Dietary Intake, morbidity and Nutrition Status of HIV-infected women attending patients support centers in Suba District, Kenya

BY

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DECLARATION

This thesis is my original work and has not been presented for a degree or any other award in any other University.

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DEDICATION

To my dear parents Francis Situma and Virginia Situma; to my brothers and sisters, who have been source of great inspirations. And to my husband Jeremiah and son Crispin for their moral support. Thanks to the Almighty God for the strength and zeal He gave me while doing this work.
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<tr>
<td>AIDS</td>
<td>Acquired Immuno Deficiency Syndrome</td>
</tr>
<tr>
<td>AMPATH</td>
<td>Academic Model for Prevention and Treatment of HIV/ AIDS</td>
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<tr>
<td>ARV</td>
<td>Anti retroviral</td>
</tr>
<tr>
<td>ART</td>
<td>Antiretroviral Therapy</td>
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<tr>
<td>BMI</td>
<td>Body Mass Index</td>
</tr>
<tr>
<td>CBS</td>
<td>Central Bureau of Statistics</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<tr>
<td>FANTA</td>
<td>Food and Nutrition Technical Assistance</td>
</tr>
<tr>
<td>HAART</td>
<td>Highly Active Anti Retroviral Therapy</td>
</tr>
<tr>
<td>KAIS</td>
<td>Kenya Aids Indicator Survey</td>
</tr>
<tr>
<td>Kcals</td>
<td>Kilocalories</td>
</tr>
<tr>
<td>KDHS</td>
<td>Kenya Demographic and Health Survey</td>
</tr>
<tr>
<td>KEMRI</td>
<td>Kenya Medical Research Institute</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MoFP</td>
<td>Ministry of Finance and Planning</td>
</tr>
<tr>
<td>MUAC</td>
<td>Mid Upper Arm Circumference</td>
</tr>
<tr>
<td>NACC</td>
<td>National Aids Control Council</td>
</tr>
<tr>
<td>NASCOP</td>
<td>National Aids and Sexually Transmitted Infections control Programme</td>
</tr>
<tr>
<td>NETWAS</td>
<td>Network of Water and Sanitation.</td>
</tr>
<tr>
<td>NGOs</td>
<td>Non-Governmental Organizations</td>
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<tr>
<td>PLWHA</td>
<td>People Living with HIV/AIDS.</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<td>--------------------------------------------------</td>
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<tr>
<td>TB</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>TSBF – CIAT</td>
<td>Tropical Soil Biology Fertility –International Centre for Tropical Agriculture</td>
</tr>
<tr>
<td>UNAIDS</td>
<td>Joint United Nations HIV/AIDS Programme</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations International Children’s Education Fund</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WFP</td>
<td>World Food Programme</td>
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ABSTRACT

The HIV/AIDS epidemic has become a serious health and development problem in sub-Saharan Africa. This is particularly true in Western Kenya where it exacerbates poverty by decreasing agricultural production, food and nutrition security especially in HIV/AIDS affected households. The purpose of this study was to assess dietary intake, health and nutrition status of HIV infected women attending patients support centers in Suba District. The objectives of the study were; to determine demographic characteristics of HIV infected women, assess their dietary intake, assess their nutrition status, determine prevalence of morbidity among them, determine household food sharing dynamics and other issues affecting their nutrition and determine whether there is any relationships between demographic characteristics, dietary intake, morbidity and nutrition status. The study was a cross-sectional descriptive study. Two patient support centers; Suba district hospital patient support centre and Mbita health centre patient support centre were used to identify HIV infected women included in the study. All HIV-infected women were eligible for the study. Data were collected between June and July 2006. A total of 191 women were sampled using Proportionate sampling and systematic random sampling methods. A structured questionnaire and observation checklist were used to collect data. Anthropometric measurements, prevalence of morbidity, socio-economic and demographic characteristics were collected. Data obtained were then coded, edited and analyzed. Statistical Package for Social Sciences was used to analyze descriptive statistics and inferential statistics. Anthropometric data were analyzed using EPI Info. Chi-square tests were used to determine the relationships between the dependent and independent variables at 0.05 level of significance. The results showed that 41.9% of the women were widowed. The mean daily caloric intake was 1378 kilocalories where protein intake as a percentage of caloric intakes was 17.4% while carbohydrate intake was 45.6% and fat was 37%. Caloric intake was deficient in more than 90% of the HIV-infected women. Presence of illness such as malaria, gastro-intestinal and respiratory infections among respondents was 66.4%. Majority (97.9%) of respondents did not have any cultural beliefs and taboos about food. Basing on BMI, 46% of the HIV-infected women were at nutritional risk. There was statistically significant relationship between dietary intake and nutrition status (p=0.025) at 0.05 level of significant. There was no statistically significant relationship (p=0.453) between morbidity and nutrition status; nutrition status and household food sharing dynamics, cultural beliefs and taboos at 0.05 level of significant among the HIV-infected women attending patient support centers in Suba district. There is need to encourage and support good nutrition and proper health care support among the PLWHA. The study findings are useful in planning and implementing interventions that aim at improving health and nutrition status of HIV-infected women.
CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The picture of the global distribution of HIV/AIDS and its prevalence varies widely. The epidemic has become far more extensive than what the WHO had predicted at the beginning of 1990s (UNAIDS and WHO, 2001). According to their estimates more than 36 million people were living with HIV at the end of 2000, more than 50% higher than earlier projections. Furthermore, it is estimated that approximately 58 million people had acquired HIV infection by the end of 2000 worldwide since the epidemic began in the early 1980s and 22 million of these had already died (UNAIDS and WHO, 2001). However, it is important to note that more men are infected and are dying from HIV than women globally except in sub-Saharan Africa where women are dying more than men (UNAIDS and WHO, 2001).

One of the very important adjuncts to management of infected persons is the maintenance of a balanced nutrition and good health care services (Murphy and Barr, 2005). Maintenance of adequate nutrition for people living with HIV/AIDS has been found to play a pivotal role in their management and treatment outcome. HIV infection increases nutritional demands by impairing the immune system, reducing adequate food intake, absorption and utilization of nutrients (FANTA, 2004).

Good nutrition for people living with HIV/AIDS is important to prevent malnutrition and wasting associated with the disease, achieve and maintain optimal body weight and enhance the body’s ability to fight opportunistic infections, help delay the progression of
he disease, improve the effectiveness of drug treatment and improve the quality of life (Murphy and Barr, 2005). In Kenya, HIV epidemic is superimposed on a pre-existing and ongoing background of extensive malnutrition. Weight loss is the AIDS-defining diagnosis for about 20% of people with AIDS (Cohan, 2004) and ultimately occurs among a majority of people living with AIDS. Loss of the muscle tissue is one of the most debilitating and relentless complications of HIV disease (Murphy and Barr, 2005). There is a critical level of body cell mass below which survival is impossible. Studies indicate that death occurs for those with wasting syndrome either when their body weight approaches 66% of their ideal body mass or when body cell mass approaches 54% of normal (Cohan, 2004). HIV/AIDS reduces a households productive labor, income and food stores, undermining food security. Where prevalence of HIV/AIDS is high, a whole community’s ability to produce and buy food is reduced and as a coping strategy there is reduced food intake.

AIDS a major health and development problem in Kenya was declared a national disaster on 25th of November 1999 by former Head of State President Daniel Arap Moi (Kenya AIDS, 2005). Since then, many plans have been in place to address the epidemic. This was mainly to reduce its impact on the Kenyan society and economy. Increasing access to nutrition care and support of people infected and affected has been one of the strategies. The programme has been very impressive in Nyanza Province. In Suba District the programme has several key partners working in collaboration with the Ministry of Health. The programme has a bottom up approach where the affected and infected own the programme to ensure sustainability. It has a component of Home Based Care where the emphasis is on referral system that ensures meeting holistic needs of PLWHA.
Vulnerable families with food insecurity are referred to a community based organization or emergency food programmes that promote food security in the district. There are strong links with micro finance programmes and income generating activities that have been established to provide economic support that ensures food security in the households affected by HIV/AIDS epidemic. Indeed this is good as proper nutrition strengthens immune system to fight infections thus delaying progression of the HIV to AIDS.

1.2 Statement of problem

HIV/AIDS is one of the epidemics that has threatened and continues to threaten the basic core of human existence (Cannoly, 2005). Evidence from several studies has shown that nutrition status and the progression of HIV to AIDS are strongly interrelated (Appendix I). HIV infection compromise the nutrition status of infected individuals by impairing the immune system, reducing food intake, absorption and utilization of the nutrients, while on the other hand, poor nutritional status exacerbate HIV transmission and progression to AIDS (FANTA, 2004).

There is enough evidence that good nutrition status improves the efficacy of drug therapy and treatment outcome. Furthermore, adequate nutrition helps individuals to stay healthier and live longer whether they are HIV positive or not. In view of the prevailing HIV/AIDS situation in Kenya and the prevailing food insecurity, and women being the most vulnerable and affected group, there is need to assess their dietary intake, nutrition and health status. Women play critical multiple roles in the families, communities and in nations. In addition to their reproductive role, women contribute greatly to the nation's economic development (MOH and UNICEF, 2006). According to FAO (2000), 80% of
agricultural labor in Africa is contributed by women. The social, economic, health and development implications of the women’s malnutrition can be devastating. Women malnutrition results in lost lives, lost health, lost opportunity and lost income. It is important therefore to ensure that women’s dietary intake, health and nutrition status are assessed and suitable interventions are put in place so that their health and nutrition status are safeguarded not only for their own sake but also as a way of improving their capacity to care for their families. It is also important to establish food situation at household level and ensure that relevant nutritional interventions are put in place in addressing HIV/AIDS problems among the infected women. Adequate food security in the household is necessary for optimum nutrition, health and survival (FANTA, 2004).

1.3 Purpose of the study

To assess dietary intake, health and nutrition status of HIV-infected women attending Patients Support Centers in Suba District.

1.4 Objectives

1. To determine socio-economic characteristics of HIV – infected women
2. To assess dietary intake of HIV – infected women
3. To determine prevalence of morbidity among HIV- infected women
4. To determine household food security affecting nutrition of HIV –infected women
5. To assess nutrition status of HIV- infected women
6. To establish the relationship between demographic characteristics, dietary intake, morbidity and nutrition status of HIV infected women
1.5 Hypothesis

1. There is no statistically significant relationship between dietary intake and nutrition status
2. There is no statistically significant relationship between dietary intake and morbidity
3. There is no statistically significant relationship between morbidity and nutrition status
4. There is no statistically significant relationship between household food security and nutrition status of the women

1.6 Significance

The information is important in planning and implementing interventions that aim at improving health and nutrition status of HIV infected women. The study will form a basis for future researches.

1.7 Limitations

1. Since technique of dietary recall was used during the process of data collection, there was a possibility of biased reporting. Comparing data from 24hr recall and food frequency questionnaire validated the data.
2. Since the participants were drawn from the Patients Support Centers, those not attending the centers, though HIV positive could not be reached
3. The interview involved following up participants up to their homes and due to various prevailing social norms and stigmatization, some participants dropped out.
1.8 Conceptual framework

The conceptual framework attempts to explain the effect on HIV/AIDS on immune system, which in turn interferes with nutrition status and health status of the individual.

Figure 1.1 Relationships between HIV / AIDS and Nutrition
Source: Adopted and modified from FANTA (2004).
1.9 Operational definitions

AIDS - A combination of illnesses caused by human immunodeficiency virus (HIV) that weaken the immune system

ART - Treatment of persons with AIDS using drugs that specifically deal with treatment of viruses including HIV virus

Diet - Amount and kind of food and / or drink taken by a person

Food security - Secure access to food resources to adequately meet their needs

HAART - A combination of several anti retroviral drugs which inhibit HIV multiplication in the body, improve health status and delay development of AIDS

Health - A state of physical, social and mental well-being

HIV - The human immunodeficiency virus that causes AIDS

Morbidity - Sickness or illness

Nutrient - A substance or component of food, including carbohydrates, proteins, fats, vitamins, minerals and water

Nutrition Status - A measurement of the extent in which an individual’s physiological needs for nutrients are being
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature was reviewed under the following sub themes; Global HIV/AIDS status, HIV/AIDS status in Kenya, HIV/AIDS and women, HIV/AIDS and nutrition and nutrition support for people living with HIV/AIDS.

2.2 Global HIV/AIDS status

Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV/AIDS), has evolved into one of the greatest human tragedy over the last two decades. The pandemic is taking an unusually heavy toll on the populations in sub-Saharan Africa (SSA) (Murphy and Barr, 2005). It has defied all boundaries, infecting persons of all ages. As the spread of HIV progresses in the society, it leaves an ever increasing number of men and women who are pushed towards their expected early demise more through stigma, malnutrition and poor health care than the disease it causes (Kimberley and Hendricks, 2005). Approximately, 45 million people are currently living with HIV/AIDS worldwide of which SSA contributes over 80% (Murphy and Barr, 2005). The highest levels are found in Southern Africa with prevalence rates exceeding 30% among the adult population (WHO, 2005). In Kenya, it is estimated that about 65,000 adults and 25,000 children acquire HIV every year (TSBF -CIAT and AMPATH, 2005).

2.3 HIV/AIDS status in Kenya

Kenya’s HIV/AIDS epidemic has entered a death phase in which more people are dying of AIDS related complications than are getting infected. Currently about 1.1 million adult Kenyans are infected with HIV, of whom, two thirds are women. In addition, 100,000
children are estimated to be living with HIV (TSBF-CIAT and AMPATH, 2005 and MOH, 2007). The HIV/AIDS epidemic continues to have devastating effect in Kenya. By 2002, it was estimated that over 1.4 million Kenyans were living with the virus and some 1.5 million had already died since the first case was diagnosed in 1984 (Njeru and Kioko, 2004). HIV/AIDS pandemic continues to be a major development hindrance and public health crisis over twenty years since it was first diagnosed (Kenya Aids Indicator Survey (KAIS), 2007). To date new infections are still being registered despite reduction in prevalence of HIV infection among the adult population from 13.5% to 7% in the year 2005 (NASCOP, 2006). Latest reports also indicate that the prevalence of HIV in the country is decreasing (TSBF-CIAT and AMPATH, 2005 and MOH, 2007). UNAIDS (2006) indicated that the prevalence is now 6.1%. The number of HIV infected people in Kenya now stands at 1.25 million out of whom 120,000 are children under the age of 14 years. The number of new infections in children is 34,000 per year and 86,000 for adults. This downward trend in prevalence could probably be attributed to several strategies that the government and non-governmental bodies have adopted to combat the spread of HIV infection and prolong the quality of life of those already infected.

Nyanza Province has the highest total rates of HIV infections, 15.1% (KDHS, 2003). According to KAIS 2007, Nyanza and Rift Valley are homes to over 50% of all infected persons in Kenya with Nyanza province having 436 000 adults infected. Among the districts in Nyanza Province, Suba district has the highest prevalence of 42% according to the 2004 sentinel survey. Basing on Nyanza Model 2008, fishing community is 26.2% at risk of getting infected.
2.4 HIV / AIDS and women

According to MOH (2007), for every infected man there are about two infected women. Among the 15 to 19 year olds, the ratio of infected women to men is 3:1 and the peak prevalence (13%) is among the women aged 25 to 29 years (MOH, 2007). According to KAIS (2007), HIV prevalence among women aged 15 to 49 years is 9.2% compared to the men which is at 5.8%. In addition young women aged 15 to 34 years are disproportionately infected compared to young men. Women often attend to the nutritional needs of their children and other family members neglecting their own needs. The situation becomes worse when they themselves get the HIV infection and progress faster towards AIDS. Studies have found out that compared to HIV infected men, women with HIV are at an increased risk of death (WFP, 2001). Some HIV positive women experience excessive bleeding and this is thought to be due to fewer blood platelets. For those who are already in the antiretroviral therapy programme, especially those on Zidovudine (AZT) the risk of iron deficiency anemia is a real threat (WFP, 2001).

Women’s health status, education, socio economic status, legal rights and welfare have a significant influence on child’s survival and overall human development (Jackson, 2002). Evidence for the positive influence of female control of income on household food expenditure (Haddad and Hoddinott, 1991), on calorie intake (Garcia, 1991) and on anthropometric indicators (Thomas, 1990; Engle, 1993) has been observed in Africa, Asia and Latin America. At similar levels of income, households with more women controlled income are more likely to meet the calorie requirements.

Elsewhere, it has been indicated that women’s authority within the households as proxy by earnings from peltry trading and education is positively correlated with improved child anthropometric status (Tripp, 1981; Sahan, 1990). Unfortunately women in Africa,
especially young women, are the worst hit by the HIV/AIDS pandemic. It is estimated that about 55% of all new infections on the continent, occur among women (WHO, 2006). The prevalence of HIV/AIDS among women in Kenya is very high compared to men. Several factors including socioeconomic, political, legal and cultural practices as well as biological factors make them more vulnerable to HIV infection than men (Gupta, 2000). Yet they are also the main caretakers for everyone who becomes ill with AIDS. Investing in their nutrition, especially those with HIV and AIDS is therefore likely to generate large social and economic returns.

2.5 HIV/AIDS and Nutrition

There are nutritional and metabolic issues that significantly impact morbidity and mortality in HIV-infected populations. Evidence has shown that nutrition and HIV/AIDS are closely intertwined. Poor nutrition increases the risk of HIV infection and the progression of the disease. In turn, the disease exacerbates malnutrition (FANTA, 2004). Once the virus gets into the human body, it replicates rapidly destroying the CD4 cells, which result in a weakened immune system. It also leads to reduce dietary intake, nutrient malabsorption and increased utilization as well as increased excretion of proteins and micronutrients in response to the invading pathogens (HIV) (Piwoz and Preble, 2000). Questions have been raised about the use of antiretroviral therapy (ART) against a background of numerous health problems including widespread malnutrition that is not often seen in the developed world but prevalent in resource-limited Sub-Saharan Africa (Raiten, 2005). According to Saadeh (2005), antiretroviral drug therapy is the only proven intervention which delays mortality associated with AIDS but must be complimented by well planned and executed strategies to meet the nutritional needs of
HIV infected individuals. Mwadime (2005) has suggested that nutrition should be a key component in the ARV and TB – treatment programmes in Africa. Malnutrition, a major manifestation of HIV progression often seen in most HIV/AIDS infected adults has been associated with an increased risk of transmission of HIV from infected mothers to infants, and it may further compromise HIV- infected individuals who have tuberculosis or persistent diarrhea disease (Murphy and Barr, 2005). The introduction of Highly Active Anti Retroviral Therapy (HAART) will have a significant impact on the mortality of HIV but will not completely alleviate the malnutrition associated with HIV infection in the global setting (Wanke, 2005). Malnutrition, often accompanied by low serum levels of micronutrients was common in HIV- positive people prior to the introduction of HAART (Lanzillottis and Tang, 2005). Malnutrition leads to immune impairment, worsens effect of HIV and contributes to more rapid progression to AIDS (FANTA, 2004 and Murphy and Barr, 2005). It has serious and direct implication in treatment, management and quality of life of PLWHA (Chevalier, 2005).

2.6 Nutrition support for People Living With HIV/AIDS (PLWHA)

In Africa, nutrition support programmes for PLWHA are often offered in the context of extreme economic deprivation, hardship, social stigma, endemic malnutrition and scarcity of food (Piwoz and Preble, 2000). Despite these extreme difficulties such programmes have demonstrated commitment from various players including health workers. Nutrition priorities vary for the various phases of HIV infection. During the early stage of the HIV infection, the main objective is to stay healthy by building stores of essential nutrients, maintaining weight and preserving lean body mass (Nestle, 2005). A healthy
diet, adequate in terms of energy, protein, fat or other essential micronutrients should be promoted as key component of positive living (MOH, 2007). During the early stages of the symptomatic phase, the main objective is to minimize consequences by maintaining food intake during an infection as well as increasing energy intake and meeting requirements for proteins, iron, zinc, calcium, selenium and vitamins A, B, C and assuring weight gain (Nestle, 2005 and MOH, 2007).

Good nutrition and healthy diet may help prolong the period of time between HIV infection and onset of opportunistic infections, commonly attributed to progression to AIDS (FANTA, 2004 and MOH, 2007). As the disease progresses to AIDS in the late phase, the main objective is to provide comfort or palliative care including treatment of opportunistic infections and modifying the diet according to symptoms (Nestle, 2005). It is estimated that persons living with HIV/AIDS need 10-15% additional energy and 50-100% more proteins than non-HIV infected persons (Nestle, 2005) but according to MOH (2007), there is no evidence for increasing protein intake. Studies indicate that diets high in fat may depress the immune response and increase the risk of infection, and often result in diminished T-cell activity (Langsett, 1999 and MOH, 2007).

An average adult needs about 2100 KCals while an average adult who is HIV positive in asymptomatic stage need 10% more energy that is about 210 Kcals. Symptomatic ones need 20% to 30% more energy that is, 420 to 630kcals this translates to 2-3 cups of porridge (MOH, 2007). Protein needs of an average adult are 52.5g (FANTA, 2004 and Linda 2005). Data show that consumption of proteins in most parts of Africa including Kenya falls short of these recommendations. Most of the diet in these regions is characterized by 37% of energy consumption derived from tubers, roots and cereals, 17% from legumes and less than 3% from animal products, indicating a 43% deficiency in
energy requirements (TSBF-CIAT and AMPATH, 2005). Data collected recently in western Kenya indicate that the amount of calories consumed is equivalent to about 1600kCals per day and that of protein is 30g per person per day (TSBF-CIAT and AMPATH, 2005). Fat intake should be adjusted according to individual tolerance and no recommendations exists for micronutrients but 100-200% RDA must be obtained for the time being in order to cater for their heavy utilization and urinary losses (MOH, 2007). Other studies also indicate that supplementation with Vitamin A and carotenoids, vitamins C, E, B-complex, zinc, copper; manganese, alpha lipoic acid, flavonoids and Coenzyme Q10 improve the health and nutrition of the patients (Chevalier, 2005).

The period between HIV infection and the onset of AIDS-related illnesses is often years, and sometimes the PLWHA or affected homes may need care and support during this period: access to sufficient, nutritious food can significantly help to prolong the period for healthy living for PLWHA.

2.7 Summary

In accordance to the 2005-2010 Kenyan National HIV/AIDS strategic plan, the government of Kenya has identified good nutrition as a key component of the national response to the HIV/AIDS epidemic. This is in keeping with global recognition that good nutrition is essential for the promotion of health and quality of life of all people, particularly people living with HIV/AIDS.

There is an important relationship between HIV and nutrition. HIV infection increases nutrient requirements, at the same time impairs nutrient intake and uptake. In turn, poor nutrition increases the risk of opportunistic infections and accelerates the progression of
HIV to AIDS. Malnutrition and HIV / AIDS are synergistic and create a vicious cycle that additively weakens the immune system.

HIV and AIDS pose a major threat to food security and nutrition, diminishing the availability of food and reducing household’s ability to produce and purchase food. Household members who are ill cannot contribute to household income and labor, often require care and support of other members of the household and incur expenses that further deplete income.

HIV/ AIDS impacts on a household’s economic potential and retards the social economic development of the community, jeopardizing community advancement. A varied and healthy diet adequate in micronutrients is fundamental to better health for HIV infected individuals. Education and support about nutrition, particularly in nutritionally vulnerable populations, is essential. In management of HIV infection, correct and consistent information on nutrition is part of the continuum of the care and support of PLWHA.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology that was employed in the study. This includes: Research design, research variables, and area of study, target population, data collection instruments, data collection procedures and data analysis.

3.2 Research design

The study employed a cross-sectional descriptive study design. The research design was used to collect both quantitative and qualitative data. Descriptive study allows the research to describe behavior as it occurs naturally (Mugenda and Mugenda, 1999 and Orodho, 2004). This research design was appropriate because it allowed for extensive data collection and in depth investigation within a short time frame (Mugenda and Mugenda, 1999). The study targeted HIV-infected women attending Patient Support Centers in Suba District. The population studied was carefully chosen and clearly defined in order to set precise parameters. This was facilitated by staffs at two patient support centers.

3.3 Research variables

These are items for which data is sought. It includes independent and dependent variables.
3.3.1 Independent variable

These were variables that had already happened and the researcher had no control over them. In this study, they included socio demographic data namely: age, marital status, level of education, religion, morbidity, occupation and cash income.

3.3.2 Dependent variables

These were variables that attempted to indicate the total influence arising from the effects of the independent variable. They vary as a function of the independent variable. In this study they included nutritional status, health status and socio-economic status.

3.4 Area of study.

The research was carried out in Suba district, Nyanza Province, Kenya. The study sites were Suba District Hospital Patient Support Centre and Mbita Health Centre Patient Support Centre. These sites were selected because they have the highest number of patients and they also act as referral centers. They were used for identification and selection of women studied.

3.4.1 Profile of Suba District

Suba district is one of the 13 districts that make Nyanza Province. It's located on the southwestern part of Kenya along Lake Victoria. It borders Bondo to the North, Homabay to the east, Migori to the south and Lake Victoria to the west (Appendix VI). Suba district has 5 divisions, which are Mbita, Lambwe, Gwasi, Gembe (Central) and Mfungano. Mbita Patient Support Centre is located in Mbita Division while Suba District Hospital Support Centre is located in Central Division. According to the 1999 population and housing census projections, the district has a total population of 174,524 of which
113,675 are women with an annual growth rate of 2.95 % (Ministry of Finance and Planning, 2002). The district has a total area of 1,056 square km exclusive of surface under water. The district comprises sixteen islands, the biggest in size being Mfangano and Rusinga. The water mass covers an area of 1190 square kilometers. The soils of the district are of moderate to high fertility with black cotton soils being predominant. Annual rainfall ranges from 700-1200 mm p.a. with more than 60% reliability. The long rains occur in March to May, while short rains occur in August to December (Ministry of Finance and Planning, 2002).

3.4.2 Socioeconomic status of Suba District

Fishing is the major economic activity in Suba District. According to Fisheries Department (2005), commercially important species were as follows Nile perch was the majority with 45.5% followed by argentis and tilapia with 35% and 18% of the income respectively. Fish is the main animal source of protein in Suba District.

Crops grown on large scale include sunflower oil, sorghum and ground nuts while those on small scale include beans, maize and sweet potatoes. Maize and beans are major staple food crops with greater importance in suppressing famine. Destructive practices contributing to low food production include gully erosion, forest destruction and poor farming practices. Potentiality for horticultural crops and irrigation along the lakeshore is enormous but remains largely unexploited. Much of the land lies idle. Suba as a district is a net exporter of beef cattle to the neighboring districts of Homabay, Bondo and even Kisumu. Milk production in the district is minimal. Bee keeping is also an opportunity that has not been fully exploited though there is a high potential of honey production in the district. Sheep and goat remain fast source of income to rural livelihood despite minimal care given to them. The poverty level in the district is high with 64-74% living
below the poverty line. This could be due to minimal innovative ideas on resource utilization, negative cultural practices, poor farming, and lack of capital, migrations and poor infrastructure especially the road network. HIV / AIDS has made the situation even more worse where there is reduction in food production as it has affected mainly the productive age and especially women. Mbita town, which falls under Mbita Division, has commercial opportunities for both local people and those from outside the district.

3.4.3 HIV / AIDS situation and justification of the study area

In this study, Suba district was targeted because of its high prevalence of HIV/AIDS among the adults, which is estimated at 65% by the 2004 sentinel survey (MOH, 2007). The main factors contributing to the spread of the disease in the district are widow inheritance, premarital sex among the teenagers, loose lifestyle among the migrant fishermen, negative cultural beliefs, patronizing of nightspots, passive attitude towards the disease and idleness (Ministry of Finance and Planning, 2002).

Suba District Hospital Patient Support Centre was chosen because it is the largest site with approximately 1800 female clients. It also acts as a referral clinic in the district. Mbita Health Centre Patient Support Centre was chosen because it equally serves many clients because it is at the district headquarters. It has approximately 600 clients. Many of the participants were drawn from the district hospital, as it was a suitable convergent point of the participants and also a referral for other health centre hence more representatives (MOH, 2005b).
3.5 Target population

HIV infected women attending Suba District Hospital and Mbita Health Centre Patient Support Centers were targeted. Suba district hospital had approximately 1350 patients and Mbita health centre had approximately 450 patients attending Patient Support Centers.

3.6 Sampling technique and sample size

3.6.1 Determining the sample size

According to Gay (1999), a sample size of 10% of the accessible population is adequate enough for a descriptive survey. In the two patient support centres, they around 1800 clients registered and actively utilizing services available at the patient support centers. This was based on the hospital health and information records for Suba Health Facilities. Therefore a sample of 180 was adequate. To cater for attrition 11 clients were added to the sample size to make 191 clients.

3.6.2 Sampling techniques

Proportionate and systematic random sampling techniques were used to obtain a representative sample.

Proportionate sampling was done so that each study site was proportionately represented.

In Suba District Hospital, there were 1350 clients attending patient support centre, while in Mbita Health Centre Patient Support Centre there were 450 clients. Sampling proportion was 3: 1. Therefore in Suba District Hospital Patient Support center 143
clients were sampled and in Mbita Health Center Patient Support Center 48 clients were sampled.

In **systematic sampling** every $K^{th}$ case in the population frame is selected for inclusion in the sample (Mugenda and Mugenda, 1999).

Suba District Hospital Patient Support Centre sampling interval ($K$) was;

\[
K = \frac{\text{Population size}}{\text{Sample size}}
\]

\[
K = \frac{1350}{143} = 9
\]

For Mbita Health Center Support Centre, sampling interval ($K$) was;

\[
K = \frac{\text{Population size}}{\text{Sample size}}
\]

\[
K = \frac{450}{48} = 9
\]

Basing on the proportion of women attending patient support centers, 143 HIV-infected women were sampled in Suba District Hospital Patient Support Center and 48 HIV-infected women were sampled in Mbita Health Centre Support Center. All clients in the centers come once in a month unless in cases of complications before the next visit date. This necessitated being in each centre for a period of month to be able to capture all the patients sampled. In the two months, the researcher was in the field, 191 respondents were reached.
3.7 Exclusion and inclusion criteria

Only HIV infected women attending Suba district hospital and Mbita health centre patient support centers were included in the study. HIV infected women attending other patient support centers or not attending any patient support centre though HIV infected were not included in the study. Pregnant and mentally ill women were not studied.

3.8 Data collection instruments

Primary and Secondary data were collected for this study.

3.8.1 Primary data

A structured questionnaire (Appendix II) was used to collect data on the social demographic characteristics such as age, sex, marital status, religion, level of education, occupation and cash income and other relevant characteristics of the women represented in the study. This enabled the researcher to determine the health status of women, their socio economic status, consumption patterns and dietary intake of the respondent. It had both open ended and closed questions.

24 hour dietary recall was used to obtain data on the type of food, quantity, ingredients used and preparation methods of foods consumed in the previous 24 hours.

Food frequency recall was used to establish the frequency of which selected foods of particular interest were consumed over a specified period of time of one week and their sources.

Morbidity data was used to establish presence of illness among women, frequency of the illness and their management two weeks preceding the study.

Anthropometric measurements where physical dimensions were taken then used to develop an understanding of an individuals nutritional status. Height was taken using the
height board, weight using adult salter scale, MUAC using MUAC tape, waist and hip using a regular measuring tape.

Observation checklist was used to check on sanitation, housing condition, presence of toilets, availability of water and land, presence of kitchen garden and foodstuffs in the household and foods available at market.

3.8.2 Secondary data

Respondent’s clinical records were used to obtain data on stage of HIV/ AIDS and ARV use by the surveyed HIV- infected women.

3.9 Validity and reliability

Calibrating the equipments such as weighing scale and following standard methods of taking measurements ensured validity of the instruments. Validity of the questionnaire was ensured by giving it to a panel of 3 competent researchers in the field of nutrition and HIV/AIDS and their feedback was put into consideration.

Consistency of the instrument was tested by administering the questionnaire to 20 respondents (10 % of the sample size) twice to check on uniformity of their responses. The responses were analyzed where Product Moment Correlation Coefficient was determined. Product Moment Correlation Coefficient of 0.8 was obtained and this was considered high enough for reliability of the instrument (Orodho, 2004).

3.10 Research authorization

The study was approved by the Board of Postgraduate Studies of Kenyatta University (Appendix III) and the Ministry of Education (Appendix IV). Verbal consent was obtained from the District Commissioner, Suba District and Ministry of Health, Suba
District. HIV-infected women also gave verbal consent on the understanding that their identity would be anonymous and information received would be confidential.

3.11 Data collection procedures

Upon consent the interview schedules were administered using a pre-tested questionnaire. Demographic data were collected where variables like age, sex, religion, education level, occupation, marital status and cash income were of interest.

Anthropometric measures were collected where weight was taken using the adult Salter scale. The scale was adjusted to zero and a measuring scale was placed on a smooth level, flat hard surface. Respondent removed their shoes/sandals and any other clothing. The subject was assisted to stand on the weighing scale gently and waited until the scale settled. The subject’s weight was read to the nearest 0.1kg and recorded. The procedure was repeated 3 times. For the height, a measuring board was placed on a smooth level, flat hard surface preferably against the wall. The subject removed the shoes/sandals and headgear or any other heavy material. The subject was assisted to stand with the back against the measuring board. The positions of the heels, buttocks, and shoulders were checked and the back of the head touched the board. The chin of the subject was held so that the subject was looking up straight. The headpiece was adjusted so that it was at level. The headpiece was lowered until it was firm on top of the head and pressed gently to ensure that it was in contact with the head. The subject’s height was read to the nearest 0.1cm. The readings were recorded and procedure repeated 3 times.

For the MUAC, the subject was requested to uncover their right hand. The arm was bent and the lower part placed across the stomach. The mid point between the shoulder and the
tip of the elbow was determined. Measurement was taken at the midpoint and recorded to the nearest 0.1cm. The procedure was repeated for 3 times.

For the waist and hip, the subject stood straight and a regular tape measure was wrapped around the fullest part of the hip and then the waist and measurements recorded to the nearest 0.1cm. The procedure was repeated for 3 times.

For dietary intake the subjects were asked what they had consumed in the previous 24 hours and if they had consumed the selected foods in the questionnaire in that week. To establish the amounts consumed, food models and food pictures for portions were used to determine proxy volume. Probing was done to get more details of ingredients used, amounts of the ingredients used, method of preparation and snacks consumed.

The researcher filled the observation checklist after observing the home and clarity was sought from the respondent.

3.12 Training of research enumerators

Two research enumerators were trained two days prior to the research. The training was on data collection technique, content of the questionnaire, purpose and objectives of the study. All research enumerators were selected from within the study area and they had completed their fourth form (secondary school) waiting to join tertiary institutions. They were conversant with the Dhaluo dialect.

3.13 Pre-testing of the questionnaire

Data collection instruments were pre-tested prior to the research. Testing was done on reliability of the tools, sensitivity and clarity of the questions as well as the duration taken to carry out the interview. Two HIV infected women from outside the study area (1% of
the sample size) were interviewed during the pre-test. The researcher determined the sensitivity, clarity; duration of the interview and how it could be modified to enable the researcher get the desired information. Adjustments, alterations and modifications were made accordingly.

3.14 Data analysis

Data collected were edited, coded (open-ended questions) and entered into a microcomputer spreadsheet in a standard format to allow for analysis of both descriptive statistics and inferential statistics where the Statistical Package for Social Sciences (SPSS) computer software was used. First level data analysis involved descriptive statistics (means, medians mode and standard deviations) for continuous and frequency distributions for categorical data. Second level of analysis involved inferential statistics where concepts and relationships were determined. Pearson Product Moment Correlation was carried out to determine reliability of the instruments and Chi Square statistic was used to measure relationship among categorical variables.

For anthropometric data, EPI info with EPINUT version for anthropometric variable was used for analysis. Body mass index was computed using standard equations and expressed as kilograms/meter squared. The BMI were classified as follows: Underweight <18.5, normal range 18.5-24.5, overweight 25.0-29.9, obese class I 30.0-34.9, Obese class II 35-39.9 and obese class III > 40.0 (According to WHO, 2005. Data were grouped under the above categories and analyses using descriptive and inferential statistics. Raw values for waist, hip and MUAC were computed into nutritional indices of waist-hip ratio and MUAC for age using EPI info. Waist-hip circumference ratio above
0.8 indicates nutritional risk. Mid Upper Arm Circumference < 23.2cm indicates muscle wasting for women aged 15 to 59 years (WHO, 2005).

For observation checklist data were analyzed under two categories; present or absent, available or not available and low or high. Frequency distribution and percentages were determined.

The 24-hour dietary recalls were analyzed using Nutri-Survey package for windows. Food consumed was transformed into daily nutrient intake basing on amounts consumed, ingredients used and method of preparation. Emphasis was on kilocalories, protein, carbohydrate, lipids and a few selected mineral elements; calcium, iodine, iron, zinc, magnesium, folic acid and selenium. Vitamins of interest were Vitamin A, B1, B2, B3, B6, B12, C, D, E and K. Data were analyzed in terms of adequacy, mean daily intake and percentages of RDAs.
CHAPTER FOUR
RESULTS AND DISCUSSION

This chapter presents results of the 191 surveyed HIV infected women attending Patient Support Centres in Suba District Hospital and Mbita Health Centre. Results are presented and discussed under the following themes and sub-themes:-

- Socio-demographic characteristics of the respondents
- Dietary intake of respondents
- Prevalence of Morbidity among the respondents
- Household food sharing dynamics, cultural beliefs and taboos about food among respondents
- Nutrition status of the respondents
- Relationships between socio demographic factors, dietary intake, morbidity and nutrition status among the respondents

4.1 Socio-demographic characteristics of respondents

The significant impact of socio-demographic variables on dietary intake, health and nutrition status makes its definition necessary. The socio demographic variables that were assessed included relationship of the HIV-infected women to the household head, age, sex, and marital status, level of education, occupation and cash income.

4.1.1 Relationship to the head of household

The results in Table 4.1 show that most (61.3%) respondents were the heads of household in which they included those who were single, separated and widowed. A considerable percentage (30.4%) represented HIV-infected women who had spouses and they were
married and still living with their husbands. It is important to note that in this ethnic group, women are hardly heads of household unless in cases of death of husband. Studies show that households headed by women are prone to food insecurity due to factors such as lack of capital (TSBF-CIAT and AMPATH, 2005).

### Table 4.1: Respondent’s relationship to the head of household

<table>
<thead>
<tr>
<th>Relationship</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self (head of household)</td>
<td>117</td>
<td>61.3</td>
</tr>
<tr>
<td>Spouse</td>
<td>58</td>
<td>30.4</td>
</tr>
<tr>
<td>Son</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Daughter</td>
<td>8</td>
<td>4.2</td>
</tr>
<tr>
<td>Siblings</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Grandchild</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>191</td>
<td>100.0</td>
</tr>
</tbody>
</table>

#### 4.1.2 Age

The results in Figure 4.1 indicate that 35.6% of the surveyed HIV-infected women were in the age range of 21-30, followed by 31-40 (34.6%) then 41-50 (20.9%). A few (5.2%) were below 20 years and above 50 years accounted for (3.7%). NASCOP (2000) indicate that women aged between 25 to 30 years have the highest HIV/AIDS prevalence. Study findings concur with this observation, and in addition, it is also the most affected age group based on the KDHS (2003) findings. According to KAIS (2007), young women aged between 15 to 49 years are most infected and disproportionately infected compared to young men.
Figure 4.1: Frequency distribution of age among the surveyed HIV-infected women

4.1.3 Marital status

Figure 4.2 shows that 41.9% women were widowed, 34% were married, 16.2% were single and 7.9% were separated. There was no case for divorce, which reflects a typical African setup where divorce is still an uncommon practice. Widowhood being the highest among HIV-infected women indicates that the epidemic has reached the death phase (Njeru and Kioko, 2004). Separation has been a rare phenomenon among the Kenyan community where in 2003 Kenya Demographic Health Survey accounted for 5.9% but from these study findings there was an increase to 7.9% which could be attributed to the impact of HIV/AIDS on families especially in cases of discordant couples or in trying to minimize re-infections. Marriage was still valid (with 34% married) as shown in the results despite the high prevalence of HIV/AIDS and the threats it has on marriage.
Figure 4.2: Percentage distribution of marital status among the surveyed HIV infected women

4.1.4 Religion

The results in Figure 4.3 show that 44% of the HIV-infected women were Protestants, followed by Adventists (31.9%) and 23.1% were Catholics. The least were the Muslims and traditionalist. This illustrates the impact of HIV/AIDS on the individual’s faith where most of them tend to turn to God for consultation especially in rural areas (AIDS Education Global Information System, 2003). In comparison with KDHS (2003), there are slight variations where those with no religion were the majority (11.1%) and Muslims had a considerable (2.7%) representation. This could be due to regional variations and long-term impact of HIV/AIDS. According to MOH (2002), PLWHAs usually suffer from anxiety, anger, guilt or distorted imagination. They therefore turn their trust in God as a source of rest for the mind where forgiveness and reconciliation replace anger and guilt.
4.1.5 Level of education

Figure 4.4 present the percentage distribution of the HIV-infected women by level of education. The majority (61%) of the respondents at least had some or had completed primary school education. Among the respondents 1% had tertiary education, 3% technical education, 8% completed secondary school education while 13% had some secondary school education. Only 14% had not gone to school at all. This indicates that the levels of illiteracy were still high considering that the majority of the respondents had some or had completed primary education (61%) and only 14% had not gone to school at all. The study findings concur with the KDHS (2003) report whereby highest (27.2%) percentage was for those who had completed primary education and 16.9% had some primary education. Studies show that the women’s level of education has a significant influence on overall human development (Jackson, 2002). Drop out rate is high in Suba district among the girls where it is 21% in primary school, 8% in secondary school and
84% in tertiary institutions compared to boys where it is only, 8%, 6% and 60% respectively (Ministry of Finance and Planning, 2002). This could explain the higher percentage of primary school leavers among the surveyed HIV-infected women.

![Figure 4.4: Percentage distribution for level of education the surveyed HIV infected women](image)

4.1.6 Occupation

The results presented in Table 4.2 indicate that most (59.2%) of the surveyed HIV-infected women were self employed and this consisted mainly of business and manual work. Individuals in this occupation did not have any basic skills. This could explain why it was the most common occupation. The unemployed respondents accounted for 24.1%, homemaker by choice 2.1%, wage earner 4.2%, and self-employed professionals 1% and others 0.5%. A few respondents were wage earners and self employed professionals and this shows that most of them had low income. According to KDHS (2003) report, 70% of women in Nyanza Province were unemployed and out of it, the highest proportion, 49% and 26.6% engaged in agricultural based occupation and business respectively. The study findings concur with KDHS (2003) findings as most of the manual work was related to fishing and considerable percentage business. Ministry of Finance and Planning (2002), indicate that 51% of the population in Suba district are
in agriculture related occupation, wage earners are 5% of the total population, 3% are self employed professionals and the others category is 40%. Findings of the present study are in contrast with Ministry of Finance and Planning (2002) findings. This could be because this study was done in two urban centers of the district; Mbita and Sindo while the Ministry of Finance and Planning captured the rural parts of the district in addition to urban centers.

Table 4.2: Frequency distribution of occupation among the surveyed HIV-infected women

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployed</td>
<td>46</td>
<td>24.1</td>
</tr>
<tr>
<td>Home maker by choice</td>
<td>4</td>
<td>2.1</td>
</tr>
<tr>
<td>Self employed</td>
<td>113</td>
<td>59.2</td>
</tr>
<tr>
<td>Wage earner</td>
<td>19</td>
<td>4.2</td>
</tr>
<tr>
<td>Self employed professional</td>
<td>8</td>
<td>1.0</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>191</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.1.7 Level of income among HIV-infected women

Studies show that women authority within the households as proxy by earnings from paltry trading and education is positively correlated with improved household food and nutrition security (Tripp, 1981; Sahan, 1990 and FSAU, 2003). The results in Figure 4.5 show that most (54%) women were earning between Kshs 1000 to 5000. About 6% were earning Kshs 5000 to 10,000 and another big block (40%) was earning less than Kshs 1000. It's important to note that among HIV-infected women none was earning above Kshs 10,000. Income reflects the purchasing powers, diet and medical care. Economic empowerment of women is crucial in general human development.
Figure 4: 5 Percentage Distribution of cash income per month among the surveyed HIV-infected women
4.2 Dietary intake of HIV-infected women

4.2.1 Food frequency

Among the staples, the most consumed food was maize ugali with a percentage of 71.2% consumed on a daily basis and 33% consumed more than 3 times a week. Sorghum was also well consumed by respondents with 70% daily and 11% more than 3 times a week. Other staples consumed in considerable frequencies were rice 49.2% once per week and 20.9% twice a week. Dry maize and beans were equally consumed in moderately frequent times where they were consumed by 36.1% twice a week and 40.3% once a week. For sweet potatoes, much of them (18.3%) were consumed once a week. The rest of the staples in the questionnaire were rarely consumed.

According to Ministry of Finance and planning (2002), the main staple foods in Suba district are maize, sorghum and beans, green maize, cassava and finger millet. Green maize, finger millet and cassavas were not captured because they were out of season. Staples are the main source of kilocalories. Studies in Kenya show that 37% of energy consumed is derived from staples indicating a 23% deficit. This can only be met through diet diversity and use of energy dense foods like fat, oils and sugar (TSBF–CIAT and AMPATH 2005).

Among the vegetables only kales, pumpkin leaves and cowpeas leaves were consumed in considerable frequencies. The rest of vegetables were rarely consumed. Kales were the most consumed with 48.7% of the surveyed HIV-infected women consuming twice a week, 24.6% of respondents more than thrice a week and 15.2% consuming it daily. This was followed by cowpeas leaves, which were consumed by 13.6% of the respondents thrice a week, 29.8% twice a week and 15.2% consuming it once a week. Pumpkin leaves were consumed by few as most of the people (64.4%) did not consume them at all. Most
of the vegetables were rarely consumed especially the root vegetables and traditional vegetables. It's important to note that, generally vegetables were consumed in minimal amounts and there was minimal variety in the diet. There was no consumption of indigenous vegetables yet they contribute a lot of nutrients when it comes to HIV/AIDS management (MOH, 2007). Vegetables are good sources of vitamin A, which boosts the immunity, vitamins C an anti-oxidant that is pivotal in HIV/AIDS management. They are also good sources of fiber important in prevention of constipation and many other crucial roles (Kenya medical Research Institute, 2005).

Results shown in Table 4.3 below indicate that, among fruits, only avocado and ripe bananas were consumed by considerable proportions of the respondents. Most (90.6%) of the surveyed HIV-infected women did not consume avocados within that week. This was almost the same with ripe bananas. Avocados were consumed by 14.7% of the HIV-infected women once a week while bananas by 8.4% of respondents once a week. It is important to note that deep yellow or orange fruits such as mangoes, pawpaw, passion fruits and red watermelon are rich in vitamins particularly Beta-carotene yet they were hardly consumed.

Fish and argentis were the most consumed animal proteins with daily intake of 12.0%, 29.8% more than thrice a week, 36.1% twice a week and 20.4% once a week for fish. For argentis daily intake was 12%, 44% for more than thrice a week, 28.0% for twice a week and 28.3% for once a week. Other animal proteins consumed by considerable proportions of respondents were eggs and beef. Eggs were consumed by 6.3% while beef was by 16.2% once per week. Animal protein should contribute 3% of kilocalories and more than 50% of the protein requirements. A diet containing animal and plant protein complements each other in terms of kilocalories and proteins. It is important to consider
variety, adequacy and balance to ensure sufficient intake of both micro and macronutrients (MOH, 2007).

Table 4.3: A weekly food consumption frequency among the surveyed HIV infected women in Suba district

<table>
<thead>
<tr>
<th>Food item per week</th>
<th>Frequency of consumption per week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td><strong>Cereals/ starches</strong></td>
<td></td>
</tr>
<tr>
<td>Maize ugali</td>
<td>136</td>
</tr>
<tr>
<td>Sorghum flour</td>
<td>134</td>
</tr>
<tr>
<td>Rice</td>
<td>1</td>
</tr>
<tr>
<td>Dry maize/ beans</td>
<td>1</td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>1</td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td></td>
</tr>
<tr>
<td>Kale</td>
<td>29</td>
</tr>
<tr>
<td>Pumpkin leaves</td>
<td>1</td>
</tr>
<tr>
<td>Cowpeas leaves</td>
<td>4</td>
</tr>
<tr>
<td><strong>Fruits</strong></td>
<td></td>
</tr>
<tr>
<td>Avocados</td>
<td>2</td>
</tr>
<tr>
<td>Tipe bananas</td>
<td>1</td>
</tr>
<tr>
<td><strong>Meat/ meat products</strong></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td>1</td>
</tr>
<tr>
<td>Eggs</td>
<td>1</td>
</tr>
<tr>
<td>Fish</td>
<td>23</td>
</tr>
<tr>
<td>Tungtis</td>
<td>23</td>
</tr>
</tbody>
</table>
4.2.2 Sources of food consumed

Much of the staples were obtained through purchase and own production as illustrated in Table 4.4 below. The most purchased staple was rice (67%) followed by maize ugali (39.3%), dry maize and beans (37.7%), sorghum (27.2%) and then sweet potatoes (18.8%). From own production sorghum was leading with 60.2% followed by maize for ugali (52.9%) then dry maize and beans (41.9%). Rice and sweet potatoes were produced in very small negligible percentages.

Most of the vegetables consumed were from both own production and purchase. Most kales (76.6%) were purchased followed by cowpeas leaves (28.8%) then pumpkin leaves (12.6%). More consumers of cowpeas leaves (28.8%) than kales (15.2%) and pumpkin leaves 12.6 % obtained them from own production. On the other hand, 18.8% of the avocado consumers obtained it from purchase and negligible percentage was from own production. Equally 8.4 % of respondents consumed bananas from purchase and negligible percentage was from own production.

From the results in Table 4.4, much of the animal protein was obtained through purchase and own production. The most purchased (91.1%) animal protein was argentis; followed by fish (87.4%), beef (4.6 %) and the least were eggs (8.4%). From own production fish was highest with 11 % followed by argentis 5.8%.
Table 4.4: Sources of food consumed by surveyed HIV infected women in Suba district.

<table>
<thead>
<tr>
<th>Food item per week</th>
<th>Own production</th>
<th>Purchase</th>
<th>Donation / gifts / assistance</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals/ starches</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Maize ugali</td>
<td>101</td>
<td>52.9</td>
<td>75</td>
<td>39.3</td>
</tr>
<tr>
<td>Sorghum flour</td>
<td>115</td>
<td>60.2</td>
<td>52</td>
<td>27.2</td>
</tr>
<tr>
<td>Rice</td>
<td>9</td>
<td>4.7</td>
<td>128</td>
<td>67</td>
</tr>
<tr>
<td>Dry maize/ beans</td>
<td>80</td>
<td>41.9</td>
<td>72</td>
<td>37.7</td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>6</td>
<td>3.1</td>
<td>36</td>
<td>18.8</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kale</td>
<td>29</td>
<td>15.2</td>
<td>152</td>
<td>76.6</td>
</tr>
<tr>
<td>Pumpkin leaves</td>
<td>37</td>
<td>19.4</td>
<td>24</td>
<td>12.6</td>
</tr>
<tr>
<td>Cowpeas leaves</td>
<td>55</td>
<td>28.8</td>
<td>55</td>
<td>28.8</td>
</tr>
<tr>
<td>Fruits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avocados</td>
<td>5</td>
<td>2.6</td>
<td>36</td>
<td>18.8</td>
</tr>
<tr>
<td>Plantains</td>
<td>2</td>
<td>1.0</td>
<td>16</td>
<td>8.4</td>
</tr>
<tr>
<td>Meat / meat products</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td>0</td>
<td>0.0</td>
<td>47</td>
<td>24.6</td>
</tr>
<tr>
<td>Eggs</td>
<td>2</td>
<td>1</td>
<td>16</td>
<td>8.4</td>
</tr>
<tr>
<td>Sushi</td>
<td>21</td>
<td>11</td>
<td>167</td>
<td>87.4</td>
</tr>
<tr>
<td>Gentis</td>
<td>11</td>
<td>5.8</td>
<td>174</td>
<td>91.1</td>
</tr>
</tbody>
</table>

4.2.3 Nutrient intake

Nutrient intake from 24 hours dietary recall was analyzed using Nutri-survey. Nutrients that were focused on were Carbohydrate, protein, fat and selected micronutrients. The micronutrients included vitamins A, B1, B2, B6, B12, C, D, E and K. The minerals included iron, selenium, zinc, iodine, magnesium, folic acid and calcium. The total
amounts of nutrient intake from all meals and snacks consumed in a day were established. This was compared with the Recommended Dietary Allowances.

Most (74%) of the surveyed HIV-infected women had two meals in a day and they also did snacking. Considerable percentage (17.6%) snacked once, 63.9% snacked twice and the remaining 18.5% snacked thrice a day. The highest energy consumption was 2156 kilocalories per day and the least was 478 kilocalories per day. The mean intake was 1378 kilocalories. From the study findings, 38.4% consumed 500-1000 kilocalories while 24.3% consumed 1001-1500 kilocalories. This is illustrated in Figure 4.6 below.

Data collected recently in western Kenya by TSBF-CIAT and AMPATH (2005) indicate that the amount of calories consumed is equivalent to about 1600 Kilocalories per day while another recent food basket survey done by MOH and UNICEF (2006) indicates that many diets of many Kenyan women is less than 2000 Kilocalories per day. The differences could be attributed to seasonality, differences in regions and impact of HIV on individuals and households' food intake as this study targeted only individuals with HIV/AIDS.

Energy requirement for HIV positive women at a symptomatic stage on moderate activity is 2460 kilocalories and symptomatic stage is 2680 to 2900 kilocalories yet none of the respondent consumed calories above 2500 Kilo Calories. This study indicated that most (>90%) of the surveyed HIV-infected women were not meeting energy recommendations. This is in contrast with the sentinel study carried out in Western Kenya by TSBF-CIAT and AMPATH (2005) in which it was reported that there was a 43% deficiency in energy intake. It is important to note that the study done in western Kenya did not target HIV/AIDS infected individuals hence the difference. Variations in seasonality and regions could be other contributory factors.
Protein intake as a percentage of caloric intake was 17.4% while carbohydrate intake as percentage of caloric intake was 45.6% and lipid was 37%. Much of the shortage in caloric intake is attributed to low intake of carbohydrates that is supposed to contribute 50-60% of the energy. Protein intake was adequate where 67.3 % came from animal protein and the remaining (32.7%) from legumes and cereals. Major sources were fish, argentsis and little of eggs and beef. This is in contrast with TSBF-CIAT and AMPATH (2005) study carried out in western Kenya where most of the diet was characterized by 37% of energy consumption derived from tubers, roots and cereals, 17% from legumes and less than 3% from animal products. Higher animal product consumption in this study could be mainly because fishing is the major economic activity. According to Ministry of Agriculture (2005), Suba district fisheries annual report, 10% of Nile perch, 35% of argentsis and 60 % of Tilapia catch were consumed locally. According to WHO 2006, there is insufficient evidence to support the need for increased intake of protein for PLWHA over and above that of uninfected persons. Protein intake is recommended at 12 to 15 % of total energy intake (MOH, 2007).

Most lipids consumed were either used in cooking or as a spreading. Fat requirements range between 25-30% of total calorie intake (MOH, 2007). It is important to note that currently there is no evidence for PLWHA having higher fat intake. A high fat intake (over 30%) may cause steatorrhoea and worsen diarrhoea. High fat intake has also been associated with immunosupression where it alters production of immune substance known as cytokines by some white blood cells (MOH, 2007).
Vitamins and minerals are required in the production and functioning of proteins, enzymes, hormones and the immune system. Vitamins A, C, E, folate and B group vitamins along with iron, zinc, selenium, iodine, magnesium and calcium are most critical micronutrients. Requirements for PLWHA should be maintained at one’s Recommended Daily Allowance (RDA) (MOH, 2007). Calcium means daily intake was high (934.983mg) representing 93.51% of RDA as shown in Table 4.5 below. It is important to note that fish and argentis are rich sources of calcium and they were the main animal protein consumed in the study area. Zinc was equally consumed in considerable amount with mean daily intake of 4.392mg representing 68.6% of RDA. Zinc plays a pivotal role in transmission and progression of HIV/ AIDS because of its anti-bacterial, anti-viral, anti-cancer and its role in protein synthesis. Vitamin A boosts body immune system, which is very vital for HIV, infected yet the mean percentage RDA was only 54.69%. An adequate micro nutrient intake can be achieved through a healthy balanced diet that
includes a variety of fruits and vegetables (Sehmi, 1993 and MOH, 2007). The deficiency in meeting the RDA intake could be attributed to lack of variety in the diet and this could be due to lack of knowledge on the role of food especially micronutrients in progression of HIV to AIDS. Micronutrients play a significant role in immune system functions. Some vitamins are water soluble such as vitamin C and B- group vitamins. The body does not store water soluble vitamins, excreting the excess, thus these vitamins should be consumed regularly and in adequate amounts. Other vitamins, such as vitamin A, D, E and K, are fat soluble. They are stored for longer periods in the body, but regular optimum intake is still required.

Table 4.5: Mean daily consumption of micronutrients among the surveyed HIV-infected women

<table>
<thead>
<tr>
<th>Micronutrient</th>
<th>Mean Daily intake</th>
<th>RDA Requirements</th>
<th>Percentage of RDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A (ug RE)</td>
<td>273.455</td>
<td>500</td>
<td>54.69%</td>
</tr>
<tr>
<td>Vitamin B1 (mg)</td>
<td>0.439</td>
<td>1.1</td>
<td>39.92%</td>
</tr>
<tr>
<td>Vitamin B2 (mg)</td>
<td>0.625</td>
<td>1.1</td>
<td>57.09%</td>
</tr>
<tr>
<td>Vitamin B3 (mg)</td>
<td>3.678</td>
<td>14</td>
<td>26.27%</td>
</tr>
<tr>
<td>Vitamin B6 (mg)</td>
<td>0.217</td>
<td>1.3</td>
<td>16.69%</td>
</tr>
<tr>
<td>Vitamin B12 (ug)</td>
<td>1.084</td>
<td>2.4</td>
<td>45.16%</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>11.093</td>
<td>45</td>
<td>24.64%</td>
</tr>
<tr>
<td>Vitamin D (ug)</td>
<td>0.361</td>
<td>5</td>
<td>7.22%</td>
</tr>
<tr>
<td>Vitamin E (mg)</td>
<td>0.768</td>
<td>5</td>
<td>15.36%</td>
</tr>
<tr>
<td>Vitamin K (ug)</td>
<td>15.59</td>
<td>55</td>
<td>28.35%</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>934.983</td>
<td>1000</td>
<td>93.51%</td>
</tr>
<tr>
<td>Iodine (ug)</td>
<td>14.698</td>
<td>110</td>
<td>13.4%</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>5.538</td>
<td>20</td>
<td>27.69%</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>4.392</td>
<td>6.4</td>
<td>68.63%</td>
</tr>
<tr>
<td>Magnesium (mg)</td>
<td>135.892</td>
<td>220</td>
<td>61.76%</td>
</tr>
<tr>
<td>Folic acid (ug)</td>
<td>108.207</td>
<td>400</td>
<td>27.05%</td>
</tr>
<tr>
<td>Selenium (ug)</td>
<td>9.4</td>
<td>26</td>
<td>36.15%</td>
</tr>
</tbody>
</table>
4.3 Prevalence of morbidity among the surveyed HIV-infected women

4.3.1 Two-week recall morbidity prevalence

According to study findings, 66.4% of the respondents reported to have suffered an illness two weeks preceding the study. Respondents who did not have any illness were only 33.6%. Most patients develop no illness or symptoms of opportunistic infections in asymptomatic stage. Symptoms of opportunistic infections begin to occur when the patient is in early symptomatic stage or late symptomatic. The incidences are also more whereby Sore mouth and throat, fever, nausea, vomiting, diarrhea, anemia, loss of taste and constipation are some of the common illnesses (MOH, 2007).

HIV is a virus that attacks the immune system, the body’s security force that fight off the infection. When the immune system breaks down, one looses this protection and develops many serious infections (UNAIDS, 2003). Opportunistic infections are common phenomenon among the HIV infected persons whereby 45% to 70% of hospital bed occupancy in public hospitals is patients with opportunistic infections (MOH, 2007). Management of common illness among the HIV infected is crucial. Studies shows that these common illnesses impair immune system further, reduce adequate food intake, absorption and utilization of nutrients (FANTA, 2004). Therefore good health care system plays pivotal role in management of HIV/AIDS (Murphy and Barr, 2005). In addition, good nutrition for people living with HIV/AIDS is important to prevent malnutrition associated with the disease, and enhance the body’s ability to fight opportunistic infections (FANTA, 2004).
4.3.2 Types of illnesses suffered

The illnesses were categorized into 5 groups. These were malaria, skin infections, respiratory infections, gastrointestinal infections and others. Skin infections included; ring worms, boils and body rashes. Respiratory infections included cold, flu, fever, ear infections, tonsils, pneumonia, tuberculosis, difficult in breathing, stiff neck and cough. Gastrointestinal infections included diarrhea, stomach ache, constipation and vomiting. Others category had anemia, diabetes and high blood pressure.

From the results shown in Figure 4.7, malaria infection had the highest (25.1%) percentage. It’s important to note that malaria is a global crisis where one fifth of the world population is at risk. Nine out of ten cases occur in Sub Saharan Africa (WHO and CDS, 2005). In Suba district, although HIV/AIDS is the most worrying epidemic in this polygamous society malaria is the main killer. MOH (2005) Suba district report shows that the numbers of cases exceed 70,000 in a district where total population is around 180,000 (WHO and CDS, 2005). Past efforts by NGOs in Suba district have concentrated on malaria case management and preventive measures. According to the Ministry of Health (2005b), the number of malaria cases seen at Suba District Hospital represents 44 - 65% of the total population. Variations within these study findings could be attributed to seasonality differences and population in focus.

Respiratory infections and gastrointestinal infections are common phenomena among the HIV infected individuals (FANTA, 2004). Other findings by Ministry of Finance and Planning (2002) indicate that Malaria infection is the most prevalent disease followed by upper respiratory tract infections then diarrhea in Suba district. Findings of the present study concur with Ministry of Finance and Planning findings whereby the respiratory
infections and gastrointestinal infections were common with a representation of 17% and 11% respectively.

Figure 4.7: Percentage distribution showing type of illness suffered by the surveyed HIV-infected women

4.3.3 Management of illnesses among respondents

There are several ways in which illness can be managed at household level. Depending on many factors, some may opt to go to hospital, some may take herbs, others may opt for certain foods believed to have some medicinal value and others may opt to buy drugs and take without seeing a physician. In the African setup, herbs were used for a long time for management and treatment of illness. Common illness like stomach ache,
diarrhea, backache, ringing worms, vomiting, mouth sores were managed and treated with herbs (KEMRI, 2005). Other than herbs, food was also used for management and treatment of common illnesses. Today, there are scientifically proved foods that have some medicinal value attached to them. They include garlic, amaranth, pumpkin leaves, pumpkin seeds, goat's milk, honey, lemon, neem, rosemary, pepper mint, eucalyptus, turmeric and others (MOH, 2007). From the results shown in Figure 4.8, most (93%) of the respondents managed illnesses from the hospital. It is important to note that the surveyed HIV-infected women were drawn from Patient Support Centres, which are within the hospital premises, and therefore there could be bias in reporting. Provision of free antiretroviral drugs could also be a contributory factor. Herbs were least (1%) used by respondents in management of illness, yet KEMRI (2005) recognizes the herbal remedies derived from plants commonly used locally for therapeutic purposes. This could be due to the impact of western civilization and Christianity, lack of knowledge and absence of the plants in the study area from which the herbs are derived from. From the study, management of common illness with food was equally low (4%) while WHO and FAO (2002) appreciate the medicinal value attached to some foods and the role foods play in management of HIV/AIDS. This could be due to lack of knowledge.
4.4 Household food security affecting nutrition status of surveyed HIV-infected women

4.4.1 Cultural beliefs and taboos about food

Food security and nutrition security at household level is influenced by several factors. It is possible for food to be available in the household but not available to all members of the household. Intra household food distribution, cultural beliefs and taboos are among other factors that may influence household food and nutrition security (FAO, 2000).

The results are presented in Figure 4.9. Majority (97.9%) of respondents did not have any cultural beliefs and taboos about food. A negligible percentage (2.1%), indicated presence of cultural beliefs and taboos about food. Out of these 75% (3), was about women not eating chicken gizzard while remaining 25 % (1) was about children eating fish eye for good mental development. For specific food being consumed by specific persons, majority (97.4%) disagreed and only 2.6% agreed. This is a negligible percentage. Even though the ethnic group studied is rich with culture, it is important to
note that from this study that much of their culture does not revolve around food consumption.

![Bar chart showing frequency distribution of cultural beliefs and taboos about food among HIV-infected women.](image)

Figure 4.9: Frequency distribution of cultural beliefs and taboos about food among HIV-infected women

4.4.2 Intra household food distribution

Intra household food distribution affects factors like who eats what? And how much? Nutrition security depends on quality and quantity of food consumed. Among other factors, intra household food distribution plays a pivotal role in ensuring household nutrition security (FAO, 2000). Many studies show that children and women are the most vulnerable groups to food insecurity in a household (FAO, 2000; UNICEF, 2004). Results in Figure 4.10 indicate that during mealtime, 44% of the surveyed HIV-infected women served children first, 31.4% of the respondents served food through self-service and 23.6% of respondents served father first. It important to note that out of 191 respondents only 1 (0.5%) served food first to women. This concurs with other studies that have shown women being the most vulnerable and affected group where they often
attend to the nutritional needs of their children and other family members while neglecting their own needs (WFP, 2001).

Within the household, there are several factors that may influence intra household food distribution to household members. From the study results, age and sex are some of the contributory factors. Out of 191 respondents, 46% agree that age and sex influences intra household food distribution. It is important to note that a higher (54%) percentage disagreed with it. According to FAO (2000), age and sex are among other factors that influence household food distribution. Men are usually served more and women served less yet women’s nutritional requirements are high.

Amounts of food served to an individual affect their nutrition security. From the study findings, most respondents (87.4%) served old person more while 1.1% respondents served male more. Considerable percentage (11.5%), served both old persons and male more. These results still give further evidence that women are the most vulnerable groups in households when it comes to food security and nutrition security where men are served first and more while women are served last and less. In times of shortage, women miss some meals.

The study findings also indicate that women were mostly (46%) affected in times of shortage followed by children (19%). This concurs with many studies that show that in a household, women are the most vulnerable group in times of food shortage (FAO, 2000). This could be because they are served last and also in times of shortages they skip meals.
4.5 Nutrition status of HIV- infected women

Determining nutritional status of HIV-infected women is necessary to identify those at nutritional risk, improve nutritional status, prevent complications and improve quality of life. Anthropometric measurement offers cheap and easy method for assessment of health and nutritional status and in prediction of morbidity and mortality (MOH, 2007).

4.5.1 Nutrition status by BMI

The highest BMI was 27.6 while the lowest was 15.9 with a mean BMI of 21.7. Figure 4.10 shows the BMI distribution among the surveyed HIV- infected women. The modal class was the wasted, with 46% followed by 42.9% who were normal while 11.1% were overweight. There was no one at all in obese I, obese II and obese III. Wasting is a common syndrome among the HIV infected people. It is characterized by reduced lean muscle. It is important to note that, there is a critical level of body cell mass below which survival is impossible. Studies indicate that death occurs for those with wasting syndrome either when their body weight approaches 66% of their ideal body mass or when body cell mass approaches 54% of normal (Cohan, 2004). With the availability of antiretroviral drugs and good nutrition, wasting is no longer a defining phenomena to the HIV infected. According to KDHS (2003) statistics in Nyanza province, 72.8% of PLWHA had normal BMI, 10.6% were wasted and 16. 6% had BMI greater than 25 (overweight). This variation could be attributed to the impact of the HIV/ AIDS on body composition and dimension where it is characterized by the wasting syndrome.
Figure 4.10: Frequency distribution of BMI among the surveyed HIV-infected women

4.5.2 Nutrition status by waist - hip ratio

The highest waist - hip ratio was 1.02 and the least was 0.54. Mean ration was 0.94. From the results shown in Figure 4.11 most (88.5%) of the surveyed HIV-infected women were at nutritional risk with waist - hip ratio being above 0.8. Only 11.5% of the respondents were not at risk.

Figure 4.11: Frequency distribution of hip- waist ratio among the surveyed HIV-infected women
4.5.3 Nutrition status by MUAC

Mid Upper Arm Circumference (MUAC) is mainly used as a rapid method of nutrition assessment. It compliments other nutrition indices. It mainly assesses lean muscle. The use of MUAC is recommended for individuals who cannot stand for weight and height measurements. In women, the cut off point \( \text{MUAC} < 23.3 \) provides strong correlation with BMI (MOH, 2007). The results in Figure 4.12 indicate that 63% of the HIV-infected women had wasted lean muscle that is, they had muscle wasting and were at risk of illness and 37% had normal lean muscle. There was no respondent with edema.

![Percentage distribution of MUAC among the surveyed HIV-infected women](image)

Figure 4.12: Percentage distribution of MUAC among the surveyed HIV-infected women

Comparing findings from all methods used in the study for nutrition status assessment, the results show that most (BMI=46%, MUAC=63% and Waist –hip ration=88.5%) of the surveyed HIV-infected women were at nutritional risk. This calls for relevant intervention to address the problem. In subsequent analysis, BMI will be used because it assesses directly the nutrition status of the subject (FSAU, 2003).
Nutrition status is a result of many factors in addition to food consumption. It does not always correlate directly with food availability and access. Factors such as sanitation, availability of land, presence of kitchen gardening and availability of water are crucial factors that have to be put into consideration. Quoting the words of Kofi Annan the United Nations General Secretary "We shall not finally defeat HIV/AIDS, tuberculosis, malaria, or any other infectious diseases that plaque the developing world until we have also worn the battle for safe drinking water, sanitation, personal hygiene and basic health care". Indeed access to clean water, good sanitation, good housing condition and nutritious food are urgent matters across the planet (NETWAS, 2006a). As a result, these factors were included in this study because they both influence health and nutrition status of people.

4.5.4 Sanitation scores among HIV-infected women

Sanitation mainly affects food hygiene, personal hygiene, housing environment, and food handling practices that affect susceptibility to infection (MOH, 2007). As in Figure 4.13, majority (91%) of the HIV-infected women had good sanitation with a few scoring average (5%) and bad (4%) respectively. Good sanitation is crucial in preventing common infections like diarrhea, vomiting, typhoid; amoebas, malaria and cold of which HIV-infected individuals are prone to due to their compromised immune system (Cohan, 2004). It is important to note that personal hygiene is encouraged, supported and promoted during home based care follow ups and home based care givers are encouraged to have good sanitation practices always (MOH, 2007 and Observation). According to Ministry of Education, Science and Technology (2004), sanitation coverage in Kenya is estimated at 46% and only 15% of Suba district residents have access to good sanitation.
Inconsistency in research findings could be attributed to education provided to care givers of PLWHA where a lot of emphasis is put on good hygiene.

![Pie chart showing frequency distribution of sanitation among surveyed HIV-infected women]

Figure 4.13: Frequency distribution of sanitation among the surveyed HIV-infected women

4.5.5 Water availability among HIV-infected women

Water availability affects sanitation, food production and workload in the household. Most (96.4%) respondents had a readily available source of water while only a small fraction (3.6%) did not (Figure 4.14). Suba district is surrounded by Lake Victoria and most of the HIV-infected women obtained their water from the lake. Safe clean water boiled or treated is necessary for PLWHA. Those with diarrhea and excessive sweating or
be explained by the fact that this ethnic group is not agriculturalist by origin but fishermen. From observation much of the land was lying idle. This could be attributed to lack of innovative ideas on resource utilization, negative cultural practices and poor farming practices and to some extend the impact of HIV/AIDS on human labor where it has affected the productive age (FAO, 2000). According to Ministry of Finance and Planning (2002), only 19594 ha are under food crops, representing less than 2% of the total land and 3.4% of the arable land. This further indicates that it is the people in the district who do not cultivate land and prefers other economic activities other than farming.

### 4.5.8 Opinions about Food presence on the market by respondents

Availability of food on the market plays pivotal role in ensuring food security in the household, where by food can be accessed when purchasing power is available (FAO, 2000). Results indicate that most (96%) of the HIV-infected women agreed that food was available on the market in adequate amounts. Whilst only 4% did not accent. From observation most food on the market was imported from other districts even though Suba district had a higher potential to produce the same food.

### 4.5.9 Opinions about Prices of food on the market by respondents

In assessing economic access one has to consider the purchasing power of the consumers. Price of foods among other factors is crucial. Seasonal fluctuations in food prices may affect household food security (FAO, 2000). From the study findings shown in Figure 4.15, majority (86%) of the HIV-infected women thought that prices were high while only 3% of the HIV-infected women reported low prices, 6% average and 5% affordable.
Food can be available on the market but not affordable and therefore the households will still be food insecure. Economic access is crucial in addressing household food security (FAO, 2000).

![Figure 4.15: Percentage distribution of opinions on price of food on the market among the surveyed HIV-infected women](image)

### 4.5.10 Opinions about Food availability in the household among respondents

According to the MOH and UNICEF (2006), an estimated 40% of the African populations live under conditions of food insecurity with women being the most vulnerable group. Food availability in the household mainly involves physical access of food in the household that is achieved through own production, purchase, exchange, gifts, relief and transfers (FAO, 2000).
Figure 4.16 indicates that a few (5.2%) households had food available in adequate amounts; the majority (50.3%) had food but not in adequate amounts while a considerable percentage (44.5%) did not have food at all. Food insecurity is a global problem where more than two thirds of the world population is food insecure (FAO, 2000). Many strategies have been put in place to mitigate the problem. It is important to note that 50.3% and 44.5% represent households with food insecurity.

According to MOH (2007), 47% of the total populations are food insecure in Kenya. It is also important to note that not all PLWHA are food insecure. The difference in percentages of food insecurity could be attributed to the impact of HIV/AIDS on households where it reduces the household ability to produce and buy food. Adults with HIV are less able to work on their land or earn income from other activities. Increased health cost uses household money that is needed for food (FAO, 2000). Low farm yield is a common phenomenon in the district. Many farmers in the district do not use certified seeds and fertilizer due to their high cost (Ministry of Finance and Planning, 2002). Bad weather, which occurs occasionally in the district negatively, affects the agricultural production as well. When there are good rains, whatever were harvested ends up being sold at throw away prices because of limited sources of income in the district and lack of proper storage facilities (Observation). Devastating effect of HIV/AIDS has pushed households below poverty line where people are reduced into beggars and they become more vulnerable as they go about looking for their livelihoods (FAO, 2000).
No food, 44.50%

Not adequate, 50.30%

Adequate, 5.20%

Figure 4.16: Frequency distribution of opinions about food availability in the household by the HIV-infected women

4.5.11 Presence of toilets among HIV-infected women

Toilets play a key role in addressing issues of sanitation and in turn infection prevention. In this study, as illustrated in Figure 4.17, 61.8% of the respondents did not have toilets at all, 29.8% were sharing with neighbors while only 8.4% of the surveyed HIV-infected women had their own toilets. The greater percentage without toilets (2004), to reach millennium development goals by 2015, Kenya will have to construct 200,000 toilets per year or 548 toilets per day for ten years to serve 2 million families. Safe disposal of faeces is the most important public health priority. According to NETWAS (2006a), one gram of faeces can contain 10 million viruses, one million bacteria, one thousand parasite cysts and hundred worms’ eggs. Majority of illnesses in developing countries result from faecal matter entering the human body because of poor sanitation and hygiene. The
consequences are 5 million premature deaths globally per annual killed by diarrhea (NETWAS, 2006b). In Suba district, according to Ministry of Finance and Planning (2002), lack of pit latrines in many homesteads has forced many people to defecate in the bushes near their homes and it is also understood that fishermen while fishing empty their bowels directly into the water especially at night. It is important to note that, water pollution is not only fatal to human beings but also to the living things like fish. According to the Public Health Department (2006), the toilet coverage is 35% of the population where 11923 households have latrines in their homes. In a place like this where there is no free flow of water, the percentage latrine coverage is too low and poses a health risk.

![Figure 4.17 Frequency distribution for presence of toilets among the surveyed HIV-infected women](image)

**Figure 4.17** Frequency distribution for presence of toilets among the surveyed HIV-infected women
4.6 Relationships among demographic characteristics, dietary intake, morbidity and nutrition status of surveyed HIV-infected women

4.6.1 Relationship between nutrition status and dietary intake

When kilocalorie intake and nutrition status were correlated, it showed that $r=0.841$ and $p=0.033$. This indicates that dietary intake was significantly related to nutrition status. There was a positive strong significant relationship at 0.05 significance level. Among those who took a diet containing less than 500 kilocalories, 56.3% were wasted while 37.5% were normal. Majority of the HIV-infected women who took a diet of more than 1500 kilocalories had normal BMI. There were those who took a diet containing more than 2000 kilocalories and were wasted. This could be because they were trying to catch up with their weight may be after some counseling.

4.6.2 Relationship between nutrition status and morbidity

From the study findings nutrition status was not significantly (p value 0.453) related to morbidity as illustrated in Table 4.6 below. Nutrition status did not significantly influence the occurrence of the illness and neither did the presence of illness influence the nutrition status of the HIV-infected women. According to FANTA, 2004 a vicious circle between morbidity and nutrition status exist whereby nutrition status and morbidity are interrelated. From the study findings, morbidity and nutrition status were not statistically significantly related. This could be because the severity and duration of the illness was not put into consideration while collecting data. It is possible that the illness may have not affected food intake, absorption and utilization. There could also be other confounding factors that the researcher was not able to identify.
Table 4.6: Relationship between Nutrition status and Morbidity of surveyed HIV-infected women in Suba

<table>
<thead>
<tr>
<th>BMI</th>
<th>Presence of illness</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wasted</td>
<td>42</td>
<td>27</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60.9%</td>
<td>39.1%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>82</td>
<td>36</td>
<td>118</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>69.5%</td>
<td>30.5%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 1.576$; df $= 2$; p value $= 0.455$

4.6.3 Relationship between nutrition status and demographic characteristics

Demographic factors investigated on were marital status, religion, and level of education, occupation and cash income. Among these characteristics, only cash income significantly (where $r = 0.631$ and p value $= 0.009$) influenced the nutrition status of the surveyed HIV-infected women. Majority (66.2%) of the HIV-infected women who were wasted were earning less than Kshs. 1000. Those earning between Kshs. 5000-10000 (83.3%) had normal BMI. According to Tripp (1981), women’s income influences household’s food security as they devote most of their income to food purchase. Though FAO, 2000 indicates a relationship between occupation and nutrition status, in this study, there was no significant relationship between occupation and nutrition status. The variation in the finding could be attributed to confounding factors that the researcher was not able to identify.
4.6.4 Relationship between nutrition status and HIV stage

From the study findings, nutrition status was significantly (P value 0.000) related with the HIV stage of the HIV- infected women. Majority (95.7%) of the HIV- infected women who were wasted were in the late symptomatic stage while 76.3% of the HIV- infected women who had normal BMI were in early symptomatic stage. Moderately obese respondents were all in early symptomatic stage. HIV infection increases nutrient requirements and at the same time impairs food intake, absorption and utilization. Poor nutrition increases risk of opportunistic infections and progression of HIV to AIDS. According to MOH (2007), malnutrition and HIV / AIDS are synergetic and together create a vicious cycle that additively weakens the immune system. The late stage of HIV is characterized by wasting syndrome in more than 80% of the patients (FAO and WHO, 2002). According to MOH (2007), degree of wasting is one of symptoms of defining stages of HIV. Correlating mean BMI of early symptomatic and late symptomatic stages of HIV/ Aids, there was a positive though weak relationship (r=0.32).

4.6.5 Relationship between nutrition status and use of ARV

When the mean BMI was correlated to ARV use among the surveyed HIV –infected women, the findings showed a negative strong significant (r=-0.687 and p=0.019) relationship between nutrition statuses of the HIV- infected women and use of ARV therapy. Majority (58%) of the HIV- infected women who were wasted were on ARV therapy. Most (92.1%) of the HIV- infected women who were normal were not on ARV therapy. According to MOH (2007), antiretroviral therapy should improve overall nutrition status with an increase in total body weight and intracellular water. Interaction between food and nutrition varies for different ARVs. This means that ARVs have many
nutrition implications for PLWHA. It is important that adherence to ARV regimen is very key in improving overall health and nutrition status of the PLWHA.

6.4.7 Relationship between morbidity and dietary intake

The Chi - Square results indicates a significant (p value 0.017) relationship between morbidity and dietary intake. This is illustrated in Table 4.7. It is clear that greater proportions of the respondents who were not ill were able to attain highest contents of calories than those who were ill. According to MOH (2007), dietary deficit in sickness could be attributed to poor appetite, pain from sickness, co- existent gastrointestinal disease, dietary restrictions and food insecurity.

Table 4.7: Relationship between Morbidity and dietary intake of surveyed HIV – infected women

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>Kcal intake grouped</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 500</td>
<td>501-1000</td>
</tr>
<tr>
<td>Yes</td>
<td>7</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>5.5%</td>
<td>45.7%</td>
</tr>
<tr>
<td>No</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>14.1%</td>
<td>26.6%</td>
</tr>
</tbody>
</table>

\[ X^2 = 12.069; \text{ df} = 4; \text{ p-value} = 0.017 \]
4.6.8 Relationship between Morbidity and HIV stages

Morbidity was compared with the HIV stages of the HIV-infected women. The results are presented in Table 4.8. The results indicated that the HIV-infected women in late symptomatic stage had higher proportion (96.1%) of illness than those in early symptomatic stage but at the same time a greater proportion (95.3%) in late symptomatic did not have any illnesses. The Chi-Square results indicated that there was no statistical significance between morbidity and HIV stages. This could be because the respondents were drawn from the patient support centers whereby as part of medical care, they are put on broad spectrum antibiotics prophylaxis that are meant to prevent or minimize on infections. Opportunistic infections are more common and severe in the late symptomatic stage of HIV than in the early symptomatic stage. It is important to note that the type of opportunistic infections, their severity, their frequency of occurrence and the duration they take are used in differentiating the early symptomatic stage from the late symptomatic stage of HIV (FAO, 2002).

Table 4.8: Relationship between Morbidity and HIV stages of HIV-infected women in Suba

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>HIV stages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Early symptomatic</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>3.9%</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4.7%</td>
</tr>
</tbody>
</table>

X2 = 0.60; df = 1; p value = 0.807
4.6.9 Relationship between morbidity and use of ARV drugs among respondents

The results of the Chi – Square indicate that there was no statistical significant (p value 0.505) relationship between morbidity and use of ARV drug therapy among HIV-infected women. Even though a high proportion of the HIV-infected women (67.9%) who indicated that they were on ARV therapy and had been ill within two weeks preceding the study, the proportion is not statistically significant. This is illustrated in Table 4.9. According to MOH 2007, highly active antiretroviral therapy if there is more than 95% adherence the quality of life is expected to improve and the incidences and severity of the infections is also expected to go down.

Table 4.9: Relationship between Morbidity and use of ARV drugs of HIV – infected women in Suba

<table>
<thead>
<tr>
<th>Use of ARV</th>
<th>Morbidity</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
</tr>
<tr>
<td>Yes</td>
<td>76</td>
<td>48</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>67.9%</td>
<td>63.2%</td>
<td>66%</td>
</tr>
<tr>
<td>No</td>
<td>36</td>
<td>28</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>32.1%</td>
<td>36.8%</td>
<td>34%</td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>76</td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

X2 = 0.445; df =1; p value = 0.505
4.6.10 Relationship between dietary intake and demographic characteristics

Demographic characteristics investigated included; age, marital status, occupation, level of education and cash income. There was no statistically significant relationship between dietary intake and the investigated demographic characteristics.

4.6.11 Relationship between dietary intake and HIV stage of respondents

The results of Chi-Square test of significance indicated a near significance (p value 0.052) between dietary intake and the HIV stages of the HIV-infected women. In the symptomatic stages of HIV, incidences of nutritional related complications like nausea, vomiting, lack of appetite that interfere with food intake are common. This could be the reason as to why high proportions of respondents take less kilocalorie. This is illustrated in Table 4.10. According to MOH (2007), PLWHA in late symptomatic stage have higher nutrient requirements but their dietary intake is usually low due to their complications that affect their food intake. This could explain why there is a rapid increase in intake of nutrient supplements among the PLWHA. According to FANTA (2004), various strategies could be used to achieve nutrient requirements. These include enrichment of food, diet diversification and supplementary feeding.
Table 4.10: Relationship between dietary intake and the HIV stage of the HIV-infected women

<table>
<thead>
<tr>
<th>BMI</th>
<th>Kilocalories intake per day</th>
<th>Less than 500</th>
<th>500 - 1000</th>
<th>1001 - 1500</th>
<th>1501 - 2000</th>
<th>2001 - 2500</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early symptomatic</td>
<td></td>
<td>6</td>
<td>37</td>
<td>20</td>
<td>21</td>
<td>13</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td></td>
<td>37.5%</td>
<td>49.3%</td>
<td>40.8%</td>
<td>72.4%</td>
<td>59.1%</td>
<td>50.8%</td>
</tr>
<tr>
<td>Late symptomatic</td>
<td></td>
<td>10</td>
<td>38</td>
<td>29</td>
<td>8</td>
<td>9</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>62.5%</td>
<td>50.7%</td>
<td>59.2%</td>
<td>27.6%</td>
<td>40.9%</td>
<td>49.2%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>16</td>
<td>75</td>
<td>49</td>
<td>29</td>
<td>22</td>
<td>191</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

X2 =9.411; df =4; p value =0.052

4.6.12 Relationship between nutrition status and household food security

There was no statistically significant relationship between nutrition status and household food security of the surveyed HIV infected women attending patient support centers in Suba district. Though (FAO,2000) has shown a relationship between nutrition status and household food security, the present study findings did not find any significant relationship. This could be attributed to some confounding factors especially at household level that the research did not include in the study.
TESTING OF HYPOTHESIS

- There was statistically significant relationship (p=0.025) between dietary intake and nutrition status of the surveyed HIV infected women attending patient support centers in Suba district at 0.05 level of significance. Therefore the hypothesis was rejected.

- There was no statistically significant relationship (p=0.453) between morbidity and nutrition status of the surveyed HIV infected women attending patient support centers in Suba district at 0.05 level of significance. Therefore the hypothesis was accepted.

- There was no statistically significant relationship between nutrition status and household food security of the surveyed HIV infected women attending patient support centers in Suba district at 0.05 level of significance. Therefore the hypothesis was accepted.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter gives a summary of the study findings and conclusions that emanated from the study findings. It also gives recommendations for policy, practice and further research work.

5.1 Summary of the study

The study was conducted in Suba district hospital and Mbita health centre patient support centers. HIV-infected women who attended patients support centre between June and July, 2006 in Suba district hospital and Mbita health centre patient support centers participated in the study. Participants were systematically sampled and their participation in the study invited. The purpose of the study was to assess the dietary intake, health and nutrition status of HIV-infected women attending patient support centers in Suba district and to determine if there was any significant relationship between dietary intake and nutrition status, morbidity and nutrition status and finally between household food sharing dynamics, cultural issues and nutrition status of women. The Ministry of Education National authorities, Ministry of Health District authorities, District Administrative Office authorities and Ministry of Health Facility authorities approved the study. Consent was also sought from the participants. A cross sectional descriptive design was used to collect both quantitative data and qualitative data. Participants were interviewed using close and open-ended pre-tested questionnaire. Data collected included socio-demographic factors such as age, marital status, and religion, level of education, occupation and cash income. Participant’s dietary intake was determined using
the food frequency recall and 24-hour dietary recall. Establishing morbidity pattern while computing serial measurements of height assessed health status, weight, MUAC, waist and hip assessed nutrition status. Data were coded, edited and entered into microcomputer using Statistical Package of Social Sciences. Anthropometric data were analyzed using EPI info while Nutri Survey analyzed data from 24-hour dietary recall. Results were presented in tables, graphs and pie charts. Chi Square was used to test for relations between independent and dependent variables. P value of less than or equal to 0.05 was considered significant.

5.1.1 Socio-demographic characteristic of the surveyed HIV-infected women.

The data were collected from 191 HIV-infected women attending patient support centres in Suba district hospital and Mbita health centre. The results show that most respondents were the head of households (61.3%), 30.4% represented women who had spouses, 41.9% of the women were widowed, 34% were married, and 16.2% were single while 7.9% were separated. There was no case for divorce. For religion, 44% of the HIV-infected women were Protestants, followed by Adventists (31.9%) and then Catholics with (23%). The least were the Muslims and traditionalist. Among HIV-infected women there was none who was not affiliated to some religion. From study findings, 1% of the HIV-infected women had tertiary education, 3% technical education, 8% completed secondary, 13% had some secondary education while the majority had some or had completed primary education (61%) and only 14% did not go to school at all. The HIV-infected women who were self-employed were 59.2% and this involved basically business and manual work. Majority of the women (54%) were earning between Kshs
1000 to 5000 and a few (6%) were earning Kshs 5000 to 10,000 while 44% were earning less than Kshs 1000. It’s important to note that among HIV-infected women none was earning above Kshs 10,000. The results also indicated that most (35.6%) respondents were in the age range of 21-30, followed by 31-40 (34.6%) then 41-50. A small number (5.2%) were aged below 20 years and those aged above 50 years were the least (3.7%).

5.1.2 Dietary intake among the surveyed HIV-infected women

The staple foods consumed in large quantities included ugali with 71.2% consumed daily and 33% consumed more than 3 times a week. Sorghum was also well consumed by respondents with 70% of the respondent consuming it daily and 11% more than 3 times a week. Other staples consumed in considerable frequencies were rice, sweet potatoes, dry beans and maize. Rice had a percentage of 49.2% once per week and 20.9% twice a week. Dry maize and beans were equally consumed in moderately frequent times. On average they were consumed by 36.1% of the respondent twice per week while 40.3% consumed once a week. For sweet potatoes much of them (18.3%) were consumed once per week. The rest of the staples were consumed within a week time frame.

Among the vegetables only kales, pumpkin leaves and cowpeas leaves were consumed in considerable frequencies. Kales were the most consumed with 48.7% reporting to have consumed it 2 times a week, 24.6% more than 3 times a week and 15.2% daily by the HIV-infected women. This was followed by cowpeas leaves, which were consumed 13.6% 3 times a week 29.8% 2 times a week and 15.2% once a week. Pumpkin leaves though consumed but it was in moderate amounts as most of the people (64.4%) did not consume
them at all. Most of the vegetables were rarely consumed especially the root vegetables and traditional vegetables.

For fruits, only avocado and ripe bananas were consumed in considerable amounts. Majority (90.6 %) of the HIV- infected women did not consume avocados within that week. This was almost the same with ripe bananas. Avocados were consumed by 14.7% of the HIV- infected women once a week while 8.4% ripe bananas.

Among the animal proteins fish and argentis were the most consumed with daily intake of 12.0%, 29.8% more than 3 times a week, 36.1 % 2 times a week and 20.4 % once a week for fish. Daily intake for argentis was 12%, 44% for more than 3 times a week, 28.0 % for 2 times a week and 28.3% for once a week. Other animal proteins consumed in considerable amounts were eggs and beef. Eggs and beef were consumed by 6.3 % and 16.2% of the HIV- infected women once per week. Much of the percentages were for non-consumption.

Nutrient intake from 24-hour dietary recall was analyzed using Nutri survey to obtain nutrient intake. The total amount of kilo Calories and some crucial nutrients in HIV/AIDS from all meals consumed in a day were established and compared with Recommended Dietary Allowances. The highest energy consumption was 2156 kilocalories and the least was 478 kilocalories. The mean intake was 1378 kilocalories. Protein intake as a percentage of caloric intake was 17.4% while carbohydrate intake as percentage of caloric intake was 45.6% and fat was 37%. Much of the shortage in caloric intake could be attributed to low intake of carbohydrates, which is supposed to contribute 50-60% of the energy. Protein intake was adequate where 67.3 % came from animal
protein and the remaining (32.7%) from legumes and cereals. Major sources of protein were fish and argentis while a little came from eggs and beef.

Lipid intake accounted for 37% of the total calorie. Most lipids were used in cooking and as spreading.

In summary, the household diets was characterized by high animal protein intake, low plant protein intake, low energy content, limited variety and relatively minimal sources of essential vitamins and minerals. This could be due to poverty or unavailability of nutrient rich foods. This could be due to lack of information about nutrient requirements, nutrient value of various foods, ways of preserving food quality during preparation, cooking and storage and more so, the need for dietary diversification.

5.1.3 Prevalence of morbidity among the surveyed HIV- infected women

The majority (66.4%) of the respondents suffered from some illness.

Malaria incidences accounted for the highest (25.1%) percentage while respiratory infections and gastrointestinal infections had 17% and 11% respectively. Majority (93%) of illness were managed from the hospital but it is important to note that the fact that the respondents were drawn from patient support centers which were within the hospital premises, there could have been bias in reporting. From the study, management of common illness with food was low (4%) and herbs were the least (1%).
5.1. Household food security affecting nutrition status of surveyed HIV-infected women

The results obtained from this study show that majority (97.9%) of the HIV-infected women did not have any cultural beliefs and taboos about food. A negligible number (2.1%) indicated presence of cultural beliefs and taboos.

For specific food being consumed by specific persons, majority of the HIV-infected women (97.4%) disagreed whilst only 2.6% agreed. It was clear that even though the ethnic group studied was rich in culture, study findings indicated that much of their culture did not revolve around food consumed. The findings also indicated that during mealtimes 44% of respondents served children first, 31.4% of respondents served food through self-service and 23.6% of respondents served the fathers first. It is important to note that out of 191 respondents only 0.52% served women food first. Age and sex were reported to influence intra household food distribution by 46% of the HIV-infected women while 54% of the HIV-infected women did not consent to this.

5.1.5 Nutrition status of the surveyed HIV-infected women

The highest BMI reported among HIV-infected women was 27.6 while the lowest was 15.9 with a mean BMI of 21.7. Those who were wasted accounted for 46%. There was no one at all in obese I, II and Obese III. The highest waist–hip ratio was 1.02 and the least was 0.54. Mean ration was 0.94. The results indicated that most (88.5%) respondents were at nutritional risk. For MUAC results indicated that 63% of the HIV-infected women had wasted lean muscle that is, they had muscle wasting and were at risk of illness while 37% had normal lean muscle. Oedema was not reported among HIV-infected women. Comparing findings from all methods used in the study for
anthropometric assessment, the results show that many respondents were at nutritional risk. This calls for relevant intervention.

5.2 Conclusion

Majority (61.3%) of the HIV-infected women were heads of the household where about 41.9% of them were widowed. Households headed by women were prone to food insecurity. The productive age bracket (21-30 years – 35.6% and 31-40 years – 34.6%) was the most affected by HIV/AIDS pandemic. The level of education among HIV-infected women was low and this resulted in most of them being unemployed or self employed with low-income levels.

Most of the HIV-infected women (>90%) had inadequate dietary intake and minimal variety in the diet. Diet diversity and use of energy dense foods enriched with fat, oils and sugar could be used to ensure adequate calorie intake. Including root vegetables and indigenous vegetables could improve on micronutrient intake. Consumption of nutritious snacks could be a strategy in ensuring optimum calorie and micronutrient intake.

Majority (66.4%) of the HIV-infected women suffered from some form of illness with malaria being the most common illness. Malaria infections are more likely to be severe in PLWHA. This could be attributed to the body’s reduced ability to fight infections. Incidences of infections were common in the symptomatic stages. Proper health care system is pivotal in management of the common illness among the PLWHA. This could be coupled with good nutrition to prevent malnutrition associated with the disease and enhance the body’s ability to fight opportunistic infections. The use of food and herbs in management of illness among HIV-infected women was minimal. Appreciating
medicinal value attached to some foods and herbs strengthen home based care of common illnesses among PLWHA.

Women were the most vulnerable members of the household to food insecurity. Women were mostly served last. Cultural beliefs and taboos did not influence food intake of women. Age and sex of the household members among other factors influenced intra household food distribution. Intra household food distribution that allows indiscriminate food distribution among the household members could promote women nutrition security and reduce their vulnerability.

The research revealed that many of the HIV- infected women were at nutritional risk and required some nutritional interventions. Good nutrition for people living with HIV/ AIDS is important to prevent malnutrition and wasting associated with the disease, achieve and maintain optimal body weight and enhance the body’s ability to fight opportunistic infections, help delay the progression of disease, improve the effectiveness of drug treatment and improve the quality of life.

Nutrition status was significantly related to dietary intake, cash income, HIV stage and use of ARV by respondents. Morbidity related significantly dietary intake.
5.3 Recommendations

5.3.1 Recommendations to policy makers

➢ The Ministry of Health should put more emphasis on good nutrition for PLWHA and various mechanisms put in place to ensure that good nutrition is promoted, supported and encouraged among the PLWHA. This can be done in collaboration with the Ministry of Agriculture.

5.3.2 Recommendations for practice

➢ PLWHA should be counseled on importance of good nutrition in management of HIV/AIDS ensure that their diets are nutritionally adequate and varied to ensure adequate macro and micro nutrient intake. This can be achieved through inclusion of vegetables and fruits and a variety of plant proteins.

➢ PLWHA counseled on importance of prompt treatment of opportunistic infections to minimize on their longevity and severity of the illnesses. Comprehensive treatment and care should be provided especially in case of malaria and upper respiratory tract infections. This could be achieved by ensuring continuous availability of the essential drugs in the patient support centers.

➢ Periodic nutritional status assessment of PLWHA should be encouraged to determine the severity of the nutritional impairment, probable causes and relevant intervention implemented. This could be achieved by provision of the anthropometric equipments like weighing scales, stadiometers which are still a challenge in most patient support centres.

➢ High levels of sanitation, food hygiene and water / food safety should be maintained at all times for PLWHA so as to minimize on common infections.
PLWHA should be educated on food, diet, and nutrition and health so that they can make the best choices from their available options.

PLWHA should be educated on nutrition management of common illness.

Positive behavior change should be promoted especially among the young women.

5.3.3 Recommendation for further research

An in-depth, boarder-based study, covering a wider geographical region and embracing greater demographic, ethnic, political, economic and social diversity than what was achievable in this study would be valuable, to establish whether the conclusion can be generalized.

Sufficient research is needed on impact and effectiveness of food and herbs in management of common illness among PLWHA.

A similar study could be carried in a different setting where the HIV-infected women are drawn from community based support groups to minimize on bias in reporting.
REFERENCES


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APPENDICES

Appendix I: Cycle of Good Nutrition and Resistance to HIV and AIDS

Good Nutrition
(good food intake, maintenance of weight and muscle tissue, good micro nutrient status)

Strengthening of the immune system
(Ability to fight HIV and other infections)

Management of HIV-related complications e.g. malabsorption, diarrhea, lack of appetite, weight loss

Increased resistance to infections
(e.g. diarrhea, tuberculosis, respiratory infections)

Source: FANTA, 2004
Appendix II: Health and Nutrition Baseline Survey Questionnaire; Suba District

Socio-Demographic Questionnaire

Interview Date...

Interviewer Name and Code...

Name of Participant...

Birth Date...

Division...Location...Sub-Location...

A. General Information, Demographic and Social Economic Characteristics

Household Characteristics [Fill In the Appropriate Codes].

(a) Starting with the head of the household which people are living in your household with you, their relationship to the head of the household, sex, marital status, denomination, level of education, occupation and whether they earn any income.

<table>
<thead>
<tr>
<th>Relationship to HH head</th>
<th>Age</th>
<th>Marital status</th>
<th>Religion</th>
<th>Level of education</th>
<th>Occupation</th>
<th>Cash income (tick)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>10.</td>
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</table>

Codes:

**Relationship to HH head:** 1= self 2=spouse 3 = son 4 = daughters 5 = siblings 6 = grandchildren 7 = others – specify.

**Marital status:** 1 = single 2 = married 3 = separated 4 = widowed 5= Not Applicable

**Religion:** 1 = catholic 2 = protestant 3 = Adventist 4 = Muslim 5 = traditionalist

**Education:** 1 = none 2 = primary 3 = some secondary 4 =completed secondary 5 = technical 6 = tertiary 7= Not Applicable

**Occupational status:** 1=Unemployed 2 = home make by choice 3 = self employed 4 = wage earner 5= self-employed professionals 7 = others 8= Not Applicable

**Income per month:** 1= 0-1,000 2 = 1,000-5,000 3 = 5,000 – 10,000 4 = 10,000-20,000 5>20,000 6= Not Applicable
B: Food Frequency Consumption

1. What is the frequency of consumption of the following traditional and other foods?

<table>
<thead>
<tr>
<th>Traditional Foods and Others</th>
<th>Frequency Of Consumption Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Name</td>
<td>Local name</td>
</tr>
<tr>
<td><strong>Cereals and Legumes</strong></td>
<td></td>
</tr>
<tr>
<td>Maize ugali</td>
<td></td>
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<tr>
<td>Cassava flour</td>
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<tr>
<td>Millet flour</td>
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<tr>
<td>Soybeans</td>
<td></td>
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<tr>
<td>Sorghum flours</td>
<td></td>
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<tr>
<td>Rice</td>
<td></td>
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<td>Dry maize/beans</td>
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<td>Green grams</td>
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<tr>
<td>Spaghetti</td>
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<tr>
<td>Groundnuts</td>
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<td>Chapatti</td>
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<td><strong>Tubers</strong></td>
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<tr>
<td>Arrow roots</td>
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<tr>
<td>Irish potatoes</td>
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<tr>
<td>Sweet potatoes</td>
<td></td>
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<tr>
<td>Cassava</td>
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<tr>
<td><strong>Vegetable</strong></td>
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<tr>
<td>Carrot</td>
<td></td>
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<tr>
<td>Mushroom</td>
<td></td>
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<tr>
<td>Green bananas</td>
<td></td>
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<tr>
<td>Pumpkins</td>
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<tr>
<td>Spinach</td>
<td></td>
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<tr>
<td>Kale</td>
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<tr>
<td>Cabbage</td>
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<tr>
<td>Lettuce</td>
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<tr>
<td>San hamp spider plant</td>
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<tr>
<td>Amaranths</td>
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<tr>
<td>Saget</td>
<td></td>
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<tr>
<td>Pumpkins leaves</td>
<td></td>
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<tr>
<td>Night shade</td>
<td></td>
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<td>Jute</td>
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<tr>
<td><strong>Fruits</strong></td>
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<tr>
<td>Avocado</td>
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<tr>
<td>Mango</td>
<td></td>
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<tr>
<td>Oranges</td>
<td></td>
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<tr>
<td>Pineapples</td>
<td></td>
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<tr>
<td>Pawpaw</td>
<td></td>
</tr>
<tr>
<td>Lemon</td>
<td></td>
</tr>
<tr>
<td>Frequency Codes</td>
<td>Source code:</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>1 = Daily</td>
<td>1 = Own production</td>
</tr>
<tr>
<td>2 = more than 3 times a week</td>
<td>2 = Purchase</td>
</tr>
<tr>
<td>3 = 2 times a week</td>
<td>3 = donations/assistance/gifts</td>
</tr>
<tr>
<td>4 = once.</td>
<td></td>
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</tbody>
</table>
C: 24- Hour Recall Questionnaires

Tick the day of the week, which you are recalling
Monday - ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐
Sunday ☐

<table>
<thead>
<tr>
<th>Time of day</th>
<th>Food item consumed</th>
<th>Detailed description of the item as well as preparation</th>
<th>Ingredients used</th>
<th>Amounts in HHD measures</th>
<th>Weight (metric)</th>
</tr>
</thead>
<tbody>
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</table>
D: Morbidity

1. Have you been ill in the past two weeks?
   1 = yes  2 = No.

2. If yes, the type of illness suffered from?

3. Where was the illness managed?
   1 = Hospital  2 = foods  3 = Herbs 4 = others

4. Are there specific traditional foods consumed as remedies for disease management? 1 = yes  2 = No.

5. If yes, which ones and what value is attached and for what disease are they administered for?

<table>
<thead>
<tr>
<th>Traditional food</th>
<th>Attached value</th>
<th>Illness</th>
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<tbody>
<tr>
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</tbody>
</table>
E: Household Food Sharing Dynamics and Cultural Issues

1. Do you have some cultural beliefs and taboos about food?
   1 = Yes  2 = No

2. If yes, are there some that affect food consumed within this household?
   1 = Yes  2 = No

3. If yes, which foods?

4. Which members of the household are affected by these beliefs and taboos?
   1 = Children  2 = Women  3 = Men  4 = Sick person
   5 = others specify.

5. Are there specific foods that are consumed by specific person?
   1 = Yes, 2 = No

6. If yes, which ones?

7. How do you distribute food within the household?
   1 = Father first  2 = Children first  3 = Women first
   4 = Father last  5 = Children last  6 = Women last

8. Does the amount of food served do members depend on age and sex?
   1 = Yes  2 = No

9. If yes, how?
   1 = Old persons more  2 = male more  3 = both

10. In times of shortage, which group is most affected?
    1 = women  2 = children  3 = men  4 = women and children  5 = men and women
F: Anthropometric Assessment

Height, Waist, Weight, Hip and MUAC will be taken for all women in the study. All measurements will be taken thrice and weight rounded off to the nearest 0.1 kg and Height, Waist, Hip and MUAC to the nearest 0.5 cm.

<table>
<thead>
<tr>
<th>Variables</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kgs)</td>
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<tr>
<td>Height (cm)</td>
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<tr>
<td>MUAC (cm)</td>
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<tr>
<td>Waist (cm)</td>
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<td>HIP (cm)</td>
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G. Observation checklist

<table>
<thead>
<tr>
<th>Comment</th>
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<tbody>
<tr>
<td>Sanitation</td>
</tr>
<tr>
<td>Water availability</td>
</tr>
<tr>
<td>Food availability in the HH</td>
</tr>
<tr>
<td>Kitchen gardening</td>
</tr>
<tr>
<td>Food presence on the market</td>
</tr>
<tr>
<td>Price of food on the market</td>
</tr>
<tr>
<td>Presence of toilet in the HH</td>
</tr>
</tbody>
</table>
Appendix III: Letter of Authorization (Kenyatta University)

KENYATTA UNIVERSITY
GRADUATE SCHOOL
P.O. Box 43144,
Nairobi,
Tel. No 020-6264013/4
Email: degrees@kunyatta.ac.ke

Our Ref: H60/11122/04
Date: 16th March, 2006

Your Ref:

The Permanent Secretary,
Ministry of Education, Science & Technology,
P.O.Box 30040,
NAIROBI.

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION

I write to introduce Ms. Jane Naliaka Situma who is a Postgraduate Student of this University. She is registered for a M.Sc. degree programme in the Department of Foods, Nutrition & Dietetics.

Ms. Jane Naliaka Situma intends to conduct research for a project entitled, "Dietary Intake, Health and Nutrition Status of HIV-Infected Women from Low Income Households Participating in AMPATH Programme in Uasin Gishu District, Kenya".

Any assistance given to her will be highly appreciated.

Yours faithfully,

J.O. IFUKHOKHA

FOR: DEAN, GRADUATE SCHOOL

cc Registrar (Academic)
Dean, Graduate School - to action file
Dean, School of Health Sciences
Chairman, Foods, Nutrition & Dietetics Department

JOI/wm
21st March 2006

Jane Naliaka Situma
Kenyatta University
P.O. Box 43844
NAIROBI

Dear Madam

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ‘Dietary intake: Health and nutrition status of HIV infected women from low income households participating in AMPATH Programme in Uasin Gishu District’

I am pleased to inform you that you have been authorized to carry out research in Uasin Gishu District for a period ending 30th April 2008.

You are advised to report to the District Commissioner, the District Education Officer and the Medical Officer of Health Uasin Gishu District before commencing your research project.

On completion of your research, you are expected to submit two copies of your research report to this office.

Yours faithfully,

[Signature]

B. G. ADEWA
FOR: PERMANENT SECRETARY

Copy to:
The District Commissioner – Uasin Gishu District
The District Education Officer – Uasin Gishu District
Appendix V: Location of Suba district in Kenya
Appendix VI: Administrative boundaries of Suba district