Marital status</td>
<td>13.882</td>
<td>0.008</td>
<td>1.423</td>
</tr>
<tr>
<td>Gender</td>
<td>1.201</td>
<td>0.273</td>
<td>3.155</td>
</tr>
<tr>
<td>Income</td>
<td>25.088</td>
<td>0.001</td>
<td>3.169</td>
</tr>
<tr>
<td>Education</td>
<td>15.618</td>
<td>0.004</td>
<td>1.256</td>
</tr>
<tr>
<td>Occupation</td>
<td>71.218</td>
<td>0.223</td>
<td>2.224</td>
</tr>
<tr>
<td>Assets ownership</td>
<td>3.026</td>
<td>0.963</td>
<td>3.124</td>
</tr>
<tr>
<td>Expenditure on food</td>
<td>22.441</td>
<td>0.039</td>
<td>2.756</td>
</tr>
</tbody>
</table>

Chi square test results showed that all the demographic factors had no significant relationship with food security status, energy intake and morbidity patterns; Food security and age ($\chi^2=8.917$, $p=0.178$), food security and marital status ($\chi^2=13.882$, $p=0.008$) and food security and gender ($\chi^2=1.201$, $p=0.273$) (Tabe 4.11).
4.9.2 Relationships between socio-economic factors and food security status, energy intake and morbidity patterns

Most of the socio-economic factors had a significant relationship with the household food security status as shown by the chi square test results; education ($\chi^2=15.618$, $p=0.004$), income ($\chi^2=25.088$, $p=0.0014$), food storage ($\chi^2=15.148$, $p<0.001$) and expenditure on food ($\chi^2=22.441$, $p=0.039$). Occupation ($\chi^2=71.218$, $p=0.223$) and asset ownership ($\chi^2=3.026$, $p=0.963$) had insignificant relationships with food security status (Table 4.11). Energy intake was also associated with education level ($\chi^2=1.256$, $p=0.041$), income ($\chi^2=3.169$, $p=0.002$) and expenditure on food ($\chi^2=2.756$, $p=0.016$). The relationship between morbidity and education was significant ($\chi^2=5.715$, $p=0.021$) as well as between morbidity and expenditure on food ($\chi^2=13.114$, $p=0.027$) as shown in Table 4.11.

4.9.3 Relationship between dietary diversity score and dietary intake

*Table 4.12: Correlation between dietary diversity score and nutrient intake*

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>R</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (Kcal)</td>
<td>0.571</td>
<td>0.042</td>
</tr>
<tr>
<td>Vitamin A (RE)</td>
<td>0.563</td>
<td>0.033</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>0.814</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>0.767</td>
<td>0.017</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>0.462</td>
<td>0.046</td>
</tr>
</tbody>
</table>

Pearson correlation coefficients (r) showed that dietary diversity score had significant associations with energy (r=0.571, p=0.042) and other nutrients taken such as vitamin A (r=0.563, p=0.033), Vitamin C (r=0.814, p<0.001), Zinc (r=0.767, p=0.017) and iron (r=0.462, p=0.046) (Table 4.12). The significant relationships between DDS and energy and other nutrients in question implied that as dietary diversity increased the amount and variety of nutrients consumed also increased.
4.9.4 Relationship between Energy (Kcal) intake and nutrition status

Pearson Correlation was conducted to ascertain the association between intake of kilocalories and BMI. The study found a significant association between Kcal and BMI (r=0.825, p=0.029).

4.9.5 Relationship between dietary intake and morbidity patterns

Various nutrients play an important role in protecting the body against disease and in this study information was collected on vitamin A, vitamin C, iron and zinc; they are considered important for the health of PLWHA. As such results in this section are presented on relationships between the specified nutrients and the presence/absence of illnesses in general. Chi square test results showed that there were significant relationships between the presence of illness in a respondent with the intake of vitamin A ($\chi^2=66.921$, $p=0.046$), vitamin C ($\chi^2=47.743$, $p=0.027$), ($\chi^2=52.846$, $p=0.033$) and ($\chi^2=66.921$, $p=0.028$) (Table 4.13).

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Presence of illness (yes/no)</th>
<th>Chi square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>$\chi^2=66.921$</td>
<td>0.046</td>
<td></td>
</tr>
<tr>
<td>Vitamin C</td>
<td>$\chi^2=47.743$</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>$\chi^2=52.846$</td>
<td>0.033</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>$\chi^2=33.456$</td>
<td>0.028</td>
<td></td>
</tr>
</tbody>
</table>

4.9.6 Relationship between dietary diversity score and nutritional status

High dietary diversity is often linked with an increase in BMI. In this study, the dietary diversity score had a highly significant relationship with BMI (r=0.754, p=0.015) as shown in Table 4.14.
Table 4.14: Correlation between HDDS and BMI

<table>
<thead>
<tr>
<th>Factor</th>
<th>BMI</th>
<th>HDDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>1</td>
<td>0.015</td>
</tr>
<tr>
<td>HDDS</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
CHAPTER FIVE: DISCUSSION

This chapter gives the interpretation and explanations of findings presented in chapter four in relation to the study hypothesis. It also shows how the findings of the present study relate with those of other studies.

5.1 Demographic characteristics of the respondents

Age, gender and marital status are important factors that influence the household food security status. Amaza et al. (2009) and Walingo and Kidake (2013) assert that food productivity and socio-economic status increases with age; adults in advanced age brackets make better agricultural and production decisions and also have stable income sources to purchase food. In another dimension, food production and income fetched by an individual or household would decrease as age of the household members’ advances but this study concentrated on the individuals of productive age (PLWHA aged 18-55 years) and not the elderly. Contrary to the findings of Amaza et al. and Walingo and Kidake, this study found no significant relationship between age and food security probably because majority of respondents relied on food purchase rather than production. Most adults also were educated to primary level only hence giving young people the upper hand in securing high income opportunities.

There were more females than males in this study probably due to the cultural beliefs of the community; polygamy and wife inheritance still stand out and many females are likely to be infected with one man (AMREF USA, 2014). Gender forms a basis
upon which various aspects of life are defined, among them is food security. Most studies show no significant differences between the food security of females and males (Jayawardena et al., 2011; Aidoo et al., 2010; Nanziri, 2006). This study found insignificant relationship between gender and food security hence concurring with findings of other studies. The insignificant relationship between gender and food security would be probably because majority of the respondents were engaged in income projects (farming and businesses) that fetched almost the same amount of income regardless of gender.

Marriage on the other hand is often linked to stability and hence it is assumed that most married people would have better food security that those who are not. In this study majority of the respondents were married and just a handful single, separated or divorced; this would be attributed to strong societal regard of marriage institution as evidenced by polygamous institutions and wife inheritance as well as traditions that allow early marriages (ROK, 2009; Datta & Njuguna, 2009). In this study marriage had no significant relationship with food security status; this was probably because people in marriage were unemployed or only one spouse was working. Given that household food access heavily relied on purchasing the food security situation in household headed by one person and that of the married was not any different. These findings were in agreement with studies conducted by Olayemi (2012) and Aidoo et al. (2010) which showed that marriage was not a food security determinant.
5.2 Socio-economic characteristics of the study population

Household income, education, occupation and asset ownership are some of the most important socio-economic indicators that determine household food security status. Education to a larger extent determines type of occupation one engages in; people with post-secondary training often have entry into formal employment compared to those with secondary education or less (Dauda, 2010). Majority of the respondents in this study had primary level education and it came up during FGDs that this was due to the cultural practices and beliefs; for instance that women needed to get married early. As such most of the respondents were self employed as farmers and business people owing to the fact that primary level education would not secure high income opportunities in Kenya. Kenya currently has high masses of learned individuals and with a high rate of unemployment (BTD, 2014; UNDP, 2013).

This study found a significant relationship between food security status and education, energy intake and education and number of meals and education hence was in agreement with studies conducted by Walingo and Kidake (2013), Tiyoy et al. (2012) and Nord (2007) which found out that the level of education affects food access and availability; whereby more educated people tend to have better jobs or engage in quality enterprises that generate more income and hence tend to access diverse and quality diets. In this study, almost half of the respondents reported a household income of less than USD 30. Most of the respondents confirmed through the FGD that lack of employment opportunities was the main reason their income was low. This study found a significant relationship between income and food security and income and energy intake; these findings were consistent with those of other studies which
documented that income is an important aspect of food access; and that the higher the income levels the better the food security in terms of dietary diversity, diet quantity and quality (Aidoo et al., 2010; Bukusuba et al., 2007).

Wealthier households have more income that can be converted to assets. Assets have been observed to play an important role in sustaining household food security especially when PLWHA are too weak to work or bring in very little income; household assets are sold or exchanged to get food (Ecker and Breisinger, 2012; Bukusuba et al., 2007). Studies conducted by Kariuki et al. (2013) and Saaka and Osman (2013) showed significant relationship between asset ownership and food security. This study found no significant relationship between asset ownership and food security probably because the immediate dietary diversity of urban households depends on cash available for food purchases rather than assets.

5.3 Dietary Practices among respondents

The 24 hour recall effectively obtained information on the number of meals consumed by the respondents in a day. Majority of the respondents consumed three meals only yet adults living with HIV and AIDS are supposed to eat more frequently; small but frequent meals about six times a day (FANTA, 2001). Frequent and adequate meals are important for PLWHA to meet their increased energy and nutrient needs to enable them lead an active and healthy life. Studies conducted by Chinnock (2011), Quigley, Taylor and Scragg (2007) and Chege (2012) proved that increased number of meals ensures increased energy, minerals and vitamin intake.
The infrequent intake of meals by the study population was because only 25% of the respondents had one or two snacks a day. There was no significant difference in number of meals consumed by males and females. Majority of the respondents reported during FGDs to have intentionally restricted themselves to main meals so as to spare food for the future. The findings of this study were in agreement with studies conducted by Nyirenda, Sampa and Husken (2010) and Bukusuba et al. (2010) which showed that most PLWHA consume less than 3 meals a day because of food insecurity in their households or poor dietary practices due to poverty and harsh urban living conditions. Such coping strategies have negative effects on the health of PLWHA (World Bank, 2007).

Frequency of food consumption, assessed using the seven day food frequency questionnaire is also important for PLWHA to attain their increased energy and nutrient needs. In this study cereals, oils/fats and sugars were the most consumed almost daily in seven days while legumes, meats, eggs and fruits were consumed less than two days in a week; these findings were in agreement with findings of studies conducted by Tiyou et al. (2012) and Bahwere et al. (2011).

Legumes, meats, eggs and fruits are good sources of proteins and vital micronutrients and hence their less frequent consumption would lead to increased cases of protein-energy malnutrition and micronutrient deficiencies (ROK 2006; WHO, 2003). Majority of the respondents cited high market prices and low local production as the main constraints to their frequent consumption of meat, eggs, legumes and fruits. Nevertheless, there is need to put interventions in place that will ensure frequent
consumption of the less consumed foods/food group. Studies by Walingo and Kidake (2013) and Sunguya et al. (2014) showed that increased dietary diversity and food consumption frequency contribute to higher energy, macronutrient and micronutrient intake.

The 24 hour recall also effectively obtained information on the minimum daily nutrient requirements. The minimum daily requirement of caloric intake was used to define the household food security status as per the Food and Nutrition Technical Assistance (FANTA) guidelines (Swindale & Ohri-Vachaspati, 2005). A majority of the respondents met their daily caloric (energy) requirements and were categorized as food secure while 26.6% had kilocalorie intake below RDA and were food insecure. On average the percentage of male respondents meeting their RDAs for energy, protein, fat and five micronutrients on which data was collected was lower than the females. But the differences were not significant; there was limited intake by the entire study population of meat and eggs which are rich food sources of protein, iron and zinc as shown by the HDDS and food frequency questionnaire.

Another concern was the low percentages of respondents who consumed fat and vitamin C; it came up from the FGDs that the low dietary intake was due to low local production and high market prices of vegetables and fruits. Vitamin C deficiency would lead to a poor immune system, more opportunistic infections and quick progression of disease (Drain et al., 2007) and would also impair iron absorption and utilization leading to iron deficiency anaemia (Finkelstein et al., 2011). On the other hand, fat enhances absorption and storage of vitamin A (Ball, 2005) and low intake of
the same would lead to vitamin A deficiencies. In light of WHO (2003) nutrient recommendations, PLWHA require more nutrients to lead a healthy life and they often have deficiencies of several nutrients.

5.4 Nutritional status of respondents

The undernutrition prevalence was 19.6% and this data falls within the ranges documented by ROK (2008); the undernutrition prevalence among PLWHA in Kenya is documented to vary between 15 and 65 percent. Only a small portion of the study population was obese: obesity has been observed to be a growing concern in developing countries as a result of changing lifestyle. Studies show that in a population with undernourished individuals, there are also overweight and obese people (Economist Intelligence Unit Limited, 2013; Mbochi, 2011).

The major determinant of nutritional status in this study was dietary diversity score. The DDS had a significant relationship with BMI implying that high dietary diversity translates to high diet quality and has a positive impact on nutritional status; these results were consistent with those from studies conducted by Jayawardena et al. (2013), Hooshmand and Udipi (2013) and Kariuki (2011). However, food security (prevalence) as calculated from the DDS had an insignificant relationship with BMI implying that the food security status of a household may not only be defined by DDS but also other factors. These results were consistent with those of studies conducted in Rwanda by Sirotin et al. (2012) and Mozambique by FAO (2008a) which showed that food security status had no association with BMI.
The findings conflict those of a study done in Uganda by Rawat et al. (2013) which showed association between food security status by HDDS and BMI. The difference in results would be because the Rawat et al. (2013) study was conducted in a food crisis region where people were severely food insecure and under food assistance which boosted their food security. The vitamin fortified meal and CSB provided were of high nutrient density and hence had immediate effect on nutritional and health status of the beneficiaries. There was no significant difference in the BMI of males and females.

5.5 Morbidity patterns among People living with HIV and AIDS

Malaria was the most prevalent disease affecting respondents at around the study period. From the FGDs the disease was highly prevalent because Homa Bay is highly endemic with a malaria prevalence of about 50% among children aged 14 years and below (Division of Malaria Control, KNBS & ICF Macro, 2011) also because of lack of mosquito nets and low usage of nets among adults (KNBS & UNICEF, 2013). The disease manifested as diarrhoea, fever, headache, loss of appetite and vomiting; symptoms which lead to reduced dietary intake and increased nutrient needs (Chege, 2010; Mupere et al., 2012). Tuberculosis also affected a minority of respondents with cough and tiredness being the main symptoms; the T.B cough coupled with asthma and pneumonia coughs, made cough a third prevalent condition after diarrhoea that drove respondents to seek medical attention.
Malaria parasites handle disease but when the immune system is compromised, the disease finds its way easily than when body immunity is strong (Arguin & Tan, 2013). Adequate dietary intake of macronutrients, vitamin C, iron and zinc is responsible for achieving and maintaining a sound immune system (WHO, 2003; WHO 2014a). In this study, the absence of illness was associated with increased nutrient intake (vitamin A, vitamin C, iron and zinc), higher levels of education and increased expenditure on food. This study’s findings were consistent with results of studies conducted by Maritawa (2009) and Onyango et al. (2012) which showed that PLWHA needed to consume diverse diets, adopt good dietary and health practices so as to attain optimal nutrition and health status.

5.6 Food security status of the respondents

The results of the HDDS showed that 72.6% of the respondents consumed about 5 food groups out of 12 and based on the Integrated Food Security Phase Classification Global Partners (2012) definition, households that consume 5 or more food groups are food secure. FGD discussions confirmed that eggs, meat and fruits were the least consumed food groups because fish was the preferred source of proteins by the study population and fruits were expensive and not locally available. There was no significant difference between the food security status of males and females and neither age nor marital status had relationship with food security status. These results concur with those of studies carried out by Zambia (2007), Nanziri (2006) and Aidoo et al. (2010) respectively, where sex of household head, age and marital status had no direct effect on food security status.
The study found significant relationships between food security status and income levels and education of the respondents. These results were consistent with those of results of studies conducted by Harris et al. (2010) and Walingo and Kidake (2013) in Zambia and Western Kenya respectively. These studies found out that food security had significant relationship with socio-economic status and that the higher the education level the better the food security. The relationship between food security and occupation, asset ownership, expenditure on food and main staple food source were insignificant.

HFIAS was effective in capturing poverty in food access and coping strategies that reflected looming food security crises in the households within the past 30 days before the interview date. Majority of the respondents reportedly had some fear that they will lack enough food, often ate less preferred foods and/or skipped a meal or reduced their food portions, a good number of households had no food at all or had some members sleeping unsatisfied while in a few households members went to bed hungry during the day and night. HFIAS was found to have significant relationship with socio-economic status (by assets) probably because the tool captures coping strategies that households resort to in times of severe food crises and erosion of assets owned would be one of them. These findings are consistent with results from studies conducted by Frongillo and Nanama (2006) and FAO (2008) which showed that the food insecurity scores increased with a decrease in the number of household assets.
5.7 Relationship between nutrient intake and BMI among the respondents

The major determinants of nutritional status are nutrient intake and morbidity. The Pearson correlation results of this study showed significant relationships between energy intake and BMI. These results were in line with those from studies conducted within and outside Kenya which showed that a higher energy intake was associated with better nutritional status (Quigley et al., 2007; Nti, 2011; Walingo & Kidake, 2013). This study’s results also concurred with the WHO (2003) recommendations that PLWHA should consume more energy to prevent malnutrition and also enhance better health outcomes. This chapter has discussed the results in relation to other studies. The next chapter provides summary, conclusions and recommendations to the study.
CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

Age and marital status were important factors that influenced the socio-economic position of the household hence its food security; the mean age was 36 years and majority of respondents were married following societal regard for the marriage institution. There were more females than males in this study following cultural beliefs that increased exposure of females to HIV&AIDS such as early marital age for females, polygamy and wife inheritance.

The study also found that socio-economic status was a crucial factor that influenced household food security which ultimately affected nutritional status. Employment was observed to be an important way of earning income for the urban dwellers and education influenced the form of occupation held. The majority of respondents had primary education and given the unemployment status in Kenya, they were self employed. Low education especially among females was because most of them were expected to get married early. The majority of the respondents earned less than a dollar a day which affected expenditure on food hence low food access; unemployment was the major reason their income was low. Asset ownership was found to have little effect on household food security because majority of household in this study relied on food purchase as opposed to own food production.
The study population had a nutrient intake above RDA but a certain percentage (26.6%) had their dietary intake below the RDA. Of particular concern were the low fat and vitamin C consumption which were a consequence of high food prices and low access to fruits and vegetables. Most of the respondent ate three meals a day as opposed to the recommended six. Cereals, milk, oils/fats and sugars were the most frequently (>3 days per week) consumed food groups. The study population on average had normal BMI (>18.5) and very few cases were below or above the recommended cut off. Malaria was the most prevalent illness reported by the study population partly because Homa Bay is naturally prone to the disease and because of low usage of mosquito nets. Findings of this study clearly demonstrate that PLWHA in urban areas are at risk of food insecurity; a good number consumes less than 5 out of 12 food groups as assessed by the HDDS. Most of them also experience poverty in food access and hence engage in negative coping strategies that would be detrimental to their nutritional and general health status as captured by the HFIAS; which was conducted to attain deeper understanding of the food security situation.

6.2 Conclusions

Demographic factors such as age, marital status and gender were found to have no relationship with key study variables but gender was instrumental in establishing whether there were significant differences between the food security and dietary intake of males and females. Socio-economic factors such as income and education were also key determinants of household food security whereby households with higher income levels were observed to spend more on food and consumed diverse diets of higher quality and quantity as compared to households whose earnings were
lower. Higher education was also associated with increased dietary diversity, high nutrient intake and lower morbidity.

In general most of the respondents met their RDA for energy, protein, fat, vitamins A, B and C, zinc and iron. About 26.6% of respondents did not meet the RDA for energy, fat, vitamin C, vitamin A, zinc and iron. More females as compared to males met their RDA for the studied nutrients although the differences were insignificant. A proportion of the respondents had poor nutritional status and was classified as underweight. Majority of the study respondents suffered from malaria which manifested as diarrhoea, vomiting, fever and loss of appetite. The HDDS which assessed food security status found out that majority of the respondents were food secure and a minority (27.4%) food insecure. Although the HFIAS illuminated that despite these households being food secure, most of them employed negative coping strategies including resorting to less preferred foods, skipping meals, reducing food portions and sometimes sleeping hungry.

Food security status was associated with BMI; the higher the dietary diversity scores the higher the BMI. Food security was also associated with dietary practices (amount of nutrients consumed and number of meals) and females were observed to have higher nutrient intakes and number of meals per day as compared to males. The study therefore rejected the null hypothesis that there is no significant relationship between the household food security status and dietary intake.
Dietary intake was also associated with morbidity patterns; the intake of vitamin A, C, iron and zinc was associated with absence of illnesses. The study hypothesis that there is no significant relationship between morbidity patterns and nutrient intake was rejected. Morbidity patterns and dietary practices were both observed to have influence on the nutritional status. The null hypothesis that there is no significant relationship between the dietary intake and nutritional status was not accepted.

The study therefore concluded that household food security is a major determinant of good dietary practices and nutritional status as indicated in the conceptual framework. Good dietary practices rely on the household food security and together with morbidity that is checked on time the individual or population is able to achieve good nutritional status.

The fact that there was minimal information on food security status of PLWHA and how it relates with dietary practices and consequently nutritional status, this study has generated this information and thus has added to body of knowledge. In addition the study also provided information on morbidity patterns and how they interact with dietary practices to cause poor nutritional status.
6.3. Recommendations

6.3.1 Recommendations for practice

- The government and other stakeholders in food security and HIV&AIDS need to come up ways of boosting the income of people living with HIV&AIDS such as starting small income generating projects.

- To improve the food security status of household with people living with HIV and AIDS in Homa Bay, the government and other stakeholders in food security may consider educating the people on positive coping strategies such as kitchen gardening.

- To improve dietary practices of people living with HIV&AIDS, the government and stakeholders in food security could provide food aid for the very poor and food insecure households in Homa Bay.

- The government may liaise with private organizations to provide ART and other treatment and care services for the people living with HIV&AIDS in Homa Bay since at the public health facilities they are identified by visiting a separated service providing wing.

6.3.2 Recommendations for policy

- The government should come up with policies safeguarding PLWHA especially in formal employment and income provision such that a certain percentage is allocated to them to ensure better food access.
6.3.3 Suggestions for further research

- The study recommends that longitudinal studies be conducted especially with an aim of coming up with standardized food groups, reference periods and cut-offs that define the food security status by HDDS
REFERENCES


Zambia. (2007). *Measuring the impact of HIV on food security in Lusaka, Zambia*. Faculty of Medicine, University of London. pp 11
Dear respondent,

My name is Naom Nyamunsi Mokono, an MSc research student from Kenyatta University. I am undertaking a study on “Food security status and nutritional status of people living with HIV AND AIDS in Homa Bay, Kenya”. The information will be used by governmental ministries such as agriculture/public health and sanitation and other program implementers to improve the food security of people living with HIV and AIDS in Homa Bay and other regions in Kenya.

Procedures to be followed

The participant shall undergo a medical history session at the MOH/MSF clinic during recruitment to ascertain that they have no chronic disease conditions such as diabetes, cancer and others/conditions that may hinder weight/height measurements. This exercise will be carried out by the clinical officer in charge of non-communicable diseases, as will be requested by the principal investigator.

Participant must also be a resident of Homa Bay town for at least 6 months; this will be confirmed from the clinic’s patient records.

With your consent, we (principal investigator and research assistants) intend to ask you questions on dietary intake, socio-economic status, morbidity and water availability, hygiene and sanitation. Some body measurements (weight and height) will also be taken, at least twice a week.

Please note that interviews will be conducted at the household in a place and setup (with or without family members/relatives) where the participant feels comfortable. Our interviews will involve a few questions that may expose your health status but in case such question arise during the interview especially in presence of a family member(s)/relative whom you are not free to discuss such subject with, you may decide not to answer the particular question(s) or in great discomfort you may stop the interview as you choose. I give you the assurance that the research team have been
trained appropriately to take an approach that protects you by making discussions wholesome, discreet and confidential as possible.

Confidentiality

The participant should note that any information given to the researchers will be treated with care, respect and strict confidentiality. The information will be used solely for statistical purposes and records relating to the participant’s identity such as name will not be used in any verbal or written report of results. Further, participant’s identity will not be revealed to any community members; researchers shall trace participant’s residence through physical/telephone contacts given by the participant during recruitment into study.

Benefits/risk and discomfort

The selected persons will benefit from long-term programs that are likely to be rolled out in the region as a result of the recommendations this study will make. Please note that there will be no payment associated with the study. There may be risk of information leakage during the study, more especially on health status; as a way of minimizing this risk, the participant should be assured of high professionalism and confidentiality during the interviews and in handling and use of information given. Some of the questions you will be asked will touch on subjects otherwise perceived as personal/private and may make you uncomfortable or embarrassed; in such a case you may refuse to answer those questions if you so choose.

Liability/termination

Please note that participation in this study is voluntary and for this reason, the participant shall release all researchers involved in the study from any liability on any arising issues subsequently occurring in connection with the study; during the study or issues that may arise thereafter. If for any reasons you no longer wish to take part in the study, you may stop at any time.

Persons to contact

You are welcome to ask questions before consenting and at any time thereafter. The principal investigator (Naom Nyamunsi Mokono) and other research team members
will be available to answer your questions anytime during working hours. In case you
have further queries regarding the study and your participation, you may contact Dr.
Peter Chege on 0722642356 or Dr. George Rombo on 0723161865 or Kenyatta
University Ethical Review Secretariat on contacts given below.

**Your participation will be highly appreciated.**

______________________
Naom Nyamunsi Mokono
Principal Investigator
Kenyatta University
P .O Box 43844 – 00100, Nairobi
Tel: +254-729811508

Kenyatta University Ethical Committee
P .O Box 43844 – 00100, Nairobi
Tel: 8710901/12
Email: kuerc@ku.ac.ke

**Respondent’s consent**

I have understood the above information as fully explained to me by the principal
investigator, and I voluntarily consent to participate in this study (Please indicate by
signing or impressing using a thumb print your willingness to participate in this study)

Name of participant____________________________________

Yes______________________ No _______________________

Signature/ thumb print_____________________ Date_____

**Investigator’s statement**

I, the undersigned, have explained to the volunteer participant in the most
understandable way and language, the procedures to be followed, risks and benefits
involved in this study. I will also give the participant a copy of this signed consent form.

Name of interviewer______________________________

Interviewer’s signature_________________________ Date_________
APPENDIX I: Introduction and Consent Letter

Jaduoko Mogen,

Nyinga en Naom Nyamunsi Mokono, japuonjre e mbalariany mar Kenyatta masomo Nonro. Akawo somo ng’io wach chiemo kendo kaka chiemo gi konyo e dend kuom jomani gi tuo mar ayaki nitie ei Homa bay. Gi thuolo mari wachano mar choko weche kuom kidienje mag chiemo, kit dak gi yore mag ohalo, kit touché gi bedo mar pi, ler mar ng’ato gi ler mar aluora. Pim mar ng’ato (bor gi pek) bende ibiro kaw, mok tin ne diriyo e juma.

Miriwo/miweyo

Nonro biro kawo jogo man kod tuo mar ayaki man kod higni 18 (apar kod aboro) nyaka 55 (piero abich kod abichi). Jochiwre ibiro timnegi nonro mar thiethgi e osibtende e saa ma iyierogi mondo ratiro abedi ni gi onge kod kit touché madongo kaka tuo mar sukari, kansa, kod mamoko/ okenge manyalo thiro pek/ bor. Jachiwre nyaka bed jadaka mar Homa bay ma ok tinne higa achiel; ma ibiro fneny e sigand jatuo e osibtal.

Maling’ ling’

Jachiwre onego ong’e ni wach moro a mora ma onyis jotim nonro ibiro rit gi luoro kendo ibiro ket maling’ ling’ matut. Wach/wechego ibiro ti go kuom kawo kwan kendo weche mondiki machalo kaka nying jachiwre, ok bi tigo kindiko kata fulo gi dhok, kichiwo dwoko mag nonro. Kendo nying jachiwre ok bi ful ne jagweng’ moro a mora; jotim nonro biro luwo jochiwre e puonjni kod kuma gibiro wacho ni giae kod e nembni mag simu e seche ma ikawo gi e puonjni.

Ohala/midhiero

Jachiwre ma ibiro yier nyalo yudo ohalu kuom chenro mabiro budho ma ibiro chaki kaluwore kod wuok mar nonro ni. Kuom ng’uono ng’e ni onge chudo moro a mora
ma oluwo gi nonro. Nyaló betié midhiero mar golo wach e saa mar somoni, ahinya ahinya e wach ngíma mar nga’tó; é yo mar duoko midhieroní chien, jochiwe nyaka bed kod rátiro kuom okang’ ma malo mar tiegruok kod maling’ ling’ é saa mar penjo, nono kendo tiyo gi weche magi chiewo.

**Lal/Weyo**

Ng’e ni chiwruok e puonjni en nono kendo kuom ma, jachíwe moro a mora ok bi kawó jotim nonro makosa kuom wach moro amora ma biro timore koluwo gi weche mag nonro. Ka iwinjo ka okidwar dhi nyime gi timo nonro to ingalo weyo saa mora a mora.

**Joma idhi irgi e yor nonro matut**

Orwaki mondo ipenj penjo ka pok iyie kod saa mora a mora bange. Jatim nonro maduong’ (Naom Nyamunsi Mokono) kod jononro mamoko biro bedo mar dwoko penjo magi saa a saaya e seche mag tich. Ka in on kod penjo motenore gi nonro, kod chiwniok mari, in thuolo mar nenori gi apis mar duol mar weche mag kitwa gi timbewa e mbalariyaní mar Kenyatta.

**Wabiro go ni erokamano kuom chiwniok mari. Erokamano.**

____________________

Naom Nyamunsi Mokono

Kenyatta University

P. O Box 43844 - 00100 Nairobi

Tel: +254-729811508

Kenyatta University ethical committee

P. O Box 43844 - 00100 Nairobi

Nairobi, Kenya
Yie mar jaduoko
Awinjo weche ma malo gi ma oyarna tiendgi kod janonro maduong’, kende ayie mar
chiwora e nonro ni (yie inyis yie mari mar chiwruoko e nonroni kod keto kogno ka
seyi mari piny ka)
Yes (Ayie) __________ No (Adagi) __________

Signature (Seyi) ____________________

Thumb Print (Kogno mari)
APPENDIX II: Structured Questionnaire

Questionnaire No. ____________________  Date __________________________

Interviewer __________________________ Location ______________________

Name of the respondent _____________  Village _________________________

Age of the respondent_______________  Household Size___________________

R/ship of the respondent to HH head* __________

Section 1: Socio-demographic and socio-economic characteristics

A) Socio-demographic data

For all adults (>18years) in the household state the name, age, highest education attained, occupation, health status and state if each member earns income.

<table>
<thead>
<tr>
<th>S/No</th>
<th>Name</th>
<th>Sex (M/F)</th>
<th>R/ship to HH head</th>
<th>Age (Yrs)</th>
<th>Educ</th>
<th>Occup</th>
<th>Marital status</th>
<th>Income (1=Yes) (2=No)</th>
<th>Health Status +ve/-ve</th>
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B) Socio-economic data

1) Food access and expenditure

State the name and age of all members (including <18 years) who earn some income, how much each earn, who decides on how much is spent on food, how much is spent on food weekly, how many people eat in the HH, food storage and source of staple food

<table>
<thead>
<tr>
<th>S/No</th>
<th>Name</th>
<th>Sex M/F</th>
<th>R/ship to HH head</th>
<th>Age (yrs)</th>
<th>Monthly Income (Ksh)</th>
<th>Who makes Decision on food expenses</th>
<th>Amt spent on food/week</th>
<th>No. of people eat</th>
<th>Is there food stored (1=Yes) (2=No)</th>
<th>If Yes how long it will last</th>
<th>Staple food source</th>
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How long stored food will last 1. <1month 2. 2-6 months 3. >6months 4. Don’t know  

Food access experiences and coping strategies (by HFIAS)

For the questions that follow, think about events that took place in last 4 weeks. If the respondent answers yes to any question, remember to indicate the number of times, e.g. rarely (once or twice), sometimes (3 -10 times), or often (more than 10 times) in the past 4 weeks.

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
<th>CODE</th>
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<tbody>
<tr>
<td>1. In the past four weeks, did you have any fear that your household would lack enough food?</td>
<td>0 = No If yes: 1 = Rarely (once or twice) 2 = Sometimes (3 – 10 times) 3 = Often (more than 10 times)</td>
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<td>• When we say a household we mean people living together and eating from the same pot</td>
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<td>2. In the past four weeks, have you or anyone in your household missed to eat any of the kinds of foods you preferred because of a lack of resources?</td>
<td>0 = No If yes: 1 = Rarely (once or twice) 2 = Sometimes (3 – 10 times) 3 = Often (more than 10 times)</td>
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<td>• Examples of preferred foods: rice, chapatti, fresh fish, meat, milk, eggs, fruits etc.</td>
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<td>3. In the past four weeks, have you or anyone in your household been forced to reduce the use of different varieties of food because resources were not enough?</td>
<td>0 = No If yes: 1 = Rarely (once or twice) 2 = Sometimes (3 – 10 times) 3 = Often (more than 10 times)</td>
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<td>• Example: ugali with kale instead of ugali with meat and kale; monotonously eating ugali without changing with foods such as chapatti, rice etc for a long time</td>
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<td>4. In the past four weeks, did it happen that you or someone in your household had to eat foods that you really did not want to eat because of a lack of resources?</td>
<td>0 = No If yes: 1 = Rarely (once or twice) 2 = Sometimes (3 -10 times) 3 = Often (more than 10 times)</td>
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<td>• For example: eating foods such as rice porridge, thin porridge, thin ugali, ugali with salt, unripe unusual fruit, wild roots etc</td>
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<td>5. In the past four weeks, have you or anyone in your household been forced to eat smaller amounts of food at meals than you would have wanted because of a lack of enough food?</td>
<td>0 = No If yes: 1 = Rarely (once or twice) 2 = Sometimes (3 -10 times) 3 = Often (more than 10 times)</td>
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<td>• For example: Eating less/small amounts of food per day</td>
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<td>6. In the past four weeks, have you or anyone in your household been forced to reduce the number of times you eat in a day because of a lack of enough food?</td>
<td>0 = No If yes: 1 = Rarely (once or twice) 2 = Sometimes (3 -10 times) 3 = Often (more than 10 times)</td>
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<td>• For example: Skipping lunch in order to avail supper or so that children can have food to eat</td>
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<td></td>
<td>Question</td>
<td>Response Options</td>
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<tr>
<td>7.</td>
<td>In the past four weeks, has there been a time when there was no food at all in your house because of a lack of resources to obtain food?</td>
<td>0 = No&lt;br&gt;If yes:&lt;br&gt;1 = Rarely (once or twice)&lt;br&gt;2 = Sometimes (1-10 times)&lt;br&gt;3 = Often (more than 10 times)</td>
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<td>8.</td>
<td>In the past four weeks, have you or anyone in your household slept without being satisfied because food was not enough or it lacked completely?</td>
<td>0 = No&lt;br&gt;If yes:&lt;br&gt;1 = Rarely (once or twice)&lt;br&gt;2 = Sometimes (3-10 times)&lt;br&gt;3 = Often (more than 10 times)</td>
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<tr>
<td>9.</td>
<td>In the past four weeks, have you or anyone in your household gone a whole day and night without eating anything at all because food was not enough or it lacked completely?</td>
<td>0 = No&lt;br&gt;If yes:&lt;br&gt;1 = Rarely (once or twice)&lt;br&gt;2 = Sometimes (3-10 times)&lt;br&gt;3 = Often (more than 10 times)</td>
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</table>
**Living indicators**

Observe and probe on ownership and usage of the following items

<table>
<thead>
<tr>
<th>Who owns house you live in</th>
<th>How many rooms does it have?</th>
<th>How many people sleep in it at least 4 nights/week for most of the year</th>
<th>Of what material are the walls of the house made?</th>
<th>Of what material is the roof of the house made?</th>
<th>What is your main source of lighting?</th>
<th>What is your main source of cooking</th>
<th>What assets do you own</th>
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<td>Assets. (Please tick)</td>
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<td>3. VCD/DVD</td>
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<td>6. Motocycle</td>
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<td>9. Cattle</td>
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<td>10. Poultry</td>
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<td>11. Goats</td>
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<td>12. Sheep</td>
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<td>14. Donkey</td>
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<td>15. Others (specify)</td>
</tr>
</tbody>
</table>

**Who owns house** 1. Own 2. Rented 3. Other (specify________

**Wall material** 1. Mud and wooden poles 2. Un-burnt mud bricks 3. Cement or stone blocks 4. Iron sheets 5. Timber 6. Other (specify________


Section 2: Water, hygiene & sanitation and Morbidity

A) Water, hygiene & sanitation

Now ask the following questions:

<table>
<thead>
<tr>
<th>What is the main source of water for the HH</th>
<th>What are the major alternative source(s) of water</th>
<th>Amount of water used (Litres)</th>
<th>Do you treat your drinking water? (1=Yes) (2=No). If yes, how?</th>
<th>What is the approximate distance from the water source?</th>
<th>Is there a latrine/toilet in the compound? (1=Yes) (2=No)</th>
<th>Is the compound and house clean? (Observe) (1=Yes) (2=No)</th>
</tr>
</thead>
</table>

Main source of water 1. Well 2. River/Lake 3. Piped 4. Roof catchment 5. Other (specify__________)


Distance from water source 1. <0.1Km 2. 0.11-0.5Km 3. 0.51-1Km 4. 1.1-2 Km 5. 2.1-3Km 6. 3.1-4Km 7. 4.1-5Km 8. 5.1-7Km 9. 7.1-10Km 10. >10.1Km

Number of People who use Toilet 1. <2 people 2. 2-5 people 3. >5 people

Compound Clean: observe for litterless ground with well cut grass, no bushes, no stagnant water and no exposed feaces and generally clean.
**B) Morbidity and health seeking behavior**

<table>
<thead>
<tr>
<th>How do you rate your health at the present time?</th>
<th>Have you been ill in the past two weeks? (1=yes) (2=No)</th>
<th>Did you receive any medication in the last two weeks? (1=Yes) (2=No).</th>
<th>Which illnesses are of great concern in this household? Number starting with the greatest</th>
<th>What is the approximate distance from the household to the health facility?</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____</td>
<td>If yes, what were you suffering from?</td>
<td>_____</td>
<td>Who prescribed the medicine?</td>
<td></td>
</tr>
</tbody>
</table>

**Health status** 1. Not Sure 2. Poor 3. Fair 4. Good


**Distance to health facility** 1. <2Km 2. 2-5Km 3. >5Km
### Section 3: Dietary related information

#### A) Household dietary diversity score (HDDS)

<table>
<thead>
<tr>
<th>Question</th>
<th>Food group</th>
<th>Examples</th>
<th>YES (1)</th>
<th>NO (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>CEREALS</td>
<td>• Bread, noodles, biscuits, cookies or any other foods made from millet, sorghum, maize, rice, wheat + <em>insert local foods e.g. ugali, porridge or pastes or other locally available grains</em></td>
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<td></td>
</tr>
<tr>
<td>B</td>
<td>WHITE TUBERS AND ROOTS</td>
<td>• White potatoes, white yams, cassava, or foods made from roots?</td>
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</tbody>
</table>
| C        | VEGETABLES                        | • pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside + *other locally available vitamin-A rich vegetables*  
• Dark green, leafy vegetables, including wild ones + *locally available vitamin-A rich leaves such as cassava leaves etc.*  
• other vegetables, including wild vegetables |         |        |
| D        | FRUITS                            | • Ripe mangoes, papayas, *other locally available vitamin-A rich fruits*                      |         |        |
| E        | MEAT                              | Beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds, liver, kidney, heart or other organ meats or blood-based foods |         |        |
| F        | EGGS                              | • chicken eggs or any other eggs                                                             |         |        |
| G        | FISH                              | • Fresh or dried fish or shellfish                                                          |         |        |
| H        | LEGUMES, NUTS AND SEEDS           | • Beans, peas, lentils, nuts, seeds or foods made from these                               |         |        |
| I        | MILK AND MILK PRODUCTS            | • Cow’s, goat’s or any other animal’s milk, cheese, yogurt or other milk products           |         |        |
| J        | OIL, FAT OR BUTTER                | • Cooking fat/oil, fish oil, lard, margarine/butter, coconut oil/milk etc.                  |         |        |
| K        | SUGAR FOODS                       | • Sugar, honey, soda with sugar, molasses, *kaimati* (a very sweet doughnut), sugar cane, chocolate, sweets, ice cream, ice. |         |        |
| L        | OTHER FOODS                       | • Spices such as ginger, curry powder, coriander, garlic, etc.: coffee, tea; alcoholic drinks such as *chang'aa, matingasibussaa* (beer from maize), etc. |         |        |
B) Interactive 24 hour recall form

Starting from morning to evening yesterday, please name all foods and drinks that you consumed as well as the amounts they were prepared.

<table>
<thead>
<tr>
<th>Time</th>
<th>Place eaten (Home/out)</th>
<th>Food or drink</th>
<th>Description and preparation Method</th>
<th>Amount eaten</th>
<th>Weight Equivalent (grams)</th>
<th>Food code</th>
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Probe for alcohol: ☐ Yes ☐ No

Probe for sickness: ☐ Yes ☐ No
If yes, did sickness affect appetite? ☐ Yes ☐ No
If yes, how? ☐ Increase ☐ Decrease

Was food intake unusual? ☐ Yes ☐ No
If yes, how was it unusual

Was food intake unusual? ☐ Yes ☐ No
If yes, how was it unusual

Was it a feast day? ☐ Yes ☐ No
Was it a market day? ☐ Yes ☐ No
Was it a fasting day? ☐ Yes ☐ No

Code* Method of preparation: 1=eaten raw, 2=boiled, 3= steamed, 4= roasted, 5= deep fried, 6 =shallow fried 7=baked, 8= others specify

Anthropometry

(Each measurement must be done thrice)

<table>
<thead>
<tr>
<th>Measurements</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Average</th>
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<tbody>
<tr>
<td>Weight 0.1 (Kg)</td>
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<tr>
<td>Height 0.1 (Cm)</td>
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<td>MUAC 0.1 (Cm)</td>
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</table>
ITE MAR ARIYO: penjo mopangi

Namba mar penjo ________________________  Tarik ____________________________

Japenjo ____________________________

Gweng_______________________________

Nying ja duoko _____________________  Dhot ________________________________

Iga mar jaduoko____________________ kwan jo ot___________________________

Wat mar jaduoko gi wuon ot* __________ 

Section 1: Ngiyo gi jomaopogore gi Yuto mar gi mopogore 

A) Ngiyo gi jomaopogore choko

Ne joma dongo tee (iga 18 kadhi mbele) e ot ul nying, ikgi, somo mamalo, tich, ngimane kendo ul kata ka en gi yuto moro

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<thead>
<tr>
<th>Namba</th>
<th>nying</th>
<th>Chuo/ mine</th>
<th>Wat gi wuon ot</th>
<th>iga</th>
<th>somo</th>
<th>tich</th>
<th>keny</th>
<th>Yuto (1=eee)</th>
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Ngima mari penj chieng pimruok ayaki mogik to gi duoko mar pim no’’
Yuto mar gi moyudi

1) Yuto mar chiemo gi tije pesa

Kwan nying joma udakgo (morowo nyaka joma pok ochopo iga 18) man gi yuto, kwan ma gi yudo, ngama ochung korka gik ma ichamo, kwan ma itiyo go echiemo ejuma, jiadi machiemo eod no, kano chiemo kod kuma igole

<table>
<thead>
<tr>
<th>S/No</th>
<th>Nying</th>
<th>chuo/ mine</th>
<th>Wat gi wuon ot</th>
<th>iga</th>
<th>Yuto edwe (omenda ma Kenya)</th>
<th>Ngama nigi duol echiemo mingio</th>
<th>Kwan pesa mitiyo go echiemo / juma</th>
<th>Kwan joma chiemo</th>
<th>Nitie chiemo mokan (1=eee) (2=oyo)</th>
<th>Chie mo ma ogen</th>
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Chiemo mokan budho maromo nade 1. <1dwe (<1 month) 2. 2-6 dweche (2-6 months) 3. >6dweche (>6months) 4. Akia (Don’t know)

Penjo mag koso chiemo eudi (Food access experiences and coping strategies by HFIAS)

Ne penjo ma adwa penji gi, par gik ma osetimore jumbe angwen mokalo, ka jaduoko oyiie penjo mora mora par iket kar didi, kaka matin(dichiel/diriyo)sechemoko(di 3-10) mageny(mokalo apar)

<table>
<thead>
<tr>
<th>Penjo</th>
<th>Kaka osebedo</th>
<th>namber</th>
</tr>
</thead>
</table>
| 1. Jumbe angwen mokalo ise bedo gi luoro ni nyalo koso chiemo eot  
  * ka wawacho no ot tiende ni jok ma udak go machiemo kanyila | 0 = oyo  
  Ka en adier:  
  1 = matin(dichiel kata diriyo)  
  2 = sechemoko(di 3-10)  
  3 = mageny (mokalo di par) | …|___|
| 2. Jumbe angwen mokalo be ngato oedu osekoso chamo chiemo mauhero ni ketch onge pesa?  
  * kaka michele, chapat, rech mangich, ringo, chak, tong olembu gumamoko | 0 = oyo  
  Ka en adier:  
  1 = matin(dichiel kata diriyo)  
  2 = sechemoko(di 3-10)  
  3 = mageny (mokalo di par) | …|___|
| 3. Jumbe angwen mokalo be osechuno u ni uduok kabind chiemo ma uchamo ni ketch nok mar pesa  
  * kaka kuon gi alot kuom chamo kuon alot gi ringo, chamo kuon maok loki | 0 = oyo  
  Ka en adier:  
  1 = matin(dichiel kata diriyo)  
  2 = sechemoko(di 3-10)  
  3 = mageny (mokalo di par) | …|___|
| 4. Be ose bedo ni in kata jaot osechamo chiemo moro maok udwar niketch koso pesa?  
  * kaka chamo chiemo moka kaka michele, nyuka, kuon matin, nyuka matin, kuon gi chumbi, olemo maok chiek | 0 = oyo  
  Ka en adier:  
  1 = matin(dichiel kata diriyo)  
  2 = sechemoko(di 3-10)  
  3 = mageny (mokalo di par) | …|___|
| 5. Jumbe angwen maokalo be osetimore ni in kata jaot osechamo chiemo matin seche chiemo ma okudwaro?  
  * kaka chamo chiemo matin e odiochieng | 0 = oyo  
  Ka en adier:  
  1 = matin(dichiel kata diriyo)  
  2 = sechemoko(di 3-10)  
  3 = mageny (mokalo di par) | …|___|
| 6. Jumbe angwen mokalo be osebodo ni in kata jaot ka ose duoko kwan kaka uchieno pin e odiochieng ni ketch nok mar pesa?  
  * kaka riyo saa lunch mondo uyud chiemo ma go tieno | 0 = oyo  
  Ka en adier:  
  1 = matin(dichiel kata diriyo)  
  2 = sechemoko(di 3-10)  
  3 = mageny (mokalo di par) | …|___|
| 7. Ejumbe angwen mokalo be nitie seche moko ma usekoso chiemo kabisa ni ketch onge pesa? | 0 = oyo  
  Ka en adier:  
  1 = matin(dichiel kata diriyo)  
  2 = sechemoko(di 3-10)  
  3 = mageny (mokalo di par) | …|___|
<table>
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<tr>
<th></th>
<th>Question</th>
<th>0 = oyo</th>
<th>Ka en adier:</th>
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<tbody>
<tr>
<td>8.</td>
<td>Jumbe angwen mokalo bende usenindo ka ok uyieng kata ukoso chiemo ma gotieno?</td>
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<td>1 = matin(dichiel kata diriyo)</td>
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<td>2 = sechemoko(di 3-10)</td>
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<td>3 = mangeny (mokalo di par)</td>
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<td>9.</td>
<td>Jumbe angwen mokalo bende use dhi odioching gi otieno ma ok uchiemo ni kech onge pesa?</td>
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<td>1 = matin(dichiel kata diriyo)</td>
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<td>2 = sechemoko(di 3-10)</td>
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<td>3 = mangeny (mokalo di par)</td>
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**Ranyisi mag dak**

Ngi kasto ipenji wuon gigi

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<tr>
<th>Ngama wuon ot maudakeni</th>
<th>Opog odni didi</th>
<th>Jiadi manindo eot maok thin ne otiemo agwen/juma</th>
<th>Kor ot olos gi ango</th>
<th>Tado mar ot olos gi ango</th>
<th>Ler mago tieno igloo kanye</th>
<th>Itedo gi ango</th>
<th>Mwandu mage ma ingo</th>
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<td>15.moko(dimbi)</td>
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**Ot mar nga** 1. Mari (Own) 2. Akomba (Rented) 3. Moko (dimbi_________)

**Kor ot** 1. Lo kod sirni (Mud and wooden poles) 2. Matafari ma ok owing (Un-burnt mud bricks) 3. Simiti kata bloks (Cement or stone blocks) 4. Mabati (Iron sheets) 5. Bao (Timber) 6. Moko (dimbi_________)


Section 2: Pii, ler to kod midekre

A) Pii gi ler

Koro penj penjo gi:

<table>
<thead>
<tr>
<th>Pii ma utiyo go</th>
<th>To ka ukoso pii kanyo to uyude kanye</th>
<th>Kwand pii ma utiyo go (ltr)</th>
<th>Be uthiedho pii modho (1=eee) (2=oyo).</th>
<th>Kama uome pii bor manade</th>
<th>Be nitie cho e laro (1=eee) (2=oyo)</th>
<th>Be laro ler (ngi) (1=eee) (2=oyo)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ka en ee eyomane</td>
<td></td>
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</tbody>
</table>


**Bor mar kamiyude pii** 1. <2Km 2. 2-5 Km 3. >5Km

**Kwan joma tiyo gi choo** 1. <ji ariyo 2. Ji 2-5 3. >ji 5

**Ler mar laro:** ngii chilo manyalo bedo elaro, lum kaobeti, pigi ma ochung kata mana losruok manyalo bedo elaro
Midekre to gi yudo thieth (Morbidity and health seeking behavior)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>(dimbi________)</td>
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<tr>
<td>(dimdi___________)</td>
<td></td>
</tr>
<tr>
<td>Bor mar kar thieth</td>
<td>1. &lt;2Km 2. 2-5Km 3. &gt;5Km</td>
</tr>
<tr>
<td>HIV/AIDS EN ANGO:</td>
<td>tuo mar koso bedo gi remo magengo tuoché moko ma ikelo gi timo era ma ok ogeng, tiyo gi gik ma bith kanyakla e.g. wembe sindanto koth tiithbrash, to kod nyuol marach. Kaluore gi duoko marجادوکول. Ongeyo kabisa 2. Ongeyo matin 3. Chike moko 4. Okia kabisa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ngimani ineno nade esechegi?</th>
<th>Ise bedo matuo jumbe ariyo mokalogi? (1=eee) (2=oyo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaen kamano angoma ne chami?</td>
<td>Be iseyudo thieth e dweche adek mokalo gi (1=eee) (2=oyo).</td>
</tr>
<tr>
<td>Ngama ne ondiko ni yath?</td>
<td>En tuo mane ma uluoro ahinya eodu ka, kochakore gi maduong</td>
</tr>
<tr>
<td>Kar thieth ma chiegni ka bor maromo nade?</td>
<td>Epachi in iwuon HIV/AIDS en ango?</td>
</tr>
<tr>
<td>Ere kaka inyal genge?</td>
<td></td>
</tr>
</tbody>
</table>
Section 3: weche modok kor ka kabin chiemo

A) Yuto mar ka bind chiemo eot

Ngii chiemo mo cham gi jaot are nyoro godiochieng, ka iketo oko chiemo ma ocham oko mar ot, chak gi chiemo ma ocham go kinyi

<table>
<thead>
<tr>
<th>penjo</th>
<th>Kabind chiemo</th>
<th>Kaka</th>
<th>EE (1)</th>
<th>OYO (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>KOTHE</td>
<td>• MKATE, BISCUITS CHIEMO MORA MORA MOLOR GI BEL, KAL, ODUMA, MCHELE, KATA MANA CHIEMB NYALUO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>WHITE TUBERS AND ROOTS</td>
<td>• Rabuond rachar, rabuond nyaluo, mariewa, chiemo moa e tie cham</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Alode</td>
<td>• budho, karat, kana alode mag nyaluo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Olembe</td>
<td>• maembe, apoyo, oliembe moko mamedo vitamin A • olembe moko kata mag bungu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Ringo</td>
<td>thiang, anguro, rombo, diel, apuoyo, ring bungu, gweno, atudo, kata winy moko, Chuny, obo, kana mana lemo mag remo</td>
<td></td>
<td></td>
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<tr>
<td>F</td>
<td>Tong</td>
<td>• tong gweno kata mana mora mora</td>
<td></td>
<td></td>
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<tr>
<td>G</td>
<td>Rech</td>
<td>• rech ma ngich kata mo owang</td>
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</tr>
<tr>
<td>H</td>
<td>Kothe nag tielo</td>
<td>• oganda, ngor, njugu, kothe kata chiemo ma olos gi gigi</td>
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<tr>
<td>I</td>
<td>Chalk</td>
<td>• chak mar thiang kata mana mar gimora mora</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Moo, bor kata mor thiang</td>
<td>• mor chiedi/, mor rech, , mor thiang, chalk.</td>
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</tr>
<tr>
<td>K</td>
<td>Skari</td>
<td>• skari, mor kich, soda man gi skari, molasses, niang, sweets kata mana gimoro amora man gi skari</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Chiemo mamoko</td>
<td>• coffee, chai, math mameri ji kaka chang’aa, ilbusaa (kongo ma olois gi oduma), gimamoko</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## B) Paro mar seche 24

*Kochakore go konyi nyaka go dhiambo nyoro, nyisa gik ma isechamo gi kar kiwango gi*

<table>
<thead>
<tr>
<th>Kama ochieme (ot/oko)</th>
<th>Chiemo kata math</th>
<th>Pim to gi kaka olose</th>
<th>Kar mocham</th>
<th>Pek mare kopin gi (grams)</th>
<th>Na,ber mar chiamo</th>
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</tbody>
</table>

*Ngiyo gi kongo: □ ee □ oyo
Ja midekre: □ ee □ oyo
Ka in jamidekre be tuo neo ketho dhogi? □ ee □ oyo
Kano ketho nade? □ tingo malo □ duoko piny

*Chiemo ne ok en ma pilel? □ ee □ oyo
Kaen kamano ere kaka ok ne en mapile

*Ngiyo gi yien: □ ee □ oyo
□ Iron □ Vitamins □ Other supplements □ Anti-malaria

**Nambar** kaka olose: 1=chamo kanumu, 2=ochwake, 3= oboke, 4= obule, 5= odumber e mor maliet, 6=ochiele7=baked, 8= moko dimbi

### Anthropometry

*(pim te nyaka tim ka)*

<table>
<thead>
<tr>
<th>Pimo</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pek 0.1 (Kg)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bor 0.1 (Cm)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>MUAC 0.1 (Cm)</td>
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</tbody>
</table>
APPENDIX III: Focus Group Discussion Guide

Questions for focus group discussion

A) Socio- economic factors

What are the major occupations taken by most people? Why do they prefer them?

Does being in these occupations (formal/informal as listed in 1 above) affect the earnings of a household. If yes, explain. What are some of the barriers to higher education?

B) Food Security

1. Are there foods that are not regularly consumed in the region and why?

2. How can the situation be improved?

C) Dietary practices

1. How many do Most people eat in a day? Are there any particular reasons for this?

2. What problems do you experience in accessing food? (feature food groups such as fruits, vegetables, meats, eggs and legumes)

D) Morbidity

1. What diseases are most problematic in this region and why?

2. Where do most people seek attention when sick? What are some of the reasons they prefer the source of attention to the other sources?

3. Do you have any concrete suggestions to the Ministry of Health on how the situation at the health centres would be improved?
APPENDIX III: Focus group discussion guide (yore ma konyo jo kanyakla egolo) paro

Penjo mag jokanyakla

a) Tudruok gi dongruok
Tije mage ma thoth gi timo?
Ango ma omiyo giyierogi
Be bedo e tije gi siro yuto mag udi
Ka en kamano chiw ler matut
Gin gik mage ma thiro tiegruok e rang”iny mamalo?

b) Yore mag yudo chiemo makare
1 bende nitiere kit chiemo ma okthor cham e gwenge? To nikench ango
2) Ere kaka inyalokel lokruok

c) Yore mag chiemo
  1. Chiemo marindade ma ji nyalochamo e odiochieng?...ango momiyo
  2. Chandruok mane ma uyudo e manyo chiemo? (wach kit chiemo kaka olemo,alode,ringo kod tong gweno)

d) Tuoche gi landruok margi
1 Tuoche mage machendo ahinya engwenge gi? To ango omiyo
2 Kure majomathoth yude thieth?ang”omiyo gihero kuongegi?
3 Bende in gi paro moro amora ne migao mar thieth kaka inyalo konyo kuonde mag yudo thieth
### APPENDIX IV: Training Guide

#### Day 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Event/Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.30 - 09.00</td>
<td>Registration and welcoming</td>
</tr>
<tr>
<td>09.00 - 09.30</td>
<td>official opening remarks</td>
</tr>
<tr>
<td>09.30 - 10.00</td>
<td>Introduction to consent letter</td>
</tr>
<tr>
<td>10.00 - 10.15</td>
<td>Tea Break</td>
</tr>
<tr>
<td>10.15 - 12.45</td>
<td>Questionnaire synthesis- demographic, SES, Morb, WaterSan</td>
</tr>
<tr>
<td>12.45 - 1.45</td>
<td>Lunch</td>
</tr>
<tr>
<td>1.45 - 2.30</td>
<td>Questionnaire synthesis- Morbidity and health seeking behavior</td>
</tr>
<tr>
<td>2.30 - 3.10</td>
<td>Questionnaire synthesis- Dietary information-HDDS and interactive 24-hour recall</td>
</tr>
<tr>
<td>4.10 - 4.30</td>
<td>Questions answer session</td>
</tr>
</tbody>
</table>

#### Day 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Event/Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.30 - 09.30</td>
<td>Recap</td>
</tr>
<tr>
<td>09.00 - 10.00</td>
<td>Questionnaire synthesis-Dietary information- HFIAS</td>
</tr>
<tr>
<td>10.00 - 10.15</td>
<td>Tea Break</td>
</tr>
<tr>
<td>10.15 - 10.45</td>
<td>Questionnaire synthesis-Introduction to Anthropometry</td>
</tr>
<tr>
<td>10.45 - 12:45</td>
<td>Questionnaire synthesis- Anthropometry practice-Weight, height, MUAC Demo</td>
</tr>
<tr>
<td>12.45 - 1.45</td>
<td>Lunch</td>
</tr>
<tr>
<td>1.45 - 2.15</td>
<td>Recap</td>
</tr>
<tr>
<td>2.15 - 3.15</td>
<td>Measurements mastery individual assessments</td>
</tr>
<tr>
<td>3.15 - 4.00</td>
<td>Introduction to pre-test</td>
</tr>
<tr>
<td>4.00 - 4.30</td>
<td>Questions answer session</td>
</tr>
<tr>
<td>5.00</td>
<td>Close of Day 2</td>
</tr>
</tbody>
</table>

#### Day 3

<table>
<thead>
<tr>
<th>Time</th>
<th>Event/Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.30 - 09.30</td>
<td>Recap</td>
</tr>
<tr>
<td>09.00 - 10.00</td>
<td>Introduction to Focus group discussion</td>
</tr>
<tr>
<td>10.00 - 10.15</td>
<td>Tea Break</td>
</tr>
<tr>
<td>10.15 - 11.45</td>
<td>FGD synthesis</td>
</tr>
<tr>
<td>11.45 - 12.15</td>
<td>Role play FGD</td>
</tr>
<tr>
<td>12.15 - 12.45</td>
<td>Role play FGD</td>
</tr>
<tr>
<td>12.45 - 1.45</td>
<td>Lunch</td>
</tr>
<tr>
<td>1.45 - 2.15</td>
<td>Recap</td>
</tr>
<tr>
<td>2.15 - 3.15</td>
<td>Questions answer session</td>
</tr>
<tr>
<td>3.15 - 4.00</td>
<td>Questions answer session and closing remarks</td>
</tr>
<tr>
<td></td>
<td>Close of Day 3</td>
</tr>
</tbody>
</table>
APPENDIX V: Research approval by Kenyatta University

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

FROM: Dean, Graduate School
TO: Nyamunsi Naom Mokono
C/o Foods, Nutrition and Dietetics
Department

DATE: 14th May, 2013
REF: H60/10900/2007

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board, at its meeting of 8th May, 2013, approved your Research Proposal for the M.Sc Degree Entitled, “Use of Dietary Diversity Score and Food Insecurity Access Scale to Assess Food Security among Pwba in Homa Bay Town, Kenya.”

Thank you.

DAVID NJOROGE
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Department of Foods, Nutrition and Dietetics
APPENDIX VI: Research approval by NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20 2241349, 20-267 3550,
0713 788 787, 0735 404 245
Fax: +254-20-2213215

Email: secretary@nacost.go.ke
Website: www.nacost.go.ke

When replying please quote

Our Ref: NACOSTI/P/13/1012/73

Naom Nyamunsi Mokono
Kenyatta University
P.O.Box 43844-00100
Nairobi.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Use of dietary score and food insecurity scale to assess food security in HIV&AIDS households in Homabay, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Homabay County for a period ending 6th January, 2014.

You are advised to report to the County Commissioner and the County Director of Education, Homabay County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

DR. M. K. RUGUT, PhD, HSC.
DEPUTY COMMISSION SECRETARY
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Copy to:

The County Commissioner
The County Director of Education
Homabay County.
Appendix VII: Research permit by NACOSTI

THIS IS TO CERTIFY THAT:

MS. NAOM NYAMUNSI MOKONI
of KENYATTA UNIVERSITY, 10331-100
Nairobi, has been permitted to conduct research in Homabay County on the topic: USE OF DIETARY DIVERSITY SCORE AND INSECURITY SCALE TO ASSESS FOOD SECURITY IN HIV&AIDS HOUSEHOLDS IN

Permit No: NACOSTI/P/13/1012/73
Date Of Issue: 9th October, 2013
Fee Received: Kshs 1000.00
APPENDIX VIII: Ethical clearance by Kenyatta University

Kenyatta University
ETHICS REVIEW COMMITTEE

Fax: 8711242/87111875
Email: kuerc.chairman@kun.ac.ke
kuerc.secretary@kun.ac.ke
Website: www.ku.ac.ke

Our Ref: KUECOMM/91/219

Nyamunsi Naom Mekono
School of Applied Human Sciences
Kenyatta University
P.O. Box 43844-00100, Nairobi

Date: 19th September, 2013

Dear Ms. Mekono,

APPLICATION NUMBER KU/E/131/1 115 OF 2013 – “USE OF DIETARY DIVERSITY SCORE AND FOOD INSECURITY ACCESS SCALE TO ASSESS FOOD SECURITY IN HIV & AIDS HOUSEHOLDS IN HOMA BAY, KENYA” – Version 2

1. IDENTIFICATION OF PROTOCOL

The application before the committee is with a research topic “Use of dietary diversity score and food insecurity access scale to assess food security in HIV & AIDS households in Homa Bay, Kenya” dated 16th September, 2013.

2. APPLICANT

Nyamunsi Naom Mekono
School of Applied Human Sciences
Kenyatta University
P.O. Box 43844-00100, Nairobi

3. SITE

Homa Bay, Kenya

4. DECISION

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines, and is of the view that against the following elements of review,

(i) Scientific design and conduct of study,
(ii) Recruitment of research participant,
(iii) Care and protection of research participants,
(iv) Protection of research participant’s confidentiality,
(v) Informed consent process,
(vi) Community considerations.

AND APPROVED that the research may proceed for a period of ONE year from 19th September, 2013.
5. ADVISE/CONDITIONS

i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.

ii. Serious and unexpected adverse events related to the conduct of the study are reported to this board immediately they occur.

iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.

iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.

If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.

\[Signature\]

PROF. NICHOLAS K. GIKONYO
CHAIRMAN ETHICS REVIEW COMMITTEE

I, \[Name\], hereby accept the advice given and will fulfill the conditions therein.

Signature \[Signature\] Dated this day of \[Date\] 2013.

cc. Vice-Chancellor
DVC: Research, Innovation and Community Outreach.
Director: Institute for Research Science and Technology
APPENDIX IX: Map of Homa Bay