

**DIETARY MANAGEMENT OF HOSPITALIZED HIV/AIDS  
PATIENTS; A CASE STUDY OF KENYATTA NATIONAL  
HOSPITAL, NAIROBI**

**By**

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in Applied Human Nutrition, in the Department of Food Technology & Nutrition,  
College of Agriculture & Veterinary Sciences, University of Nairobi**

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## DECLARATION

I, Edna Kasinja Warentho, hereby declare that this dissertation is my original work and has not been presented for a degree in any other University.

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## **DEDICATION**

To my beloved husband Tobias and my sons and daughters Joyce, Robert, Felix and Jackline. Your love, emotional, physical and spiritual support contributed immensely towards the success of this work at all stages.

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## OPERATIONAL DEFINITIONS

- Adequate Diet:** It is a diet which meets in full all the nutritional needs of a person for maintenance, repair, the living processes and growth development.
- AIDS:** Acquired Immunodeficiency Syndrome, is a disease caused by a retrovirus known as the Human Immunodeficiency Virus, which attacks and impairs the body's natural defense systems against disease and infection. AIDS is the terminal stage of HIV infection, characterized by symptoms that weaken the immune system such as severe weight loss, chronic diarrhoea, fever and persistent cough, etc.
- Cytokines:** Cytokines are small substances/molecules (<30 kd) produced in tissues that cause inflammatory changes in tissue cells; for example tumor necrosis factor and interleukin-1. Cytokines activate the immune system and initiate metabolic events to supply the immune system with nutrients from internal sources.
- HIV:** Human Immunodeficiency Virus is a retrovirus that targets cells of the body with CD4<sup>+</sup> (T helper cells), langerhans cells, macrophages and their depletion is correlated with clinical progression to AIDS. Two types of HIV have been recognized: HIV-1 and HIV-2.
- Nutritional Counselling:** Nutrition counselling is counselling which is conducted in an interactive manner responsive to individual client needs. It focuses on providing accurate, consistent therapeutic information aimed at promoting informed decision making on issues related to nutrition.
- Opportunistic Infections:** These are infections within organisms that do not usually cause disease in a healthy person, but are able to cause severe and potentially - life threatening illness among immunodeficient individuals such as patients

with AIDS, cancers or on treatment with immuno-suppressive drugs such as steroids, or chemotherapy. HIV-infected person's defense system is impaired, and other viruses, bacteria and parasites take advantage of this "opportunity" to further weaken the body and cause various illnesses, such as pneumonia, tuberculosis and oral thrush, hence the word "opportunistic infections".

**T-lymphocytes:** These are cells of the immune system that originate from the thymus gland. Subsets of T cells have a central role in the immune system, and affect both humoral and cell mediated immunity. T4 (CD4<sup>+</sup>) have a receptor site for HIV.

**HIV-1:** HIV-1 is the predominant type worldwide, divided into groups M, O, and N. Group M is further divided into subtype A-K, which have distinct geographical distribution, apparently different tropism for the different target cells, and therefore differ at efficacy of transmission. Subtype A, C, D and E are predominant in Africa and Asia, and subtype B is predominant in the Caribbean, the United States, South America, and Western Europe.

**HIV-2:** HIV-2 is mostly found in West Africa and compared to HIV-1, is less transmissible, especially through vertical means and is associated with a lower viral load and a slower rate of clinical disease progression. In addition to the viral properties, the concentration of HIV in blood is correlated with enhanced transmission by all routes.

## ABBREVIATIONS

<b>ACC/SCN</b>	Administrative Committee on Coordination/Sub-Committee on Nutrition
<b>AIDS</b>	Acquired Immuno Deficiency Syndrome
<b>ANP</b>	Applied Human Nutrition Programme
<b>ARC</b>	AIDS -related complex
<b>AZT</b>	Azidothymidine or Zidovudine
<b>BMI</b>	Body Mass Index
<b>CBS</b>	Central Bureau of Statistics
<b>FAO</b>	Food and Agriculture Organization
<b>GIT</b>	Gastrointestinal Tract
<b>HIV</b>	Human immunodeficiency virus
<b>KNH</b>	Kenyatta National Hospital
<b>LDC</b>	Least Developed Countries
<b>NACC</b>	National AIDS Control Council
<b>NASCOP</b>	National AIDS and STDs Control Programme
<b>PCM</b>	Protein Calorie Malnutrition
<b>PLWHA</b>	People living with HIV/AIDS
<b>RDA</b>	Recommended Daily Allowance
<b>SPSS</b>	Statistical Package for Social Sciences
<b>UNAIDS</b>	United Nations Programme on HIV/AIDS
<b>USAID</b>	US Agency for International Development
<b>WHO</b>	World Health Organization

## ABSTRACT

A prospective study (qualitative in nature) was carried out on 56, purposively selected HIV seropositive adult males and females hospitalized at the Kenyatta National Hospital, situated in Nairobi. The objective of this study was to evaluate dietary management and adequacy for hospitalized HIV/AIDS patients.

Data collection was undertaken using a structured, pre-tested (and modified) questionnaire for patients and relatives; key informant interviews; direct participant observation; record of dietary intake of patients; patients anthropometry; weighing of food; and case notes from patients files and records. Nutritional status was determined using body mass index. Nutrient adequacy of hospital diets and home diets consumed by study cases was computed using Food Composition Tables to calculate calories (energy), proteins, carbohydrates and fat consumption. These variables were then compared to the WHO recommendations for HIV/AIDS - infected adults.

The study results show that the study cases (n=56) were relatively young adults with a mean age of 32 years (s.d 7.72). Two-thirds (62.5%) of the cases were married. Almost all (94.6%) of the cases were literate and majority (50.0%) of them having attained primary education, and 30.4% who had secondary education. A quarter (25.0%) of the cases were unemployed and ill, hence with reduced productivity. About 23.3% were self employed in small scale businesses and only 16.0% were in salaried employment.

Most (57.0%) of the cases had a diagnosis of pulmonary tuberculosis and were treated using anti tuberculosis drugs mainly Ethambutol and Rifater. Among the 22 (39.3%) malnourished cases, majority 14 (63.6%) had Pulmonary Tuberculosis (PTB).

Body mass index showed that majority (58.9%) of the cases were within normal limits, hence had good nutritional status.



About 39.3% of the cases were malnourished using BMI (cut-off point <18.5) while 1.8% had BMI levels above normal limits (>25) hence obese. Among the malnourished cases 40.0% were males and 38.7% were females.

The median BMI for both sexes were comparable, 18.8kg/m<sup>2</sup> (13.4 - 24.4) for males and 18.8 kg/m<sup>2</sup> (11.6-29.2) for females, thus there was no significant difference in the BMI levels between the sexes  $p < 0.05$  ( $p = 0.82$ : Mann-Whitney test). BMI levels did not show any significant association with appetite  $p < 0.05$  ( $p = 0.38$ : Chi-square test). Majority (65.0%,  $n = 13$ ) of the cases with poor appetites had normal BMI levels, while only (35.0%,  $n = 7$ ) of the cases in the same category had BMI levels below the cut-off point (<18.5).

The hospital standard menu as a sole diet in the dietary management of HIV/AIDS cases shows that it was not adequate in energy and proteins as recommended by WHO. The percent RDA contributed by the hospital diet was 69.7% for energy and 63.1% for protein. However special diets significantly contributed to the energy  $p < 0.05$  ( $p = 0.045$ : Mann-Whitney test) and protein  $p < 0.05$  ( $p = 0.013$ : Mann-Whitney test) intake of 30.0% ( $n = 17$ ) of the patients being offered special diets by the nutritionist i.e. special milk, special uji, fresubin, milk and eggs (high protein, high calorie diet) in addition to the hospital diet. Also highly significant  $p < 0.05$  ( $p < 0.001$ : Chi-square test) was the fact that out of the 33 (58.9%) of the cases who were not given dietary counseling services almost all of them ( $n = 31$ ) were not offered special diets. Home diets complemented the hospital diet by contributing 23.4% RDA for energy and 20.6% for proteins thus raising up nutrient intake to 93.1% RDA for energy and 83.7% RDA for proteins. More (78.6%) of the patients were able to consume >75% RDA as energy and protein (64.3%) when home diets were considered. This study shows that home diet was statistically highly significant  $p < 0.05$  ( $p < 0.001$ : Chi-square test) in complementing the nutrient adequacy of the hospital diet. Appetite was found to be significant  $p < 0.05$  ( $p = 0.004$ : Chi-square test) in the increased intake of energy and protein when the hospital diet was complemented by home diets. The opposite was also true. Inadequate energy and protein intake was highly significant  $p < 0.05$  ( $p < 0.001$ : Chi-square test) among the cases who consumed below

75% of RDA for energy and protein after consuming both the hospital and home diets combined. There was no significant difference between males and females in the intake of energy  $p < 0.05$  ( $p = 0.242$ : Mann-Whitney test) and protein  $p < 0.05$  ( $p = 0.09$ : Mann-Whitney test). Only about 41.0% of the patients received dietary counseling. Over three-quarters (80.0%) of the cases out of the 20 cases who reported to be having poor appetites had not received dietary counseling. Poor appetite was highly associated  $p < 0.05$  ( $p = 0.017$ : Chi-square test) with inadequate dietary counseling.

This study established that hospital diets at Kenyatta National Hospital are not adequate according to the WHO recommendations for HIV/AIDS<sup>+</sup> infected adults and need to be improved to fill in the nutrient gaps for energy and proteins contributed by the home diets. This study recommends that hospital diets should meet at least 70% RDA for energy and 77% RDA for protein so as to provide adequate energy and protein when complemented by home diets. Adequate nutrition will enhance quick recovery, reduce average length of hospital stay and therefore reduce hospital costs. Also more aggressive dietary counseling should be undertaken for optimal nutritional care.

# CHAPTER ONE

## INTRODUCTION

### 1.1 BACKGROUND INFORMATION

The Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS), has become an extremely serious Public Health problem in many countries around the world.

The global picture on HIV statistics is overwhelming. By the beginning of the year 2000, the Joint National Programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO) estimated that over 34 million people were infected HIV/AIDS, while 13 million people around the world had died from the disease. Presently, it is estimated that worldwide about 22 million people have died of AIDS; 36 million are currently infected with HIV, the virus that causes AIDS; and out of these, approximately 70% live in Sub-Saharan Africa (Kenya, Ministry of Health, 2001). Today although one in every 100 adults in the sexually active age bracket (15-45 years) is living with HIV, only a small fraction know about their infection.

HIV/AIDS infections are concentrated in the Least Developed Countries (LDC) with 89 per cent of the infected people living in Sub-Saharan Africa and Asia. Over two thirds of all people living with HIV/AIDS in the world (22 million) live in Africa. It is estimated that 87% of children living with HIV/AIDS in the world also live in Africa (UNAIDS, 2000).

AIDS is now a major cause of morbidity and mortality in most African countries South of the Sahara. The AIDS epidemic in Africa has reduced life expectancy, and diverted scarce resources from other pressing development, including efforts to promote food security, improve health services, and increase education and economic productivity. At the family level, illness and death from AIDS have profoundly affected family well being, including caregivers' ability to ensure adequate food and nutrition for the family. AIDS orphans in Africa have become a growing and highly vulnerable group. An estimated 12 million African children have already lost their mothers or both parents to AIDS before age 15 and the number of AIDS orphans is expected to grow dramatically in the next 10 years (UNAIDS, 2000).

Medical services, already inadequate for existing needs, in most African countries, have become severely over-stretched. Hospitals in particular are increasingly unable to deal with the huge case load of patients with HIV/AIDS in need of medical and nursing care (Williams, 1990).

In Kenya the first AIDS case was recognized in the mid 1980s. Presently, it is estimated that 2.2 million Kenyans are infected with HIV/AIDS (Kenya, Ministry of Health, 2001).

Since 1990, the HIV prevalence rates in Kenya has been rising rapidly from 3.3 percent in 1990 to 4.4 percent in 1991 and 5.6 percent in 1992 (Kenya, Ministry of Health, 2000). By 1995, 63,179 cases had been reported. By June 2000, it was estimated that 1.5 million people in Kenya had died of AIDS since the epidemic started early in 1980s. The Kenya National AIDS Control Council (NACC) estimates that the national adult HIV prevalence rose from 5.3 percent in 1990 to 13.1 percent in 1999. Prevalence is generally higher in urban areas, with an average of 16-17 percent than in rural areas, with an average of 11-12 (NACC, 2000). Currently out of every eight adults in rural areas, one is infected. In urban areas, nearly one out of every five adults is infected. Most people do not know they are infected (Kenya, Ministry of Health, 2001).

In Kenya, the AIDS epidemic affects the productive age groups hardest, with 75 percent of those dying of AIDS being men and women between the ages of 20 and 45 years. Specifically, the highest infection levels for women are in the 20 to 24 age group; while for men the highest levels are in the 30-39 age group (Kenya, Ministry of Health, 2001).

The main modes of transmission of HIV are sexual contact (90%), mother-to-child transmission (10%) and contact with blood (less than 10%) (Kenya, Ministry of Health, 2001).

HIV infection compromises the nutritional status of infected individuals and, in turn, poor nutritional status can affect the progression of HIV infection. The infection itself and associated complications frequently have a tremendous effect on the nutritional status of an individual (Piwoz and Preble, 2000; Williams, 1990).

Infections affect nutritional status by reducing dietary intake and nutrient absorption and by increasing the utilization and excretion of protein and micronutrients as the body mounts its “acute phase response” to invading pathogens. Infections also result in the release of pro-oxidant cytokines and other reactive oxygen species. This leads to the increased utilization of “antioxidant” vitamins (e.g. vitamin E, vitamin C, beta-carotene) as well as the sequestration of several minerals (e.g. iron, zinc, selenium, manganese, copper) that are used to form antioxidant enzymes (Cimoch, 1997). “Oxidative stress” occurs when there is an imbalance between the pro-oxidants and antioxidants, causing further damage to the cells, proteins, and enzymes (Piwoz and Preble, 2000).

Malnutrition associated with HIV infection has serious and direct implications for the quality of life of HIV/AIDS patients. Weight loss is often the event that begins “a vicious cycle of increased fatigue and decreased physical activity, including the inability to prepare and consume food” (Piwoz and Preble, 2000).

HIV/AIDS related illness and mortality affects household food security through these mechanisms: the loss of adult on-farm or off-farm labor reduces household income; as a result, household savings, assets, and remittances are reduced; there is usually an increase in household expenditures for medical treatment, transportation, and other case-related needs; and at the same time the number of dependents relying on fewer productive household members for survival is increased (Piwoz and Preble, 2000; Williams, 1990; Kenya, Ministry of Health, 2001).

Nutrition interventions to preserve or reverse weight loss and wasting associated with HIV infection may help to preserve independence, to improve life and to prolong survival. Micronutrient interventions may help to strengthen the immune system and reduce the severity

and impact of opportunistic infections in HIV/AIDS patients. It is believed that in the early stages of HIV infection – especially before the onset of secondary infections – simple, affordable nutrition supplementation and counselling may be feasible and have a positive impact on body composition and weight (Cimoch, 1997; Piwoz and Preble, 2000; Ross, 1999). Nutrients cannot cure or reverse the progression of AIDS, but adequate diet may help to improve responses to drug therapy, reduce duration of hospital stay, and promote greater independence with an improved quality of life overall (Sizer and Whitney, 2000).

## **1.2 STATEMENT OF THE PROBLEM**

Poor nutrition increases the risk and progression of HIV/AIDS disease. In turn, disease exacerbates malnutrition. Food and nutrition play an important role in prevention, care and mitigation activities on HIV/AIDS affected people. One area of serious concern for the health sector is bed occupancy in hospitals. AIDS patients occupy 50% of beds in some district and provincial hospitals in Kenya (ACC/SCN, 2001).

In Kenya's strategic plan to combat the spread of HIV infection it is stated that nutritional care is part of this strategic approach. However, the impact of good nutrition in the care of HIV/AIDS people, especially in most hospitals has not been felt since emphasis is towards promotion of healthy behaviours. This argument is supported by Dr. Peter Piot, executive director of UNAIDS, who said that nutrition must be brought into the essential care package. "Care" has somehow been narrowed to the cost of anti-retrovirals and this is counter productive. (ACC/SCN, 2001).

HIV/AIDS hospitalized patients in most facilities are generally malnourished on admission. Others develop malnutrition during hospital stay. This may be partly attributed to the large numbers of cases admitted in most hospitals, which overburdens the hospital services resulting to insufficient patient care. Most important is lack of adequate nutritional care in terms of dietary intake of essential nutrients. Studies have shown that 30%-50% of patients have Protein Calorie Malnutrition (PCM) when admitted to hospital, and 25%-30% will develop malnutrition during their hospital stay. Further more, as many as 69% of patients will undergo declining nutriture during their hospital stay (Konstantinides, 1998).

A study conducted by Mbotela (1999), revealed that nutrition counseling of HIV/AIDS patients is barely offered in major government and private hospitals in Kenya, unless a patient is referred to a practicing dietician. This might be the reason as to why most HIV patients are not adequately educated on good nutrition practices. Nutritional care and support is therefore critically important in preventing nutritional depletion for people living with HIV/AIDS particularly aiming at improving the quantity and quality of the diet of hospitalized HIV/AIDS patients. Hence, an important component in the package of care services for people living with HIV/AIDS.

### **1.3 JUSTIFICATION OF PLANNED INVESTIGATION**

Nutritional care and support is critically important in preventing nutritional depletion for people living with HIV/AIDS. Nutrition education and counselling are important components in the package of care service for people with HIV/AIDS and should be given along with diet therapy.

The turn over of patients in the Kenyatta National Hospital's medical wards has been increasing dramatically. Half (50%) of the patients occupying beds in medical wards are HIV/AIDS patients. Due to heavy workload currently being experienced by the nutritionists in the hospital, nutritional services particularly for HIV/AIDS in-patients have not been adequately provided.

Nutritional counselling has been compromised partly due to high turnover of patients, and lack of implementing appropriate nutritional strategies in the management of HIV/AIDS patients. A lot of effort has been made by the hospital through Nutrition and Catering Department to meet the increased nutrient needs of patients at high risk of developing malnutrition while hospitalized. However, one area that requires improvement is Nutritional Support for HIV/AIDS patients.

This study therefore tried to look into the diets of this group of patients for adequacy of the essential nutrients. It also tried to find out if counselling services provided were appropriate in order to come up with practical suggestions and solutions based on the findings.

#### **1.4 PURPOSE**

The purpose of this study is to provide information that would be used in health institutions aimed at improving dietary intakes of HIV/AIDS in-patients by following suggestions on how to maximize food intake.

#### **1.5 MAIN OBJECTIVE**

Evaluation of dietary management and adequacy for hospitalized HIV/AIDS patients at Kenyatta National Hospital, Nairobi.

#### **1.6 SPECIFIC OBJECTIVES**

1. To determine the nutrient adequacy of the hospital diets and dietary supplements given to hospitalized HIV/AIDS patients at Kenyatta National Hospital.
2. To evaluate appropriateness of dietary counselling that is given to hospitalized HIV/AIDS patients at Kenyatta National Hospital.
3. To evaluate appropriateness of dietary supplements given to hospitalized HIV/AIDS patients at Kenyatta National Hospital, from outside the hospital (Home diet).
4. To compare the caloric and protein content of the hospital diet and dietary supplements given to hospitalized HIV/AIDS patients at Kenyatta National Hospital to the WHO Recommendations.

#### **1.7 RESEARCH QUESTIONS**

1. Does the Hospital diet meet the nutrient needs of hospitalized adult HIV/AIDS patients as recommended by the WHO?
2. Is dietary counselling given to hospitalized adult HIV/AIDS patients appropriate?



## **1.8 EXPECTED BENEFITS OF THE STUDY**

It is expected that by highlighting information on gaps in the dietary management of hospitalized HIV/AIDS patients, this study will aid in improving the quality of nutrition care and Diet therapy given to hospitalized HIV/AIDS patients.

This study will therefore facilitate development of simple, affordable and acceptable nutrition guidelines for hospitalized HIV/AIDS patients at Kenyatta national hospital, which will be used as role model for other health institutions in the country and Sub-Saharan Africa. Currently many advanced diet therapies available in industrialized countries remain unaffordable for most people from less developed countries affected by HIV/AIDS.

The findings of this study are expected to be of use primarily to the Ministry of Health, health institutions, relevant health planners, training institutions, e.g. non-governmental organizations, whose programmes focus on improving the quality of life, and prolonging survival for people living with HIV/AIDS.

Finally, this study can be used as a basis for further research into the dietary management of hospitalized HIV/AIDS patients in a wider scope.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 EFFECTS OF MALNUTRITION IN THE HIV INFECTED POPULATION

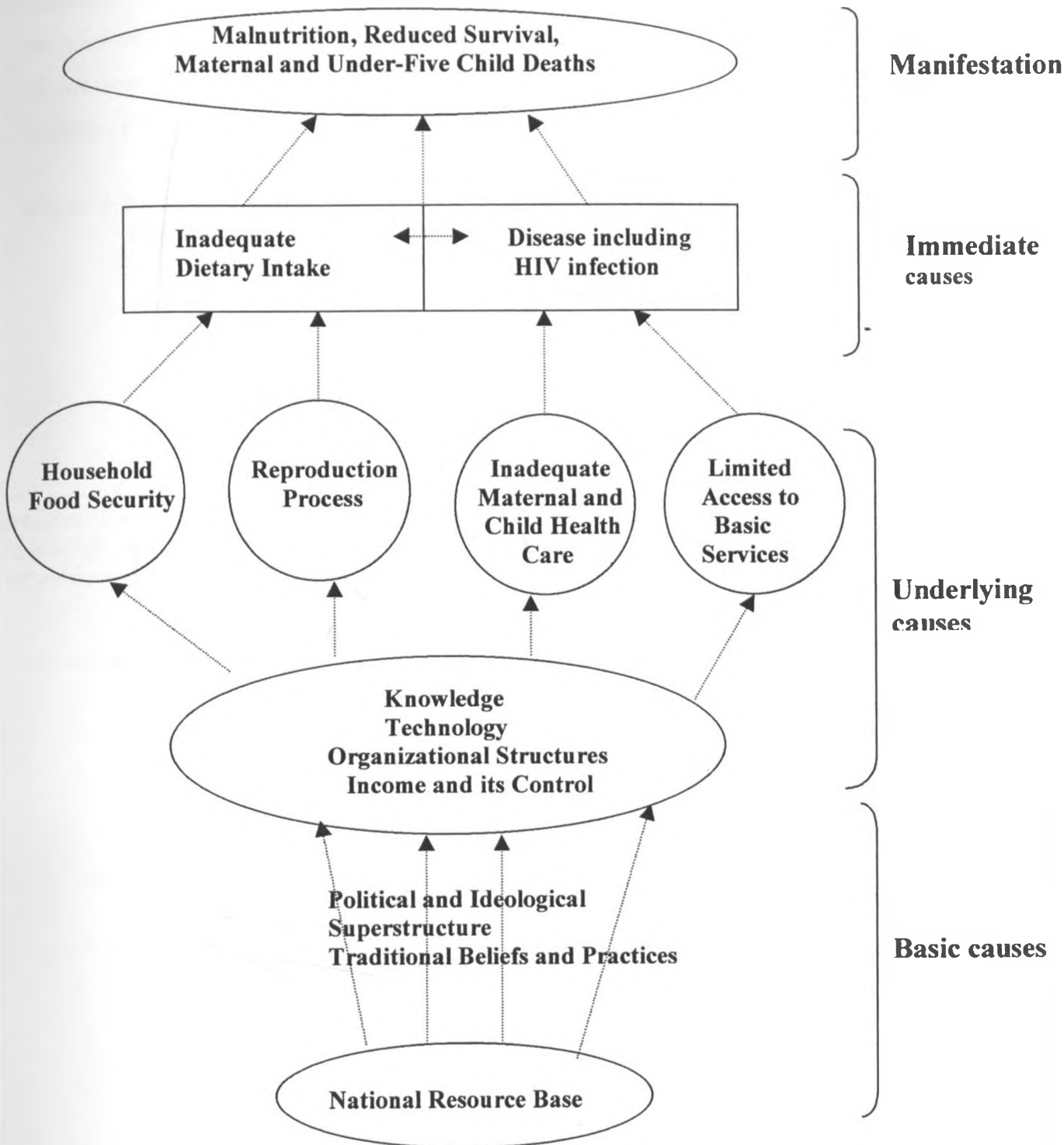
##### 2.1.1 Conceptual Framework on the causes of malnutrition

Malnutrition results in increased risk of illness and death. Malnutrition is a direct result of both inadequate intake of food and infectious diseases (figure 2.1). Inadequate food intake is a consequence of insufficient food at the household level and improper feeding practices (USAID, 1996).

Infectious diseases, particularly diarrhea, AIDS, acute respiratory illness, malaria and measles, result from inadequate healthcare, an insufficient water supply and poor environmental sanitation. Diarrheal disease compromises nutritional status through reduced dietary intake, poor absorption and increased nutrient loss. Recurrent infections result in weakened immunity and increased susceptibility to malnutrition. When both malnutrition and infection are present, the result is an interaction that is biologically more detrimental than the combined effect of the two working independently (USAID, 1996).

Both inadequate intake of food and disease reflect underlying social and economic conditions at the household, socio-economic, environmental and cultural factors, operating at the national and community levels, and poverty at the household level, ultimately affect the nutritional status by determining the availability of educational opportunities, employment, health services, and quality of sanitation. Employment, by providing a service of income, is an important determinant of household food security. Environmental factors such as the season of the year will affect nutritional status. Studies on association between land ownership and the nutritional status of family members in Kenya have shown that malnutrition was more prevalent among rural, landless, Kenyan families and small shareholders compared with families who owned more than 1.5 hectares (USAID, 1996).

Figure 2.1: Conceptual Framework Model for the Causes of Malnutrition and Death

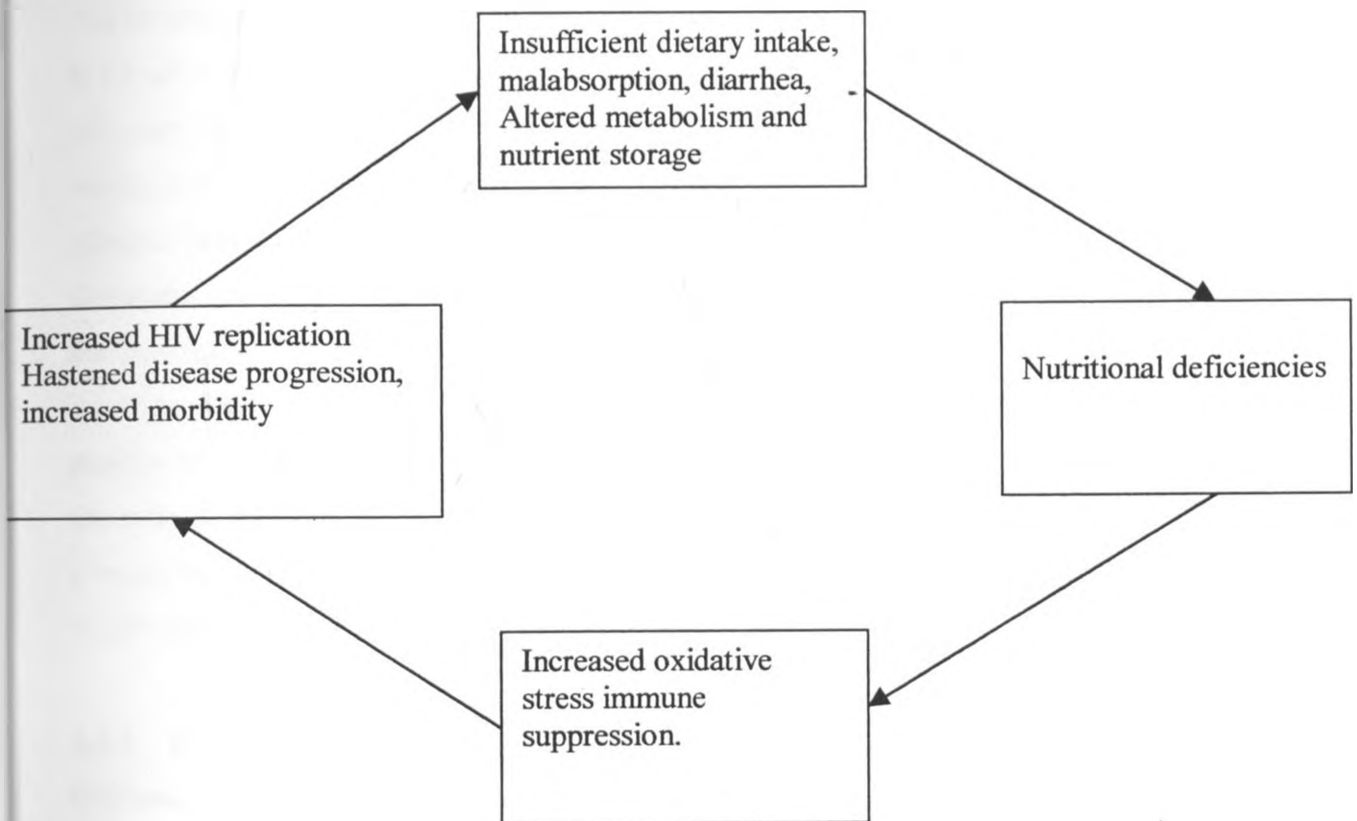


Source: Modified UNICEF conceptual model (USAID, 1996)

## 2.2 SYNERGISTIC EFFECTS OF MALNUTRITION AND HIV

Malnutrition and HIV affect the body in similar ways. Both conditions affect the capacity of the immune system to fight infection and keep the body healthy. Before AIDS, the impairment of immune function caused by malnutrition was called Nutritionally Acquired Immune Deficiency Syndrome or NAIDS (Piwoz and Preble, 2000). Refer to figure 2.2.

**Figure 2.2: The Vicious Cycle of Micronutrient Deficiencies and Human Immuno deficiency Virus (HIV) Pathogenesis**



**Source: Modified UNICEF Conceptual Model (USAID, 1996)**

### 2.2.1 Effects of Infection on Nutritional Requirements

- **Increased metabolic rate**

Fever is usually present with infection. There is an elevation of approximately 13 percent in the metabolic rate of each rise of 1°C in body temperature, or 7.2 percent for each degree Fahrenheit (Krause and Mahan, 1979).

- **Catabolism**

The catabolic response to infection begins after the onset of fever. This catabolism is reflected in negative nitrogen, potassium, magnesium, phosphate, sulfate and zinc balances that persist into convalescence. If the infection is severe and prolonged there will be muscle wasting and weight loss as muscle protein is catabolized for energy. Eventually, however, a stable negative nitrogen balance is reached (Krause and Mahan, 1979). There is also hyperglycemia due to decreased secretion of insulin and tissue resistance to insulin. In addition to the wastage of nutrients caused by this catabolic response, there are additional gastrointestinal losses from vomiting and diarrhea. Nutrient intake is diminished because of anorexia and the common practice of withholding food from an ill person and possibly because of malabsorption, as in the case of gastrointestinal infection. Demands on the host's defense system to synthesize phagocytes, leukocytes, immunoglobulins and non-specific proteins further increase protein requirements (Krause and Mahan, 1979).

### 2.2.2 The Immune system

Immunity comprises cell-mediated and humoral:

- **Cell-mediated Immunity (T-Cell)**

In this form of immunity, lymphoid cells may be induced, by prior exposure to antigen, to react subsequently directly with the inducing antigen and bring about cytotoxic effects, as for example on foreign cells from a graft (Weir, 1983; Cimoch, 1997).

T-lymphocytes originate from the thymus gland. CD4<sup>+</sup> T-lymphocytes respond to antigenic stimulation and IL-1 to increase the expression IL-2 receptors and to produce IL-2 and other cell growth and differentiation cytokines. This T-cell response dramatically amplifies the

immune response. CD8<sup>+</sup> T-lymphocytes (cytotoxic cells) lyse cells which express foreign antigens (Weir, 1983; Cimoch, 1997).

- **Humoral Immunity (B-Cell)**

The characteristic of this form of immunity is the appearance in the blood of globulins known as antibodies or immunoglobulins. These combine specifically with the antigen, which stimulates their production and can lead to some remarkable consequences. B-lymphocytes make up 12 to 15 percent of peripheral blood lymphocytes. They are derived from the bone marrow and on antigen stimulation and transform to plasma cells which produce antibodies (IgM, IgA, IgD, IgE, IgG). All of these antibodies are involved in immune function. The primary role of IgA, in particular is to bind to enteric pathogens to prevent them from attaching to and invading the intestinal epithelial cells. Levels of IgA antibodies are reduced in malnutrition; thus malnutrition is associated with a higher incidence of infectious complications (Weir, 1983; Cimoch, 1997).

According to Friis and Michaelson (1998), infections affect nutritional status by reducing dietary intake and nutrient absorption, and by increasing the utilization and excretion of protein and micronutrients as the body mounts its "acute phase response" to invading pathogens. Anorexia, fever, and catabolism of muscle tissue frequently accompany the acute phase response. Infections also result in the release of pro-oxidant cytokines and other reactive oxygen species. This leads to the increased utilization of "antioxidant" vitamins (e.g. vitamin E, vitamin C, beta-carotene) as well as the sequestration of several minerals (e.g. iron, zinc, selenium, manganese, copper) that are used to form antioxidant enzymes ( Piwoz and Preble, 2000).

Piwoz and Preble (2000), found out that "oxidative stress" occurs when there is an imbalance between the pro-oxidants and antioxidants, causing further damage to cells, proteins, and enzymes. Krause and Mahan (1979) report that studies have demonstrated that the severity and outcome of infection are frequently worsened by malnutrition. When patients are given diets inadequate in protein, it is very likely that they will develop lowered resistance to infection. This will interfere with the production of antibodies and lymphocytes, which play an important

role in both natural and acquired immunity. Serum antibodies or immunoglobulins in malnourished people may be normal, but production of specific antibodies may be impaired. T-lymphocyte or cell-mediated immunity may also be impaired. In clinical studies, deficiencies of protein and vitamins have been found to reduce the phagocytic activity of white blood cells and to lower resistance. It appears that intracellular killing of the infective organism by the phagocyte is impaired by these deficiencies (Krause and Mahan, 1979).

A number of vitamin deficiencies can alter the immunocompetence of the host. Deficiencies of vitamins A and C and of niacin impair tissue integrity, wound healings fibroblastic response to trauma, walling of abscesses, collagen formation and thus, the body's resistance to the invasion of infective organisms. Lysozymes, which help to destroy pathogenic microorganisms, are present in tears, sweat and saliva, and their levels in the body are reduced in malnutrition, particularly when vitamin A is deficient (Cimoch, 1997). Infection reduces blood levels of vitamin A. Considerable research has been carried out on the relationship between vitamin A and the common cold, pulmonary tuberculosis and other infectious diseases. Apparently, vitamin A deficiency may play a role in reducing natural resistance, but the administration of the vitamin during the course of an infection has little, if any, beneficial effect unless a deficiency is present (Krause and Mahan, 1979).

Vitamin C has a role in the white blood cell response to infection. Studies have shown that vitamin C enhances phagocytosis activity by macrophages, and in vitamin C deficiency, productive macrophage mobilization and aggregation are impaired. Vitamin B<sub>6</sub> and panthothenic acid deficiencies cause depressed antibody formation in humans (Krause and Mahan, 1979).

According to the above information it is evident that research supports the current evidence that people who have inadequate diets also have decreased resistance to infection.

### **2.2.3 Nutrition and the Immune System**

Nutritional health affects both cell-mediated (T-cell) and humoral (B-cell) immune function. Specific nutrients are known to influence antibody production, phagocytic cell function, complement levels, and T-lymphocyte function. More over, CD4<sup>+</sup> lymphocytes (helper cells) may be affected by nutrition status to a greater extent than are other types of T cells (Cimoch,1997). Nutrients affect immune system function directly via processes like protein synthesis or indirectly via their roles in various enzyme systems. When macronutrient intake (total energy, carbohydrate, protein, and fat) is insufficient to meet metabolic needs, protein - calorie malnutrition (PCM) and deficiencies of micronutrients (vitamins, minerals, and trace elements) develop. These deficiencies impair the synthesis of molecules necessary for the immune response and impair the function of immune-related enzyme systems (Piwoz and Preble, 2000).

In HIV disease, the presence of malnutrition strongly predicts patient survival independent of CD4<sup>+</sup> T-lymphocyte counts. Clinical deficiencies of some nutrients occur rapidly in response to deficiencies, malabsorption, or altered metabolism, while those having a storage form in the body may take longer (Cimoch,1997). The presenting symptoms of malnutrition typically include weight loss, a change in body habitus, or a change in functional status. Maintaining nutritional health is critical to prevent further insult to an immune system already under attack. Individuals with HIV disease have an increased likelihood of developing deficiencies of specific nutrients including total kilocalories, protein, vitamins A, B<sub>6</sub>, B<sub>12</sub>, C and E, and folic acid, and the minerals magnesium, selenium, and zinc. Patients often have multiple nutrient deficiencies at once, and many of the nutrients likely to be deficient are directly or indirectly involved in maintaining normal immune system function (USAID, 2001; Piwoz and Preble, 2000; Cimoch, 1997).

## **2.3 HIV/AIDS AND NUTRITION**

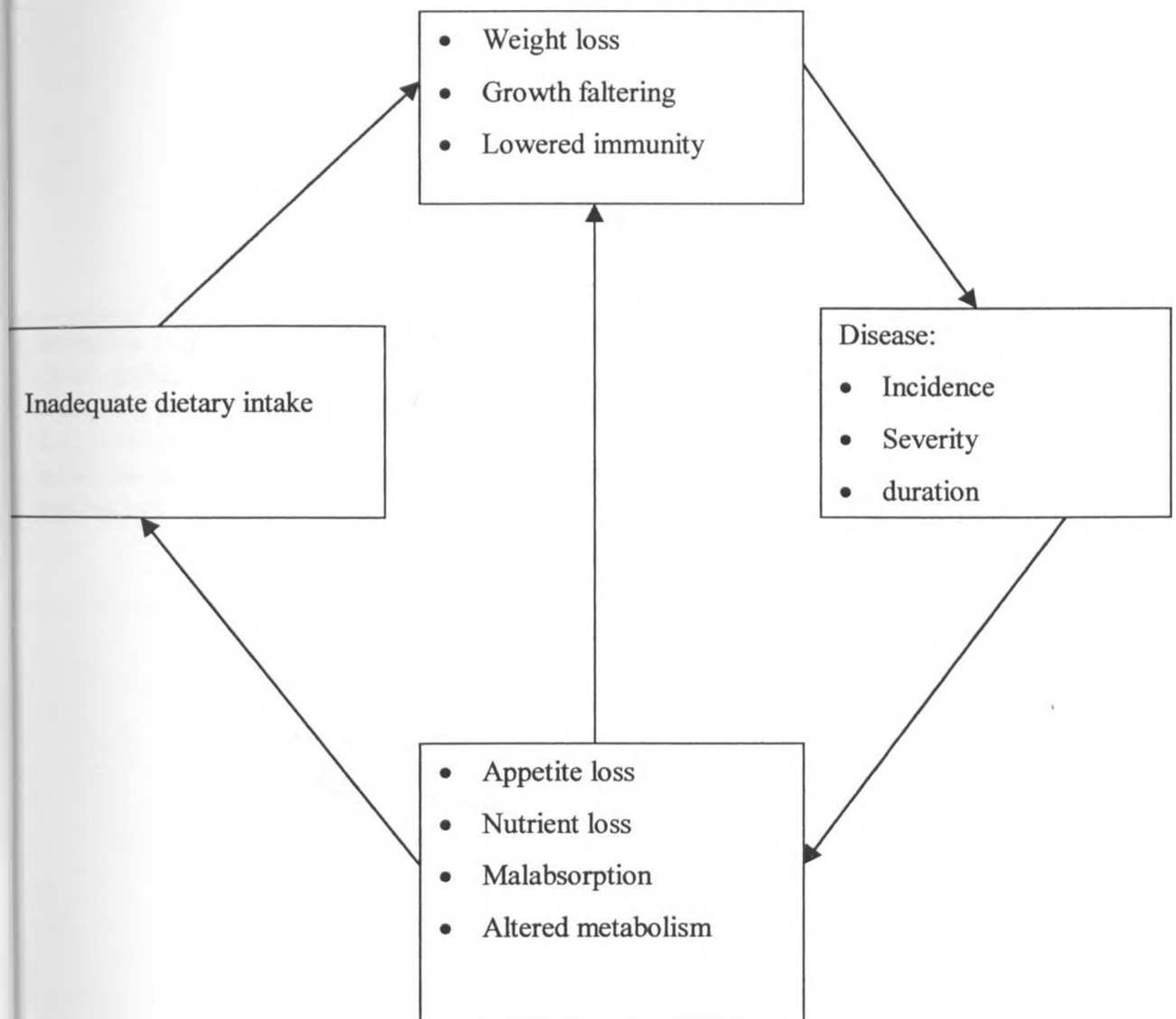
### **2.3.1 The Relationship Between HIV/AIDS and Malnutrition**

Malnutrition increases vulnerability to and severity of infections, and infections aggravate malnutrition. Inadequate dietary intake leads to malnutrition and lowered immune system function. Malnutrition reduces the body's ability to fight infections and therefore contributes



to increased incidence, severity, and length of infections. Symptoms that accompany infections, such as loss of appetite, diarrhoea, and fever, lead to reduced food intake, malabsorption, nutrient losses, and altered metabolism, which lead to weight loss, growth faltering, and further weakening of the immune system (RCQHC, 2003). In resource – limited settings, HIV infection is often contracted by people who may already be malnourished. Their lowered immune systems increase their vulnerability.

**Figure 2.3: Vicious cycle of malnutrition and infection**

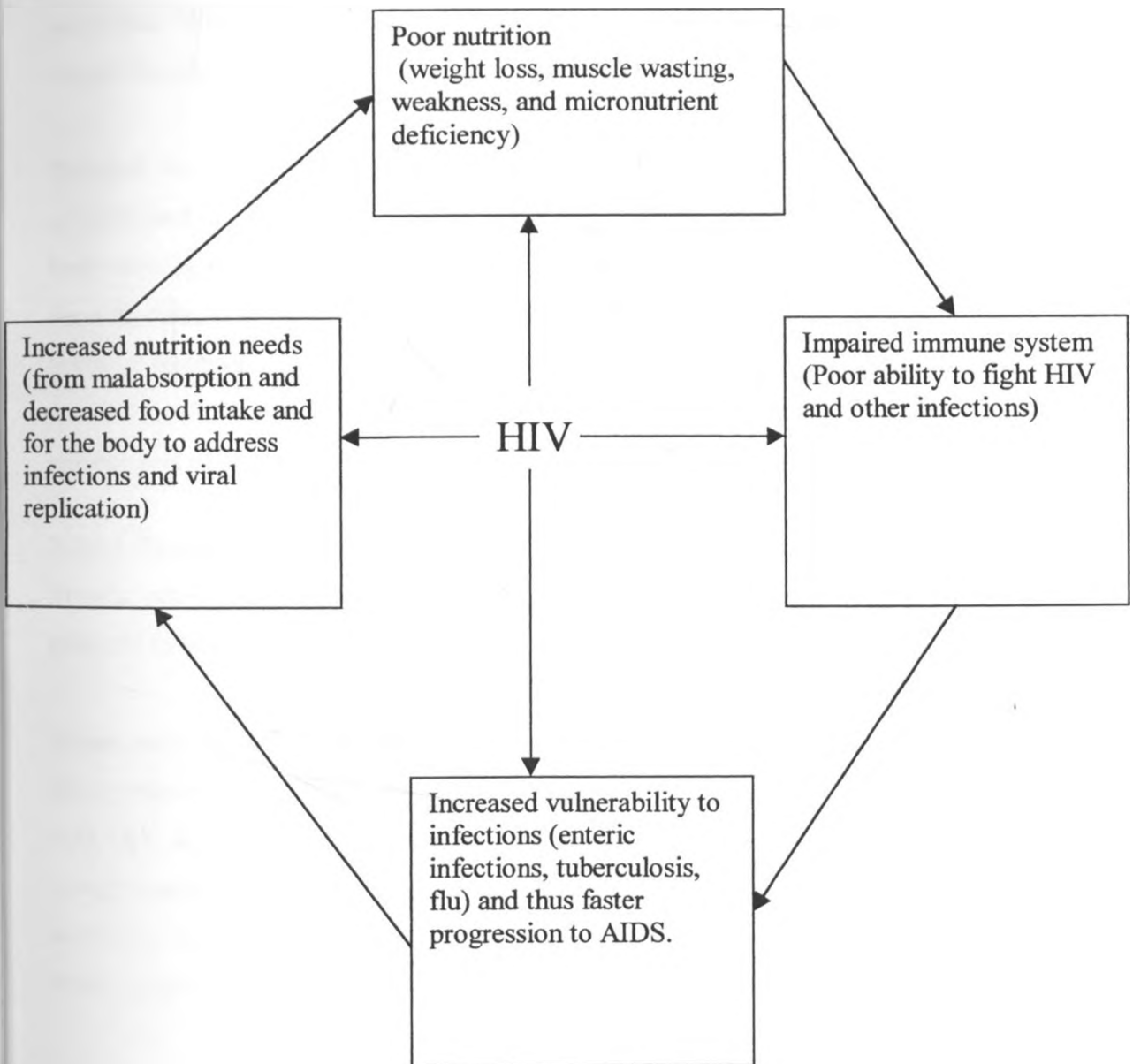


*Source: Adapted from RCQHC, 2003*

### 2.3.2 Impact of HIV/AIDS on Nutritional Status

HIV infection has long been recognized to have a possible negative impact on nutritional status. The relationship between HIV/AIDS and malnutrition is an example of the vicious cycle of immune dysfunction, infectious diseases, and malnutrition. Malnutrition can weaken the immune system and increase vulnerability to infections, and may speed the progression of the disease (RCQHC, 2003). Refer to figure 2.4

*Figure 2.4 Cycle of malnutrition and infection in the context of HIV/AIDS*



*Source: Adapted from RCQHC, 2003*

The nutritional needs of HIV infected people and the effects of HIV infection on their nutritional status may vary according to stage in the disease (Piwoz and Preble, 2000).

Malnutrition is a common complication of HIV infection and is felt to play significant and independent role in its morbidity and mortality. Studies of body composition demonstrated depletion of body cell mass (protoplasmic mass) out of proportion to loss of weight and loss of body fat. A fundamental effect of HIV infection is major weight loss, which eventually leads to extreme cachexia similar to that of cancer patients (Konstatinides, 1998). AIDS wasting which is otherwise also known as the wasting syndrome can be defined as unintentional loss of more than 10% of the patients baseline weight with either diarrhea or fever for more than 30 days (Cimoch, 1997).

Research has shown that as little as 5% loss of usual weight can significantly increase the risk of death and opportunistic infections in persons with HIV disease. This serious characteristic body wasting resulting from HIV infection then also becomes a cofactor in the development of the full disease syndrome in infected persons as the malnutrition itself suppresses cellular immune function. Body wasting is characterized by loss of body cell mass, primarily muscle protein; death occurs when body weight reaches 2/3 of normal weight and body cell mass reaches half of normal values (Dietetic team Chelsea/West minister hospital, 1999).

#### **2.3.2.1 Protein Calorie Malnutrition**

Protein calorie malnutrition results when absorbed calories and protein do not meet the patient's metabolic needs. Protein calorie malnutrition can be due to:

##### ***Hyper metabolism***

Most patients with HIV infection have increased metabolic needs even when stable. Patients with HIV infection who have secondary illnesses may have up to 35% increases in resting energy expenditure (REE). Changes in metabolism may be due to severe reduced food intake as well as from the immune system response to HIV infection. During illness however, food intake is often diminished. REE may continue to increase, exacerbating wasting.

Although patients with active infections have elevations in their metabolic rates, they may be unable to utilize excess calories. Progressive loss of lean body mass is inevitable (FANTA, 2001). Energy metabolism is altered, as futile cycling of fatty acids is associated with increased serum tryglycerides, catabolism of skeletal muscle as an endogenous source of energy and elevated levels of cytokine alpha-interferon. This metabolic picture is unlike simple starvation in which the body fat is oxidized for energy. Without treatment of the underlying infections nutrition is of little benefit (Piwoz and Preble, 2000).

### *Altered metabolism*

When the body responds to invading pathogens it releases pro-oxidant cytokines and other reactive oxygen species. This leads to the increased utilization of antioxidants (vitamins A, E, C, beta-carotene) as well as several minerals that form antioxidants enzymes (e.g. zinc and selenium). Oxidative stress occurs when there is an imbalance between the pro-oxidants and anti-oxidants causing further damage to the cells, proteins and enzymes. Oxidative stress is believed to increase HIV replication and transcription leading to higher viral loads and disease progression (Cimoch, 1997; Piwoz and Preble, 2000; FANTA, 2001).

### *Mal-absorption of nutrients*

From early reports, as well as clinical experience, diarrhea and mal-absorption such as fat mal-absorption (fat mal-absorption in turn affects the absorption and utilization of the fat soluble vitamins further compromising the nutritional status and the immune status) have been common in AIDS. These malabsorptive symptoms have been related to both drug-diet interactions and progressive effects of HIV infection. An "AIDS enteropathy" in the early stages of the infection that is characterized by blunting of the intestinal villi, abnormal intestinal enzymes that cause clinical mal-absorption, and HIV infection of infiltrating lymphocytes as well as enterocytes. In later stages the intestine is infected more frequently with opportunistic organisms such as **mycobacterium avium intracellulare (MAI)**. These and other opportunistic infections result in more severe diarrhea and mal-absorption (Cimoch, 1997; Piwoz and Preble, 2000; FANTA, 2001).

### ***Anorexia***

Loss of appetite: This is related to both the patient's personal life changing situation and the body's physiological changes from the disease. They often eat less and fail to meet their dietary requirements. Anorexia is common when individuals are depressed from the social stigma of the disease (FANTA, 2001).

### ***Chronic infections and illnesses***

Fever and infections that accompany an HIV infection lead to greater nutrient requirements and poor use of the nutrients in the body. People who are chronically ill may also have a reduced appetite, which leads to reduced food intake and weight loss (FANTA, 2001).

### ***Dysphagia and odynophagia***

Difficult and painful swallowing: which impairs the ability to eat, can result from infections, ulcers, or cancers of the mouth or esophagus, this in turn reduces the ability of the infected person to eat adequately (Cimoch, 1997).

### ***Vomiting and nausea***

Active use of medication may cause nausea, vomiting as well as nutrient mal-absorption. Nausea also leads to reduced food intake (FANTA, 2001).

### ***Oral thrush***

Thrush refers to whitish spots on the inside of the mouth and the tongue. These sores are uncomfortable and result in difficulty in eating foods, loss of appetite and reduced food intake and thus lead to weight loss (FANTA, 2001).

### ***Anemia***

Anemia results from inadequate number of red blood cells in the body. This is often due to lack of iron in the body and to infections such as malaria and hookworms, which destroy red blood cells. Women and children are most prone to anemia. The relationship between anemia and HIV is not clearly understood. It is however known that HIV infected persons who are anemic generally progress faster to AIDS than those who are not (FANTA, 2001).

### ***Social considerations***

Non medical problems can contribute to inadequate food intake.

These include:

#### ***Psychosocial:***

- Social isolation
- Self-denial
- Rejection
- Depression

#### ***Economical:***

- Lack of help for shopping and preparation of food
- Inadequate funds for food
- Lack of or inadequate food preparation and cooking facilities (FANTA, 2001)

### ***2.3.2.2 Effects of HIV/AIDS on micronutrient status***

Most common reported deficiencies are vitamin B<sub>12</sub> (which is important for new cell development and maintenance of nerve cells), vitamin B<sub>6</sub> (facilitates metabolism and absorption of fat and proteins and helps make red blood cells), fat-soluble vitamins due to fat mal-absorption, other vitamins of the B-complex, folic acid, and iron. While the common mineral deficiencies are zinc (enhances immune function and resistance to infection), and selenium (deficiency increases risk of progression and disease severity) (Cimoch, 1997).

*(Refer to Table 1 Appendix 1: Micronutrients in HIV/AIDS).*

## **2.4 NUTRITION MANAGEMENT OF HIV/AIDS**

Nutrition support plays a vital role throughout the HIV disease process in two basic areas. First, it is a vital component of care for the involuntary weight loss and body tissue wasting caused by the disease effects on metabolism. Secondly, and fundamental, it is an intimate and integral component of care through the specific roles of key nutrients in maintaining the body's immunocompetence. Individual nutritional status influences the impact of morbidity and mortality irrespective of the disease process (Zimmerman, 2002).

#### 2.4.1 Goals of nutritional intervention

- Preservation of lean body mass
- Nutritional repletion during infection
- Provision of adequate level of nutrients
- Minimization of symptoms of mal-absorption
- Maintain optimal health in patients with HIV/AIDS
- Enhancement of quality of life (FAO, 2003)

The role of good nutrition in the management of HIV/AIDS has assumed increasing importance over the past decade. Good nutrition and a healthy diet may help prolong the secondary infections attributed to the progression of AIDS (FANTA, 2001). (Refer to Table 2: *Food guide: A guide to daily food choices for HIV infected persons Appendix 2*).

Medical research has shown that nutritious food is one of the most powerful weapons available for fighting the often-calamitous effects of AIDS (Ross, 1999). Further more, it has been clinically confirmed that malnutrition is the fatal manifestation of AIDS for many of the people who succumb to the disease. Malnutrition compromises immunity. Impaired immunity then opens the way for infectious diseases, which raise nutrient needs and reduce food intake, and nutrition status suffers further. Thus disease and malnutrition create a synergistic downward spiral that must be broken for recovery to occur. Deficiencies of vitamins and minerals also diminish the immune response, as may excesses. Likewise, interactions between nutrients may enhance or impair immunity. Adequate nutrition is therefore a key player in maintaining a healthy immune system to defend against infectious diseases (Piwoz and Preble, 2000; Cimoch, 1997).

Severe malnutrition in HIV/AIDS occurs because of: mouth, throat and systematic infections that cause anorexia; malabsorption due to gut infection, mucosal damage and diarrhea; catabolism in infected and stable AIDS patients and in non-infected patients with AIDS-related complex (ARC) (Piwoz and Preble, 2000).

People living with AIDS may require up to twice the normal daily caloric intake to protect themselves from the dangers of HIV-related malnutrition; heightened immunosuppression, muscle wasting, and outright starvation due to malabsorption and abnormal metabolism of nutrients. In addition, appropriate dietary modifications can significantly reduce both the side effects of medication and the symptoms of opportunistic infections (FAO, 2003).

Nutrition support has not been shown to reverse the underlying disease process but it may improve quality of life and be used as adjunctive support during drug therapy (Taylor and McLaren, 1992). Nutritional support for people with HIV/AIDS recommends a healthy diet that is adequate in terms of energy, protein, fat and other essential nutrients (Whitney and Rolfes, 1999).

Based on existing studies, it is recommended that HIV positive adults increase their energy intakes by about 10-15 percent, to about 40 kcal/kg body weight, to maintain their weight, and somewhat more (50 kcal/kg) to actually gain weight (Woods, 1999). This amounts to an additional 300 to 400 kcal/day for adult women and men, respectively, for weight maintenance.

Protein intake should also be increased to protect lean body mass, with recommended levels reaching about 1.5 g/kg body weight, or a 50 percent increase (Woods, 1999). In real terms this amounts to about 25-30 additional grams of protein/day in adults. These energy and protein increases can be realized by consuming high-energy, high protein snacks twice or three times daily. For persons suffering common AIDS-related symptoms (e.g. chronic diarrhea, mouth sores, fevers, chills, chronic cough, and wasting), the emphasis should be to mitigate the nutritional consequences of the disease and to preserve functional independence whenever possible. Also important is provision of preferred foods that are soft and well tolerated by infected persons, and increasing intake during periods of convalescence from acute infection (Cimoch, 1997). Additionally, proper nutrition takes on an added importance when considered in conjunction with the effect that the diet has on the absorption of certain medications by the body (Whitney and Rolfes, 1999).



Nutrition education and counselling should be given along with diet therapy aimed at increasing consumption of key foods and nutrients or managing anorexia and other conditions that affect eating patterns. Nutrition counselling should include information on locally available foods and diets to meet estimated requirements given the individual's age, sex and physiologic state (e.g. pregnancy, lactation, engaged in strenuous physical labor etc (Ross, 1999).

In industrialized countries efforts to reverse muscle wasting have been made which relied on relatively expensive appetite stimulants and hormones such as testosterone and recombinant growth hormone (Piwoz and Preble, 2000). Studies done in the United States have shown that dietary supplements high in fatty acids, such as omega-3 fatty acids common in fish and some seeds may benefit some people with AIDS but may not overcome the metabolic consequences of acute infections in others (Piwoz and Preble, 2000).

In another study in the USA, it was found that weight gain and/or weight maintenance could be achieved among a symptomatic HIV positive people and HIV infected individuals in early stages of AIDS with no secondary infections who received at least once daily, high energy, high protein, liquid food supplement along with nutritional counselling recommending a high protein diet and foods that minimize gastrointestinal complications. In participants who had already developed secondary infections, however, weight loss continued to occur despite supplements and nutritional counselling (Piwoz and Preble, 2000).

### **Outcomes of malnutrition in HIV/AIDS**

The association between malnutrition and negative health outcomes has been extensively studied in many countries around the world. According to Cimoch (1997) malnutrition impacts negatively on people living with HIV/AIDS in that it leads to:

- Worsened clinical outcome as a result of worsened response to drugs
- Compromised immune function leading to increased risk of specific infection, increasing risk of disease progression
- Decreases physical activity due to fatigue, tiredness and low energy
- Reduced quality of life and productivity

## 2.4.2 Feeding options

Choice of feeding option will depend on the patients underlying condition(s). Whenever possible, a patient's nutritional requirements should be met by eating and drinking normal foods. This is the preferred route, for obvious social, psychological, clinical and economic reasons. However, if oral feeding cannot meet nutritional requirements, a choice between enteral or parenteral feeding must be taken. When the gastrointestinal tract is functioning and accessible, enteral feeding should be used in preference to parenteral feeding.

The feeding options in HIV/AIDS patients as suggested by Cimoch (1997) are highlighted below:

- **Oral feeding**

Oral feeding is recommended when patients are able to eat enough food in familiar forms to maintain or restore good nutritional status through the oral route. The patients should be counseled on the importance of good nutrition, so as to maintain a high calorie, high protein, well balanced diet, and to take vitamins daily (unsuitable for anorexia or patients with swallowing difficulties).

- **Aggressive Nutrition therapies**

When underlying disease cannot be controlled, the patient will need a nutrition assessment to assess whether any additional intake or nutrition support will be beneficial. When choosing aggressive nutrition therapies all the benefits and risks must be assessed on an individual basis.

- ***Enteral feedings***

Tube feeding may be appropriate for the patient whose gastrointestinal tract is still working well but who is unable to consume adequate calories orally. Enteral nutrition by tube is cheaper, safer and more physiological than parenteral nutrition. It stimulates intestinal and biliary motility and provides a greater range of nutrients. Potential risks include inability to tolerate feeding tube (pain or discomfort at the tube site), regurgitation or aspiration of formula and diarrhea are due to bacterial contamination, antibiotic use, or high osmolarity of the feed.

➤ ***Parenteral feedings***

This may be appropriate for patients with malabsorption, or when tube feedings are not feasible. This mode of feeding has potential risks and very expensive and can only be administered under hospital set up where the patient will need evaluation of the basic biochemical parameters, making it unreachable to majority of the HIV infected.

➤ ***Nutrition supplements***

Nutrition supplements can be utilized for patients without malabsorption. This should be chosen with financial implications in mind. Since most patients find commercial supplements unpalatable, flavor enhancers can be added. Nearly all commercial nutrition supplements are lactose free.

### **2.4.3 Good Nutritional Practices**

Suggestions on how to cope with the complications of HIV/AIDS have been widely reported in various publications detailing the conditions that require nutritional intervention and foods that should be eaten or avoided i.e. good nutritional practices (FAO, 2003). It is recommended that good nutritional practices should be used both within the hospital set up and during home care.

***Weight loss and anorexia***

- Have small attractive meals
- Take snacks
- Serve high protein foods
- Eat favorite foods
- Eat slowly in a relaxed atmosphere
- Use spices and seasonings to improve food aroma and taste
- Enrich meals with eggs
- Minimize odors by staying away from cooking area

***Adults***

- Maintenance 35-45 kcal/kg actual body weight
- Add 500kcal/per day to foster 0.45 kg weight gain
- Protein 1.2-2 g/kg weight necessary to promote anabolism

### ***Diarrhea***

- Avoid excessively fried foods and extra oils
- Drink lots of fluids to avoid dehydration, and encourage nutritive fluids (soups, and fruit juices)
- Avoid very acidic juices as they may irritate the stomach
- Limit the intake of gas forming foods such as cabbage, and carbonated drinks
- Avoid foods that are high in fiber.

### ***Vomiting and nausea***

- Small frequent meals
- Alternate dry and fluid feedings; use fluids such as soups herbal teas and lemon juice in warm water
- Eat promptly when hungry
- Keep away from cooking areas
- Avoid fatty and sugary foods
- Serve warm foods
- Avoid lying flat immediately after eating
- Use antiemetic before foods

### ***Soreness in the mouth (or thrush)***

- Use soft mashed or moist foods - mashed potatoes, scrambled eggs soups and porridge
- Avoid salty and spicy foods
- Use nourishing drinks
- Avoid hot, acidic, rough dry foods
- Avoid sugary foods; these cause yeast to grow
- Use straws if possible with hygiene precautions
- Avoid carbonated drinks

### ***Constipation***

- Diet high in fiber
- Drink plenty of nutrient fluids
- Avoid processed or refined foods

### *Bloatedness/heartburn*

- Eat small frequent meals
- Avoid gas-forming foods
- Drink plenty of fluids, which are not acidic

#### **2.4.4 Recommendations for Nutritional Support for Adults with HIV and AIDS**

Recommendations for nutrition counseling and care for people with HIV/AIDS vary depending on the underlying nutritional status of the individual and the stage of infection or level of disease progression. General guidelines for use by healthworkers, counselors and caregivers as recommended by Piwoz and Preble (2000) are outlined below:

- Good nutrition and a healthy diet may help prolong the period of time between HIV infection and the onset of secondary infections attributed to the progression of AIDS
- Home-based care providers should be familiar with the basic nutritional advice and practices for the patients they care for
- Nutrition counseling should include information on locally available foods and diets to meet estimated requirements given the individual's age, sex and physiological state
- HIV positive adults should increase their energy intake by 10-15%, to maintain/gain weight
- PLWHA should be encouraged to maintain their level of physical activity - this is helpful in building lean body mass and may help stimulate appetite
- Antioxidants and B vitamins, which preserve immune function and disease progression, should be taken. Since PLWHA may need to consume 2 to 5 times the RDA of these nutrients for healthy individuals, vitamin-mineral supplements will be needed to reverse underlying nutrition deficiencies and build the nutrient stores
- Counseling should include discussion of hygiene and safe food handling given increased susceptibility of HIV infected individuals to bacterial infections
- Specific advice on how to maintain intake during periods of weight loss should be provided (e.g. through more frequent meals and snacks and through the consumption of well-liked foods)
- All PLWHA should be advised to avoid unhealthy lifestyles that include alcohol consumption, tobacco and drug use, which may affect nutritional processes, and unsafe

sexual practices, which may increase the risk of re-infection or co-infection with HIV and other STDs

- Fluid intake must be maintained to avoid dehydration especially during diarrhea
- To minimize GIT discomfort, gas and bloating, foods that are low in insoluble fiber and low in fat should be consumed. Milk and dairy products should be avoided if there is lactose intolerance. Spicy foods should be avoided
- For people with mouth and throat sores; hot and spicy, very sweet foods, caffeine and alcohol should be avoided. Preferred (favorite) foods that are softened, mashed, or liquefied should be encouraged
- All infections that affect appetite, ability to eat, and nutrient retention should be treated immediately. (*Refer to Table 3: Appendix 3: Daily Energy and Protein Requirements for Adults*)

#### **2.4.5 Dietary Considerations and Combination Therapy**

Diet is important when taking combination therapy for HIV infection. In many instances it can be the difference between success and failure with these medications, since many HIV medications have special dietary needs for their absorption in the body. Dietary management can also help alleviate some of the side effects of these medications. The first and easiest category is those medications that have no specific eating requirements. These medications can be taken on a full or empty stomach, with or without food (Krales, 1998). These medications include the non-nucleoside reverse transcriptase inhibitors nevirapine (viramune) and delavirdine (Rescriptor), and the nucleoside analogues AZT + 3TC (Combivir), 3TC (Epivir), d4T (Zerit), ddC (Hivid and AZT (Retrovir) (Krales, 1998).

The second category is medications that should be taken on an empty stomach. They are the nucleoside analogue ddl (Videx) and the protease inhibitor indinavar (Crixivan) (Krales, 1998)

The third category is medications that should be taken with food. They are the protease inhibitors Invirase, Fortovase, Norvir and Viracept (Krales, 1998).

## 2.5 NUTRITION ASSESSMENT OF PEOPLE WITH HIV/AIDS

The initial nutrition assessment must be comprehensive to provide the baseline information necessary for beginning and continuing nutrition care.

### Nutrition assessment of people with HIV/AIDS

Component	What to look for
General appearance	Cachexia; truncal and bitemporal muscle wasting
Weight history	>10% below usual weight
Visceral protein stores Serum albumin Prealbumin Retinal binding protein	<3.0g/dl <16mg/dl <3.9mg/dl
Fat and somatic protein stores mid arm circumference	<25 <sup>th</sup> percentile
Physical problems associated with eating	Nausea, vomiting, diarrhea, dysphagia, dysgeusia, difficulty chewing, shortness of breath
Diet history	Inadequate intake
Vitamin/mineral usage	Possible mega dosing, nutrient imbalance
Alternative nutrition therapies	Potential deficiencies with dietary therapies, toxicities of herbs
Food intolerance	Dairy, citrus, spicy foods
Social consideration	Inadequate funds for food, kitchen facilities, shopping/cooking problems

## 2.6 GAPS IN KNOWLEDGE

In Kenya little is documented on the dietary management of hospitalized HIV/AIDS patients. Specifically, there is still lack of practical evidence – based information on the role of nutrition on dietary management of HIV/AIDS in-patients. The essence of the study is therefore to bridge the gap on what strategies can be developed to improve the current practices as concerns dietary management of hospitalized HIV/AIDS patients to meet their nutrient requirements as recommended by the WHO.

## **CHAPTER THREE**

### **STUDY SETTING AND METHODOLOGY**

#### **3.1 STUDY AREA**

The study was based at Kenyatta National Hospital in Nairobi. Nairobi is bordered by Central Province to the north, Rift Valley Province to the south and Eastern Province to the east. The city covers an area of 680 Km<sup>2</sup>, and has varied topography with an average altitude of about 1700 m above sea level. Nairobi is considered to be one of the largest and fastest growing cities in Africa. The city population was estimated at about 2,143,254 in 1999 (CBS, 2001).

Administratively, Nairobi is divided into seven zones as illustrated on Map 1. Kenyatta National Hospital (KNH) is located in Kibera Division.

Kenyatta National Hospital was founded in the year 1901, then known as the Civil Hospital. The hospital has undergone major changes. It is presently the largest and the most sophisticated hospital in the country and acts as the main referral hospital in Kenya. KNH is also the teaching hospital for medical school of the University of Nairobi and the Kenya Medical Training College. KNH has a bed capacity of 2000 and handles an average 72,000 in-patients and 600,000 outpatients visits annually.

As the national referral hospital, KNH is expected to handle mainly referral cases from other hospitals. However, due to poor state of health care delivery systems within Nairobi and the surrounding areas, that has not been the case. It is instead operating as a general hospital for the Nairobi area and the neighbouring districts. Adults' medical wards were selected purposively for carrying out the study to allow for sample convenience since all wards admit similar patients.



**Map 1: NAIROBI ZONE ADMINISTRATIVE BOUNDARIES:**



**Source: Mbotela, C (1999)**

## **3.2 STUDY TYPE AND DESIGN**

The study was a prospective study and qualitative in nature based in a hospital set up. It was carried out from March to April 2003 at Kenyatta National Hospital's medical wards 7A, 7B, 7D and 8A. The 56 study participants who were enrolled in the study comprised adult males and females whose HIV status was already predetermined by the hospital using the ELISA test, which tested HIV positive. In addition, the respondents met the inclusion criteria (*refer to section 3.4.4*)

## **3.3 STUDY POPULATION**

The study population comprised adult males and females between the ages of 18 and 57 years admitted to Kenyatta National Hospital medical wards with a diagnosis of HIV/AIDS using the WHO criteria. (*Refer to Table 4: Appendix 4: WHO Guidelines for Diagnosis of AIDS*).

## **3.4 SAMPLING PROCEDURE**

### **3.4.1 Sample Size Determination**

Ngugi (1995) estimated bed occupancy rates for HIV/AIDS related opportunistic diseases at adult wards in major urban hospitals including Kenyatta National Hospital at 30%, while in district hospitals bed utilization for the same illnesses ranged between 10 and 30%. By the year 2000, the bed occupancy rate for HIV/AIDS patients at Kenyatta National Hospital's adult wards had risen to 50%. This study assumed a similar proportion. The 2003 K.N.H census indicated a bed capacity of approximately 2000 patients of which approximately a total of 500 patients were admitted in Adult medical wards. It was estimated that 50% of all adults patients in medical wards were HIV/AIDS patients.

The following formula, (Fisher's et al, 1999) which determines the sample size when  $n/N > 0.05$  was used.

- $n = \frac{NZ^2pq}{d^2(N-1) + Z^2pq}$   
 $n$  = The desired sample size (when the population is less than 10,000)  
 $N$  = The population in adult medical wards at KNH.  
 $Z$  = Standard normal deviate, set at 1.96 which correspond to 95% confidence interval.  
 $p$  = 50% (Proportion of adult patients in medical wards, estimated to be with HIV/AIDS).  
 $q$  =  $1-p$  (Proportion of adult patients in medical wards without HIV/AIDS)  
 $q = 1-0.5 = 0.5$   
 $d$  = Degree of accuracy desired set at,  $d = 0.13$

Hence, the desired sample size ( $n$ ) was given by

$$n = \frac{(500) (1.96)^2 (0.5) (0.5)}{(0.13)^2 (500-1) + (1.96)^2 (0.5) (0.5)}$$

$n = 51$  patients  
 Plus 10% attrition =  $51 \times (10/100) = 5.1$   
 $n = 56.1$   
 $n = 56$  patients

### 3.4.2 Sampling Frame

The sample population consisted of HIV/AIDS Adult patients. Therefore the sampling frame comprised a list of HIV/AIDS patients admitted in Adults medical wards.

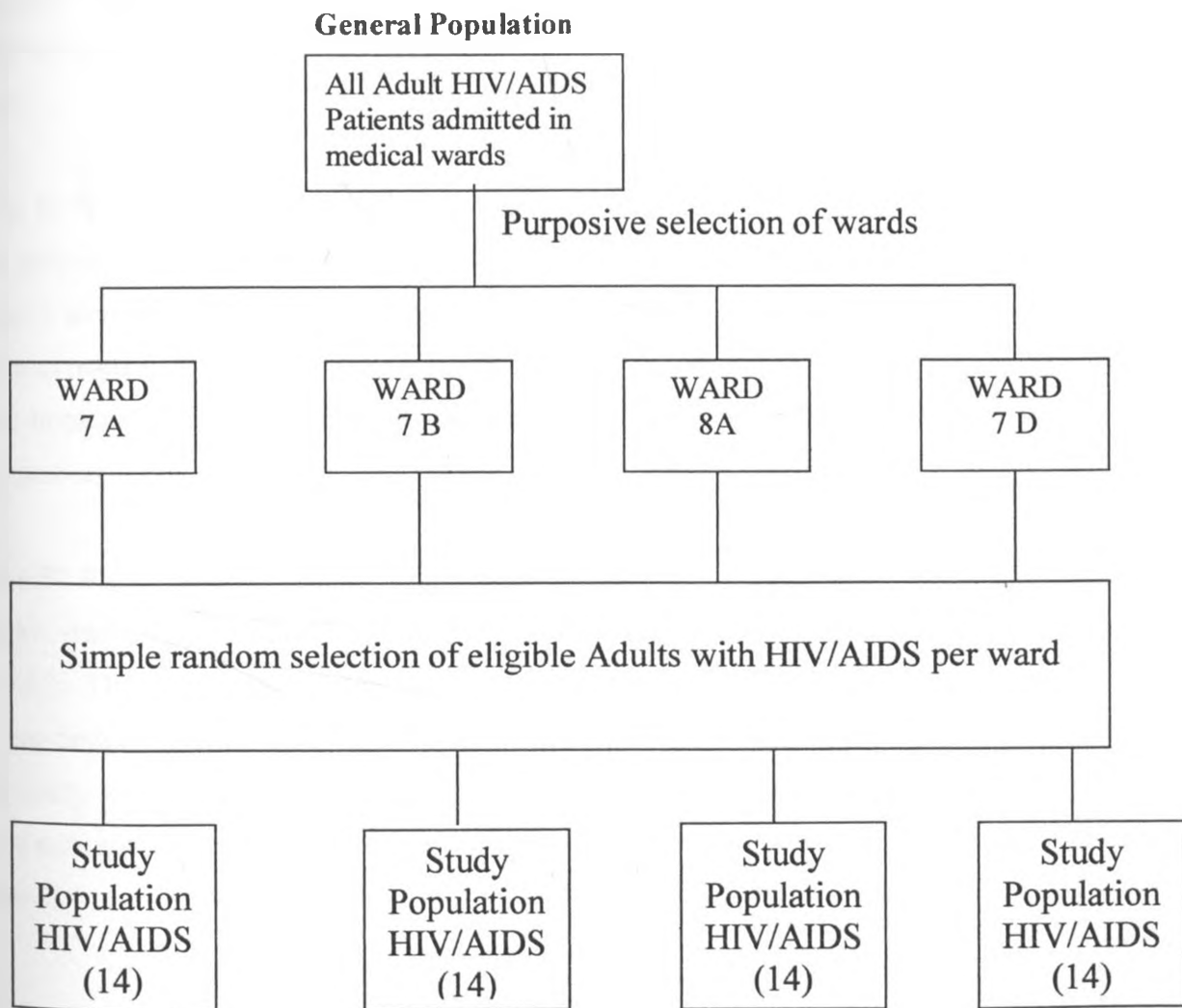
### 3.4.3 Sampling Method

Purposive sampling as part of multistage sampling procedure was used. This allowed for sample convenience since all wards admit similar patients. The wards where the study was to

be conducted were selected purposively for logistical reasons. All adults meeting the inclusion criteria were admitted to the study. Patients were identified through case notes in respective wards with the assistance of a medical doctor. Simple random sampling was then applied to obtain the actual sample of cases. A number was assigned to every subject of the study population. These numbers were written on a small piece of paper. All the papers were then put in a box, after which the box was shaken vigorously to ensure randomization. The papers were then picked at random from the box, and the numbers were recorded. The subjects corresponding to the numbers picked were therefore recruited.

The sampling procedure is outlined in figure 3.1

**Figure 3.1: Procedure of sampling:**



#### **3.4.4 Inclusion Criteria**

- Adult patients who were HIV/AIDS as defined by WHO criteria.
- Performance status - patients who were independent (Karnofsky Performance Scale with score of  $\geq 80$ ). (*Refer to Appendix 5*)

#### **3.4.5 Exclusion Criteria**

- Adults HIV/AIDS patients who were total dependent (Karnofsky Performance Scale with score of  $\leq 40$ ).
- Adult HIV/AIDS patients on Parenteral Nutrition or Nasogastric Tube Feeding (NGT).

### **3.5 DATA COLLECTION METHODS**

The study was undertaken in three phases, the preparatory phase, the pilot phase and the data collection phase. Phase IV was set aside for data processing, analysis and write up of project report.

#### **Phase I: Preparatory Phase**

The project commenced by obtaining the ethical clearance and approval to conduct the research from the K.N.H - Ethics and Research Committee. A preliminary visit to the study area was made to brief the authorities on the study objectives and to plan on the logistics of the study implementation. Identification and selection of research assistants was made as well as arrangement for equipment, instruments and supplies to be used in the study.

#### **Phase II: Pilot Phase**

A pilot study was conducted in one of the wards and the kitchen in the main study area (K.N.H). The purpose was to carry out a feasibility study to determine the appropriateness of the pre-designed questionnaires and the methodology on the study design. The results of the pilot study were used to review and modify questionnaires and other study instruments before actual data collection. During this time the research assistants were trained on all aspects of the research.

### **Training of research assistants**

Three research assistants were recruited to assist with data collection. Priority was given to those with a good background in nutrition knowledge to ensure that they had the aptitude to acquire the necessary skills in data collection and taking of anthropometric/food measurements.

### **Training procedures**

The purpose and general procedure of the study and its expected duration were explained. Emphasis was placed on the sampling methodology, administration of the questionnaires, taking anthropometric measurements, recording observational information and weighing of patients' food.

### **Ethical considerations**

The study participants i.e. patients who met the inclusion criteria and were willing to participate were required to give an informed consent before being included into the study. A written consent explaining the study purposes and the responsibilities of the principal investigator was given. The participants signed a consent form agreeing to the laid down protocol before the onset of data collection. Others chose to give a verbal consent. (*Refer to Appendix 6 Consent Form*). Consent was not required for the key informants. Study patients' agreement to fill in questionnaires was considered as consent to participate in the study by other people.

### **Phase III: Data Collection Phase**

This was the beginning of the actual study, which started in early March, 2003. Data collection was undertaken using a structured, pre-tested (and modified) questionnaire for patients and relatives; key informant interviews; direct participant observation; record of dietary intake of patients; Anthropometric/food measurements, and case notes from patients files and records.

#### **3.5.1 Key Informant Interviews (qualitative study)**

Indepth interviews with key informants were undertaken. The purpose of key informant interviews was to obtain general qualitative information on the hospital diet and matters

pertaining to the Dietary management of hospitalized HIV/AIDS patients. The interview sought information regarding foods brought from home. Key informants included the catering manager, five nutritionists, eight nurses and five senior resident medical doctors. In total nineteen key informants were interviewed. The principal investigator guided the discussions (Refer to Appendix 15).

**(i) Catering manager**

The catering manager was interviewed to obtain information on the Hospital standard menu (official menu) and the food service delivery system in the hospital. The manager's opinion on Home diet was also sought.

**(ii) The nutritionists**

The head of Nutrition Department and four other nutritionists were interviewed to obtain information on their role in the dietary management of hospitalized HIV/AIDS patients. The interview also sought to gather information on whether all admitted HIV/AIDS patients received adequate nutrition education and diet counseling. Finally, information on whether all hospitalized HIV/AIDS patients were being offered special diets was also sought.

**(iii) The Nurse, the Doctor**

Eight nurses were interviewed to obtain information on their general assessment of the hospital diet given to hospitalized patients particularly to HIV/AIDS patients. The interviews also sought to know if HIV/AIDS patients in their wards received nutrition education and dietary counseling. The nurses were also asked for their opinion on food brought from home by relatives and friends.

Interviews with five doctors sought to obtain their role in the dietary management of hospitalized patients, particularly HIV/AIDS patients. Their opinion on the adequacy of the hospital diet in meeting the requirement for hospitalized HIV/AIDS patients as per the WHO recommendations was also sought. Finally, information on drugs commonly prescribed to HIV/AIDS patients at K.N.H and their interaction with nutrients was also sought.

### 3.5.2 Questionnaires

(e) The main study instrument was a researcher administered structured questionnaire (*appendix 16 patients' questionnaire*) which was administered to patients. It was subdivided into three sections:

(a) *Demographic and other characteristics of the patient.*

This section sought to obtain information on the patient's age, sex, residency, ethnicity, occupation status, education status, marital status, religious affiliation and number of children. Other characteristics sought were the primary diagnosis, which was obtained from case notes in the patients' files and the patients' treatment sheet. In addition information on the patients' alcohol intake status and the current weight (patient anthropometry) were sought.

(b) *Food consumption in the hospital*

This section was designed to obtain information on food intake and related factors, such as appetite, eating pattern and attitude about food, food choices and supplements.

(c) *The patient's food intake record*

(Hospital diet/Home diet)

This section was designed to record all the foods consumed by the patients in a day. All the foods consumed from the hospital diet as well as home diet were recorded. The details of dietary intake are included in section 3.5.4. The nutrient intake for carbohydrates, proteins, fats and energy were also calculated.

(ii) The second questionnaire (*appendix 16*) was administered to patient's relatives or guardians on dietary supplements brought from home.

### 3.5.3 Direct Participant Observation

Individual HIV/AIDS patients randomly selected who had been recruited in the study were closely observed on dietary intake. Two patients were observed daily for two days. The study focused on both the hospital diet and also on food brought from home. The researcher observed and recorded all foods consumed by the patient in a day. Observations were carried out at ward level when the food was being served to the patients and through interviewing



them. The study was ongoing from Monday through Friday i.e. five days a week. All activities involved during food service and the patients' attitude towards food were observed and recorded. A Record diary was used. (*Refer to Appendix 8, Patient's food consumption: Instructions to the observer*).

#### 3.5.4 Dietary Intake

Individual HIV/AIDS patients were observed during meal time hours and in between meals for their dietary intake. Types and amount of foods eaten and leftovers were recorded (*refer to appendix 8 on instructions to the observer*). The daily dietary intake of the patients was based on foods from the hospital diet and home diet. The dietary intake of each patient was recorded daily using a predesigned food consumption record form (*appendix 17 Patients daily food consumption*). The actual measurements of foods eaten were recorded. The researcher and research assistants had prior knowledge of average weight per measure of utensils used in scooping the food. Standardized portion sizes were served to almost all the patients by the food porters. Any leftovers after eating were weighed using a salter kitchen scale and deducted from the original serving to obtain the net intake. The measurements were done at all meal times. Any food consumed when the investigator was absent were determined by recalls from the patient. The relatives were asked to describe the ingredients and amounts that were used in the preparation of foods brought to their patients. The cooking methods were also sought. Household measures were also determined by referring to volumes of local containers ranging from a standard tea cup, a glass, eating spoon, teaspoon, coke bottle, can for margarine or cooking fat, a flask, bowls, hotpots and so on. Also sought was information on whether the food brought was apportioned from the family pot or the ingredients were used solely in the preparation of the patients' food. The observations were conducted on all meal time hours and in between. Since two participants were being observed at a time, it was possible to monitor their actual dietary intake.

To determine the total intake of the nutrients for the duration of the study period for each patient, total daily intakes were calculated and summed up. The variables measured were protein, carbohydrates, fat and calories. The two main variables of interest in this study included **protein** and **calories** (energy). These were compared to the WHO recommendation

for HIV infected adults (James and Schofield, 1990 and WHO, 1985). Refer to appendix 3a and 3b. The mean requirements for adults for kcalories (2070 kcal/day) and proteins (57 g/day for males; 48 g/day for females) were used as basis for calculating the daily nutrient requirements for the patients. Thus, a 10% increase for energy and 50% increase for protein were used to calculate mean requirements for HIV infected people as recommended by WHO (appendix 3a and 3b). The study cases had reduced physical activity (were not active) while admitted, hence sedentary. Therefore, the calculated nutrient requirements were assumed to be adequate.

The nutritive value of all the ingredients used in the preparation of the hospital diet and dietary supplements brought from outside the hospital (home diet) consumed by the patients was determined using the Food Composition Tables (FAO, 1970; West et al., 1987; Sehmi, 1993).

Home diets were assessed to determine the percentage of nutrients home diet added up to the hospital diet.

### **3.5.5 Anthropometric measurements**

Height and weight of HIV/AIDS patients were measured as recorded by WHO (1995). Their weights and heights were used to calculate the Body Mass Index.

**\*HEIGHT:** Height measurements were taken using a stadiometer, placed against a hard flat surface. The patient stood on the foot plate with no shoes, with minimum clothing and headgear, with feet parallel and with heels, shoulders, buttocks and back of the head touching the vertical board. The head was held comfortably erect, and then the headpiece lowered and placed on the head and measurements were taken to nearest 0.1 cm.

**\*WEIGHT:** A bathroom scale was used to take weight. The patient was required to remove heavy clothing and shoes. Then stand straight with back, upright and with minimal movement on the weighing scale. Weight was then recorded to the nearest 0.1 kg.

### 3.5.6 Equipment

- A *weighing scale for food* e.g. salter kitchen scale with a maximum capacity of 5 kilogrammes was used to weigh food served to patients.
- A *bathroom scale* with maximum capacity of 200 kgs was used for weight measurements.
- A *stadiometer* was used to take height measurements.

### 3.5.7 Data Quality Control

In order to avoid bias among kitchen and catering staff on the intended study, certain precautions were undertaken as follows:-

- The pilot study through key informant interviews enabled the principal investigator to obtain baseline information regarding the hospital standard menu and food delivery system, which assisted in deciding on what measures to be undertaken before the actual study started. The information obtained during the pilot phase was different from the main study, hence kitchen and catering staff had no idea of the activities on the ground.
- Being a regular member in the department, the principal investigator did not expect her presence to cause any undue attention.
- The date of implementation was not disclosed to catering staff.
- Patients recruited in the study were not known to kitchen and catering staff.
- The study was carried out at ward level through observation of the actual foods being served to individual patients.
- Weighing of food was done in the ward's pantry rooms. Investigators prior knowledge on average weights of food samples eased the weighing exercise. (*Refer to appendix 8*)
- Study patients did not have special containers. They were served like any other patient. Stickers were used to mark their plates at ward level.
- On Anthropometric and food measurements the principal investigator ensured that all measuring equipment were checked and calibrated periodically during the study period in order to prevent instrumental errors that might have come about due to faulty equipment. Research assistants were trained in taking anthropometric measurements with emphasis on the correct methods to be used when taking measurements to enhance accuracy and validity of results.

### **3.5.8 Project monitoring and evaluation to ensure completeness and internal consistency of data**

- At the end of each day the principal investigator had a brief session with the assistants and checked recording forms, diary notes and questionnaires for recording errors and completeness. Any erroneous information was corrected after making thorough checks.
- The principal investigator also participated in the actual activities to ensure accuracy.
- Weighing scales were standardized daily throughout the study period with known weights.

### **3.6 LIMITATIONS AND CONSTRAINTS**

- The study was limited to use of food composition tables as a method to determine nutrient adequacy of the diets. Laboratory analysis could not have been done owing to the limitation in resources and time. It was therefore not included as part of data analysis procedure.
- Since patients were observed for a short period, there might have been variations in daily food consumption as a result of appetite changes and varied diets.

### **3.7 DATA PROCESSING AND ANALYSIS (PHASE IV)**

The data entry and analysis was carried out using the SPSS version 10 software package. Frequencies were run to check on the distribution of the data and to identify incorrect entries through range checks. Cleaning of data was then done before embarking on the data analysis. These were done at the ANP University of Nairobi. Food composition tables were used to calculate the nutritive value of all the ingredients used in the preparation of foods ingested by the individual study subjects e.g. Food Composition Tables developed by CTA-ECSA for use in East, Central and Southern African countries (West et al., 1987).

#### **Qualitative Data analysis:**

Cross tabulations, frequency distributions and percentiles were computed for qualitative data. Statistical tests that were applied included Chi-square tests, Fisher's exact test (for 2 x 2 tables with expected value less than about 5). A p-value <0.05 was accepted as statistically significant.

### **Quantitative Data Analysis**

Descriptive statistics i.e. means and medians were used to analyze quantitative data. Significance testing was done using Mann-Whitney U test. The minimum level of significance acceptable was taken to be  $p < 0.05$ .

## **CHAPTER FOUR**

### **RESULTS**

#### **4.1 INTRODUCTION**

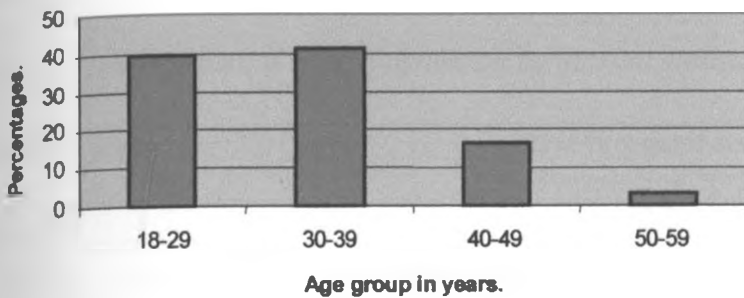
This chapter presents results according to objectives specified in chapter one. Analysis of results has been done for demographic features and other characteristics of the study sample, food consumption patterns in the hospital, anthropometry (BMI) and factors influencing food consumption and food choices. Hospital diets and food supplements from outside the hospital (Home diets) in regard to adequacy are also highlighted, which form the basis of the study.

#### **4.2 DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION**

A total of 56 respondents were included in the study, of which 31 (55.4%) were females and 25 (44.6%) were males. Majority of them (78.4%) came from Nairobi. About 14.4% came from the outskirts of Nairobi which included areas such as Ngong, Rongai, Athi River, Kikuyu and Wangige. A small proportion (7.2%) was from areas outside of Nairobi, that is, Kisii, Marigati, Murang'a and Embu.

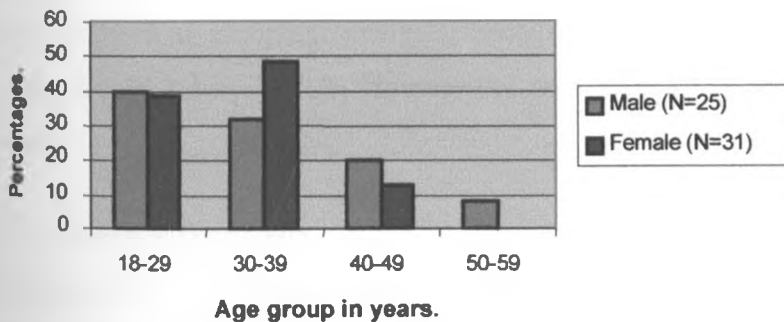
The most significant ethnic groups were Kikuyus who accounted for 35.7% of the study population, Luos 33.9%, Kamba and Luhya with a total of 10.7% and 7.1% respectively. A total of 9.0% of the cases included Kisii, Embu, Meru and Turkana ethnic groups and 3.6% accounted for foreigners; a Rwandese and a Tanzanian.

All the study respondents were adults. In general, majority of the cases comprised of the 18-29 years and 30-39 years age bracket, which represented 39.3% and 41% of all the cases respectively. About 16.1% fell in the 40-49 years age bracket. A small proportion of the much older respondents being fifty years and above represented 3.6% of the cases. A majority of the cases (80.4%) fell in the 18-39 years age bracket. The combined mean age was 32.4 years (s.d 7.72) with a range of 18-50 years. Figure 4.1 summarizes the age distribution of the study population.



**Fig. 4.1: Distribution of study population by age**

The males mean age was 33.7 years (s.d 8.12) while that of females was 31.3 years (s.d 7.33). The median age for males was 33.0 (Range 22-50 years) compared to females 32.0 (Range 18-47 years). Hence, there was no significant difference in the distribution of the population by age and sex  $p < 0.05$  ( $p = 0.30$ : Mann-Whitney test). Figure 4.2 shows the distribution of study population by age and sex.



**Fig. 4.2: Distribution of study population by age and sex**

The highest proportion (73.2%) of the cases were Christians of Protestant domain encompassing all denominations falling under the umbrella. The remainder (26.8%) of the cases belonged to the Catholic faith.

About two-thirds of the study population were married, while almost one-quarter were single (Table 4.1).

**Table 4.1 Distribution of study population by marital status.**

Marital status	Percentage of study Population N=56
Married	62.5
Single	21.4
Widowed	8.9
Divorced/separated	7.2

Half (50.0%) of the study population had primary education, while 35.8% had secondary education. A few (5.4%) had no formal education at all, while 8.8% of the respondents attained college education.

One-quarter of the study cases (25.0%) were unemployed. About the same proportion (23.2%) of the cases were engaged in business ventures and among them were carpenters, salonists and shopkeepers. Approximately 17.9% of the cases were involved in casual labour and domestic work such as house help (maid), gardener, launder. Salaried cases accounted for 16.0% and were employed as computer analysts, accountant, auditor, inspector and caterer either from civil service or private sector. Housewives represented 12.5% of the cases, while 5.4% were farmers.

#### **4.2.1 Primary Diagnosis**

More than half of the cases were admitted with a diagnosis of Pulmonary Tuberculosis (PTB), while slightly more than one-quarter had pneumonia. A small proportion of the cases presented with a diagnosis of malaria. The remainder of the cases were diagnosed to be having various disease conditions, which include Meningitis, Congestive Cardiac Failure (CCF), Liver disease and Hematemesis (Table 4.2). Among the 32 cases diagnosed with pulmonary tuberculosis, six of them also had gastroenteritis. Similarly, gastroenteritis manifested in five of the 15 cases with pneumonia (Table 4.2).



**Table 4.2: Distribution of study population by primary diagnosis**

Primary Diagnosis	Cases % (n=56)
Pulmonary Tuberculosis (PTB)	57.0
Pneumonia	26.8
Malaria	5.4
Meningitis	3.6
Congestive Cardiac Failure. (CCF)	3.6
Liver Disease	1.8
Hematemesis	1.8
Gastroenteritis*	

\*Gastroenteritis was diagnosed among 18.8% of the 32 cases with pulmonary tuberculosis and 33.3% of the 15 cases with Pneumonia.

Treatment used was a combined therapy comprising mainly of drugs, as shown in table 4.3. Among the drugs used, were those prescribed to treat specific symptoms common in HIV/AIDS e.g. Candidiasis, oral thrush, diarrhea, constipation, pain, fever and oral/oesophageal ulcers, etc.

**Table 4.3: Drugs prescribed for the study cases and use at K.N.H.**

Drug Use	Type of Drug
Anti tuberculosis	Rifater, ethambutol, ethizide, isoniazid
Antibiotics	Rocephine, zinacef, norfloxacin, chloramphenical, ampicilline, gentamycin, erythromycin, x-pen, doxycycline, augmentin, septrin, amoxil, zinat.
Anti malarial	Quinine
Antifungal	Ketonazole
Anti protozoa	Flagyl
Antidiarrhea	Imodium
Painkiller	DF118, diclofenac, ponstan, paracetamol, brufen
Vitamin	Multivitamin, pyridoxine*, neurobine* (B-Complex)
Cardiac	Digoxin
Antihypertensive	Captopril
Antiasthmatic	Ventolin
Steroids	Prednisone
Diuretics	Aldactone, lasix
Laxative	Dulcolax
Antiulcer	Zantac
Antipsychotic	Largactil
Anticoagulant	Claxane

\*These are pharmaceutical forms of vitamin supplements.

#### 4.2.2 Alcohol Intake

The respondents were asked about whether they take alcohol or not. Those who consumed alcohol accounted for 23.2% of the cases. Majority of the cases (76.8%) said they did not consume alcohol. Among the 13 (23.2%) cases who said they consumed alcohol, 4(30.8%) cases had BMI levels <18.5 indicating mild to severe malnutrition, while 9 (69.2%) cases had BMI levels >18.5, indicating normal nutritional status. Out of the 43 (76.8%) cases who said they did not consume alcohol, 18(41.9%) cases had BMI levels <18.5, while 24(55.8%) cases had BMI levels >18.5. One case (2.3%) had a BMI level >25.0 indicating obesity. Alcohol intake was found not to be significant in relation to BMI levels of the study population  $p < 0.05$  ( $p = 0.63$ : Chi-square test).

#### 4.2.3 Nutritional Status of the study population

The Body Mass Index (BMI) was the indicator used to determine the nutritional status of the study population. The study cases had their weight and height taken which were then used to calculate the BMI.

The cut off point for BMI was based on the WHO (1995) classification for BMI that is; >25.0 (obese), 18.5-24.99 (normal), 17.0-18.49 (mild malnutrition), 16.0-16.99 (moderate malnutrition), <16.0 (severe malnutrition). The mean BMI was 19.1 (s.d 4.64). Table 4.4 shows a summary of the proportions of the study population in regards to their nutritional status at the time of inclusion in the study.

**Table 4.4: Distribution of study population by BMI levels.**

Body Mass Index	Cases % (n=56)
>25.0	1.8
18.5-24.99	58.9
17.0-18.49	14.3
16.0-16.99	14.3
<16.0	10.7

*Cut-off point is 18.5*

*Source: WHO 1995*

The results show that one-third cases fell below the cut-off point (BMI <18.5), hence had mild to severe malnutrition, while more than one-half had BMI levels that were within normal limits. A very small proportion of cases were obese (Table 4.4).

The mean BMI was more or less similar for both males and females, while the median BMI (18.8kg/m<sup>2</sup>) was the same (Table 4.5). The results indicate that there was no significance in the mean BMI distribution of the study population by  $p < 0.05$  ( $p = 0.82$ : Mann-Whitney test). Table 4.5 summarizes the mean BMI distribution of the study population by sex.

**Table 4.5: Mean BMI distribution of the study population by sex**

Nutritional status indice	Male (n=25)		Female (n=31)	
	Mean $\pm$ s.d	Median min. max	Mean $\pm$ s.d.	Median min. max.
BMI	19.2( $\pm$ 3.06)	18.8(13.4-24.4)	19.0( $\pm$ 3.16)	18.8(11.6-29.2)

More than half of males (60.0%) and females (58.1%) had BMI levels that were within normal limits. Those cases that fell below the set standard (cut-off point 18.5) comprised 40.0% of males and 38.7% of females, hence described as having mild to severe malnutrition. Only 3.2% of female cases had BMI levels above normal limits, hence obese. Figure 4.3 shows the distribution of the study population by BMI levels and sex.

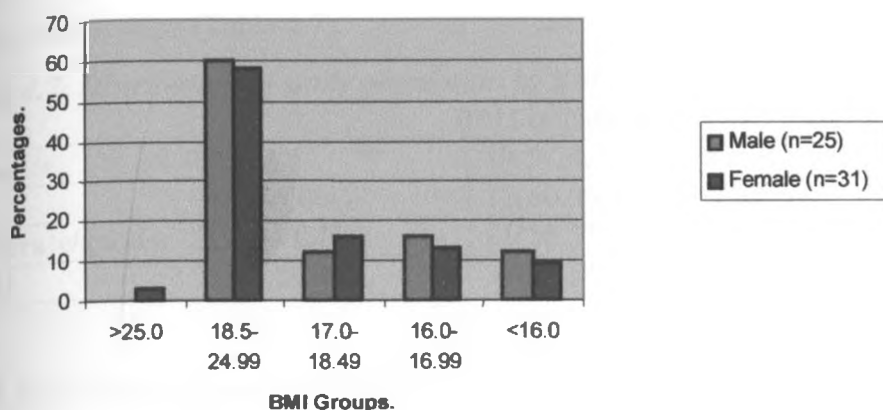


Fig.4.3: Distribution of study population by BMI Levels and sex.

### 4.3 FOOD CONSUMPTION IN THE HOSPITAL

Respondents were asked to describe their appetite, whether they enjoy eating hospital food, if they always finish the food served, food likes and dislikes, if they receive foods from home (dietary supplements from outside the hospital) and who brings those foods. Their responses are described in the sections that follow.

#### 4.3.1 Food intake patterns and related factors

##### Appetite

Respondents were asked to describe their appetite while hospitalized. Slightly more than half of the respondents said they had moderate appetite, while more than one third had poor appetites and the remaining few said their appetite was good(hearty). Diminished appetite is a common symptom in HIV/AIDS patients. Table 4.6 shows the distribution of the respondents by appetite.

Table 4.6: Distribution of the study population by appetite.

Description of appetite	Cases % (n=56)
Poor	35.7
Moderate	53.6
Good (hearty)	10.7

BMI levels did not show any significant association with the self described levels of appetite  $p < 0.05$  ( $p=0.38$ : Chi-square test). More two-thirds of the 20 cases whose appetites were poor had normal BMI levels, while more than one third of the cases in the same category had BMI levels below the cut-off point ( $<18.5$ ) indicating mild to severe malnutrition. Among the 36 of

the cases who reported their appetites to be moderate or good, more than half had normal BMI levels, while slightly less than half had BMI levels below the cut-off point indicating mild to severe malnutrition (Table 4.7).

**Table 4.7: Distribution of study population by BMI levels and appetite.**

Appetite	BMI in Numbers			Total
	<18.5	18.5-24.99	>25.0	
Poor	7(35.0%)	12(60.0%)	1(5.0%)	20(35.7%)
Moderate/good	15(41.7%)	21(58.3%)	-	36(64.3%)
Total	22(39.3%)	33(58.5%)	1(1.8%)	56(100%)

### 4.3.2 Food Consumption Attributes

Table 4.8 summarizes food consumption attributes with valid responses from the study cases.

**Table 4.8: Percentage distribution of patients according to food consumption attributes and reasons for the attribute quality.**

Food consumption	Response % (n=56)
<b>Enjoys eating hospital diet</b>	
Reasons:	(62.5)
1. Food well cooked and palatable	48.1
2. Food served hot	5.4
3. Menu contains animal protein	3.6
4. Other reasons	5.4
<b>Do not enjoy eating hospital food</b>	
Reason:	(37.5)
1. Food not properly cooked	10.5
2. Food not palatable/appetizing/tasty	16.2
3. Limited food choices and monotony	5.4
4. Other reasons	5.4
<b>Finishes the food</b>	
Reasons:	(10.7)
1. Food well cooked/prepared	8.9
2. Food is good	1.8
<b>Do not finish the food</b>	
Reasons:	(89.3)
1. Food portions too large	33.9
2. Loss of appetite	17.9
3. Early satiety	10.7
4. Gets nauseated	10.7
5. Other reasons	16.1

About two-thirds of the cases reported that they enjoyed eating the hospital diet. Out of these, about a half of the cases attributed their response to food being well prepared and palatable. Other reasons given by the rest of the cases include food being served hot, menu containing animal proteins, nobody to bring food from home and used to poverty (Table 4.8). Analysis by Fisher's exact test indicated that appetite was not among the reasons that attributed to patients

enjoying eating the hospital diet  $p < 0.05$  ( $p = 0.41$ : Fisher's exact test). Just over one third of the cases did not enjoy eating hospital food. Slightly less than one-fifth of the cases said that the food was neither palatable nor appetizing or tasty, while more than one-eighth reported that the food was not properly cooked. The remainder of the cases cited food monotony, limited food choices, poor food presentation and personal food preferences (Table 4.8).

More than three-quarters of the study participants did not finish their food, while very few of the cases ate and finished their food. The attributable reasons for not finishing the food served were food portions too large, which accounted for one-third of the cases, loss of appetite as reported by nearly one-fifth of the cases. Other reasons given include early satiety, nausea, difficult swallowing, stomach distention, taken food from home, dry mouth/sore mouth and food not palatable (Table 4.8). It was revealed in this study that appetite did not contribute to the fact that the majority of the cases did not finish their food  $p < 0.05$  ( $p = 0.08$ : Fisher's exact test)

When asked about personal food preferences, only one-quarter of the cases confessed to be averting certain foods. Foods mentioned were mala (fermented milk), beans, cabbages, fresh milk, fried eggs, citrus fruits, soda/squashes and unsalted food. The reasons given for averting some foods include stomach distention/ache, vomits, dislikes food, diarrhea, heartburn (acidity), flatulence (gas) and dietary restriction.

### **Food appearance/Palatability**

The food was generally good and palatable. As shown in table 4.8 which summarizes attributes of food consumption, two-thirds of the cases reported that they enjoyed eating the hospital diet. Out of these, about a half of the cases attributed their response to food being well prepared and palatable. According to the principal researcher and assistants there were days when food was not well prepared. Occasionally, vegetables had a lot of fat and legumes particularly *ndengu* (Green grams) stew and pigeon peas were not properly fried. On the other hand, throughout the study period the predominant starches served were rice for lunch and *ugali* (Stiff porridge) for supper. Only one meal contained mashed potatoes. With reference to table 4.8, slightly more than one-third of study cases was dissatisfied with the hospital diet. Some of the reasons

reported that could support the argument above were food not properly cooked, limited food choices and monotony.

### **Food presentation and service**

The food was generally delivered in the wards at regular times as stipulated in the meal time hour schedule. The food was being transported in insulated trolleys and arrived when still hot. Occasionally, breakfast was served slightly cold since ordinary four wheeled non-insulated trolleys were being used. The containers for breakfast were substandard and needed replacement. A key informant interview with the catering manager reported plans were in place to buy tea urns. The porters were not in full uniform as previously suggested by the catering manager.

The food service team at ward level comprised of the porter, the nutritionist and the nurse. When food arrived in the ward it was ferried near the pantry room to a halt. Thereafter the porter reported to the nurse and alerted the nutritionist. The porter then placed serving plates and serving utensils onto the trolley. The plates were made of melamine. Serving utensils were not adequate and most of the time the porter had to improvise. A variety of serving utensils were used depending on availability i.e. standard serving spoons and scoops, wooden scoops and saucers either melamine or plastics. Plastic cups or melamine cups of various capacities ranging from 300 ml to 500 ml were used by patients at breakfast time and also as serving utensils. These made portioning of food a bit difficult. The average weights per measure of these utensils had been known by the investigators by weighing food samples prior to the implementation of the study. It is important to note that pantry rooms are porters responsibility i.e. cleaning trolleys, plates, cups, serving utensils and taking stocks of the same after every meal service. The trolley was then wheeled into individual ward cubicles or just near each cubicle alongside the outer corridor. The porter in conjunction with the nurse served food to respective patients using standardized serving utensils or any other and by also following nutritional guidance in the case of patients on dietary modifications. The nutritionist sometimes assisted the porter in serving of food even though her or his main responsibility was to guide the porter on quantity and type of food to be given to each patient particularly those on therapeutic diets. The nurse in addition provided information on patients who awaited

different procedures or who were on certain types of medical treatment e.g. nil by mouth, i.v. fluids, etc. In the actual food service process the porter dished out food on to plates and delivered to the patient directly or handed the food plate to the nurse who in turn delivered food to the patient. Once patients had eaten the porter collected all the utensils from patients' beds and cleaned them in the pantry room. Notable was that patients were not provided with eating spoons by the hospital. They were expected to bring their own from home, hence some of the patients used their fingers to feed.

### Hospitality

Most food porters were generally hospitable. They showed a sense of mannerism in the approach and service to their clients. These were commendable. However, there were few ones who did not show any respect to the client they were serving. One would stand along the corridors, dish out food on plates and then start shouting and I quote "*Wamama mkujie chakula, mimi siingii huko.*" (Women come for food, I am not entering there). "*Hakuna mtu anakula hapa?*" (Isn't there anyone feeding here?). "*Kuna mwingine, eeh!*" (Is there another one, eeh?). "*Wee, mkujieni chakula.*" (You people, come for food). The porter quoted above bypassed patients who were not able to walk and never served them.

### 4.3.3 Home Diet

One of the objectives of the study was to evaluate the appropriateness of the dietary supplements from outside the hospital (Home Diet) given to hospitalized HIV/AIDS patients at Kenyatta National Hospital.

The study participants were asked on the type of foods they receive from outside the hospital and persons bringing these foods. More than three-quarters of the respondents confessed receiving food from outside the hospital, and the remaining few said otherwise. Two-thirds of the cases reported immediate family members as persons who brought them dietary supplements from outside the hospital. The rest mentioned other relatives, friends and neighbours (Table 4.9).



**Table 4.9: Percentage distribution of patients according to consumption of dietary supplements from outside the hospital and persons bringing these supplements**

Dietary supplements from outside the hospital (Home Diet)	Response % (n=56)
Takes dietary supplements from outside the hospital	85.7
Do not take dietary supplements from outside the hospital	14.3
<b>Persons bringing dietary supplements</b>	
1. Immediate family	(64.3)
Sister	14.3
Wife	12.5
Brother	12.5
Husband	10.7
Mother	8.9
Daughter	5.4
2. Other relatives	14.3
3. Friends/Neighbours	7.1

These findings correspond well with information gathered from key informant interviews with the nurses and the catering manager, who confirmed that there was non restriction of in- flow of dietary supplements from outside the hospital.

### **Opinion of Nurses**

Majority of the nurses i.e. six out of the eight interviewed from K.N.H. expressed their opinions to why food brought from home to the patients by relatives and friends was important and should not be stopped. Some of the attributable reasons were that some patients may not like the hospital food; the hospital diet lacked variety, hence, home diet supplemented what the hospital lacked. Patients requested their relatives to bring a particular food for them according to their preferences. In addition, food from home gave a patient a sense of homely environment which enhanced quick recovery. Finally, home diet was sometimes the patient's best food prepared the way she or he normally like it. A small proportion of nurses i.e. two out of eight interviewed were against home diet and commended the hospital for providing balanced diets to all the patients. They further said that the relatives did not know how to prepare suitable

diets for their patients since some patients were on dietary restrictions, i.e. could use too much spices, fat and salt.

### **Opinion of catering Manager**

The catering manager was of the opinion that home diets were not suitable for the patients and should be stopped. Reasons given were that currently the hospital provided varied diets which were able to cater for the majority of patients on the regular diet. However the manager admitted that the hospital was not adequately catering for those patients with special preferences as determined by the nature of their illnesses (and I quote) "That is where the special diets kitchen comes in. With the help of the nutritionist, we can advice the hospital on diets suitable for patients with special preferences and those whose conditions require special considerations in terms of nutrient intake." Some of the disadvantages of home diets cited by the catering manager were risk of contamination due to not knowing the source of the home food and unhygienic conditions during food preparation; wrong foods might be given contrary to patient's conditions; home diet leads to waste i.e. hospital diet ends up being thrown; there is no guarantee over control of nutrient intake since home diet is not observed, hence goes against the doctor's recommendations in terms of grams of proteins, fats, carbohydrates, energy and other micronutrients. Lastly, wrong diets from outside the hospital may affect the well being of the patient by slowing down patients' recovery rate.

#### **4.3.4 Dietary supplements commonly brought from outside the hospital (Home Diet)**

Fruits were reported by three-quarters of the cases as the most common food brought from outside the hospital, while fresh milk accounted for more than a half of the cases. Wimbi (*millet*) porridge was reported by one-quarter of the cases, while one-fifth of the cases reported irish potatoes and green bananas each. Bread and queen cakes were also among the preferred foods which accounted for one-eighth of the cases each. Eggs, liver and fish were the preferred sources of High Biological Value Proteins from meat and meat products. Beans were rarely brought, while lucozade (energy booster) was the most highly commercial drink brought. Table 4.10 shows the dietary supplements commonly brought from outside the hospital (Home Diet).

*Table 4.10: Dietary supplements commonly brought from outside the hospital (Home Diet).*

Food	Response %	Food	Response %	Food	Response %
<b>Starches/cereals</b>		<b>Milk and products</b>		<b>Fruits/fruit juices</b>	
Wimbi porridge	26.8	Fresh milk	53.6	Fresh fruits	75.0
Irish potatoes	21.4	Milky tea	8.9	Fresh fruit juices	25.0
Matoke (green bananas)	21.4	Maziwa lala	5.4	Fruit salad	5.4
Rice	8.9	Yoghurt	5.4		
Ugali	8.9				
Githeri	7.1				
Mukimo	5.4				
Potato chips	5.4				
White porridge	3.6				
Spaghetti	1.8				
Pilau	1.8				
Arrow root	1.8				
<b>Bread &amp; bread products</b>		<b>Meat and meat products/legumes</b>		<b>Commercial drinks and juices</b>	
Bread	12.5	Eggs	10.7	Lucozade	23.2
Queencakes	12.5	Liver	7.1	Quencher juice	19.6
Chapati	3.6	Fish	7.1	Soda	19.6
Maandazi	3.6	Chicken	5.4	Ribena juice	16.1
Doughnuts	1.8	Sausage	5.4		
Bun	1.8	Legumes	5.4		
Scones	1.8	Beef	5.4		
Biscuits	1.8				
<b>Vegetables</b>					
Spinach	1.8				
Traditional vegetables	3.6				

#### 4.3.5 Food Choices

The food selection patterns of the respondents and the factors related to individual food choices were sought (Table 4.11)

*Table 4.11: Distribution of the study population by food choices and reasons given.*

Food choices	Responses % (n=56)
<b>Cannot eat certain foods</b>	(44.6)
Type of foods and what happens:	
1. Beans – stomachache/upset	19.6
2. Rice – difficult swallowing	16.1
3. Sukuma wiki – heartburn (acidity)	8.9
<b>Allergic to certain foods</b>	(17.9)
Type of food and what happens:	
1. Meat (beef) – swelling of body	5.4
2. Fresh milk – diarrhea	3.6
3. Egg – itching	8.9
<b>Foods avoided due to religious beliefs/ethnic/cultural background</b>	(5.4)
Foods avoided and reasons:	
1. Pork/mutton/beef – religious belief	3.6
2. Tea leaves – religious belief	1.8

The results on the food selection pattern of the respondents as shown in table 4.11 indicated that slightly less than half of the cases reported not being able to eat certain foods, hence would omit them from their food choices. Nearly one fifth of the cases were allergic to certain foods while a few avoided certain foods due to religious beliefs. Food selection based on religious beliefs or ethnic or cultural background was insignificant since a very small proportion of the cases attributed their reasons for food choices to this factor. In this study, it is implied that a majority of the study cases were not influenced by culture or religion in their food selection patterns.

#### 4.3.6 Special Diets

The respondents were asked whether they were offered special diets while hospitalized and to mention the professional who recommended the special diet. The results are shown in Table 4.12.

*Table 4.12: Frequency of special diets offered and the recommending professional.*

Special Diet	Responses % (n=56)
<b>On special diet provided by the hospital</b>	35.7
<b>Type of diet:</b>	
1. high protein, high calorie	30.3
2. bland diet	1.8
3. soft diet	3.6
<b>Who recommended special diet</b>	
1. Nutritionist	26.7
2. Nutritionist + Doctor	5.4
3. Nurse	3.6

The results show that just over one third of the study participants were provided with special diets. This is contrary to information gathered from the nutritionists through key informant interviews, which revealed that all hospitalized HIV/AIDS patients were not put into consideration by the nutritionists and this might affect the outcome of the overall management of these patients.

Seventeen out of the twenty of the cases who were on special diets, were offered a high protein, high calorie diet. The nutritionist was the most often reported professional who recommended special diets, as reported by over one-quarter of the cases (Table 4.12). The key informant interviews with the nutritionists, doctors and nurses revealed that the nutritionist was the expert in the dietary management of patients who collaborated with the doctor by translating doctors' dietary orders to actual meals and got feedback of patients' response to the diet in liaison with the nurse.

#### 4.4 NUTRITIONAL COUNSELLING

The study sought to evaluate appropriateness of dietary counseling that is given to hospitalized HIV/AIDS patients at Kenyatta National Hospital as part of the study objective. The study participants were asked on whether they had received counseling services on diet, the type of counselor and the frequency of the counseling.

Slightly less than a half of the study cases received nutritional counseling, while less than two-thirds said otherwise (Table 4.13). The difference though, seemingly marginal indicates that nutritional counseling was not being adequately provided to all hospitalized HIV/AIDS patients. Lack of nutritional counseling may affect the patient's dietary intake due to loss of appetite, poor food choices among other factors. In this study, poor appetite among the 20 study cases was found to be associated to lack of dietary counseling services  $p < 0.05$  ( $p = 0.017$ : Chi-square test) in that over three quarters of the cases who reported to have poor appetite had not received dietary counseling as opposed to only one-fifth of the cases who confessed to having been counseled on diet. Nutritional counseling was also highly associated with whether patients were offered special diets or not  $p < 0.05$  ( $p = 0.001$ : Chi-square test) by the fact that out of the 33 cases who were not given dietary counseling services, 31 of them were not offered special diets.

The nutritionist was the highly reported diet counselor. Among the 23 cases who received nutritional counseling, slightly more than one-eighth said they were counseled once per week with the same proportion indicating more than three times per week, while the rest one-eighth reported twice per week. The study cases received counseling services while hospitalized (Table 4.13).

*Table 4.13: Distribution of study cases according to counseling services on diet, type of counselor and frequency.*

<b>Nutritional Counselling</b>	<b>Responses % (n=56)</b>
Received Dietary counselling	41.1
Did not receive Dietary counselling	58.9
<b>Who counselled you</b>	
1. Nutritionist	30.4
2. Nurse	5.4
3. Nurse + Nutritionist	3.6
4. Doctor	1.8
<b>How often(per week)</b>	
1. Once	14.3
2. Twice	12.5
3. > twice	14.3

The findings above correspond well with information gathered from the key informant interviews with the nutritionists and the nurses. According to the nutritionist at operational level they admitted to the fact that not all admitted HIV/AIDS patients received nutritional counseling due to the high patients load especially when the nutritionist had to cover two or more wards. These sentiments were contrary to those of the Head of nutrition department who expressed that all admitted HIV/AIDS patients received nutritional counseling. They admitted having guidelines for nutritional counseling for PLWHA, which they were not following (Refer to appendix ). The nutritionists said that they offered nutritional counseling while patients were still in the ward, on daily basis and during discharge. Also nutritional counseling was done when food was being served or when patients were receiving drugs. Lack of appropriate planning on the side of the nutritionist was evident since some patients received counseling services more than once a week and some did not receive at all.

The nurses reported that they were briefing patients on nutrition education in the absence of the nutritionist. After briefing they referred the patients to the nutritionist for detailed nutritional counseling. The nutritionists reported some of the information given to patients during nutritional counseling such as the importance of the balanced diet; food choices and preparation methods; nutrient value of foods with emphasis on high protein, high calorie diet and micro nutrient supplementation and the role of diet in nutrient and drug interaction.

#### **4.5 SUPPLEMENTS**

The study participants were asked whether they took any vitamin, mineral or whole food supplements, the type, frequency, and brand.

Slightly more than one-third of the cases were on various types of supplements and were certain of their intake of supplements. Nearly the same proportion of the cases was not on any type of supplement. Of interest were one fifth of the remaining cases who were taking supplements but did not know (Table 4.14).

When asked about the type of supplement taken, more than half of the cases mentioned vitamins. Of interest was a small proportion who said were on whole food supplements. They

had a misconception about Lucozade and Glucolin since to them those were whole food supplements because they were energy boosters. Nearly one-half of the cases were on multivitamins, while less than one-eight were taking folate. Other reported supplements were pyridoxine and neurobine (Table 4.14).

On how often the supplements were taken, almost one-half of the cases said they took the supplements once a day; less than one-eighth took them twice a day, while almost one-eighth said they did not know.

**Table 4.14: Distribution of study cases according to supplements taken.**

<b>Supplements</b>	<b>Responses % (n=56)</b>
On supplements	41.1
Not on supplements	39.3
DNK (Do not know)	19.6
<b>Type of supplement:</b>	
Vitamin	55.4
Whole food supplement	5.4
What brand:	
Multivitamin	44.6
Folate	7.1
Pyridoxine <sup>a</sup> - B <sub>6</sub>	1.8
Neurobine <sup>b</sup> B - complex	1.8
Glucolin c	1.8
Lucozade <sup>d</sup>	13.6
<b>How often:</b>	
Once a day	46.4
Twice a day	5.4
DNK	8.9

a,b – Vitamin supplements in pharmaceutical form (drugs).

c,d – Energy boosters regarded by the study cases as whole food supplements.

#### 4.6 DIETARY INTAKE

One of the objectives of the study was to determine the nutrients adequacy of the hospital diet and dietary supplements (home diet) given to hospitalized HIV/AIDS patients at Kenyatta National Hospital.



The catering manager was interviewed to obtain information on the hospital standard menu (official menu) and the food service delivery system in the hospital. Patients' relatives or guardians were interviewed on dietary supplements brought from home.

#### 4.6.1 Implementation of the Hospital Standard Menu.

The Kenyatta National Hospital Standard menu shown in appendix 7 is considered as an ideal menu for the hospital. This was the hospital's standard menu that was being implemented by catering department for the patients in ordinary wards (not in the private wing) at the time of study. The food items in the menus were prepared by use of standard recipes with specified ingredients to cater for approximately 2,000 patients. An average intake for one patient was then calculated (Table 4.15).

*Table 4.15: The nutrient composition per serving of the Kenyatta National Hospital Standard Menu offered on daily basis.*

DAY	Nutritive Value			
	CHO (g)	Protein (g)	Fat (g)	Kcalories
MONDAY	381 (71.8% kcal)	64 (12.1% kcal)	38 (16.1% kcal)	2122
TUESDAY	329 (68.9% kcal)	61 (12.7% kcal)	39 (18.4% kcal)	1911
WEDNESDAY	344 (67.5% kcal)	78 (15.3% kcal)	39 (17.2% kcal)	2039
THURSDAY	334 (60.9% kcal)	79 (14.5% kcal)	60 (24.6% kcal)	2192
FRIDAY	404 (71.3% kcal)	66 (11.6% kcal)	43 (17.1% kcal)	2267
SATURDAY	350 (60.1% kcal)	73 (12.5% kcal)	71 (27.4% kcal)	2331
SUNDAY	285 (57.9% kcal)	70 (14.2% kcal)	61 (27.9% kcal)	1969
Average	347 (65.5% kcal)	70 (13.2% kcal)	50 (21.3% kcal)	2118

In general, throughout the study period, the diet provided was balanced in terms of the three main food groups i.e. energy giving foods, body building foods and protective foods. Irrespective of that, a few shortcomings were noted by the observers as listed below.

**a) Menu schedules were not strictly followed**

For example, meat/chicken days interchanged, hence served on unexpected days.

**b) Menu items not always consistent**

For example, meat days substituted by mainly legumes. This led to study cases consume one meat meal only in every two days instead of two meat meals. Similarly, fruits were irregularly served. The study cases were able to eat a fruit once every two days instead of two times a day. Legumes became monotonous and rice for lunch and *ugali* (stiff porridge) for supper were predominant.

**c) Omitted food items from menu**

There were completely no vegetables for lunch and supper on Wednesday 2/4/2003 and Thursday 3/4/2003, and also Monday 24/3/2003 at lunch time.

As indicated in table 4.15 the Kenyatta National Hospital standard menu (*the ideal menu – appendix 7*) on average was found to provide approximately 2118 kcalories, 70 grams protein, 347 grams carbohydrates and 50 grams fat. Therefore it met the daily mean requirements for adults with no increased nutrient needs whose recommended dietary allowances are 2070 kcal/day for both adult males and females; 57 grams protein for adult males and 48 grams for adult females respectively. The caloric distribution of the nutrients provided by the hospital menu were 65.5% of the total calories from carbohydrates; 13.2% of the total calories from proteins; and 21.3% of the total calories from fats. These findings suggest that the diet was high in carbohydrates, high in proteins and low in fats.

Looking at the menus (appendix 7) the protein sources were dominantly of plant origin i.e. proteins of Low Biological Value, hence low bioavailability. The hospital standard menu as summarized above would not be able to meet the increased nutrient needs of HIV/AIDS patients unless a nutritional support intervention through supplementation was initiated. This study calculated nutrient adequacy of the hospital diet based on what the patients actually ate.

The key informant interview with the catering manager revealed that the hospital provided varied diets, which were able to cater for the majority of patients on the regular diet. However, the manager admitted that with the help of the nutritionists they could advise the hospital management to budget for suitable menus adequate to meet the needs of patients with special preferences and those whose conditions required special considerations. On the other hand, the key informant interview with the head of nutrition revealed that hospitalized HIV/AIDS patients were being given 'Special food.'

Outlined below is information obtained during a key informant interview with the catering manager on how the hospital food service delivery system worked and the constraints experienced:

(a) *Patients allowances for main ingredients (refer to appendix 9).*

These were the patients' allowances for the main ingredients used in food preparation per meal per patient.

(b) *Food production and service in the kitchen*

The catering manager reported that a master guide prepared by the nutritionist assigned in the kitchen which summarized all the patients diet orders from the wards including both the regular diet and therapeutic diets was used in food production and service to cater for all patients.

(c) *Raw materials, meal preparation and food delivery system/service*

All the meals were being prepared in the hospital catering kitchen with the exception of special feeds which were being prepared in the special diets kitchen. Cateresses supervised the preparation of the standard hospital menus, while special diets were being supervised by the nutritionist. When the food was ready it was served to respective ward trolleys by the kitchen cooks under the joint supervision of both the cateress and the nutritionist. The food trolleys were then ferried to the wards by uniformed porters. The porters were under the management of catering department and worked in shifts.

(d) *Food Trolleys:*

The catering unit utilized insulated food trolleys to ensure and deliver food to respective wards while maintaining appropriate food temperatures that ensured serving of hot food. The food trolleys were divided into two sections. One side was refrigerated and the other side was reserved for hot temperature. The top section of the trolley comprised of a Bain-Marie (Compartment where rectangular food containers were inserted or fitted). The trolley also consisted a cupboard with drawers where trays could be slipped in. It was made of stainless steel material. The trade name for the trolleys was known as 'MOFFAT'. Each study ward had an insulated trolley. These trolleys were used to ferry food during lunch and supper meal services. Breakfast meal service was ferried in ordinary 20 litres plastic buckets or 10 litres stainless steel buckets (for tea, porridge and bread). Aluminium milk cans (containers) were used to carry special feeds from the special diets kitchen. Breakfast was ferried to the wards by use of ordinary four wheeled non-insulated trolleys. The catering manager reported that the tea urns had been previously purchased but rejected because they were substandard. The hospital was in the process of repurchasing appropriate tea urns.

(e) *Meal time Hours*

Breakfast:	8:30 am to 9:30 am
Lunch:	11:30 am to 12:30 pm
Mid afternoon:	3:00 pm to 4:00 pm
Supper:	5:30 pm to 6:30 pm
Bed time:	Currently stopped.

Regards to bedtime snack the catering manager reported that *wimbi* (millet) porridge used to be served in the evening as a bedtime snack but had been long stopped. The attributable reason was that breakfast was being served early therefore there was no need for a bedtime snack. However, the manager reported another alternative being implemented was that some porridge was being delivered with supper on daily basis for those patients who were not able or did not wish to eat supper. They in future intended to introduce cocoa and a snack at bedtime.

(f) *Lifts:*

Two lifts had been set aside during mealtime hours to facilitate food delivery from the kitchen to the wards and vice versa. These were manned by security guards from the hospital.

(g) *Constraints in food availability*

The catering manager reported that occasionally vegetables and meat missed from the hospital menu. The attributable problems were mentioned as suppliers not able to meet the demand or not honor the tenders; K.N.H supplies department not giving LPOs to the suppliers on time; hospital delaying payment to suppliers who in turn refuse to deliver goods, and finally due to seasonality e.g. fruit and vegetables being scarce during dry seasons.

#### **4.6.2 Nutrient Intake**

The mean requirement for energy and protein for both male and female HIV infected adults as recommended by WHO was used to calculate the nutrient intake of the study cases as inferred to in section 3.5.4. The ranges for energy for both males and females were 2277- 2381 kcal/day. Protein for males was 85.5g-114g/day and protein for females was 72kg-96kg/day. This study used the mean requirements in the actual calculation, with the assumption that when patients are admitted in the wards have reduced physical activity (are not active) hence sedentary. Thus, 2277kcal/day was the standard used to calculate energy for both males and females (an increase of 10%). The standards used to calculate protein were 85.5grams for males and 72grams for females (an increase of 50%).

##### **4.6.2.1 Hospital diet as a sole diet in HIV/AIDS Management**

The mean daily nutrient intake of energy and protein consumed by the study cases from the hospital diet and the percentages of RDA from the same is shown in table 4.16. Of great concern was the difference in the minimum and maximum intake of the nutrients. This was attributed to the fact that about one-third of the study cases were consuming nutritional supplements, which were high in protein and kcalories in addition to the regular hospital diet. As mentioned before the calculations were based on what the patients actually ate from the actual menus served on daily basis.

**Table 4.16: Average daily dietary intake for energy and protein compared to percentage of RDA contributed by the hospital diet for the study population**

Statistics	Cases (N=56)			
	Energy		Protein	
	kcal	%RDA	gm	%RDA
Mean ( $\pm$ s.d)	1587.0 ( $\pm$ 653.7)	69.7	49.1 ( $\pm$ 22.1)	63.1
Median (Range)	1690.0 (min.167.5, max.2943.5)	74.2	51.0 (min 4.5, max. 97.0)	67.8

The findings in table 4.16 suggest that most study cases consumed more than two-thirds of their Recommended Daily Allowance (RDA) for energy, while for protein consumption was almost two-thirds of the RDA contributed by the hospital diet.

A half of the study cases consumed less than three-quarters (<75%) of the Recommended Daily Allowance (RDA) for energy from the hospital diet as recommended for HIV/AIDS Management, while about two-thirds of the cases consumed proteins below 75% of the RDA. Approximately one fifth of the study cases (n=11) consumed below 1000kcal from the hospital diet. Noticeably, was a study case who consumed the least calories and proteins. This patient reported to be having a poor appetite and had a BMI of 14.8kg/m<sup>2</sup>. The distribution of the study cases by percentage RDA for kcalories and proteins contributed by the hospital diet are shown in Figure 4.4.

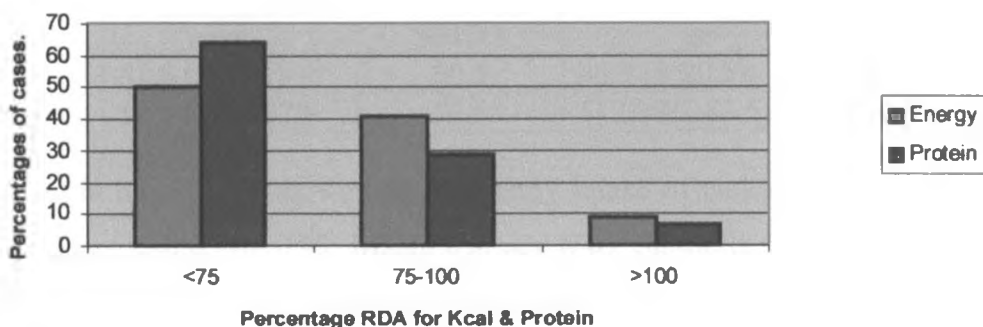


Fig. 4.4: Distribution of study population by % RDA for Kcalories & proteins contributed by the hospital diet.

A comparison was made between male and female study participants on their nutrient intake as contributed by the hospital diet and percentage of RDA for the same.

The results presented in Table 4.17a indicate that on average, adult males consumed almost three-quarters of the RDA from the hospital diet as compared to adult females whose intake was slightly less, about two-thirds of RDA. On the other end, protein intake for the females was slightly better, about two-thirds of RDA compared to slightly less than two-thirds of the RDA for males considering the females mean requirement of 72grams per day (Table 4.17a and Table 4.17b).

Table 4.17a: Nutrient intake (energy) for the study population and percentage RDA by sex

Statistics	Energy			
	Male(n=25)		Female(n=31)	
	kcal	%RDA	Kcal	%RDA
Mean ( $\pm$ s.d)	1697.5 ( $\pm$ 690.7)	74.6	1497.9( $\pm$ 619.3)	65.8
Median (Range)	1776.5 (min. 373.5, max.2943.5)	78.0	1625.0 (min.167.5, max. 2401.0)	71.4

**Table 4.17b: Nutrient intake (Protein) for the study population and percentage RDA by sex**

Statistics	Protein			
	Male(n=25)		Female(n=31)	
	gm	%RDA	gm	%RDA
Mean ( $\pm$ s.d)	51.8 ( $\pm$ 24.1)	60.5	46.9 ( $\pm$ 20.5)	65.2
Median (Range)	51.0 (7.0-97.0)	59.6	51.0 (4.5-81.5)	70.8

The results shown in table 4.17a shows that the energy intake of males and females was not statistically significant  $p < 0.05$  ( $p = 0.49$ : Mann-Whitney test). Similarly table 4.17b shows that protein intake was not statistically significant  $p < 0.05$  ( $p = 0.39$ : Mann-Whitney test) between males and females. Therefore there was no difference in intake of nutrients between the cases.

#### 4.6.2.2 Hospital Diet complemented by Home Diet in HIV/AIDS Management.

Another objective of the study was to compare the caloric and protein content of the hospital diet and dietary supplements given to hospitalized HIV/AIDS patients at Kenyatta National Hospital to the WHO Recommendations. The study was to establish whether dietary supplements from outside the hospital played any role in improving nutrient intake of HIV/AIDS patients.

The nutrient intake and the percentage of RDA contributed by the hospital diet as the sole diet given to hospitalized HIV/AIDS patients was compared to the nutrient intake and percentage of RDA when the hospital diet was complemented with home diet.

The results show that dietary supplements from outside the hospital (home diet) when complemented the hospital diet contributed highly significantly  $p < 0.05$  ( $p < 0.001$ : Chi-square test). to the dietary intake of the study cases by raising their energy (93.1% RDA) and protein (83.7%RDA) levels higher than if the hospital diet alone was consumed.



The percentage contribution by the hospital diet alone was more than two-thirds, which rose to ninety three percent when home diet was included. This was an increase of approximately 23.4% of RDA contributed by home diet. Protein intake also rose from about two-thirds of RDA to close to eighty four percent of RDA contributed by both hospital diet and home diet combined. This was an increase of about 20.6% of RDA contributed by home diet (Table 4.18). More than three-quarters of the cases received and consumed dietary supplements from home in addition to the hospital diet.

**Table 4.18: Comparison of nutrient intake and percentage RDA contributed by the hospital diet to nutrient intake and percentage RDA contributed by both the hospital and home diet combined.**

Statistics	Cases (N=56)							
	Hospital Diet				Hospital Diet + Home Diet			
	Energy		Protein		Energy		Protein	
	Kcal	% RDA	gm	% RDA	Kcal	% RDA	gm	% RDA
Mean ( $\pm$ s.d)	1587.0 ( $\pm$ 653.7)	69.7	49.1 ( $\pm$ 22.1)	63.1	2119.5 ( $\pm$ 603.9)	93.1	65.0 ( $\pm$ 22.2)	83.7
Median (Range)	1690.0 (min. 167.5, max. 2943.5)	74.2	51.0 (min. 4.5, max. 97.0)	67.8	2174.3 (min. 507.0, max. 3627.0)	95.5	67.5 (min. 17.5, max. 111.0)	83.3

A comparison of the distribution of the study participants who consumed below 75.0% of the RDA or at least 75.0% and above of the RDA for kcalories and proteins from the hospital diet alone and when the hospital diet was complemented with home diet was made.

The proportions of the study cases who consumed less than 75% of the RDA for nutrients contributed by the hospital diet reduced by approximately a half (n=28) when the hospital diet was complemented with the home diet. The proportion that consumed 75% of the RDA and above increased for the better. Of significance were the participants who consumed above 100% of the RDA from the hospital diet. Their proportion increased tremendously when the hospital diet was complemented with the home diet i.e. only 5 of the cases, consumed above

100% of the RDA for energy from the hospital diet as compared to 24 cases when the hospital diet was complemented with the home diet (Table 4.19). Figure 4.5 shows graphically these findings. The results have been purposively presented in a table and graphically for clarity.

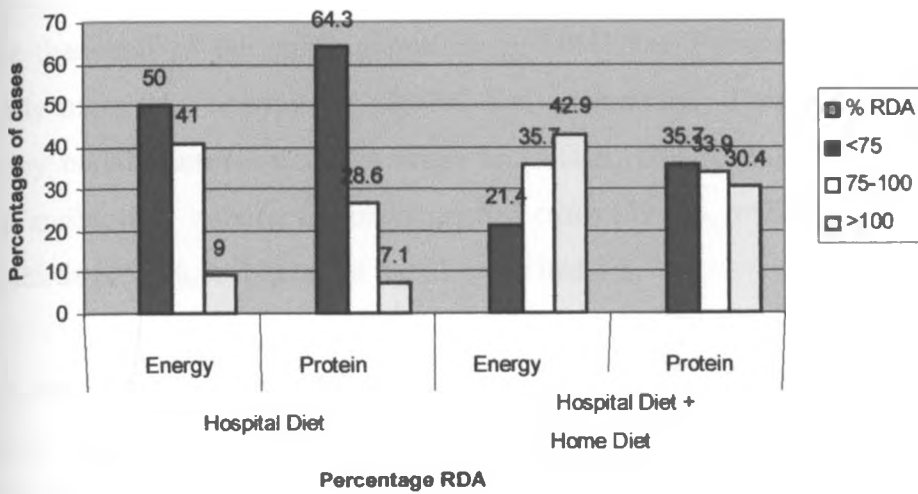
Appetite was also highly associated with the caloric intake of the study cases contributed by both the hospital diet and home diet combined  $p < 0.05$  ( $p = 0.004$ : Chi-square test) in that among the 20 cases who had poor appetite, 9 of them consumed less than three-quarters of the percentage RDA for kcalories, and 11 consumed  $>75\%$  RDA, while out of the 36 cases who reported to be having moderate to good appetite, only 3 of them consumed less than three-quarters of the RDA for kcalories, and 33 cases consumed  $>75\%$  RDA.

These findings support the fact that home diet has a role to play in the dietary management of hospitalized HIV/AIDS patients at K.N.H. Similar sentiments were supported by the nurse. More than three-quarters of the patients were able to consume  $>75\%$  RDA for energy, while two-thirds were able to consume  $>75.0\%$  RDA for protein when home diets were considered. Hence the hospital diet was inadequate in energy and protein to meet the demands of the majority of hospitalized HIV/AIDS patients particularly protein.

**Table 4.19: Comparison of distribution by percentage of RDA for kcalories and proteins contributed by both the hospital diet and the home diet combined to the hospital diet.**

%RDA	Cases %(N=56)			
	Hospital Diet		Hospital Diet + Home Diet	
	Energy	Protein	Energy	Protein
<75	50.0 (n=28)	64.3 (n=36)	21.4 (n=12)	35.7 (n=20)
75-100	41.0 (n=23)	28.6 (n=16)	35.7 (n=20)	33.9 (n=19)
>100	9.0 (n=5)	7.1 (n=4)	42.9 (n=24)	30.4 (n=17)

There was no significant difference between males and females in the intake of % RDA for kcal  $p < 0.05$  ( $p = 0.242$ : Mann-Whitney test), and % RDA for protein  $p < 0.05$  ( $p = 0.09$ : Mann-Whitney test), when the hospital diet was supplemented with home diet.



**Fig. 4.5: Comparison of distribution by % RDA for Kcalories & Proteins contributed by Hospital diet and Home diet combined to the hospital diet**

#### 4.7 SUMMARY OF RESULTS

In summary the results of this study point to the following:

The results show that over three-quarters (80.4%) of the study population were young falling in the 18-39 years age bracket with a mean age of 32 years (s.d 7.72). There was no significant difference in the distribution of the population by age and sex  $p < 0.05$  ( $p = 0.30$ : Mann-Whitney test).

About two-thirds (62.5%) of the study population were married, while almost one-quarter (21.4%) were single. Nearly all the cases are literate with more than half (50.0%) having attained primary level education, followed closely by one-third (35.8%) who had attained secondary education. Less than one-eighth (8.8%) were graduates.

One-quarter (25.0%) of the study cases were unemployed, while nearly a similar proportion (23.2%) were self employed with most of these engaged in small scale income generating activities e.g. carpenters, salonists, shopkeepers. Salaried employed accounted for one-fifth (16.0%) and were employed as computer analysts, accountants, auditor, inspector and caterer

either from civil service or private sector. The rest were casual labourers and housewives. Farmers were counted for 5.4%.

More than half of the study population (57.0%) had Pulmonary Tuberculosis (PTB), while slightly more than one-quarter (26.0%) had pneumonia. These were treated by a combined therapy mainly anti-tuberculosis drugs i.e. rifampin, ethambutol and isoniazid or ethambutol and other antibiotics. Among the malnourished cases (39.3%, n=22) had BMI levels <18.5, while two-thirds (63.6%, n=14) out of the 22 cases had TB.

Body mass index showed that more than a half (58.9%) of the study population were within normal limits, hence had good nutritional status. The median BMI levels for both sexes were comparable 18.8 kg/m<sup>2</sup> (13.4 – 24.4) for males and 18.8 kg/m<sup>2</sup> (11.6 – 29.2) for females, therefore there was no significant difference in BMI levels between the sexes  $p < 0.05$  ( $p = 0.82$ : Mann-Whitney test). BMI levels did not show any significant association with appetite  $p < 0.05$  ( $p = 0.38$ : Chi-square test).

About two-thirds (62.5%) of the cases reported that they enjoyed eating the hospital diet because the food was well prepared and palatable. Analysis by Fisher's exact test indicated that appetite was not among the reasons that attributed to patients enjoying eating the hospital diet  $p < 0.05$  ( $p = 0.41$ : Fisher's exact test). Other reasons were food being served hot, menu containing animal proteins, nobody to bring food from home and used to poverty. Just over one-third (37.5%) of the cases who did not enjoy eating hospital food said the food was neither palatable nor appetizing or tasty and not properly cooked. A few others cited food monotony, limited food choices, poor food presentation and personal food preferences.

More than three-quarters (89.3%) of the cases did not finish their food because the food portions were too large (33.9%) and due to loss of appetite (17.9%). Other reasons given included early satiety, nausea, difficult swallowing, stomach distention, taken food from home, dry mouth/sore mouth and food not palatable. The results reveals that appetite did not contribute to the fact that the majority of the cases did not finish their food  $p < 0.05$  ( $p = 0.08$ : Fisher's exact test).

Food aversion was found among one-quarter (25.0%) of the study cases. Foods mentioned were mala (fermented milk), beans, cabbages, fresh milk, fried eggs, citrus fruits, soda/squashes and unsalted food. Reasons given for distention/ache, vomits, dislikes food, diarrhoea, heartburn (acidity), flatulence (gas) and dietary restriction. Food selection based on religious beliefs or ethnic or cultural background was insignificant since a very small proportion of the cases attributed their reasons for food choices to this factor.

More than three-quarters of the respondents confessed receiving food from outside the hospital (home diet). This explains **study objective three (3)**. Dietary supplements commonly brought from outside the hospital included fruits (75.0%) of the cases, fresh milk (53.6%), Wimbi porridge (26.8%), irish potatoes and green bananas (21.4%) each. Other foods were bread, queencakes and eggs, liver and fish as the preferred sources of High Biological Value proteins in addition to milk. Beans were rarely brought by (5.4%) of the cases, probably because legumes were the dominant protein sources in the hospital menu. Lucozade and Glucolin (energy boosters) were the preferred commercial drinks regarded by the patients as whole food supplements due to ignorance. Immediate family members i.e. sister, wife, brother, husband, mother and daughter were the persons mostly bringing the foods (64.3%). Dietary supplements from outside the hospital (home diet) contributed highly significantly  $p < 0.05$  ( $p = 0.001$ : Chi-square test) to the dietary intake of the study cases by raising their energy (93.1% RDA) and protein (83.7 RDA) levels higher than if the hospitalized diet alone was consumed.

The Kenyatta National Hospital standard menu regarded as an ideal menu for the hospital provided 2118 kcalories, 347 grams carbohydrates (65.5% kcal), 70 grams protein (13.2%) and 50 grams fat (21.3% kcal) thus only met the daily mean requirements for adults with no increased nutrient needs. It was high in energy mainly from carbohydrate sources. Fat content was low. Proteins seemingly high were mainly from plant origin, thus proteins of Low Biological Value with low bioavailability. WHO recommendations for HIV-infected adults is 10%-15% increase for energy and 50% to 100% increase for proteins. The findings of the study revealed that the hospital standard menu was found not to be adequate to cater for the increased needs of hospitalized HIV/AIDS patients when it was the sole source of energy and

proteins, unless complemented by dietary supplements from the hospital's special diets kitchen or home diets. On the same note special diets in the form of high protein, high calorie diet i.e. special milk, special uji, fresubin, also eggs and milk, significantly contributed to the kcalorie intake of the cases  $p < 0.05$  ( $p = 0.045$ : Mann-Whitney test) and similarly to the protein intake  $p < 0.05$  ( $p = 0.013$ : Mann-Whitney test).

Home diet played a significant role in the nutrient consumption of the study cases. The proportions of the study cases who consumed less than 75% of the RDA for nutrients contributed by the hospital diet reduced by approximately a half ( $n = 28$ ) when the hospital diet was complemented with the home diet. These results explain **study objective one (1)** and **study objective four (4)**.

Nutrition counseling services provided to hospitalized HIV/AIDS patients were found to be inadequate due to poor planning and inefficiency among the nutritionists. The nutritionists despite having guidelines for nutritional counseling for PLWHA were found not to be using them. Only about 41.0% ( $n = 23$ ) of the patients received dietary counseling. Results indicate that some patients are counseled more than three times in a week while others never get a chance to meet the nutritionist. The reasons mentioned above are assumed to be contributory factors for poor counseling services in that the nutritionists spend too much time on one patient rather than spreading the time to cater for many. The result in this section explains **study objective two (2)**. Dietary counseling was associated with whether one was offered special diets or not in that it was highly significant  $p < 0.05$  ( $p < 0.001$ : Chi-square test) by the fact that out of the 33 (58.9%) of the cases who were not given dietary counseling services almost all of them 31 (91.9%) were not offered special diets.

In addition, this study found out that poor appetite among the 20 study cases was highly attributed to lack of dietary counseling services  $p < 0.05$  ( $p = 0.017$ : Chi-square) because over three-quarters out of the 20 cases (80.0%) who reported to be having poor appetite had not received dietary counseling, as opposed to only one-fifth (20.0%) of the cases who confessed to having been counseled on diet.

## **CHAPTER FIVE**

### **DISCUSSIONS**

#### **5.1 INTRODUCTION**

This study was carried out on hospitalized adults' male and female HIV/AIDS patients at Kenyatta National Hospital, Nairobi. The study aimed at evaluating Dietary management and adequacy for HIV/AIDS in-patients by following suggestions on how to maximize food intake. The findings of this study are expected to be of use primarily to the ministry of Health, health institutions, NGOs, PLWHA and others whose programmes focus on improving the quality of life; and prolonging survival for people with HIV/AIDS.

#### **5.2 SOCIAL DEMOGRAPHIC AND OTHER CHARACTERISTICS OF THE STUDY POPULATION**

More than three quarters of the study participants came from Nairobi and about one – third of the respondents were affiliated to Kikuyu and Luo ethnic groups respectively. However, of importance was the distribution among other ethnic groups such as Kamba, Luhya, Kisii, Embu, Meru and Turkana, which shows the trends of HIV infection in the country. It is evident from this study that HIV/AIDS is spreading all over the country especially among certain ethnic groups where HIV/AIDS infection rate was still considered to be low e.g. Meru. Studies carried out in various parts of Kenya revealed that rapid spread of HIV/AIDS infection means that no district in Kenya can be complacent about AIDS, even where HIV levels are currently low. The sentinel surveillance data conducted by the National AIDS and STDs control Programme in the Ministry of Health covering the last 10 years (1990 – 2000) revealed that Meru represented an area that has experienced rapid increase in the number of people infected (NACC, 2000; Kenya, Ministry of Health, 2001). Similar results are implied in this study since study participants came from various ethnic groups as mentioned above.

In Kenya, the AIDS epidemic affects the productive age groups hardest, with 75 percent of those dying of AIDS being men and women between the ages of 20 and 45 years (Kenya, Ministry of Health, 2001). Results in this study imply similar patterns in that more than three – quarters (80%) of the study cases are relatively young adults between the ages of 18 and 49

years. This figure is comparable to the national figure (>75%) of the distribution of reported AIDS cases by age and sex (1986-2000) in sexually active adults between the age bracket of 20-45 years (Kenya, Ministry of Health, 2001). Studies have shown that the infection patterns among male and female cases are about equal since HIV is predominantly transmitted through heterosexual contact (Kenya, Ministry of Health, 2001). The findings in this study correspond well with the national infection pattern levels by age and sex, in that ninety two percent of male cases and a hundred percent of female cases fell in the 18-49 years age bracket, while more than one third of male cases and female cases with similar proportion fell in the 18 – 25 years age bracket. Studies have shown that men and women in Africa have been about equally infected, although that varies from region to region, with 50 percent becoming HIV – positive before age 25 and with a similar percentage of these dying before they reached age 35 (Willis, 2000). This study confirms these findings.

Rates of HIV prevalence in pregnant women in Africa closely approximate the rates of infection in the adult population age 15 to 49 years. Therefore, sentinel surveillance (2000) in antenatal clinics has been used to estimate the prevalence and trends of HIV infection in the adult population. These studies indicate that young women generally have higher rates of infection than young men, but older men have higher rates of infection than older women (Kenya, Ministry of Health, 2001). Similar results have been shown in this study with young women having higher infection rates in the 18-29 and 30-39 years bracket, while older men having higher rate of infection than older women in the 40-49 and 50-59 years age bracket (Figure 4.2).

The findings in this study show that a large majority, about two – thirds of the study population are married, while almost one – quarter of these are single and over three – quarters of the married cases are young adults. Studies have shown that early marriages encouraged by some cultural practices expose young women more to HIV infection through having sex with older men who may already be infected by HIV. Also, having multiple sexual partners is culturally accepted for men since such practices as polygamy are allowed and this puts great risk to their regular partners. Men can have sex in and out of wedlock without anyone complaining. The male ego drives men into high risk behaviours like drug and alcohol abuse because of the need



to display their manhood. Young men are particularly vulnerable because they are under pressure to conform to the practices of their peers (Kenya, Ministry of Health, 2004). This study assumes these results in that since majority of the cases are young and married, could have been victims of some of the factors that are likely to increase risk of exposure to HIV infection. Death attributable to HIV/AIDS has dramatically impacted the life expectancy. The national figures estimate life expectancy at about 46 years and may decline to 45 years by 2010 (Kenya, Ministry of Health, 2001). The results in this study indicate that the widowed cases (19.7% n=11) were much older falling in the 40-59 years age bracket, implying a high risk of dying from HIV/AIDS.

Kenya has a high literacy rate of 76.0% for males and 67.0% for females. Despite the advantages of these high literacy rates, the AIDS pandemic is threatening to reverse enrolment and completion rates (NACC, 2000). Nearly all the cases are literate as indicated in the findings of this study, with more than half having attained primary level of education, followed closely by one-third of the cases who have attained secondary level. Less than one-eighth of the cases were graduates, implying that the study population have fewer skills to enable them to attain wage employment. It is not surprising that only one-fifth are in wage employment. Higher education levels have been associated with improved socio – economic status, implying better living conditions which should in turn lead to higher levels of nutritional status. Education is one of the priority areas in combating HIV/AIDS as an intervention strategy. Knowledge on HIV/AIDS can influence behaviour formation and behaviour change among 50.0% of the country's youthful population (NACC, 2000), hence preventing the spread of HIV/AIDS. Since the study cases are literate they have a potential for behaviour change.

About a quarter of the study population are unemployed, while nearly a similar proportion are self-employed with most of these engaged in small scale income generating activities. Slightly less than one-fifth are casual labourers. This kind of employment is expected to generate low incomes which could not meet adequately the increased demands of HIV/AIDS disease among the infected persons.

A study conducted in Kisumu district in 1997 (Kenya, Ministry of Health, 2001) on the age profile of infected persons found that the highest degree of sero-prevalence in women is found in the 25-29 age groups and 30-39 age group for men. These groups are normally expected to be the most economically productive. On the contrary, the socio-economic impact of AIDS is increasingly being felt among the affected families and those that are infected with HIV/AIDS. There is reduced productivity and lost labour as a result of illness and death of infected people; reduced income from less productive or lost labour. This includes caregivers' ability to ensure adequate food and nutrition for the family (Piwoz and Preble, 2000; Williams, 1993a). This study reveals similar findings to the fact that more than three – quarters of the participants are young adults in the mentioned age groups, likewise about a quarter of the cases are unemployed and ill, hence with reduced productivity. In Ethiopia a study showed that HIV/AIDS affected households spent an average of 11.6 to 16.4 hours a week on agricultural work, compared to 33.6 hours a week spent by non-HIV/AIDS-affected households (RCQHC, 2003). In this study, a unique group, less than one-eighth comprises farmers implying that their productivity will be compromised by their illness, leading to poor agricultural output and profitability.

### **5.2.1 Primary Diagnosis**

More than half of the study population in this study have pulmonary tuberculosis (PTB) as the primary diagnosis, while one-quarter of the cases have pneumonia. Some of the TB and Pneumonia cases also have gastro enteritis as a secondary infection. Tuberculosis is the most important opportunistic infection associated with AIDS (Refer to appendix 4 for the WHO guidelines for Diagnosis of AIDS). In a study, which was carried out at Kenyatta National Hospital between 1988/1997, it was found that the proportion of TB cases among all admitted patients doubled from 8% to 16%. In HIV infected patients the proportion that also had active TB infection rose from 18 to 27% over the same period (Kenya, Ministry of Health, 2001). There have been a rising number of TB cases among HIV patients, which is also implied in this study by supportive data.

The study results also show the relationship between HIV infection and nutritional status in that more than a half of the respondents diagnosed for various opportunistic diseases have good

nutritional status, while about one-third are malnourished. HIV infection compromises the nutritional status of infected individuals. Good nutrition has the greatest impact at the early stages of the disease because it strengthens the immune system to fight opportunistic infections and delay the progression of the disease. In this study it is implied that most of the cases are in the early symptomatic stage of the disease and they are still maintaining good nutritional practices, hence well nourished. However, among the malnourished cases, about two – thirds of these have TB with BMI levels below the cut off point ( $<18.5$ ). Wasting syndrome is typical in adult HIV/AIDS patients, particularly those with TB (Piwoz and Preble, 2000). Severe wasting has also been implied in this study with nearly one-eighth of the cases having BMI levels  $<16.0$ .

Following infection with HIV, the immunity progressively declines over time. As a result of the decline in immunity, opportunistic diseases (especially infections) become more frequent. Opportunistic infections include, tuberculosis, herpes zoster, candidiasis, pneumocystis carinii pneumonia (PCP), kaposi sarcoma, malaria, cryptococcal meningitis and cryptosporidium induced diarrhea (Cimoch, 1997). In this study, some of these opportunistic infections have been confirmed e.g. tuberculosis, pneumonia, malaria and meningitis. Persons with inadequate nutrition who are HIV positive, manifest symptoms such as nausea, vomiting, malabsorption, diarrhea, oral/esophageal ulcers, muscle wasting, constipation, bloatedness, heartburn and loss of taste (FAO, 2003; FANTA,2001). In this study some patients presented with similar symptoms alongside the primary diagnosis.

Drugs are a primary mode of treatment for patients with HIV disease. Two major factors underlying how a patient may respond to drug therapy include the patient's nutritional health before the therapy begins and the ability to consume and tolerate an appropriate intake during therapy. Because many drugs are bound to and dependant on serum proteins for delivery and uptake into their target cells, malnourished patients with decreased serum proteins may not fully benefit from certain drug therapies, particularly for protein-bound drugs having a short life (Cimoch, 1997).

Kenya. Ministry of Health (2002), designed a reference manual for Home-based care for PLWHA in Kenya where Drug therapy guidelines for most of the opportunistic infections and symptoms are clearly elaborated. The results show that the drugs used in the study are in accordance to the reference manual. Pyridoxine (B6) and neurobine (B-complex) are pharmaceutical forms of vitamin supplements prescribed along with Isoniazid in the treatment of Tuberculosis. Isoniazid (Isonicotinic acid hydrazide) is used as a chemotherapeutic agent for tuberculosis and is an antagonist to pyridoxine. It also inhibits the conversion of glutamic acid, the only amino acid the brain metabolizes, and causes a side effect of neuritis. Treatment with large doses of Pyridoxine, 50 to 100mg/day, prevents this effect (Williams, 1993 b). In limited-resource settings locally available, affordable, and acceptable foods rich in vitamin B6 may be recommended, such as sweet potatoes, white beans, maize, oil seeds, green leafy vegetables, meat and fish.

### **5.2.2 Alcohol Intake**

Alcohol intake depresses the nervous system, inhibits the bone marrow's ability to regenerate blood cells, depletes B vitamins with beta-carotene, may cause liver damage and causes dehydration( Kirschmann, 1996) . Alcohol may also decrease appetite, leading to reduced food intake, may interfere with metabolism and also interact with some medications, decreasing their efficacy (RCQHC, 2003). Alcohol poisons every system in the body, and for an HIV infected individual, should be consumed in small amounts or avoided completely (Kirschmann, 1996). The findings in this study confirm the suggestion by Kirschmann in that more than three quarters of the cases have chosen not to drink because of their current HIV status. According to Williams (1993 b), alcohol intake leads to malnutrition due to anorexia and reduced food intake. These findings are also implied in this study since almost one-third of the study cases among those consuming alcohol are malnourished. Although, more than two-thirds of the cases who consume alcohol have normal nutritional status, contrary to expectations.

### **5.2.3 Nutritional Status of the Study Population**

HIV infection compromises the nutritional status of infected individuals and in turn nutritional status affects the progression of HIV infection (Piwoz and Preble, 2000). Poor nutritional status may result from multiple causes: depressed appetite, poor nutrient intake and limited food availability, chronic infection, malabsorption, metabolic disturbances and muscle and tissue catabolism, fever, nausea, vomiting and diarrhea, depression and the side effect from drugs to treat HIV-related infections (Piwoz and Preble, 2000; Ross, 1999; USAID, 2003). Some of the factors are also implied in this study.

Poor nutritional status among hospital patients has been well documented. Nestle Nutrition (1996) and Miguel (1996), reported in one of the studies that malnutrition affects around 50.0% of Medical and Surgical patients of all ages. Konstantinides (1998) further indicates that between 30%-50% of patients have PCM when admitted to hospital, and 25% - 30% will develop malnutrition during their hospital stay. Furthermore, as many as 69% of patients will undergo declining nutriture during their hospital stay. The study confirms these findings since 39.3% of the study population are malnourished at admission and some are likely to develop malnutrition if timely and appropriate nutritional intervention are not taken. HIV/AIDS hospitalized patients in most facilities are generally malnourished on admission. The results of this study contradicts this fact in that more than half of the study population are well nourished with a median of 18.8 Kg/ m<sup>2</sup> for both males and females, implying that no severe weight loss has been experienced yet and hence serious intervention measures if instituted early in the diseases might help prevent further weight loss.

## **5.3 FOOD CONSUMPTION IN THE HOSPITAL**

### **Appetite**

Appetite usually refers to desire for some specific food or type of food, but not food in general. Personal appetites are developed within one's cultural food pattern, as well as new tastes learned from various life experiences. Such taste helps persons to choose particular qualities of food and develop personal food attitudes and habits (Williams, 1993 b). Poor appetite is one of the most common problems in people with HIV/AIDS. It can have many causes including infections, pain (particularly in the mouth or gut) depression, anxiety, tiredness or poor

nutritional intake. The feeling of hunger may disappear or the person may be easily satisfied and therefore not want to eat enough (FAO, 2003). Data in this study show that two-thirds of the study cases whose appetites are poor, have good nutritional status, contrary to expectations in HIV infected individuals. It is expected that generally poor appetite could lead to inadequate food intake which may result in poor nutritional status. On the same note inadequate dietary intake may be attributable to many other causes not necessarily due to loss of appetite e.g. nausea, oral thrush, constipation and bloating or heart burn. Some of these factors have been implied in this study.

### **5.3.1 Food consumption Attributes**

(Nestle Nutrition, 1996) reported that taste, texture, appearance, presentation and variety are all important in ensuring compliance with oral nutritional supplementation in hospitalized patients because it is of little value if the patient will not accept the diet or nutritional supplement or fails to maintain an adequate intake. On the same note, Thomas (1987) pointed out some particular problems of catering in hospitals and offered some solutions (Table 5.1).

**Table 5.1 Problems of catering in hospitals and offered solutions**

Catering problems	Solutions
Undesirable cooking practices which may reduce the nutritional quality of food.	Kitchen staff should observe good cooking practices by in service training where necessary.
Nutritional needs of particular groups of patients not being met.	Catering manager to consult dietitians/ nutritionist to identify the needs of these patients.
No dietician within the hospital.	Catering manager must be aware of the specific nutritional requirements of some patients. Should ask for dietetic advice.
Meals not able to be chosen in advance: -Ideally patient should be able to choose one meal in advance e.g. at breakfast time, he chooses his lunch.	Look at the present system. Could it be improved by alteration of work practices?
Lack of choice in portion size: - With a bulk trolley system, it is possible to exercise portion control at ward level.	Ideally, staff should be instructed on standard sizes available (e.g. small/standard, or small/medium/large, etc. Patients should be helped to select the appropriate quantity.
Poor presentation of food: -This is important especially when a patient is anorexic or experiencing loss of appetite. -If the food is not at the correct temperature, it will certainly not be enjoyed and probably eaten.	Use of appropriate garnishes, good portion control and attractive arrangement of food on the plate all help to improve presentation and should be emphasized during in service training. -The trolleys and equipment should be at the correct temperature. - The portaging service should deliver the food quickly and served promptly at ward level.

Some of the problems highlighted by Thomas are also implied in this study has reported by over three-quarters of the study cases who did not finish their food (Table 4.8), and over two-thirds of the cases who did not enjoy eating hospital diet. Therefore data in this study have shown that other factors play a role in reduced food intake as opposed to appetite alone.

People with HIV/AIDS may have problems in digesting certain foods or may suffer from constipation and bloating. As a result, people with HIV/AIDS may wish to omit a particular food and seeing if it makes them better e.g. fatty foods such as fried foods. Like wise cabbage, beans, onions, cold fizzy drinks that create gas in the stomach (FAO, 2003). Some of the mentioned foods are implied in this study. \*

### 5.3.2 Home Diet

Data reveals that about eighty six percent of the patients received food from home. Considering the food consumption attributes as identified in this study could explain partly why patients receive food from home. Information gathered from key informants indicate that some patients may not like the hospital food; the hospital diet lacks variety, hence home diet supplements are what the hospital lacks; patients request their relatives to bring a particular food for them according to their preferences; and finally, food from home gives a patient a sense of homely environment which enhances quick recovery. The results confirm the catering manager's sentiments that the hospital is not adequately catering for those patients with special preferences as determined by the nature of their illness. In view of the opinions expressed by the nurses and the catering manager, it is implied in this study that home diets have a bearing in the dietary management of hospitalized patients, inclusive of HIV/AIDS patients. (*Refer to table 4.10 on dietary supplements commonly brought from outside the hospital*).

Fruits are regarded as sources of vitamin C believed to play a very important role in people living with HIV/AIDS in its enhanced ability to fight infection and as an antioxidant which helps to detoxify carcinogen food additives (such as nitrates, pesticides, and other chemicals) and heavy metals. The findings in this study confirm this belief. Fresh milk and fermented milk are foods that provide high biological value proteins believed to strengthen the immunity of HIV/AIDS people. Wimbi porridge is reported to be nutritious and useful especially when the



patient refuses to eat the hospital diet. All those foods are aimed at improving the nutritional status of the cases by increasing nutrient intake. These foods are among the top foods brought from home for the study cases. Beans may also cause gas in HIV/AIDS patients and is normally omitted in their diets. This fact corresponds well with the study findings in that beans are rarely brought (Table 4.10). The hospital diet menu was mainly serving legumes as a source of protein. This factor is also implied in this study. This study also revealed the fact that Lucozade and Glucolin are the most commercial drinks brought and patients regard them as energy boosters and think they are whole food supplements. This signifies lack of nutritional knowledge among the study participants.

While the nurses feel that home diets are good for in-patients, the catering manager's opinion is that home diets should be stopped since they lead to food wastage in the hospital. Food wastage is also implied in the study, hence confirming the catering manager's views.

### **5.3.3 Food Choices**

Diets are governed basically by what is available from the environment. Selection (from what is available) is made from social, economic, cultural and religious reasons. Individual factors come into play after all other criteria of acceptability have been fulfilled. Freedom to choose what to eat is therefore predetermined often unconsciously (Hartog et al, 1985). Findings from the study imply that majority of the study cases are not influenced by culture in their food choices partly because the menu was standardized and predetermined therefore not allowing patients to select food according to personal preferences. Also implied in the study is a sense of dietary diversification since most study participants said they eat all types of foods regardless of ones ethnic background. Food allergy is the term used only for hypersensitivity that is caused by a normal immunological reaction to specific constituents of food or their digestion products.

Food allergy is distinct from food intolerances, which are caused by non immunologic mechanisms; for example, cow's milk intolerance resulting from lactase deficiency. Among the dominant food allergens are eggs, cow's milk, wheat, peanuts and fish (Williams, 1993 b). People with HIV/AIDS are intolerant to certain foods due to digestive problems and other

symptoms of the disease, e.g. fatty foods; very spicy and salty foods; acidic or very sour foods; raw vegetables; sweet foods; gas forming foods e.g. cabbage, beans, onion, green pepper; and fresh milk (FAO, 2003). The results in this study correspond well with the above information since nearly a quarter of the study population avoid some of the mentioned foods because of discomfort and allergic reactions. Some foods may aggravate the commonly occurring symptoms speeding up disease progression through infections or have so little nutritional value that they do not help improve nutritional status. Some of the foods to be avoided are such as raw eggs, unpasteurized milk and dairy products from unpasteurized milk, undercooked meats and chicken. All these may contain bacteria that are harmful to the already immune compromised HIV infected person. Other foods are 'junk' foods such as chips, biscuits and sweets which have little nutritional value. Sweets and sugars may promote the growth of fungi (thrush). Finally, expired foods, acidic foods, foods with preservatives and oily foods aggravate symptoms related to diarrhea, nausea or vomiting, loss of appetite and mouth and throat sores (RCQHC, 2003).

#### **5.3.4 Special Diets**

It is important for persons with HIV to consume a balanced diet that provides adequate kilocalories, proteins, vitamins, minerals and water. Nutrition intervention should begin early after diagnosis and should include counseling the patient on the importance of a balanced diet and in the later stages of the disease, use of more advanced nutrition support methods. Dietary interventions aim at giving high calorie and nutrient dense foods (Nutrition in the management of AIDS, 1999; Network of African PLWHA (NAP+), 1995) Nutritional support in AIDS, 1994).

In the study findings, only over one third of the study cases are on special diets, mainly a high protein, high calorie diet which confirms the above findings. These results contradict the information gathered from the Head of Nutrition Department which indicate that all hospitalized HIV/AIDS patients were being given special diets. This suggests that nutritional intervention is not adequately given to HIV/AIDS in-patients and this might affect the outcome of the overall management of HIV/AIDS patients. In one of the studies on HIV/AIDS and nutrition quoted in Piwoz and Preble (2000), HIV-infected adults who were given high

energy/protein liquid supplements gained weight and maintained it as long as they did not suffer secondary infections.

Research has shown that when early nutritional intervention is offered to those at risk there is a 10-30% reduction in average length of stay and therefore in costs. Studies of hospital malnutrition carried out by Miguel (1996), found that intervention within the first three days reduced hospital stay by 2.1 days compared with those receiving later intervention (Nestle Nutrition, 1996). Adequate nutrition has been found to strengthen the immune system of HIV/AIDS persons; improve responses to drug therapy; reduce duration of hospital and also help to prolong survival (Sizer and Whitney, 2000).

The nutritionist is the expert in the dietary management of patients who translates the doctor's orders to actual meals and gets feedback of patient's response to the diet in liaison with the nurse (Kenya National Hospital Nutrition and Dietetics Department, 2002). This fact is implied in this study in that the nutritionist is the most reported professional recommending special diets. Information gathered from the doctors, nurses and nutritionists concur with the findings.

#### **5.4 NUTRITIONAL COUNSELLING**

The goal of nutritional counseling is to make the fewest possible changes in the person's lifestyle and food patterns necessary to promote optimal nutritional status while providing maximum comfort and quality of life. It is a person-centered care process (Williams, 1993 b).

Nutrition education and counseling should be an integral part of nutritional care and support of the HIV infected individual. Nutritional education and counseling are important to help the need to maintain an adequate diet and how to manage common gastro intestinal problems related to HIV that may have a negative impact on nutritional intake (RCQHC, 2003).

It is evident in the findings of this study that nutritional services provided to hospitalized HIV/AIDS patients are inadequate and lack quality. The key informants agree that counseling

services are not optimally given to HIV/AIDS patients by the nutritionists. Heavy workload and large coverage area are some of the reasons given by the nutritionist that hinder counseling services. However, the findings suggest that there is poor planning and some degree of inefficiency among the nutritionists since they are not managing counseling activities well. The results show that they spend so much time attending to one patient, in that some patients are counseled three times in a week, while others do not get a chance to meet the nutritionist. The nutritionists admitted having guidelines for nutritional counseling for PLWHA which they are not strictly following (Refer to appendix 13). This implies that the education content the patients receive is sub standard. The findings are contrary to the sentiments of the Head of Nutrition Department who claims that all admitted HIV/AIDS patients receive nutritional counseling. This implies lack of accountability among the senior managers, which requires change of attitude in order to foster better performance among staff.

Similar results have been shown by a study conducted by Mbotela (1999) which revealed that nutritional counseling of HIV/AIDS patients is barely offered in major government and private hospitals in Kenya, unless a patient is referred to a practicing dietitian. This might be the reason why most HIV patients are not adequately educated on good nutrition practices. This study confirms the findings in Mbotela's study.

Lack of nutritional counseling may affect adequate dietary intake in-patients due to loss of appetite, poor food choices among other factors. In this study poor appetite due to lack of adequate dietary counseling is implied (Refer to section 4.4).

Ross (1999) a registered dietitian in the United Kingdom recommends that dietary advice needs to be individualized to maximize the chance of effectiveness. Specific advice should be offered to the patient if they experience a profound loss of appetite, vomiting, diarrhea or a sore mouth. Individualizing advice will allow the advice to be kept as simple as possible, and provide the best chance of the patient totally understanding the purpose of the advice and should begin with suggestions about food intake. Advice should be relevant to the individual, to local need and resources. Nutrition Counseling gives dietary control to the person with HIV, providing the necessary knowledge necessary to improve eating habits and adjust nutritional

intake as appropriate. Data in this study suggest that if the study cases are provided with adequate nutritional counseling they might be able to translate knowledge into practice be able to translate knowledge into practice i.e. consuming nutritious foods and thereby improve their nutritional status. Consequently with knowledge they will best utilize their limited nutritional and health resources to enhance their status.

All in all, the results support the fact that diet counseling is the mandate of the nutritionists as reported by 17 study cases out of 23 cases who received counseling services. According to the nutritionist's point of view, they offer counseling services on daily basis when they come into contact with a patient, and during discharge.

## 5.5 SUPPLEMENTS

Vitamin and mineral supplementation for HIV infected people aims at ensuring absorption by oversupplying the nutrients that are necessary for the immune system to function at its very best all the time. Several studies have shown that individuals with HIV disease have an increased likelihood of developing deficiencies of specific nutrients, including total calories; protein; vitamin A, B6, B12, C and E and folic acid; and the minerals magnesium, calcium and zinc (Cimoch, 1997).

The National Guidelines (Reference Manual) for vitamin and mineral supplementation for PLWHA suggest a daily intake of one tablet of a standard multivitamin. However, the manual stresses a balanced diet as the best source of vitamins and minerals (Kenya, Ministry of Health, 2002). These findings are implied in this study in that more than half of the study population, are on vitamin supplements and are taking them once a day.

One interesting revelation is that one fifth of the cases are on vitamins, but do not know. This suggests that there is some level of ignorance in the patients who are not certain of their vitamin intake or treatment in general, which implies that there is need for healthcare givers to educate patients and give them appropriate instructions on medication use and contraindications. Pyridoxine (B6) and neurobine (B-Complex) are pharmaceutical forms of

vitamin supplements which are used in conjunction with TB treatment (Isoniazid) to counter neuropathy.

## 5.6 DIETARY INTAKE

### 5.6.1 Implementation of the hospital diet as a sole diet in HIV/AIDS Management

Dietary practice plays an important role in maintaining a healthy lifestyle. An HIV- infected person already has a weakened immune system. A nutritious diet can help to maintain the proper functioning of the immune system. Maintaining adequate nutrition means consuming a variety of foods to be sure the body is getting the necessary energy, protein and micronutrients it needs. PLWHA should eat a balanced diet consisting of beans; nuts, animal foods, starchy staples (rice, potato, maize), fruits and vegetables. A balanced diet will ensure that the individual consumes sufficient nutrients to maintain energy and ensure the body's proper functioning (FANTA, 2001; FAO, 2003; Zimmerman, 2002).

The findings of the study reveal that the Kenyatta National Hospital Standard Menu is a balanced diet in that it provides all the major nutrients. i.e. carbohydrates (65.5% kcal), Proteins (13.2% kcal), Fats and kcal (21.3% kcal) that meet the daily mean requirements for adults, with no increased nutrient needs, whose Recommended Daily Allowances for energy is 2070 kcal/day and Proteins is 58 grams and 48 grams for male and female adults respectively. However, the diet has been found to be low in fats, although high in carbohydrates and proteins which are of Low Biological value. It is assumed in this study that diets that are adequate in proteins and energy are usually adequate in micronutrients. It is therefore implied in this study that carbohydrates are a major source of energy; providing two thirds of the daily caloric need of the general patients, since the diet is low in fats. Proteins from plants have low bioavailability unless complemented with other foods.

HIV/AIDS infection necessitates the need for a balanced diet and a safe margin to meet the extra body needs (Peck et al. 1990). Hence diets for HIV/AIDS persons should be well balanced and contain extra nutrients to meet the extra needs for physiological stress that their bodies undergo during phase of infection (Peck et al., 1990). Study data reveals that the hospital diet is deficient in energy and proteins to meet adequately the increased needs of

HIV/AIDS cases considering increases of between 10% to 15% for energy and 50% to 100% for proteins as recommended in HIV/AIDS dietary management recommended by WHO (James and Schofield, 1990; WHO, 1985). These findings therefore conclude that the hospital standard menu would not be able to meet the increased needs for HIV/AIDS patients unless a nutritional support intervention through supplementation is initiated. Data in this study confirms the fact that oral supplementation (special diets) offered to one third of the study cases improved their dietary intake.

Ideally the standard menu is meant to provide varied diets as revealed by the key informant (Catering Manager). However, the actual menus served are not always varied. There are days when specified menu items are not served, for instance meat, vegetables and fruits; hence menu inconsistency. The problem of food monotony has also been observed especially legumes (beans, dengus, and pigeon peas), rice and ugali. There are days when vegetables are not served completely, on about three occasions, hence a problem of omitted foods from menu.

It is evident in this study that lack of adherence to the hospital standard menu is likely to impact negatively on the nutrient intake and adequacy for the study cases resulting from inadequate food intake influenced by some of the factors mentioned above. It is not surprising that a half of the study population consumed <75% RDA for kcalories and two-thirds consuming <75% RDA for proteins from the hospital diet. Notably are approximately one-fifth of the cases who consumed <1000 kcalories from the hospital diet. These findings suggest that unless timely nutritional intervention are initiated to increase the nutrient intake of these patients, their disease status will progress drastically and their survival will be threatened. The findings confirm the fact that the hospital menu is not adequate to cater for the increased needs of HIV/AIDS hospitalized patients unless dietary supplementation is initiated.

The nutrient intake of the study population was calculated based on the actual food intake from hospital menus served daily. The study results indicate that the nutrient intake has been found to be comparable for both male and female respondents.

A unique shortcoming worth mentioning was poor hospitality observed in some porters. Majority showed a sense of mannerism in the approach and service of their clients, however, very few among them did not show any respect to the clients they were serving. This observation calls for training in customer care service for staff involved in food service to patients, particularly food porters. Such attitudes could cause some adverse effects on nutrient intake in some patients due to stigma. Despite the fact that two-thirds of the cases reported that the hospital diet is palatable, data suggest that there is still food wastage observed. It is implied in this study that patients preferred food from home since it met their food choices. By consuming the home diet it is obvious that the hospital diet will not be eaten hence leading to food wastage. Also implied in this study are large portion sizes and use of sub-standard food serving utensils. Considering the fact that food was enough but monotonous could have influenced the feeding pattern of the patients i.e. eating less from the hospital diet, hence inadequate intake from the hospital diet. Appetite changes due to the effects of the disease could have also hindered food consumption. This study suggests re-evaluation of the food service delivery system to improve its performance. Interview with key informant (Catering Manager) confirmed food wastage attributing it to home diet.

#### **5.6.2. Hospital Diet complemented by Home Diet in HIV/AIDS Management**

The findings in this study support the role of home diet in the management of HIV/AIDS hospitalized patients by raising the patient's energy intake to 93.1% RDA and protein to 83.7% RDA, than if the hospital diet alone is consumed. This is an increase of about one-fifth of percentage RDA for both kcalories and proteins. It is implied in this study that when home diet is considered, HIV/AIDS patients are able to meet at least their mean requirements for energy and protein. At times it is not possible for HIV/AIDS patients to consume 100% RDA for nutrients therefore an intake of 75% RDA and above was suggested in this study. This study suggests that the hospital diet should strive to provide at least 70% of energy and 77% of protein so as to provide adequate energy and protein when complemented by home diet.



## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 CONCLUSIONS

1. The hospital standard menu was found not to be adequate to cater for the increased needs of hospitalized HIV/AIDS patients when it is the sole source of energy and protein unless complemented by dietary supplements from the hospital's special diets kitchen or home diets.
2. The caloric and protein content of the hospital diet did not meet the WHO recommendations for HIV infected adults. On average the hospital diet provided 70gm of protein and 2118 kcalories. The mean requirements as recommended by WHO is 2277 kcalories (10% increase) for both males and females HIV/AIDS cases; 85.5 grams protein for males and 72 grams protein for females (50% increase). The proteins from the hospital diet, though seemingly high, were mainly of Low Biological Value, hence low bioavailability. Therefore, the diet was inadequate. Supplementation of the hospital diet by dietary supplements from outside the hospital enabled majority of the patients to meet the requirements.
3. Dietary supplements from outside the hospital, which were given to hospitalized HIV/AIDS patients at K.N.H. contributed significantly  $p < 0.05$  ( $p = < 0.001$ : Chi-square test) towards the patients' nutrient intake by raising the patients' energy and protein intake to higher levels. This boosted the overall dietary intake contributed by the hospital diet.
4. Optimal Nutrition education and nutritional (dietary) counseling was found to be wanting. Dietary counseling was not being given to all hospitalized HIV/AIDS patients, although some efforts have been attempted. However, poor planning and inefficiency among the nutritionists were found to play a role in provision of inadequate nutritional counseling services.

5. Nutritional intervention is offered to very few HIV/AIDS cases on first encounter by the nutritionists due to a high turn over of patients, heavy workload and shortage of nutrition staff.

## 6.2 RECOMMENDATIONS

1. Provision of adequate amounts of all macronutrients and micronutrients to HIV/AIDS patients by giving appropriate oral nutritional supplements that are nutrient dense in addition to the general diet so as to help replete and maintain good stores which in turn will strengthen the immunity. When necessary, nutritionists should explore other alternative feeding methods such as enteral and parenteral nutrition when oral intake is not adequate.
2. Catering managers or food service managers from respective institutions should collaborate with nutrition professionals available in their institutions or elsewhere in order to plan and develop nutritionally balanced, varied diets which meet the needs of people living with HIV/AIDS.
3. Hospital diets should meet at least 70% RDA for energy and 77% RDA for protein so as to provide adequate energy and protein when complemented by home diets.
4. Nutrition education and dietary counseling of all hospitalized HIV/AIDS patients should be made mandatory and appropriately done i.e. proper planning and following guidelines for nutritional counseling services for PLWHA. Patients should be offered to an HIV disease nutrition specialist for counseling and intervention when they are first diagnosed.
5. Strengthening the staff establishment for nutrition staff so that at least one nutritionist could cater for one ward so that appropriate and timely intervention can be provided.

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## APPENDICES

### Appendix 1

**Table 1: Micronutrients in HIV/AIDS**

Nutrient	Suggested daily dose	Comments
Vitamin A	3000-8000 $\mu$ g as retinol or beta-carotene	Maintains health of the skin and digestive tract epithelium. Can help reduce risk of respiratory infection.
Vitamin C	0.5 g - 1.0 g	May help inhibit viral growth and maintain immune strength.
Vitamin B6	100-250 mg	Can enhance immune function and resistance to infection.
Vitamin E	200-400 mg	May reduce oxidant damage from infection and help maintain immune response to the virus.
Zinc	30-60 mg	Can enhance immune function and resistance to infection.
Selenium	200-300 $\mu$ g	Deficiency sharply increases risk of progression and disease severity.
Arginine plus glutamine	2-3 g Arginine, 3-5 g glutamine	Arginine stimulates production of white blood cells, glutamine supports the immune system and increases white blood cell function.

*Source: The Role of Micronutrients in Prevention and Therapy (Cimoch, 1997)*

## Appendix 2

**Table 2: Food Guide: A Guide to Daily Food Choices for HIV Infected persons:**

Food Groups	Number of Servings each day
Bread, Cereal, Rice, Pasta	6+
Meat, Poultry, Fish, Eggs, Dry beans & Nuts	2 – 3
Whole Milk, Cheese, Yoghurt	2 – 3
Fruit Group	2 – 3
Vegetable Group	3 – 5
Butter, Margarine, Oil	Use sparingly

*Source: Kenyatta National Hospital Nutrition and Dietetics Department (2002)*



### Appendix 3a

**Table 3a: Daily Energy and Protein Requirements for Adults**

Mean Requirements for Adults (kcal/day) 2070	Energy Kcal/day	Protein g/day
a) Adjustment for Activity Level		
Moderate: Males	+360	57
Females	+100	48
Whole population	+140	
Heavy: Males	+850	57
Females	+330	48
Whole populations	+350	
b) Pregnancy	+285	55
c) Lactation	+500	68
d) HIV-infected Adults	increase of 10-15%	increase of 50 to 100%

**Note:** The mean requirement is 2,070 kcals per day. A moderately active female aged 27 years who is pregnant and HIV-infected would require:

Average	Activity level	Pregnancy	HIV status*	TOTAL
2,070 +	100 +	285 +	368 +	2,823kcals

\*The addition for the woman's HIV infection to be 15% of 2,070+100+285 = 368 kcals

*Sources: James and Schofield (1990) and WHO (1985)*

### Appendix 3b

**Table 3b: Calculated Values for Protein and Energy as per the WHO Recommendations**

ENERGY		PROTEIN
<b>Increase of 10-15%</b>		<b>Increase of 50-100%</b>
<b>MALES:</b>		
Mean requirement	2277-2381 Kcal/day	85.5g – 114g/day
Moderate Activity	2673-2795 Kcal/day	85.5g – 114g/day
Heavy Activity	3212-3358 Kcal/day	85.5g – 114g/day
<b>FEMALES:</b>		
Mean requirement	2277-2381 Kcal/day	72g – 96g/day
Moderate Activity	2387-2496 Kcal/day	72g – 96g/day
Heavy Activity	2640-2760 Kcal/day	72g – 96g/day

*Sources: James and Schofield (1990) and WHO (1985)*

## Appendix 4

**Table 4: WHO Guidelines for Diagnosis of Aids**

Major signs:	Weight loss > 10% of body weight. Chronic diarrhoea > 1 month (Intermittent or constant)
Minor signs:	Persistent cough for > 1 month. Generalized pruritic dermatitis. Recurrent herpes zoster. Oropharyngeal candidiasis. Chronic progressive, disseminated herpes Simplex infection. The presence of Kaposi's sarcoma or Cryptococcal meningitis are sufficient by themselves for the diagnosis for AIDS.

*Source: Kenya, Ministry of Health (2002)*

The WHO criteria was developed for use in resource poor settings and depends on clinical presentation. This criteria was first developed as an epidemiological surveillance tool but in the absence of an alternative criteria it has been used or adopted for clinical use. The WHO criteria defines AIDS in an adult by the existence of at least two of the major signs associated with at least one minor sign, in the absence of known causes of immunosuppression such as cancer, severe malnutrition, use of immuno-suppressive drugs or other recognized aetiologies.

## Appendix 5

### Karnofsky Performance Scale

This scale is an instrument developed to assist caregivers in the assessment of a patient's status for ADL's. A score of 50 or less for cancer diagnosis is significant. Non-cancer diagnosis score of 40 or less may be significant.

- 100 No complaints, no evidence of disease
- 90 Able to carry on normal activity. Minor signs of symptoms.
- 80 Normal activity with effort, some signs or symptoms of disease.
- 70 Cares for self but unable to carry on usual activities.
- 60 Requires occasional assistance, able to care for most of own needs.
- 50 Requires considerable assistance with ADL's and frequent medical care.
- 40 Disabled. Requires special care and maximum assistance.
- 30 Severely disabled although death not imminent.
- 20 Gravely ill, unable to swallow, totally dependent.
- 10 Actively dying.
- 0 Death

*Source: Karnofsky Performance Scale. <http://www.hom.org/clinical/karnofsky.html>*

## Appendix 6

### Consent Form

#### Evaluation of Adequacy of Hospital meals at Kenyatta National Hospital

Name of Patient ..... IP/No. ....

Date of Birth ..... Age ..... Sex .....

Nutritional care and support is very important in preventing nutritional depletion which lead to malnutrition. This may occur during the patient's hospitalization period.

A well-nourished person has a stronger body for fighting illness. Provision of good nutrition is therefore very important during hospitalization.

The purpose of this study is thus to evaluate the adequacy of the diet given to hospitalized patients. The study might aid in improving the quality of nutrition care and Diet therapy for hospitalized patients.

In this assessment you will be interviewed and observed on matters pertaining to your food consumption during your hospital stay for both the hospital diet and/or food brought from home if any.

Your answers will be put together with a lot of other people's so you will not be identified in any way in the overall results. This exercise will last a day. In addition, your weight will be taken after every three days as part of normal hospital routine. The study will not interfere with your normal medical treatment while in hospital.

Absolute confidentiality will be observed in the information you give. You will not be identified in any public reports or publications or to any other parties.

Your cooperation with this study will help the principal researcher to come up with recommendations that will be useful on how to improve food service to hospitalized patients at K.N.H and other Health Institutions.

You are free to withdraw the consent to participate in this study at any time.

**I have read the information shown above and had the opportunity to ask questions and all were answered satisfactorily. I hereby give consent for my participation as explained to me.**

Patient's sign or thumb print: ..... Date .....

## Appendix 7

### Kenyatta National Hospital Standard Menu

DAY	BREAKFAST 8:30 am – 9:30 am	LUNCH 11.30 am - 12:30 pm	MID AFTERNOON 3:00 pm – 4:00 pm	SUPPER 5:30 pm – 6:30 pm
Monday	Milky tea Wimbi porridge ( <i>paediatrics</i> ) Bread Butter/margarine	Bean stew Steamed rice Fried cabbages Ripe bananas	Wimbi (millet) porridge	Ndengu stew Ugali Steamed cabbages Oranges
Tuesday	Milky tea Wimbi porridge ( <i>paediatrics</i> ) Bread Butter/margarine	Mashed potatoes/rice Ndengu stew Buttered carrots	Wimbi (millet) porridge	Bean stew Ugali Fried sukuma wiki and spinach
Wednesday	Milky tea Wimbi porridge ( <i>paediatrics</i> ) Bread Butter/margarine	Chicken stew or fried Irio/Rice French beans and carrots Ripe bananas	Wimbi (millet) porridge	Bean stew Ugali Steamed cabbages and grated carrots
Thursday	Milky tea Wimbi porridge ( <i>paediatrics</i> ) Bread Butter/margarine	Beef stew Mukimo (pigeon peas) Cabbages and grated carrots Pineapple slices	Wimbi (millet) porridge	Ndengu stew Plain rice or rice pilau Fried cabbages
Friday	Milky tea Wimbi porridge ( <i>paediatrics</i> ) Bread Butter/margarine	Ndengu stew Fried rice Fried cabbages Ripe bananas	Wimbi (millet) porridge	Pigeon peas Steamed rice Sukuma wiki and spinach Oranges
Saturday	Milky tea Wimbi porridge ( <i>paediatrics</i> ) Bread Butter/margarine	Mutton stew Parsley potatoes or buttered rice Fried cabbages Oranges	Wimbi (millet) porridge	Pigeon peas Ugali Sukuma wiki and spinach Ripe bananas
Sunday	Milky tea Wimbi porridge ( <i>paediatrics</i> ) Bread Butter/margarine	Beef stew Fried rice Steamed cabbages	Wimbi (millet) porridge	Ndengu stew Ugali Fried cabbages

## Appendix 8

### PATIENT'S DAILY FOOD CONSUMPTION

#### *Instructions to the observer:*

1. Observe and record all foods consumed by the patient (hospital diet and home diet inclusive) in a day.
2. Describe foods carefully when recording them, for example, whether milk is whole or skimmed, etc.
3. Weigh plates or other dishes or containers used before food is put on them.
4. Weigh the food, where possible.
5. Weigh plates or other dishes or containers with food before the patient eats and leftovers after the patient has eaten.
6. Investigators must weigh samples to find out the average weight per measure.
7. Record and mark with a star (\*) foods already taken when you arrive in the morning and after you have left the ward.
8. Others
  - Observe activities involved from the time food arrives in the ward until it is served to the patient.
  - How is the food ferried.
  - How is it presented to the patient i.e. utensils used to scoop food, is the food kept next to the patient or given directly to the patient, what is the conduct of the staff serving food, etc.
  - How does the patient feed i.e. with or without assistance, using a spoon or not, etc.
  - How much does the patient eat e.g. 2 spoonfuls and then stops, etc.
  - Observe other foods coming in apart from the hospital diet that interferes with patients' food intake and record them.

## Appendix 9

### Patient Allowances for main ingredients

Food item	Quantity per serving	Unit measure per serving (g) (ml)
Rice	1 cup	250g
Ugali	1 cup	250g
Irio	1 cup	250g
Beans	1 ladel (125cc capacity)	150g
Ndengus	1 ladel (125cc capacity)	150g
Potatoes	1 cup	200g
Sukuma	1 ladel (125cc capacity)	100g
Cabbage	1 ladel (125cc capacity)	100g
Spinach	1 ladel (125cc capacity)	100g
Carrots	1 carrot	50g – 100g
Fruits	1-2 fruits	100g – 200g
Meat or products	2-3 pieces with bones 2-3 pieces without bones	130g – 150g 60g – 90g
Chicken	1 piece	150g – 180g
Fish	1 piece (2" x 3")	100g
Bread	2 slices	50g
Millet porridge (wimbi)	1 cup	250ml – 300ml
Tea with milk	1 cup	250ml – 300ml
Eggs	1 for special cases	50g
Sugar	2 teaspoons	10g
Cooking fat	1 teaspoon	5g
Margarine/butter	½ to 1 teaspoon	2.5g to 5g
Milk (for tea)	¼ cup	50 ml
Milk for special cases	1 packet	500ml



## Appendix 10

### General guidelines for diet ordering procedures

1. Specific diet prescriptions should be indicated on the treatment sheet.
2. All diet should be given in writing on the diet sheet.
3. Specific diets should be accompanied by a meal plan.
4. The diet sheet is completed by the nutritionist then sent to the kitchen.
5. Common acceptable diet ordering terms should be used e.g.

- Regular Diet
- High Protein, High Calorie Diet
- Diabetic Diet
- Sodium Restricted Diet (Low Salt)
- Low Cholesterol Diet
- Blenderised Diet (Toto Diet)
- Light Diet/Soft Diet
- Renal: Low Protein Diet
- High Fibre Diet
- Low Residue Diet
- High Protein High Energy Milk (Special Milk)
- High Protein High Energy Soup (Special Soup)
- High Protein, High Energy Uji (Special uji)
- Lactose Free Mixture
- Parenteral Nutrition

Note: Other diets that may be found necessary and are not included in the above list may be ordered through a meal plan with detailed specifications.

6. Parenteral nutrition, enteral nutrition and dietary consultations are interpreted by the nutritionist as prescribed on the treatment sheet.
7. Diet orders that are not precise will be interpreted using nutrition dietary guidelines, or at the discretion of the nutritionist on duty, until the doctor writes a specific diet order.
8. Wards 'ON CALL' should clearly indicate on the diet sheet. Discharges and cancelled diet orders for specific patients on therapeutic diets should also be indicated clearly on the diet sheet.
9. Late diet requests i.e. diets ordered late and are not appearing on diet sheet will only be honoured if ordered by the nutritionist or nurse in charge who must follow it up with the cateress on duty in the kitchen to ensure their delivery.

**Source: Kenyatta National Hospital Nutrition and Dietetics Department (2002)**

## Appendix 11

### K.N.H Therapeutic feeds (Blenderized feeds)

#### (1) SPECIAL UJI

AMOUNT	PROT (gm)	FAT (gm)	CHO (gm)	KCAL
100mls	2.8	4	13.4	103
200mls	5.6	8	26.8	206
250mls	7	10	33.5	257
400mls	11.2	16	53.6	412
500mls	14	20	67	515
1000mls	28	40	134	1030

#### (2) SPECIAL MILK

AMOUNT	PROT (gm)	FAT (gm)	CHO (gm)	KCALS
100mls	3.33	11	5.08	101
200mls	6.7	22.6	10.2	202
250mls	8.3	27.5	12.7	252.5
400mls	13.3	44	20.3	404
500mls	16.7	55	25.4	505
1000mls	33.3	110	50.8	1010

*Source: Kenyatta National Hospital Nutrition and Dietetics Department (2002)*

## Appendix 12

### K.N.H Commercial Nutritional Supplements

\*Brand used by study cases will be listed

Product Name	Composition per 500ml	Indications	Manufacturer
Nutritionally complete liquid diet  Fresubin	CHO –13.8g = 55% of total kcals PRO – 3.8g = 15% of total kcals FAT – 3.4g = 30% of total kcals Energy = 100kcal/100ml	Nutritionally complete liquid diet for total or supplemental feeding, oral feeding or tube feeding, low in lactose	Fresenius

*Source: Kenyatta National Hospital Nutrition and Dietetics Department (2002)*

## Appendix 13

### Guidelines for Nutritional Counseling for PLWHA at Kenyatta National Hospital, Nutrition Department

Nutrition counseling for PLWHA is a person-centered care process and should be initiated within 48 to 72 hours from the time an HIV-infected individual is admitted to hospital depending on the underlying condition.

#### Steps involved:

- **Nutrition assessment of the patient**

Components of nutrition assessment:

- ✓ Anthropometry
  - Take weight/height, calculate BMI (less than 18.5 indicates nutritional risk), calculate MUAC - mid-upper-arm circumference (less than 23 cm indicates nutritional risk)
- ✓ Biochemical indices/medical history e.g. serum proteins, albumin, pre-albumin, transferrin, completed blood count
- ✓ Clinical observations: general signs of nutritional status/drug effects
- ✓ Diet evaluation (take diet history):
  - Eating habits i.e.
    - Usual intake, current intake, restrictions, modifications
    - Nutritional supplements, vitamin-mineral supplements taken
    - Food allergies and intolerance
    - Activity level (general kcalories expended per day e.g. active, sedentary)
    - Support system (care given to help with nutrition care plan)
- ✓ Social considerations (which contribute to inadequate food intake)
  - Psychosocial: social isolation, self-denial, rejection, depression, attitude towards nutrition, inability to prepare food, age, level of education
  - Economical: inadequate income, inadequate funds for food, current medical and other expenses, inadequate facilities for preparing and cooking food

- **Nutritional Intervention:**

- ✓ Calculate the daily caloric and protein requirements of the patient and translate into a meal plan and implement the diet
- ✓ Nutrition education and dietary counseling
  - Components of nutritional counseling:
    - It should aim at changing dietary habits, increasing consumption of key foods and nutrients.
    - Specific advice should be offered to patients if they experience a profound loss of appetite, vomiting, diarrhea, sore mouth and other conditions that affect eating pattern
    - It should include information on locally available foods and diets to meet estimated requirements given the individual's age, sex and physiological state
    - Counseling should include discussion of hygiene and safe food handling given increased susceptibility by HIV infected individuals to bacterial infections
    - Education on drug nutrient interaction should be reinforced

- The importance of exercise in HIV/AIDS should be emphasized in its role of stimulating appetite and stress reduction
- Should address the role of vitamin and mineral supplementation and adequate diet in HIV/AIDS.
- Should consider and encourage of use safe traditional therapies that can relieve symptoms
- Should include education on HIV prevention i.e. safer sex practices to prevent repeated exposure to infection.
- Home based care providers (e.g. relatives/guardians) should be familiar with the basic nutritional advice and practices for the patients they care for, especially after the patient's discharge from the hospital.
- ✓ Follow up/evaluation
  - Assess nutritional knowledge as reflected in behaviour change
  - Monitor food and fluid intake
  - Monitor anthropometry/clinical data

**Note:** Appropriate nutritional counseling gives dietary control to the person with HIV, providing the necessary knowledge to improve eating habits and adjust nutritional intake as appropriate.

**Source:** *Adapted from Kenyatta National Hospital Nutrition and Dietetics Department (2002)*

## Appendix 14

### DIETARY MANAGEMENT OF HOSPITALIZED HIV / AIDS PATIENTS; A CASE STUDY OF KENYATTA NATIONAL HOSPITAL, NAIROBI.

**STUDY QUESTIONNAIRE**

**SECTION A: PATIENT'S INFORMATION**

The information in this section will be obtained by asking the patient directly and from the patient's medical records i.e. patient's file and the doctor.

Study No: .....

Hospital ..... Date ..... / ..... / .....

Medical Ward ..... IP / No. ....

1. Name of Patient .....

2. Patient's Age: ..... Sex: .....

1 = male    2 = female

3. Patient's other characteristics

\* Key / Codes are provided below

Residence	Ethnicity	Occupation	Education	Marital Status	Dominant Religion	Family Size: No. of Children
				1 = Single 2 = Married 3 = Divorced / Separated 4 = Widowed	1 = Muslim 2 = Catholic 3 = Protestants 4 = Others (specify)	

**Occupation \***

- 1 = Housewife
- 2 = Artisan
- 3 = Trader / Businessman / Woman
- 4 = Professional / Accountant / Lawyer / Doctor
- 5 = Government Employee
- 6 = Private Sector employee
- 7 = Servant / Houseboy / Maid
- 8 = Casual Labourer
- 9 = Farmer
- 10 = Student
- 11 = Unemployed

**Education \***

- 1 = None
- 2 = Primary
- 3 = Technical training after Primary
- 4 = Secondary
- 5 = Post Secondary Certificate
- 6 = University / Professional
- 7 = Unknown

4. Primary Diagnosis from the file .....

5. Current Treatment

Name of medication	Mode of taking *

\* 1 = On a full stomach

2 = On an empty stomach

3 = With food

4 = Without food

6. Alcohol intake: .....

1 = Normal

2 = Moderate

3 = Excessive

4 = N / A

7. Patient Anthropometry

Weight and Height at admission

Date .....

Weight .....Kg

Height ..... cm.

Wt. (Kg)

BMI = \_\_\_\_\_ .....

Ht (m)<sup>2</sup>

Weight after every three (3) days

Date

Weight

.....

.....

.....

.....

.....

.....

Weight on discharge

Date .....

Weight .....Kg

## SECTION B: Food Consumption in the Hospital

8. Appetite

How would you describe your appetite? .....

1 = Hearty

2 = Moderate

3 = Poor

9. Eating pattern and attitude about food

(a) Do you enjoy eating the food given in the hospital? Specify .....

.....

(b) Do you always finish the food? Yes ..... No .....

Give reasons .....

.....

(c) Are there any foods that you do not eat because you don't think they are good for you?

Yes ..... No .....

Give reasons .....

.....

(d) Apart from the regular food that is given by the hospital, are there any other foods you take?

Yes ..... No .....

If yes, what? .....

Who brings these foods? .....

10. Food Choices

- (a) Is there any food you can't eat? Yes ..... No .....
- If yes, what food(s)? .....
- What happens when you eat this food? .....
- (b) Are you allergic to any foods? Yes ..... No. ....
- If yes, what food(s)? .....
- What happens when you eat this food? .....
- (c) Are there certain foods that you do not eat because you don't like them?
- Yes ..... No ..... If yes, what food(s)? .....
- (d) Are there certain foods that you avoid eating because of your religious beliefs / ethnic / cultural background? Yes ..... No ..... If yes, what foods? .....
- .....
- (e) Are you on a special diet? Yes ..... No .....
- Specify type of diet .....
- Who recommended the diet? .....
- (f) Have you received any dietary counseling about the foods you should eat in order to maintain proper health? Yes ..... No ....
- If yes, who counseled you on diet? .....
- 1 = Nurse 2 = Nutritionist 3 = Doctor 4 = 1+2 5 = Others
- How often have you been counseled? .....

11. Supplements

Are you now taking any vitamin or mineral supplements or whole food supplements?

Yes..... No ..... If yes, what type, how often, and what brand? .....

.....

.....



## Appendix 15

### SECTION D: KEY INFORMANT INTERVIEW

**A: Catering manager K.N.H**

1. Could you please give the breakdown of the seven days Hospital menu cycle beginning Monday to Sunday?

Kenyatta National Hospital: Hospital Standard menu (This form will be used to record information from Monday to Sunday)

Day: .....

Meal	Food Item	Ingredients /Amount (kg) (l)	Nutritional Value			
			CHO (g)	Protein (g)	Fat (g)	K calories
Early Morning						
Breakfast						
Lunch						
Mid Afternoon						
Supper						
Total						Total =
K Calories			x4=	x4 =	x9=	
Percent K Calories						

2. What are the patients allowances for the ingredients used in food preparation per meal per patient?

Patient allowances for main ingredients

Food item	Quantity per serving	Unit Measure per serving (g) ( ml)
Rice		
Ugali		
Irio		
Beans		
Dengus		
potatoes		
Sukuma		
Cabbage		
Spinach		
Carrots		
Fruits		
Meat or products		
Chicken		
Fish		
Bread		
Millet porridge (wimbi)		
Tea with milk		
Eggs		
Sugar		
Cooking fat		
Margarine/butter		

3. Would you please tell me if you regard the hospital diet as adequate?

Please explain.

.....  
.....  
.....  
.....

4. It has been observed that patients still receive food from home. What is your opinion on whether this practice should be stopped or not? Please specify.

.....  
.....  
.....  
.....

**SECTION E: KEY INFORMANT INTERVIEW**

**B: Nutritionist**

- 1. Who makes patient diet orders? 1 = Nurse 2 = Nutritionist 3 = Doctor 4 = Others (Specify)
- 1. Are there any considerations made for individual patients when making orders? Yes.... No ....  
If yes Specify .....
- 3. Who is responsible in ensuring that hospitalized patients receive adequate nutritional care?  
.....
- 4. Do you think hospitalized HIV/AIDS patients should get “special food” due to their sickness?  
Please give reasons .....
- .....
- .....
- 5. What would you consider as an adequate diet for an HIV/AIDS adult patient to be in terms of grams of protein, carbohydrates, fat and energy?  
1 = Protein .....gm                      2 = CHO .....gm  
3 = Fat .....gm                              4 = Energy .....kcal
- 6. What are some of the constraints you face in proper dietary planning for hospitalized adult HIV/AIDS patient? Specify .....
- .....
- 7. Do you have a special diets kitchen? Yes ..... No .....
- 8. What type of feeds (Blenderized feeds) does your special diet kitchen prepare if any? What are the nutritional values of such feeds?

Kenyatta National Hospital: Therapeutic feeds (Blenderized feeds) per 1 litre preparation

Type of feed	Ingredients /amount (g) (ml)	Nutritional Value			
		Protein (g)	CHO (g)	Fat (g)	KCalories

9. Being one of the largest hospitals in Kenya and a National referral hospital, do you use any Commercial Nutritional supplements on hospitalized patients (Not on Parenteral Nutrition) as part of Nutrition Support Care? Please specify.

Kenyatta National Hospital: Commercial Nutrition Supplements (Enteral Nutritional Feeds)

Product's Name	Nutritional Composition per (100g) (100ml)	Indications	Manufacturer

- 10. Who gives Nutrition Education and Diet Counseling to hospitalized patients? .....
- 11. Do all admitted adult HIV/AIDS patients receive nutrition education and Diet counseling about the foods they should eat in order to maintain proper health? Yes ..... No .....
- 12. How often is this service given during the patient's hospitalization? .....  
 1 = once      2 = twice      3 = none      4 = other (specify)
- 13. What information is given? .....  
 .....  
 .....

**SECTION F: KEY INFORMANT INTERVIEW**

**C: Nurse**

- 2. What is your own assessment of the hospital diet given to hospitalized patients? Please explain.  
.....  
.....  
.....
- 2. Do you think whether hospital diets meet the patients' nutritional requirements? Please explain.....  
.....  
.....
- 3. What is your opinion on the diet given to HIV/AIDS patients admitted in your ward? Is it adequate to meet their increased needs? Please explain.  
.....  
.....  
.....
- 4. Do all HIV/AIDS patients in your ward receive Nutrition education and Dietary counselling?  
Yes ..... No.....  
How often?.....
- 5. Who gives Dietary counselling to hospitalized patients?  
.....  
.....  
.....
- 6. What is your opinion on food brought from home to the patients by relatives? Should it be stopped or not? Please elaborate.  
.....  
.....  
.....

**SECTION G: KEY INFORMANT INTERVIEW**

**D: Doctor**

1. Do you have any role to play in the dietary management of hospitalized patients? Please explain.....  
.....  
.....
2. In your own assessment do you think hospital diets are adequate in meeting the requirements for hospitalized HIV/AIDS patients as per the WHO recommendations? Please explain.....  
.....  
.....
3. What are some of the drugs prescribed to HIV/AIDS patients at K.N.H which have been scientifically proven to interfere with the absorption or proper utilization of nutrients by the body? Please explain.

**Drug**

**Nutrient**

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

## Appendix 16

### QUESTIONNAIRE FOR RELATIVES

Name of Interviewer ..... Date of Interview .....

Name of Patient ..... Sex .....

Name of Relative ..... Sex .....

1. Please tell me the food you bring from home for the patient and how much of each ingredients you use in making the food.

Type of food	Amount (g)	Amount of each ingredient used (g)	
			1 = Meat or product 2 = Beans 3 = Dengu 4 = Maize 5 = Potatoes 6 = Green peas 7 = Vegetables 8 = Milk 9 = Sugar 10 = Fat, oil 11 = Fruits 12 = Others (specify)

2. Do you bring supplements to the patient? Yes ..... No .....

If yes, please list down supplements brought for the patient.

Type	Brand Name

1 = Whole food supplement

2 = Vitamin supplement only

3 = Mineral supplement only

4 = 1 + 2

5 = Herbal / Traditional

6 = N/A



## Appendix 17

### Patient's Daily Food Consumption Record Form Record of a patient's Food Intake in a day (Hospital Diet / Home Diet)

*Patient Code:* ..... *Day:* ..... *Date:* .....

Meal	Ingredients / Serving size		Wt of empty place / cup / bowl (g) M <sub>1</sub>		Wt of plate / cup / bowl and food (g) M <sub>2</sub>		Wt of plate/cup/bowl and left overs (g) M <sub>3</sub>		Net Intake (g) M <sub>2</sub> -M <sub>3</sub>		Nutrient Intake								
											Carbohydrates gm		Protein gm		Fat gm		K Calories		
	Hosp	Hom	Hosp	Hom	Hosp	Hom	Hosp	Hom	Hosp	Hom	Hosp	Hom	Hosp	Hom	Hosp	Hom	Hosp	Hom	
Early Morning																			
Breakfast																			
Lunch																			
Mid afternoon																			
Supper																			
Bed time																			
Others specify																			
Total																			
K Calories																			
Percent K Calories																			
																Total =			

Note: If a meal is missed, please indicate the reason for missing it in the table

Hosp = Hospital Diet

Hom = Home Diet