REPUBLIC OF KENYA
MINISTRY OF HEALTH

Kenyan National **Guidelines** on Nutrition and HIV/AIDS

Republic of Kenya
Ministry of Health

Kenyan National Guidelines on Nutrition and HIV/AIDS

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Foreword

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

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

HIV and AIDS pose a major threat to food security and nutrition, diminishing the availability of food and reducing household's ability to purchase food. Household members who are ill can not effectively contribute to household income and labour, often require care and support from other members of the household and incur medical expenses that further deplete income. Therefore, HIV/AIDS impacts on a household's economic potential and retards the social economic development of the community, jeopardizing community advancement.

In response to this individual, family, community and even national crisis, the Kenyan government, in collaboration with multilateral and bilateral agencies, NGOS and CBOs spearheaded the Kenya National Guidelines on Nutrition and HIV/AIDS for harmonized nutrition strategies for PLWHA and people affected by HIV/AIDS.

A Technical Working Group was established under the auspices of NASCOP/Ministry of Health to determine and outline the nutritional needs of people affected by HIV/AIDS in a coordinated and optimal manner. These Guidelines are a synthesis of information drawn from an extensive review of local and international knowledge and experience. The Guidelines are written for frontline service providers and for institutions in the health, nutrition, agriculture, education and social services sectors. They are for use by facility and extension workers whose mandates include care and support of PLWHA and home-based care. They give clear direction on nutritional support to PLWHA, including chapters dedicated to vulnerable groups such as children and pregnant or lactating women. The Guidelines are written for all Kenyans, though health workers may have to adapt information to meet the local situation; stress certain issues related to their patients; or translate information to meet various language needs.

Successful nutritional care and support of PLWHA requires an inferred partnership between those affected and different levels of care providers. A coordinated effort is required from people in many disciplines. The wide dissemination and use of these Guidelines, as well as supportive policies and services to implement the recommendations herein, will help all stakeholders to improve the quality of life of people living with HIV and AIDS.

Honourable Charity Ngilu EGH.M.P
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Preface

In the two decades since the onset of the HIV epidemic, there have been significant improvements in the understanding of its pathogenesis. It is now clear, for example, that HIV infection contributes to malnutrition, wasting away reserves of fat and muscle. Good nutrition, on the other hand, gives strength to help fight opportunistic infections and can enhance the quality of life of a PLWHA.

A varied and healthy diet and adequate micronutrient intake are fundamental to better health for HIV-infected individuals. Education and support about nutrition, particularly in nutritionally-vulnerable populations, is essential. In the management of HIV infection, correct and consistent information on nutrition is part of the continuum of care and support of PLWHA.

The Kenyan National Guidelines on Nutrition and HIV/AIDS offers that information, including daily nutritional requirements for various groups (such as the malnourished, children and women), and how to fulfil those requirements. There are clear steps how to assess and analyze a client's nutritional situation, and there are actions recommended to avert malnutrition; reserve nutritional status; or rehabilitate the malnourished. As well, the Guidelines include policy imperatives required to further advocate for better nutrition.

These Guidelines will contribute to realising the national goals of the Kenya National HIV/AIDS Strategic Plan for 2005-2010 (KNASP): to improve the quality of life of those infected and affected by HIV/AIDS; and mitigate the socio-economic impact of HIV/AIDS. The Guidelines will help users develop new strategies and activities, or review existing ones, in the nutritional care for PLWHA, and even for the population in general.

To best implement the Guidelines, partnerships among sectors (such health and nutrition, education, agriculture, and social services) must be established to bring the issue of nutrition and HIV/AIDS across all sectors. Nutritionists and health professionals play a pivotal role to develop these partnerships and bring the nutrition Guidelines into multi-sector, national development strategies. If individuals in the health sector take action, the Guidelines will catalyze the development of comprehensive, national nutrition policies and actions, and facilitate scaling-up of ART.

These Guidelines were developed based on updated research and evidence. Periodic reviews of the Guidelines will be necessary to accommodate new information as it becomes available.

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The development of the Guidelines was carried out under the auspices of NASCOP/MOH. In this regard, the support extended by the Dr. I. Mohamed, Director NASCOP and his predecessor Dr. K. Chebet and Dr. D. Koech Director KEMRI is gratefully acknowledged.

Executive Summary

People infected with HIV are at greater risk of malnutrition than those who are not infected. HIV and opportunistic infections interfere with the desire and ability to eat thus reducing dietary intake; causing mal-absorption of nutrients; increasing energy demand thus increasing nutrient requirements; and causing abnormal use of protein. Limited food security and inadequate knowledge of good nutrition in regions of Kenya where HIV is prevalent, makes the situation worse. The fundamental nutritional concerns for HIV-infected people include: the availability of a balanced diet on a continuous basis; factors that negatively impact food intake and utilization; drug/nutrient interactions; and interventions to help cope with nutrition-related, chronic conditions such as diabetes mellitus. HIV infection and associated malnutrition progressively weaken the immune system, lowering quality of life and odds for survival, thus infected persons and caregivers need clear, concise information on nutritional care and support. Nutritional care, as an adjunctive intervention to ART viral treatment, will enhance rehabilitation, optimize antiretroviral therapy, and enhance adherence to ART.

The purpose of these Guidelines is to:

- Provide simple and practical ways to assess the nutritional status of HIV-infected clients and assess the risk of malnutrition;
- Assist service providers to identify locally-appropriate, sustainable ways of increasing dietary intake by those who are infected with HIV; and
- Mainstream nutrition interventions into the national HIV/AIDS response.

The Guidelines' content is summarized as follows.

- Assessment of nutritional status and nutritional risks include determining a client's dietary intake and global anthropometric and body composition measurements (e.g. weight, body mass index (BMI), weight for age in children and middle upper arm circumference (MUAC). Clinical and laboratory assessment of haemoglobin, blood count, and nutrient biochemistry, among other indicators, are important for early detection of poor nutrition. Ideally, these services should be provided in facilities where PLWHA seek help, for example at counseling and testing sites.

- HIV-infected children and adults who are asymptomatic require about 10% more energy than their uninfected contemporaries. For symptomatic PLWHA, energy needs increase by 20-30% for adults and 50-100% for children who are experiencing weight loss. Pregnant and lactating HIV-infected women require 23% to 50% additional energy depending on their severity of symptoms, their well being during pregnancy and their lactation status. With adequate intake of staple foods, these needs can be met. By including nutrient-dense snacks in the diet; increasing intake of energy rich foods and using innovative food processing practices (such as fermenting, sprouting and blending) it is possible to meet the energy requirements of PLWHA.

- Protein intake at 12% to 15% of the total energy requirements (50-80 g/day) is adequate to support the growth, maintenance and repair of body tissues, and meet immune functions in both HIV-infected and uninfected persons. Children and pregnant and lactating women require additional proteins. A variety of Kenyan plant source foods is required daily to ensure adequacy and quality of protein. Eating animal source foods, such as dairy products, poultry, meats and fish, enhance the chances of adequate protein intake.

- Vitamins and minerals (micronutrients) are required in the production and function of proteins, enzymes, hormones and the immune system. Vitamins A, C, E, folate and the B group vitamins along with iron, zinc, selenium, iodine, magnesium and calcium are most critical. Requirements for PLWHA should be maintained at one Recommended Daily Allowance (RDA). Consumption of a variety of protective foods daily (consisting of vegetables and fruits along with animal sources) will provide adequate micronutrients and a significant amount of the daily fibre requirement (15-25 g). Dietary diversification, food fortification and multiple micronutrient supplementation, assist in meeting Recommended Daily Allowances (RDA). In addition, HIV-infected lactating women and children, should take vitamin A supplementation and iodine suppment as recommended by the MOH and WHO, with iron-folate and iodine supplements also being given during the prenatal period.

- Pregnant women who are HIV-infected should be counselled to choose between exclusive breastfeeding or exclusive replacement feeding. Breastfeeding mothers should be taught how to optimally breastfeed their infants. Replacement feeding can be used when it is acceptable, feasible, affordable, sustainable and safe (AFASS). If a breastfeeding mother develops AIDS symptoms while breastfeeding, a safe alternative food for her infant should be found, and she should stop breastfeeding with as little mixed feeding as possible. To further promote the well-being of children, all children should receive vaccines and vitamin A according to the national schedule. It is also recommended that HIV-infected children be given multi-micronutrient supplements daily (RDA). HIV-infected mothers should be informed and supported to introduce nutrient dense complementary foods in addition to breast milk substitutes when the baby is six months. If there is evidence of growth faltering, the mother should be advised to introduce high nutrient dense complementary food as early as four months.

- With regard to water requirements, PLWHA should take at least 2 litres (8 glasses) of safe clean water per day (boiled or treated). Those with diarrhoea, excess sweating or vomiting and those on medications such as ARVs should take more water to avoid dehydration and related complications. Beverages such as fruit juices, soups and milk are suitable to help achieve the desired fluid intake. Alcohol intake should be discouraged and other beverages such as tea, coffee and soft drinks taken with moderation as they provide little nutritional benefit. Non-dietary interventions also can enhance quality of life for PLWHA. Adequate daily exercise, and healthy lifestyle practices such as proper personal hygiene, sanitation, and food handling practices, contribute to breaking the infection and malnutrition cycle.

- Drugs used by PLWHA may adversely alter food intake, nutrient absorption, metabolism rates, distribution and excretion. They may cause loss of appetite, change in taste, and diarrhoea. Conversely, food and nutrient intake may positively alter drug absorption, metabolism, distribution and excretion. This synergetic relationship between medications and nutrition is central to the efficacy and adherence of ARVs and other medicines used to treat HIV and AIDS. Also, undernourished PLWHA require therapeutic nutrition or food aid before and during the early phase of ART. For individuals who are not able to take food orally, health workers should administer tube and parenteral therapeutic nutrition.

In order to scale-up nutritional care and support to the national level, a framework for coordination, communication and implementation of the Guidelines is critical. Further, there are several points of summary actions for service providers incorporated into the guidelines specific to the nutrirional care and support. This will permit effective multi-sectoral implementation, monitoring and evaluation in line with the Kenya National AIDS Strategic Plan as well as inform future policy considerations for nutrition care and support in the national response to the HIV/AIDS epidemic.

Acronyms

AED	Academy for Educational Development
AFASS	Acceptable, Feasible, Affordable, Sustainable and Safe
AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral drugs
BMI	Body Mass Index
DfID	Department for International Development (of the UK)
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization of the United Nations
HAART	Highly Active Anti-Retroviral Therapy
Hb	Haemoglobin
HDL	High Density Lipoprotein
HIV	Human Immunodeficiency Virus
KDHS	Kenya Demographic and Health Survey
LBM	Lean Body Mass
MoH	Ministry of Health
MTCT	Mother-to-Child Transmission
MUAC	Mid Upper Arm Circumference
MUFA	Mono-Unsaturated Fatty Acids
NASCOP	National AIDS and STI Control Programme
NCHS	National Centre for Health Statistics
OI	Opportunistic Infection
OVC	Orphans and Vulnerable Children
PI	Protease Inhibitor
PLWHA	People Living With HIV/AIDS
PMTCT	Prevention of Mother to Child Transmission
PUFA	Polyunsaturated Fatty Acids
RDA	Recommended Daily Allowance
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNFPA	United Nations Family Planning Association
UNICEF	United Nations Children's Fund
VAD	Vitamin A Deficiency
WHO	World Health Organization

Definition of Terms

AIDS	A combination of illnesses caused by the human immunodeficiency virus (HIV) that weaken the immune system.
Advocacy	Speaking or writing in support of someone or a cause.
Antenatal	Period during pregnancy before delivery.
Anthropometry	Tool used to identify malnutrition and monitor body measurements.
Antioxidant	Compounds that scavenge free radicals (oxygen molecules) in the body.
Anti-retro Viral therapy	Treatment of persons with AIDS using drugs that specifically deal with treatment of viruses including the HIV virus.
Asymptomatic	A person infected with a disease but without clinical signs and symptoms.
Bacteria	Disease-causing micro-organism bigger than a virus and treatable with antibiotics.
Balanced diet	A meal containing all nutrients in adequate proportions to ensure nourishment of the body.
Bioavailability	The degree and rate at which a substance is absorbed into the body at the site of physiological activityand absorption (e.g. gut).
CD4 cells	A subset of specialized lymphocytes that are key in fighting (attacking) infections used as a marker for HIV progress.
Cholesterol	A fat-like substance that is produced in the liver, and also found in animal-source foods. It circulates in blood as low-density lipoproteins (LDL) and high-density lipoproteins (HDL).
Diet	Amount and kind of food and/or drink taken by a person.
Disease	Period after infection when signs and symptoms appear.
Entomophagy	The traditional practice of consuming edible insects such as termites and locusts.
Erythropoiesis	The process of red blood cells formation in the bone marrow.
Geophagy	The practice of craving and chewing non-food material (such as soil and soft rock).
HAART	Highly Active Anti-Retroviral Therapy. A combination of several anti-retroviral drugs which inhibit HIV multiplication in the body, improve health status, and delay development of AIDS.
Haematopoiesis	Process of blood formation.
Health	A state of physical, social and mental well-being (not necessary absence of disease).
Helminths	Intestinal worms.
Home-based care	Care given in the community/home by non-health personnel to people who are sick or recuperating from sickness.
HIV	The human immunodeficiency virus that causes AIDS.
Hypogonadism	Delayed sexual maturity.
Hypothyroidism	Reduced functional activity of the thyroid gland.
Immunosuppression	A weakened body defense system, creating vulnerability to infection and other disorders.
Indigenous foods	Local/native foods grown in a community.
Infant	A child from birth to 12 months of age.
Infection	The presence of disease caused by micro-organisms.
kcal	Energy taken in food and measured as its used in daily life.
Lactation	Production of breastmilk.
Lactose intolerance	A body's inability to digest lactose, the sugar that is primarily found in milk and milk products.
Lean body mass	Weight of the body without fat composed of muscle, bones and other tissues.

Malabsorption	Failure by the digestive tract to absorb nutrients leading to deficiencies.
Malnutrition	A condition in the body brought about by inadequate or excess intake of required nutrients, or malabsorption.
Meal	Food eaten at a particular time, especially breakfast, lunch and supper.
Monounsaturated fats/oils and Polyunsaturated fats/oils	Produce cholesterol in the body that reduce the risk of heart disease, and may protect against certain cancer. They are also referred to as 'good' fats.
Morbidity	Sickness or illness.
Mortality	Death, usually expressed as a rate of mortality, e.g. rate of death over a period of time.
Nutrient	A substance or component of food, including carbohydrates, proteins, fats, vitamins, minerals and water.
Nutrition	Process of food ingested, digested and absorbed to provide the body with required nutrients
Nutritional Status	A measurement of the extent in which an individual's physiological needs for nutrients are being met.
Oedema	Swelling due to accumulation of fluids.
Opportunistic infections	Illnesses caused by various organisms, some of which do not cause disease in people with a normal functioning immune system.
Over-nutrition	Excessive nutrients and nutritional stores in the body, causing obesity.
Polyunsaturated fats/oils	Produce cholesterol in the body that reduces the risk of heart disease d, and may protect the body against some cancers. They are also referred to as 'good' fats.
Prebiotics	Nutrients that support growth of healthy bacteria such as lactobacilli in the gut.
Probiotics	Live microorganisms that, when administered in adequate amounts, confer health benefits on the host.
Quality of Life	Life with minimized burden of illness with respect to daily functioning as valued by individuals.
RDA	Recommended Daily Allowance. Average requirement of various nutrients to maintain nutritional status of a healthy person according to international standards.
Red blood cells	Cells that help transport oxygen to parts of the body.
Saturated fats	Fats responsible for high levels of cholesterol in body, therefore increasing the risk of heart disease. They are also referred to as 'bad' fats.
Snack	Food or drinks readily available, eaten without much preparation, and usually taken between main meals.
Symptomatic	Infection with signs and symptoms.
Synbiotics	Combination of Prebiotics and Probiotics.
Trans fats	Solidified and partially-hydrogenated vegetable oils that raise blood LDL cholesterol levels (thus called "bad" cholesterol) and reduce the HDL or "good" cholesterol levels.
Under-nutrition	Inadequate nutrients or food intake in the body.
Viral load	Amount of human immunodeficiency virus in blood used as a marker for progress of HIV to AIDS.
Virus	Smallest of all disease-causing micro-organisms.
Vitamins	Nutrients with main function to protect the body against infection.
White blood cells	Combination of cells that protect the body and fight against infections.

Chapter 1
Introduction

1.0 HIV/AIDS Situation in Kenya

The Kenya Demographic and Health Survey (KDHS, 2003) estimates that 1.2 to 1.5 million people in Kenya between the ages of 15 to 49 years are infected by HIV. These findings and other surveys have also revealed the following:

- According to the KDHS, the average prevalence of HIV infection in Kenya is 7%. The range across the country is 3% to 15%.
- For every infected man there are about two infected women.
- Among 15 to 19 year olds, the ratio of infected women to men is 3:1.
- The peak prevalence (13%) is among women aged 25 to 29 years.
- The estimated rates of mother-to-child transmission range between 30% and 40%.
- Among adults, the epidemic has decreased the average life expectancy by eight years or more, from 57 years to 47 to 49 years.
- Kenya has an estimated burden of close to a million orphans and vulnerable children (OVC) as a result of HIV/AIDS.
- The occurrence of opportunistic infections (OIs) has increased. This has resulted in 45% to 70% of beds in public hospitals being occupied by PLWHA.

1.1 Food Security and Nutrition Situation in Kenya

Food security: About 47% of the Kenyan population does not have secure access to food resources to adequately meet their daily needs. In Kenya, the high level of food insecurity is related to poverty and a reduction in agricultural production. HIV/AIDS reduces a household's ability to produce and buy food. Adults with HIV are less able to work on their land or earn income from other activities. Increased health costs require household money that is needed for food.

Nutritional status: In Kenya, about 31% of children under five years old are stunted (too short for age) and about 20% are underweight. Rates of underweight and stunting are approximately 10% higher in rural areas than in urban areas. In addition, anaemia affects three out of every four children under five years; one out of every two women of reproductive age; and one man out of every five men. About half of Kenyan children under five years old, and of women of reproductive age, are also at high risk of zinc deficiency. Vitamin A deficiency remains prevalent among children and women in general, and among specific sub-groups of men. Vitamin A, zinc and iron deficiencies underlie widespread multiple micronutrient deficiencies that constitute significant public health problems (MoH, 1999). It is estimated that over 23,000 deaths of children are related to increased susceptibility to infections related to vitamin A deficiency, and that approximately 70% of children in Kenya grow up with lowered immunity. Overall, the nutritional situation of the Kenyan population remains precarious.

Malnutrition and disease: HIV compromises the immune system resulting in increased susceptibility to severe illnesses. Malnutrition exacerbates the effects of HIV by further weakening the immune system, reducing quality of life and life expectancy. HIV increases the risk of malnutrition by increasing nutrient needs and reducing food intake and nutrient absorption. Nutritional care and support should be an integral component of the HIV/AIDS comprehensive care package. Nutritional interventions are required by all infected persons, irrespective of whether they are on antiretroviral therapy (ART) or not, and at all stages of the disease.

1.2 Rationale for the Guidelines

The action framework for the fight against the HIV/AIDS epidemic in Kenya focuses on three priority areas: prevention of new infections, improvement of the quality of life of people infected and affected by HIV/AIDS, and mitigation of the socio-economic impact of HIV/AIDS. A key activity in improvement of quality of life of people infected by HIV is the provision of nutritional interventions (Kenya National HIV/AIDS Strategic Plan – 2005 to 2010). The national HIV/AIDS policy and several guidelines have articulated the significance of nutrition within the continuum of care and support for those infected with HIV. Specifically, nutrition interventions are given attention in *The Guidelines for Nursing Care and Home Based Care*. Although limited in scope and coverage, information provided in these guidelines and others developed by service non governmental organizations were the primary source of information for service providers involved in care and support for People Living with HIV/AIDS (PLWHA). There is need for national guidelines to enable consistent programming and services based on sound technical advice.

The *Kenya National Guidelines on Nutrition and HIV/AIDS* provide recommendations and information on nutritional care and support for PLWHA, including energy and nutrient requirements; the interaction between food, nutrition and drugs (including ART); and nutrition considerations for special groups such as children born to HIV-infected women, children who are HIV positive, and pregnant and lactating women. For the Kenyan health worker with the obligation to provide quality and comprehensive care—including food and nutritional services—these guidelines will be a valuable source of information for enhancing service provision to those affected.

1.3 The Goal and Purpose of Nutritional Care and Support for PLWHA

1.3.1 Goal of the Guidelines

The goal of nutritional care and support for PLWHA is to improve nutrition, health, quality of life and duration of survival of people infected with HIV.

1.3.2 Purpose of the Guidelines

- To provide a framework for informing policy makers and development partners of plans for nutrition intervention for PLWHA.
- To establish a consistent set of nutrition recommendations for PLWHA in Kenya in order to improve their nutritional status, manage symptoms, and promote response to medical treatment.

- To define actions that service providers need to undertake in order to provide quality care for and support to PLWHA at various contact points, including basis for developing communication messages and design of nutrition packages.
- To promote advocacy at all levels and mobilize support for prevention of malnutrition among the general population, with particular focus on PLWHA and for the integration of nutrition and HIV/AIDS services.

The Guidelines can be used in conjunction with the following important publications:

a) Government of Kenya. Ministry of Health. NASCOP. *PMTCT Training Curriculum;* Kenya PMTCT project. "A short course for health workers providing PMTCT services in areas with limited resources and high HIV prevalence." 2002.
b) Government of Kenya. Ministry of Health. NASCOP. *Guidelines to Viral Therapy in Kenya,* 2001.
c) Government of Kenya. Ministry of Health. *National Home-based Care Programme and Service Guidelines,* May 2005 (in draft).
d) Government of Kenya, Ministry of Health. Home Care Handbook: *A Reference Manual for Home-based Care for People Living with HIV/AIDS in Kenya,* 2002.
e) WHO/FAO. Living Well with HIV/AIDS: *A Manual on Nutritional Care and Support for People Living with HIV/AIDS,* 2002.
f) Government of Kenya. Ministry of Health. *Reference Manual on Nutrition and HIV/AIDS in Kenya,* May 2005 (in Draft).
g) Kenya AIDS NGOs Consortium. *Information Package for People Living with HIV/AIDS, 2000.*
h) National AIDS Control Council. *Kenya National HIV/AIDS Strategic Plan 2005/6 - 2009/10.* 2005.
i) Government of Kenya, Ministry of Health, Nutrition Division, UNICEF, WHO. *Infant and Young Child Feeding Guidelines in the Context of HIV/AIDS,* 2004.

Chapter 2

Relation between Nutrition and HIV/AIDS

2.0 Introduction

Nutrition refers to how food is processed and utilized by the body for growth, reproduction and maintenance of health. Foods contain different nutrients that include water, carbohydrates, proteins, fats, vitamins and minerals. Good nutrition is important to ensure survival and that critical functions operate, including:

- The body producing energy for survival, movement, work, and temperature control.
- Growth, development, replacement and repair of cells and tissues.
- Chemical processes such as digestion, metabolism and maintenance.
- Protection from illness, fighting infections, and recovery from illness.

2.1 Malnutrition

Malnutrition defines a state when the body does not have enough of the required nutrients (under-nutrition) or has excess of required nutrients (over-nutrition). In Kenya, under-nutrition is widespread and often thought of as the same as malnutrition.

2.1.1 HIV Infection and the Immune System

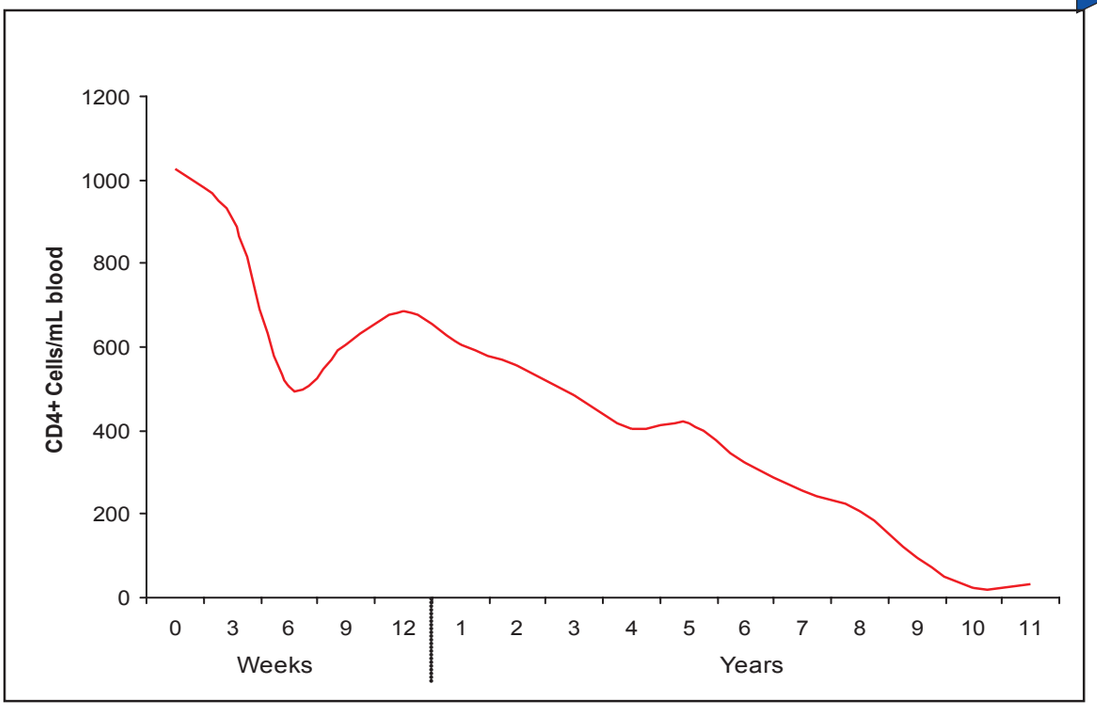
HIV attacks and impairs the body's immune system. HIV infection progresses slowly and may take years before the infected person shows persistent signs of illness (Figure 2.1). During this period, the virus attacks and destroys defence cells known as CD4's. CD4 cells are critical to the immune system functions of the body. Unlike other infections, it is practically impossible for the body to naturally eliminate HIV.

The length of time it takes for untreated and asymptomatic HIV infection to become a symptomatic disease depends on several factors, including the general health and nutritional status of a person before and during the infection period. For individuals with adequate food and health resources, the average time for an HIV-infected adult to develop to full-blown AIDS is approximately ten years (Figure 2.1). In resource-poor settings, such as in Kenya, HIV's progression to full-blown AIDS may take a shorter time because a majority of people have various nutritional deficits and health problems. The emergence of opportunistic infections (OIs) marks entry into full-blown AIDS. At this point, the body's ability to fight against infection from viruses, bacteria, and parasites, and against non-infectious diseases such as cancer and blood disorders, is significantly weakened.

When the immune system is functioning optimally, it helps slow the progression of HIV into AIDS, and increases survival. The development and full function of the immune system requires an array of essential micronutrients and adequate macronutrients, achieved through good nutrition. Generally, immune suppression responds rapidly to nutrition intervention.

Stages and CD4 Counts of HIV Infection Progressing to Full Blown AIDS for Adults

Early Stage	Intermediate Stage	Late Stage
(Asymptomatic) • Weight loss of less than 5%. • Increased energy requirement (10% more). a) Largely no related symptoms (except in the first few weeks). b) Generalized lymph glands enlarged. c) Immune system weakening and recurrent upper respiratory tract infections. d) Normal activity.	(Early symptomatic) • Increased energy requirement (20% more). • Weight loss greater than 10%/failure to thrive. • Persistent fe ver and diarrhoea. • Early opportunistic infections: Mucous membrane and skin infections (e.g. Candidiasis) ∘ Recurring respiratory tract infections. • Normal or partial activity (bed ridden for less than • 50% of the time).	(Full blown AIDS) • Increased energy requirement (30% more). • Weight loss greater than 10% and wasting. • Multiple signs and symptoms. • AIDS defining OIs: ∘ Chronic diarrhoea ∘ Pneumonia ∘ Candidiasis ∘ Tuberculosis (TB) ∘ Kaposis sarcoma • Weight loss/wasting • Weak and low activity (bed ridden for more than 50% of the time).



Modified from I. Roitt, J. Brostoff, P. Male Immunology, 6th Ed. 2002

Figure 2.1: Stages from HIV infection to full blown AIDS (table); and CD4 counts for average disease progression of untreated HIV-1 infection (graph)

2.2 The Link between Nutrition and HIV/AIDS

The link between HIV infection and nutrition can be summarized as follows:

- HIV infection increases nutrient requirements and at the same time impairs nutrient intake and absorption.
- HIV/AIDS increases the risk of malnutrition through altered food intake and/or its nutrient absorption and utilization.
- Poor nutrition increases risk of OIs and accelerates the progression of HIV to AIDS.
- Malnutrition and HIV/AIDS are synergetic and together create a vicious cycle that additively weakens the immune system.

The emergence of OIs further increases energy and nutrient-needs. Moreover, psychological stress affects nutrient intake, and can contribute to the risk of malnutrition. In a real sense, the relationship between nutrition and HIV/AIDS is a vicious cycle (Figure 2.2).

The Cycle of Malnutrition and HIV Infection

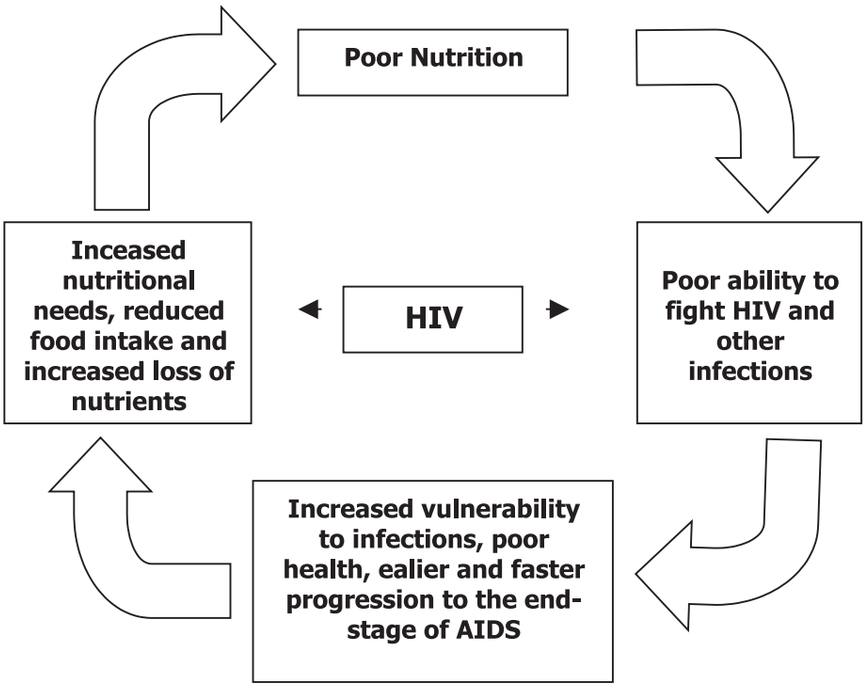


Figure 2.2: The cycle of malnutrition and infection in the context of HIV/AIDS

Effective use of viral drugs prolongs life and improves quality of life. Nutrition as an essential complementary intervention to antiretroviral treatment (ART) will enhance rehabilitation, immunity, and adherence to ART.

2.3 Characteristics of HIV/AIDS-Related Malnutrition

The following nutrition-related characteristics are commonly observed in PLWHA in the later stages of the disease:

- Weight loss, which in late stages has been described as 'slim disease,' and eventual severe wasting.
- Progressive muscle wasting and loss of fat under the skin giving rise to accelerated aging.
- Reduced immune competence leading to increased susceptibility to infections.
- Hair changes especially thinning and loss of hair.
- Diarrhoea and poor absorption of nutrients.

Maintenance of good nutrition among PLWHA improves survival and quality of life.

Chapter 3
Nutrient Needs of People Living with HIV/AIDS

3.0 Introduction

Malnutrition among PLWHA manifests itself most commonly as weight loss, wasting in adults and children, and faltered linear growth (stunting) in children. It is a result of deficiency in specific macro or micronutrients. Weight loss among PLWHA occurs due to reduced intake (starvation), malabsorption, sudden increase in energy expenditure, problems with energy utilization, or a combination of both.

Nutritional Requirements

The nutritional needs of PLWHA are influenced by several factors including age, physiological changes, level of physical activity, clinical state of health, metabolic rate and viral load count. To maintain good nutrition, an adequate intake of energy-giving foods, proteins, vitamins and minerals, fibre and water are vital. The fundamental concerns are to maintain a balance of foods from each food group, and to consume a variety within each food group daily.

Healthy HIV-Uninfected Adults: Require between 1,990 and 2,580 kilocalories per day.

Adult, HIV-Infected (early/asymptomatic stage): Need 10% more energy or about 210 additional kilocalories. This translates into a food equivalent of about an additional one mug of porridge taken during the course of the day.

Adults, HIV-Infected (advanced/symptomatic stages): Need 20% to 30% additional energy, which is 420 to 630 kilocalories depending on severity of symptoms. This translates into a food equivalent of between two to three mugs of porridge taken during the course of the day.

Children HIV - Infected: Need 10% more energy to maintain growth if the child is asymptomatic. For children who are symptomatic, the energy needs increase by about 20-30% more per day. Children who are symptomatic and experiencing weight loss need between 50% and 100% more energy per day.

3.1 Energy Requirements for PLWHA

The human body expends energy, even when resting. Infections, including HIV/AIDS, increase the body's energy needs depending on the severity of the infection. Basically, PLWHA's energy needs increase with the progression of the disease, especially during episodes of opportunistic infection.

Energy requirements for symptomatic and asymptomatic PLWHA in are described in detail in Annex 3.1.

Additional energy requirement by HIV-infected people may have important financial and household food security implications.

Main Energy Giving Foods in Kenya

Carbohydrates and Sugars

All foods provide some energy, but particular energy-giving foods maximize the energy per serving. Energy giving foods include carbohydrates, sugars, fats and oils (Figure 3.2). Main staples in Kenya are maize, rice, beans, peas, potatoes, sorghum, cassava, wheat, sweet potatoes (orange or white fleshed sweet potatoes), millet and green bananas. Sugars and sugary foods are rich sources of energy and include table sugar, honey, jam, cakes and biscuits. Cane table sugar is widely consumed in Kenya.

Table sugar as a source of energy should be taken in moderation. Table sugar is easily broken down to simple sugars, which the liver transforms into fat. Sugars should also be moderated in case of oral thrush or sores in the mouth. After the condition is cured, normal sugar consumption can resume.

Currently, there is no evidence that PLWHA have higher fat requirements.

Fats and Oils provide more than twice the energy of an equivalent amount of carbohydrates. They add flavour and taste to food, which helps to stimulate appetite. They also maintain the function and integrity of cell membrane structure. Fats and oils enhance absorption of fat-soluble vitamins (A, D, E and K). Sources of fats and oils in Kenya come predominantly from vegetables and dry land animals.

There are different types of fats and oils. A good diet should avoid excess saturated and trans fats. The "good fats" include polyunsaturated oils (PUFAs), which are not hydrogenated (vegetable oils such as corn, simsim, sunflower, and cotton seed oil) and omega-3 oils found in fish and soybeans. PUFAs lower the cholesterol level in the body hence decrease the risk of heart diseases.

Monounsaturated oils (MUFAs) also reduce the risk heart disease. Foods rich in MUFAs include peanuts, coconuts, olives and avocadoes. It is worth noting that MUFAs are more likely than PUFAs to be converted to low density lipoprotein or 'good fats'.

The trans fats and oils in margarine and shortening, however, and saturated fats in red meat, poultry, butter, whole milk and palm oil increase 'bad' cholesterol in the body, increasing the risk of heart diseases and obesity.

A high fat intake (over 30% of daily energy requirements) may cause steatorrhea (loose stool) and worsen diarrhoea. High fat intake has also been associated with immunosuppression. Excess fat may alter production of immune substances known as cytokines by some white blood cells.

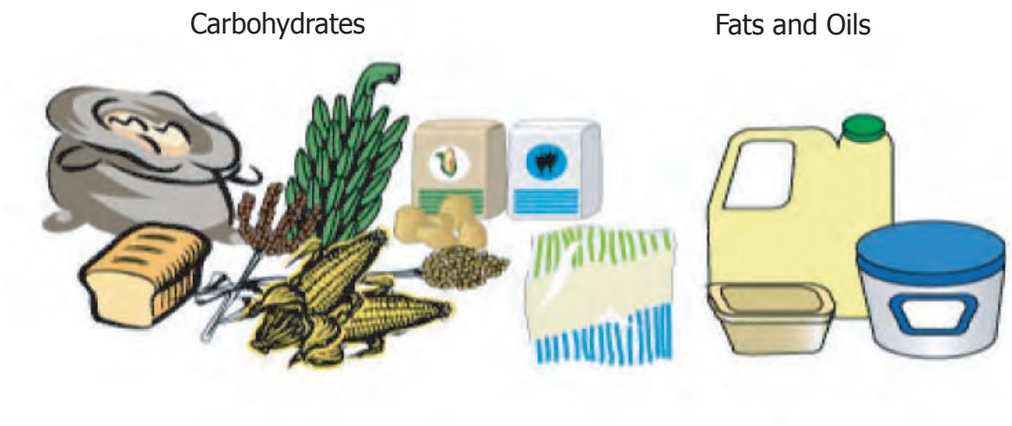


Figure 3.2 Foods that Provide Energy

Strategies to Meet Energy Requirements of PLWHA

How do you help the client meet his or her energy needs required to sustain the increased basal metabolic rates, and for the immune system to address the disease state? The following are strategies to offer to the client:

- Consume two or more snacks between meals to help meet increased energy requirements.
- Make dietary adjustments and meal plans using locally available foods. However, note that eating staple foods alone may not provide all the essential nutrients the body needs.
    - Use fat and oils in food preparation of low energy carbohydrate foods such as regular potatoes. However, fats should be used moderately as they increase the risk of heart problems. Oils (olive oil, corn oil, flax seed and canola oil, and fats from fish and soya beans) are much healthier.
    - Adopt food preparation methods that add nutritional value, for example: sweeten porridge or add nuts; fry staple foods that have relatively low caloric value (potatoes, green bananas) which raises their caloric value several times; ferment cereal foods to improve the bioavailability of most of the nutrients.
    - Promptly treat or manage any condition that may reduce food intake or nutrient absorption or utilization, such as diarrhoea, oral sores, and candidiasis.

For everyone, irrespective of their HIV-status, adequate energy intake is the first, critical step to prevent weight loss and wasting.

- If an individual is losing weight (has lost 10% or more of their usual weight) and cannot access enough food to meet his or her energy needs, whether due to lost productivity or illness, efforts must be made to provide additional food support (see Chapter 8).
- For PLWHA with chronic diarrhoea, limit the intake of oils temporarily and resume intake in moderate amounts when diarrhoea is better.

3.2 Protein Requirements for PLWHA

Protein requirements increase with age from early childhood to adolescence. An optimum protein intake is about 1 gram of protein per kilogram (g/kg) of body weight. Pregnant and lactating women require more protein. A high protein diet for adults (not pregnant and not lactating) is 1.2 to 1.5 g/kg body weight; for children is 2.5 to 3 g/kg body weight. Protein requirements for different population groups are summarized in Annex 3.1.

Proteins are made up of amino acids. Amino acids are broken down in the body and provide the basis for building blocks of protein synthesis inside the cell. There are 20 different types of amino acids that help the body make the hundreds of types of proteins. There are 8 types of amino acids that are critical to take in through dietary sources. The essential amino acids are found most completely in animal food sources (milk, eggs, and meat) and to a lesser extent in plant sources.

Consumption of large amounts of protein-rich foods, which generally are more expensive than staple foods, is not necessary for balancing nutritional requirements. Excess protein is treated as a source of energy and stored as fat in the body.

- According to WHO, there is insufficient evidence to support the need for increased protein requirements for PLWHA over and above that of un-infected persons.
- As in the case of healthy non-HIV-infected individuals, protein intake is recommended at 12 to 15% of the total energy intake. On average, this means a range of 50 to 80 g of protein daily.
- Combining sources of protein (i.e. meat, dairy and legumes) helps to ensure the adequacy of essential amino acids which maintain body cell functions.

Main Sources of Protein in the Diet

Protein-rich food, also referred to as body-building foods, include animal and plant source foods (Figure 3.3).

- *Animal source foods:* Common sources of animal proteins in Kenya include milk and milk products, beef, poultry, chicken, eggs, fillet, dried small fish (sardines, omena) and edible insects such as termites.

- *Plant source foods:* Common sources of plant proteins in Kenya are pulses and legumes which include beans, pigeon peas, cow peas, green grams, lentils, soya beans and groundnuts. Plant source foods are often deficient in one or more amino acids. These deficiencies can be overcome by consuming a wide variety of plant foods.

Note: While a proper mix of amino acids is important, it is not necessary to consume them all at the same time. Their consumption can be spread throughout a day.

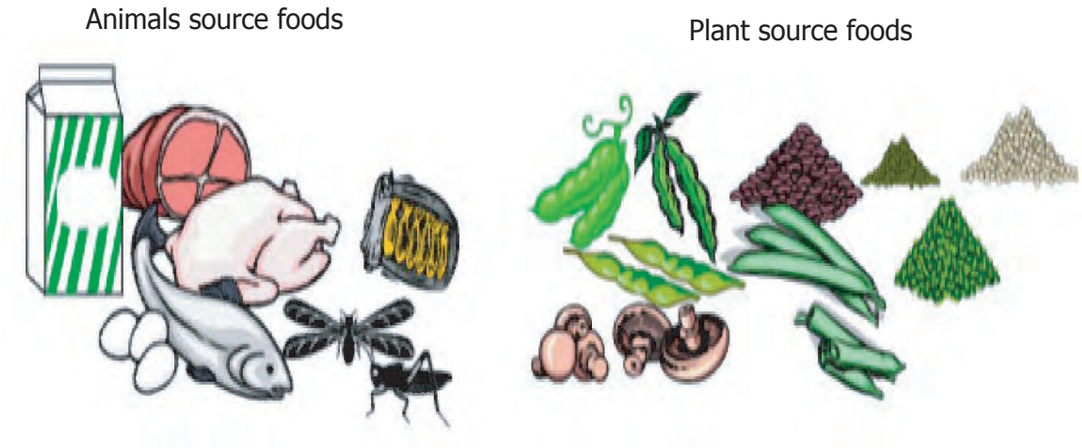


Figure 3.3 Body Building Foods- Proteins

Strategies to Meet Protein Requirements of PLWHA

Counsel and educate PLWHA on how to increase their protein intake with the following points:

- Eat both plant and animal source proteins every day. Plant source foods should include legumes and nuts.
- Consume a small amount of meat, fish, eggs, poultry, and/or milk as part of the main meal as frequently as possible.
- Animal source proteins enhance the bioavailability of iron from plant source foods, and also provide a better balance of essential amino acids.
- Fermented milk or yoghurt is easily digested and helps in the digestion and absorption of other foods; they may also inhibit the growth of harmful organisms common in PLWHA.
- Some PLWHA may be intolerant to fresh milk (called "lactose intolerant") and should try moderate amounts of fermented milk or yoghurt. Also, sometimes it's best to avoid the intake of milk or milk products within an hour of taking certain drugs, such as Tetracycline, as milk products make some drugs less effective.

3.3 Vitamin and Mineral Requirements for PLWHA

Micronutrients play a significant role in immune system functions. Some vitamins are water-soluble such as vitamin C and B-group vitamins. The body does not store water-soluble vitamins, excreting the excess, thus these vitamins should be consumed regularly and in adequate amounts. Other vitamins, such as vitamin A, D, E and K, are fat-soluble. They are stored for longer periods in the body, but regular optimum intake is still required. Important minerals include iron, selenium, zinc, iodine, magnesium and calcium.

Annex 3.2 lists important vitamins and minerals. Requirements for key micronutrients are listed in Annex 3.3 and 3.4.

- According to the World Health Organization (WHO), there is insufficient evidence to support the need for increased micronutrient requirements for PLWHA.
- WHO recommends consumption of one Recommended Daily Allowance of all micronutrients (vitamins and minerals) for both people infected with HIV and those not infected.
- However, therapeutic intervention should be considered, preferably with a multiple micronutrient supplement,for those with a vitamin or mineral deficiency, or those who are vulnerability to a mincronutrient deficiency.

Main Sources of Micronutrients in the Diet

Normally, an adequate micronutrient intake is achieved through a healthy, balanced diet. Fruits and vegetables contain essential vitamins, minerals and trace elements and are commonly referred to as protective foods (Figure 3.4). Animal source foods are also important sources of micronutrients. PLWHA should be encouraged to eat a balanced diet that includes a variety of vegetables and fruits every day in adequate amounts. WHO/FAO recommends consumption of a minimum of 400 g of vegetables and fruits everyday.

Vegetables

The deep coloured varieties of vegetables contain abundant minerals and vitamins.

- Common vegetables in Kenya include kale *(sukuma wiki)*, spinach, pumpkin leaves, cowpea leaves, carrots, cassava leaves, green pepper and the following indigenous vegetables.
- Indigenous or fresh vegetables such as African nightshade (Solanum), Amaranthus *(Amaranthus)*, jute mallow *(Corchorus olitorius)*, vine spinach *(Basella Alba)*, and stinging nestle *(Urtica massaica)* have a high micronutrient value.

Fruits

- The most common fruits in Kenya are oranges, passion fruit, mangoes, pineapples, avocadoes, pawpaws, guavas and ripe bananas.
- Deep yellow or orange fruit such as mangoes, pawpaw, passion fruit and red watermelon are rich in vitamins, and particularly β-carotenes which help the body produce vitamin A.

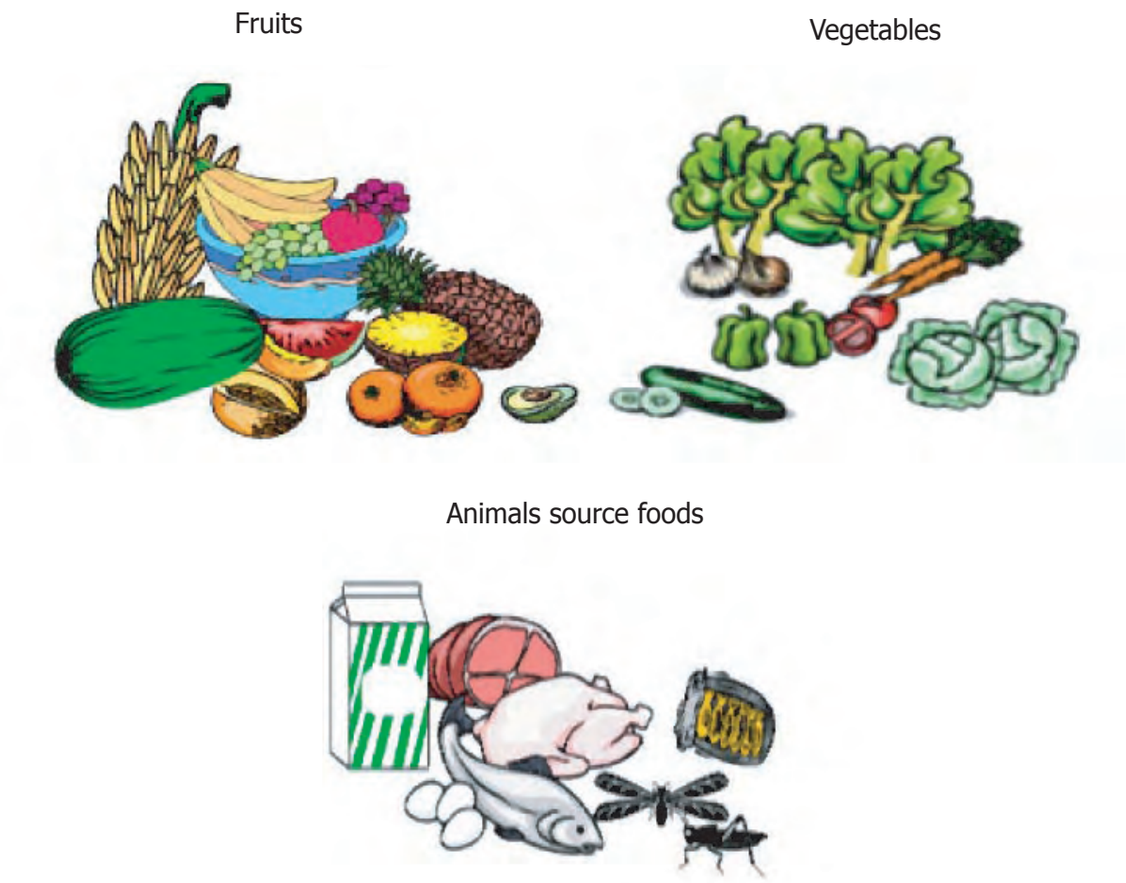


Figure 3.4 Protective Foods

Animal source foods

Vitamins and minerals are also obtained from animal source foods such as milk, eggs, liver, kidney, fish, bone soup, beef, mutton, pork, chicken.

Fortified and blended foods

In populations where many are at risk of micronutrient deficiency, adding selected vitamins, minerals and trace elements to staple foods increases nutrition in a cost-effective manner. For example, fortification of sifted maize flour restores the nutrients lost during milling; and most cooking fats and oils on the market are fortified with vitamins A and D. Combining types of foods may also enrich their nutrient value. (For example, taking vitamin C-rich food, such as mango, with iron-rich food increases the absorption of iron.) There are other foods that are blended to more fully meet nutritional needs (i.e. UNIMIX, corn soy blend).

Micronutrient Supplements

Appropriate micronutrient formulations may be helpful for adults, children or pregnant and lactating women who are vulnerable to micronutrient deficiency (refer to pp. 24 –25). With the exception of a particular medical prescription for a single micronutrient, multiple micronutrient supplements meeting the Recommended Daily Allowance (RDA) should be recommended for PLWHA.

Strategies to Meet Micronutrient Requirements of PLWHA

Counsel or educate PLWHA on how to increase their micronutrient intake with the following suggestions:

- A balanced and varied diet is the best way to ensure adequate intake of micronutrients, especially eating vegetables, fruits and animal products.
- The nutrient value of local staples is improved by pre-cooking, soaking and sprouting of cereals and legumes, and fermentation. This improves digestibility and increases the bio-availability of nutrients.
- Consume fortified foods, e.g. fortified maize flours, where available.
- Blended foods (UNIMIX, corn soy blend) are foods that are premixed and need little preparation. Some are ready to eat or drink by adding hot water. They are a good way to meet nutrient needs during convalescence or recovery from weight loss.

Micronutrient supplementation should be restricted to one Recommended Daily Allowance unless therapeutic intervention for micronutrient deficiency is required. Therapeutic intervention may be required for PLWHA who are severely deficient in a specific nutrient (e.g. anaemic or vitamin A deficient) or for those who have infections (e.g. malabsorption, diarrhea, specific intolerances, severe malnutrition).

- If a service provider must recommend supplements, take into account the following:
  - Supplements are not an alternative to a balanced and varied diet.
  - Supplements do not treat HIV/AIDS, but only improve immunity to fight opportunistic infections (OIs).
  - Taking supplements beyond the prescribed level per day can lead to toxicity. Toxicity is especially possible with vitamin A, B3 (niacin), B6 (pyridoxine), D, iron, zinc, selenium and copper. Side-effects, such as fatty liver changes, have been observed in individuals taking more than the Recommended Daily Allowance.
  - Prescriptions should be restricted to supplements that are registered with the MoH, as many are not regulated and may not contain what they claim.

3.4 Dietary Fibre Requirements and Sources

Dietary fibre, or "roughage", is a food component that cannot be fully broken down by digestive enzymes. Whole grain cereals, unrefined flour, vegetables and some fruits are good sources of non- or partially-digestible and insoluble fibre. Dietary fibre is important because it enhances bowel movement and the overall health of the digestive system. However, fibre also creates a sense of fullness and may lead to eating less, which may not be desirable for PLWHA who need to increase their food intake.

For individuals with diarrhoea, insoluble fibre from whole grains, cereals and legumes may make the diarrhoea worse. Fibre from fruit, which is more soluble, binds water in the gut and should be recommended.

Individuals with constipation should eat foods high in whole fibre (e.g. whole meal bread, vegetables, boiled whole maize, oatmeal bran, beans, fruits, and nuts). Fibre supplementation (e.g. methylcellulose or psyllium) may be necessary if dietary fibre is not helping to resolve constipation.

3.5 Water Requirements

Water is an essential nutrient. Water is important because it transports nutrients; removes waste; assists metabolic activities; provides lubrication to moving parts; and helps regulate body temperature. A person is adequately hydrated if they pass clear urine.

Drinking water must be clean and safe in order to avoid water-borne diseases. The following measures make water clean and safe:

- Boil water for at least 5 to 8 minutes to kill infectious micro-organisms.
- Store water in clean and covered metallic or ceramic containers.
- Filter water using approved filtration systems.
- Add suitable water treatment chemicals (such as chlorine) to kill bacteria.
- Use industrially sterilized and bottled drinking water. (The cost or availability of this water may be beyond the reach of many PLWHA.)
- Drinking distilled water does not necessarily add value over that of treated or boiled water. Not all distilled water has minerals or is suitable for regular consumption. Some distilled water has removed the minerals the body needs during distillation (i.e. bottled water produced by reverse osmosis).

PLWHA should drink a lot of safe, clean water. The recommended water intake is at least 2 litres (or 8 glasses of 250 mL) per day (Figure 3.5).

Strategies to Meet Water Requirements of PLWHA

- PLWHA can meet daily water requirements by drinking clean, safe water and also beverages such as fruit juices, soups and milk.
- PLWHA with infections, especially those with diarrhoea, should take more than the recommended daily amount of water, as they lose water due to illness. Fever also causes water loss (because of sweating), as does vomiting. These conditions will lead to dehydration if adequate water/fluids are not taken.
- PLWHA on ARVs and other drugs may be required to take more water to help flush out the bi-products of medicines from the body and to prevent damage to the kidney. For example, when taking Indinavir, one should drink an additional 1500 mL (6 glasses) of water a day to avoid affecting the kidney.
- Coffee and tea should not be taken to replace water intake. They have low nutrient value; tannins in the tea may inhibit the absorption of iron; and the caffeine they contain may cause dehydration.
- Squashes (artificial fruit juices) and fizzy drinks such as soda are not suitable because of the unknown effects of preservatives used, and the effect that gases from these drinks may give a false sense of satiety, affecting appetite.

- Alcoholic beverages are not suitable. They dehydrate the body; may interfere with the metabolism and effectiveness of medication, are contraindicated with many medicines used to treat OIs and ARVS, and may worsen side effects. Drinking alcoholic beverages interferes with food intake, and also digestion, absorption and storage of certain nutrients in the body. Alcohol consumption may also increase the risk of unfavourable behaviour.

Figure 3.5: Recommended 24 Hour Fluid Intake

3.6 Quantities of Food for a Balanced Diet

Estimates of food quantities can be based on portions called 'servings'. A serving is measured using common utensils such as cups and spoons, or is determined by weight of solid food items (Figure 3.6). The energy and protein values of commonly consumed foods in Kenya are presented in Annex 3.5.

3.6.1 Estimates of Food Quantities

The volume of green peas remains unchanged after cooking. The volume of dried foods such as rice, dried beans, and peas doubles upon cooking; the volume of vegetables is halved.

Servings (Measurements are based on a 200 mL cup)

- *Energy foods:* One serving is equivalent to:
  - one slice of bread or
  - ½ cup of cooked pasta, rice, or cereal or
  - one cup of high fibre cereal or
  - one cup potatoes or
  - three biscuits.
- *Body building foods:* One serving is equivalent to:
  - ½ cup of dried beans or peas (yields 1 cup cooked) or
  - one cup of fresh milk, fermented milk or yoghurt or
  - 50 - 90 g cooked meat or chicken.
- *Protective foods:* One serving is equivalent to:
  - one piece of whole fruit or
  - ½ cup of fruit juice or
  - one cup of raw chopped vegetables or
  - ½ cup of cooked vegetables.

Example of a Balanced Diet for One Day

Energy foods	Body building foods	Protective foods
6 servings of whole maize meal (or 3 cups=1288 kcal, 30 g protein)	1 serving dried beans (or ½ cup =275 kcal, 17 g protein)	1 ¼ cups of cooked vegetables without water (5 cups of raw sliced vegetables). (or 5 servings=140 Kcal, 7 g protein
5 teaspoons of fat or 25 ml oil = 225 Kcal 	1 serving meat or fillet (50 g meat or 20 g fillet=110 Kcal, 15 g protein) 1 serving of milk (or 1 cup =73 Kcal, 3 g protein)	2 servings of fruit e.g. oranges (or 2 pieces =88 Kcal)

Figure 3.6: Servings of various foods: together, a balanced diet for one day (whether taken throughout the day or at one meal)

Chapter 4

General Care and Nutritional Care and Support of PLWHA

4.0 Introduction

A key objective of nutritional care and support for PLWHA is to prevent weight loss and to maintain normal nutritional status. Another important objective is to restore the nutritional status for severely malnourished PLWHA, to optimize their health and also reduce stigma against them. Also, nutritional support will assist those who are overweight to reduce their weight and its associated health risks.

Summary of Critical Nutrition Interventions for PLWHA

- Advise the client to have **periodic nutritional status assessments,** especially of their weight, every 2nd month for symptomatic clients and every 4th month for asymptomatic clients.
- Educate and counsel PLWHA of the **increased energy needs** for their disease stage, and the need to consume a balanced diet. Clients with severe malnutrition should be supported with therapeutic supplementary foods.
- Educate and support clients to **maintain high levels of sanitation**, food hygiene, and water safety at all times. They should be de-wormed bi-annually with an appropriate broad-spectrum anti-helminthic drug, like Albendazole™ or Mebendazole™.
- They must **practice positive living behaviours**, including practicing safer sex, avoiding or moderating use of alcohol, cigarettes and non-prescription drugs.
- Counsel PLWHA to seek **prompt treatment for all opportunistic infections** and symptoms, and especially those that may interfere with food intake.
- Clients should carry out **physical activity or exercises** to strengthen or build muscles, increase appetite and health.
- Those on medicine, including ARVs, should be informed about managing the **drug-food interactions and side-effects** that can be managed by food and nutrition interventions.

4.1 Periodic Nutritional Assessment

Nutritional assessment is a process that determines a client's nutritional status and the causes of any nutritional problems. The major purpose of a nutritional assessment is to determine the severity of nutritional impairment and probable causes. A nutritional assessment will focus on information about dietary and anthropometric factors, clinical status, biochemical status, psychosocial factors, and the living environment of the PLWHA.

The following are the main goals of a nutritional assessment:

- To confirm an adequate nutrient intake, improve eating habits, and help build and maintain stores of essential nutrients.

- To confirm correct weight status, and maintain a healthy weight by preventing overall weight loss particularly of muscle mass (lean body mass, LBM) or development of obesity.
- To confirm absence of illnesses that aggravate nutritional wasting, and assist the patient in assessing treatment for illnesses that reduce food intake.
- To adjust meals and meal plans for other chronic illnesses associated with HIV.
- To facilitate provision of therapeutic nutritional care and support during advanced stages of HIV/AIDS.

Observations of these components help the service provider design nutrition interventions for care and support of PLWHA.

4.1.1 Anthropometric Assessment

Anthropometric screening is carried out through serial measurements of weight, height, mid upper arm circumference (MUAC) and skin fold thickness (SFT). The values obtained are used to show changes in body mass and dimensions as follows:

> Clients who have lost 10% or more of weight within 2 to 3 months should be referred for assessment for ARVs and started on ART as appropriate.

Weight: A client's absolute weight and the degree of weight change over time assists the service provider to understand the baseline and stability of nutritional status, impact of illness, and response to interventions. Changes can be expressed as a percentage of weight loss or gain. Rapid weight loss—losing more than 5% of usual body weight over a 2 to 3 month period—is highly associated with OIs and hospitalization. This symptom warrants a carefully executed diagnostic evaluation to determine any correctable or treatable confounding conditions. More then a 10% decrease in body weight over 2 to 3 months is a criterion of wasting syndrome. However, loss of body weight may also be a side effect of HAART (or 'Highly Active Anti-Retroviral Therapy' see Chapter 7.)

> Take and record the weight of PLWHA at each visit. Body weight assessment is required to:
> - Identify those whose growth patterns are outside the normal values, indicating either over-nutrition or under-nutrition.
> - Identify individuals at risk of malnutrition with repeated measurement (screening) over time.
> - Monitor effects of nutrition interventions on various anthropometric measurements.

For a client with oedema, net weight gain should be assessed after oedema has disappeared to ensure accuracy of the measurements obtained (i.e. that the weight is not a reflection of excess fluid retained by the body).

Body mass index (BMI): In adults, BMI is obtained from weight in kilograms divided by the square of the height in metres. Adults with a BMI less than 18.5 kg/m^2 indicates

under-nutrition and a high risk of illness; a BMI greater than 25 kg/m^2 indicates risk of overweight; and a BMI greater than 30 kg/m^2 indicates obesity with a high risk of diabetes and heart disease. BMI is not applicable for pregnant women—Middle Upper Arm Circumference (MUAC) is the preferred measure.

HIV-infected individuals with a BMI of less than 18.5 kg/m^2 and children with weight-for-height (wt/ht) of less than -2 Z scores (see Annex 4.1) should be supported with therapeutic food supplement for the purpose of improving their nutritional status to BMI above 18.5 kg/m^2 and wt/ht of > -2 Z score.

BMI is recommended as criterion for adults and determining PLWHA who require prescription for supplementary food support (details in Chapter 8). The use of Middle Upper Arm Circumference is recommended for adults and children (see below) who cannot stand up for weight and/or height measurements. MUAC values correlate strongly with BMI in men. In women, the cut-off point MUAC < 23.3 cm may provide a reasonable correlation with BMI.

PLWHA with BMI greater than 30 should be advised how to reduce weight without compromising their nutritional status:

- Control caloric intake by increasing intake of low calorie foods such as vegetables and high fibre diets such as oatmeal.
- Restrict intake of polyunsaturated fats and avoid saturated and trans fats and oils.
- Restrict sugar intake.
- Increase water intake.
- Ensure regular exercise.

Detection of growth faltering: Growth faltering in children is based on underweight, stunting, wasting and growth velocity in children. Children under 10.5 years should have an expected weight and height gain that corresponds to their age in months; the reference values are provided by the National Centre for Health Statistics (NCHS)/WHO along with variations (standard deviations).

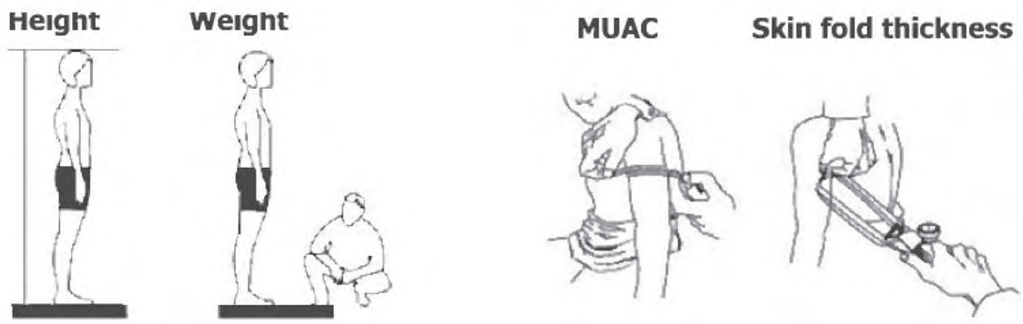


Figure 4.1 Anthropometric Measurements

Any anthropometric assessment requires relatively simple equipment:

- A calibrated Salter scale for weighing children to the nearest 100 g or a bathroom scale for adults;

- A heightometer for measuring height;
- A tape measure for measuring mid-upper arm circumference and callipers for measuring skin fold thickness (Figure 4.1).

4.1.2 Measuring Body Composition

Keeping record of the weight of a PLWHA should not be the only method to detect nutritional deficiencies. Loss of body weight in PLWHA usually signifies a change of more than one body compartment (fluids, fats, lean body mass), and sometimes a loss in one compartment is counterbalanced by a gain in another, with little change in the measured body weight. The lean body mass (LBM) (weight of the body without fat) is essential for the effectiveness of medicine and is linked to time of progression to the end stages of AIDS.

> It is recommended that PLWHA have their body composition (at least the fat mass, the body cell mass) taken at least every six months, and every three months after starting ART.

How to measure body composition

Body composition is based on fat and LBM assessment of the following:

- **Mid upper arm circumference (MUAC):** A measurement equal or lower than a cut-off point of 22 cm for women and 25 cm for men is considered risky. (A cut-off point of 23.3 cm may be applied as an average value for both men and women.) Low values are associated with under-nutrition (starvation or muscle wasting) and put a person at risk of illness. For children 1 to 5 years old, MUAC cut-off points are: 12.5 to 13.5 indicating moderate under-nutrition; and < 12.5 indicating moderate to severe malnutrition.
- **Triceps skin fold thickness:** Skin thickness below 5 mm for men and 8 mm for women indicates risk of malnutrition. Low measurements may indicate under-nutrition or changes in a person's metabolic function.
- **Waist circumference and hip circumference ratio:** In general, if the waist measurement is greater then the hip measurement, it may be associated with trunkal obesity (which indicates cardiovascular risk) or it may be a side effect of long-term ART use. A ratio above 0.8 for women and 1.0 for men suggests changes in the body shape.

Bioelectric impedance analysis (BIA)

BIA is a non-invasive tool for assessing body composition currently available in a limited number of settings in Kenya. Conventional measurement of impedance is made by placing two electrodes between the back of the wrist joints and two electrodes in front of the ankle joint on the same side of the body. The electrodes are connected with appropriate leads to a measuring device. A harmless excitation current from dry batteries is transmitted, and voltage drop measured to give the impedance.

There are computer programmes that facilitate the automatic calculation of composition indicators including the client's total body water, fat free mass, percentage of body fat, basal metabolic rates, and ideal weight taking into account his or her weight, height and gender.

4.2 Biochemical and Microscopic Investigations

There are a number of diagnostic tests that identify infection with HIV (e.g. HIV rapid tests, ELISA and RNA-PCR) and the stage progression of the disease (e.g. viral load and CD4 counts). These are well referenced in other texts. Therefore, this section focuses on diagnostic tests that evaluate nutritional status and guide nutritional interventions for PLWHA.

Biochemical and microscopic evaluations are used to assess nutritional status, monitoring for OIs, and disease progression. The tests are advantageous because they provide information on a client's risk of nutrient deficit long before anthropometric changes can be detected. Often they complement other tests such as clinical presentations. They are also important in monitoring the effects of treatment.

Priority Laboratory Investigations

The commonly used laboratory tests in nutritional care and support of PLWHA include assessment for anaemia, white blood cell count, micronutrients status, nutrition biochemistry, and detection of infective organisms.

Anaemia: Anaemia is common in PLWHA and is a side effect of some ARVs. WHO's recommended haemoglobin cut-off points for anaemia are:

- < 11g/dL for pregnant women and six to 60 month-old children.
- < 12g/dL for non pregnant women.
- < 13g/dL for men.

With iron deficiency many red blood cells are relatively small and pale in colour.

> PLWHA on **Zidovudine** or **Lamivudine** should be referred for an assessment of haemoglobin at least every 6 to 8 months. If they are anaemic, initiate low levels of iron and folic acid supplementation to the client. Clients should also be advised to eat foods rich in iron, vitamin B12 and vitamin A.

White blood cells (WBC): White cell counts in whole blood reflect the state of the immune system. A normal adult's WBC count ranges between 4,300 to 11,000 cells/mL of blood. In children, the WBC count decreases with age: less than one year is 18,000 cells/ml; 2 to 6 years is 15,000 cells/mL; and 6 to 12 years is 13,000 cells/ml.

Of special importance are the lymphocytic cells, particularly CD4 and CD8, which are used to determine the stage of HIV and in monitoring the response to ART. A CD4 cut-off point of 200 X 10^3 cells/ml of blood (200 cells/µL) and below indicates a severely compromised immune system and is currently used by most providers as a key criterion before starting ART.

Malaria: The presence of malaria parasites is confirmed most commonly by a blood film. Malarial infections are likely to be more severe in PLWHA. Confirmation by laboratory diagnosis is the first step in ensuring appropriate treatment. Confirming malaria by laboratory testing is especially important for those living in malaria endemic areas.

Intestinal and Urinary Tract Infections: Worms (helminths), bilharzias (schistosomiasis), and amoeba are common intestinal infections in places where hygiene including hand-washing, protective foot wear, and sanitation services are adequate. Infections also occur due to poor food handling and storage. These infections tend to be more severe among PLWHA. They may manifest as diarrhoea or cloudy, turbid urine. Turbid urine is suggestive of infection and/or protein loss through urine. Reagents (test kits) in the form of diagnostic strips are readily available for urine analysis. Routine microscopic methods for stool and urine are also adequate for diagnosis.

Micronutrient status: More than one test is recommended to confirm a deficiency, especially when results are marginal. This argument is based on observed fluctuations of key micronutrient indicators due to altered metabolism and distribution during acute infections. The main diagnosis criteria for key micronutrients are shown below:

Zinc deficiency (ZID)

- Low intake and poor bioavailability diets.
- Functional improvement of taste following zinc supplementation.
- Suggestive clinical signs such as delayed sexual maturation and dermatitis.
- Low plasma zinc levels: < 10.7 µmol/L.

Iodine deficiency disorders (IDD)

- Intake of non-iodized salt or poorly iodized salt.
- High intake of foods that inhibit iodine absorption and use of goitrogens (i.e. cassava leaf, kale, cabbage).
- Low urinary iodine levels (iodine intake during the preceding meals): < 50 µg/L.
- A visibly enlarged thyroid gland (goitre), which indicates a history of previous or ongoing iodine deficiency.

Vitamin A Deficiency (VAD)

- Low intake of vitamin A and pro-vitamin A rich foods for prolonged periods of time.
- In advanced cases, presence of disorders such as night blindness (reduced ability to see in dim light) and xeropthalmia.
- Low plasma or serum concentration of retinal: < 0.35 µmol/L.

Iron deficiency

Tests for assessing iron status include serum ferritin, transferrin receptor, zinc protoporphyrin and haemoglobin. With exception of haemoglobin, these tests are seldom available. A high index of suspicion for iron deficiency is based on the following:

- Low iron bioavailable diet, or marked blood loss.
- Low haemoglobin: < 11 g/dL and haematocrit: value less that about 3 times the haemoglobin value.
- Low red blood cell volume (MCV): < 72 fL.
- Low serum ferritin: < 12 ng/mL.
- Low serum transferrin receptor < 28.1 nmol/L.

- A large proportion of small red cells and generally pale red cells under the microscope.
- Large normal coloured red cells suggest deficiencies due to folate and/or vitamin B^{12}.
- High zinc protoporphyrin (ZnPP): > 40 µmol/mol of Heme.

Selenium deficiency

- Low intake and poor bioavailability diets.
- Low plasma or serum concentration of selenium: < 0.58 µmol/L.

Albumin

- Serum albumin testing indicates the adequacy of protein intake and can be included in routine nutritional assessments of PLWHA who are free from acute infections.
- Low plasma or serum concentration of albumin < 3.5 g/dL.

Cholesterol and triglycerides

- Fasting lipid profile (i.e. serum cholesterol and triglycerides) is a useful marker of nutritional status of PLWHA. Changes in lipid profiles may result from use of Efavirenz and other protease inhibitor ARVs.
- The desirable upper limit for total cholesterol and triglycerides is 5.2 mmol/L and 1.7 mmol/L respectively. The upper limit for low density lipoprotein is 3.4 mmol/L while the desirable lower limit for high density lipoprotein (HDL cholesterol) is 0.9 mmol/L.

4.3 Clinical Assessment

Clinical assessment, consisting of current and past medical history and related clinical examination, is vital in gauging nutritional risk. Of importance are the following:

- Illnesses and deficiencies that may be aggravated by HIV infection or its consequences. For example, oral and pharyngeal infections that reduce food intake, and chronic diarrhoea caused by gastrointestinal OIs (like *Mycobacterium avium* complex, bacterial pathogens such as *Salmonella, Cryptosporidium*, microsporidia, *Isospora, Giardia, Entamoeba, Clostridium difficile*) that induce malabsorption of nutrients and destabilize nutritional status.
- Drugs and/or traditional therapies that the client is taking for long-term treatment may have side effects that have a negative impact on nutritional status.
- Clinical staging of the disease.

Malabsorption can be evaluated by conducting specific laboratory tests, including 3-day faecal fat measurements and/or D-xylose absorption assessments. A common feature of malabsorption is steatorrhea (loose stool). A client generally reports several daily episodes of diarrhoea and may have associated vitamin B^{12} deficiency. Diarrhoea is defined as passing watery stool more than three times a day.

Assessment for Fat Redistribution Syndromes

The common and prominent signs of lipodystrophy (redistribution of fat stores) include facial and limb fat wasting, central and/or localized fat deposits, and visceral fat accumulation. Localized fat accumulation may include enlarged breast in both men and women (see Chapter 7) and elevated blood triglycerides and total cholesterol. Lipoatrophy syndrome is the predominant loss of subcutaneous fat and leads to a loss in total body weight, also a side effect of HAART.

4.4 Dietary Assessment

Dietary assessment is a proxy indicator of a client's nutrient intake and risk of energy and nutrient deficiency.

- Assessment of a client's food intake is based on 24-hour recall, or by having a client record food consumed over three consecutive days. The aim is to assess the amount and frequency of foods consumed that are rich in key nutrients (e.g. animal proteins, fortified foods, vegetables, fruits, water intake), and also to assess intake of foods that may be harmful to the body (e.g. alcohol, strong teas and coffee, soda).

> A PLWHA whose weight has unintentionally declined in two or more consecutively months (or has lost more than 5% of their usual weight in two to three months) should have a dietary assessment conducted by a qualified dietician/nutritionist, with a related assessment of the causes of any reduced food intake.

- If a deficit dietary intake is determined, identify the underlying factors. The causes may be poor appetite, pain from sickness, co-existent gastrointestinal disease; and/or psychiatric disorders including depression, use of non-prescriptive drugs and alcohol; or dietary restrictions mandated by HAART. Food attitude, food insecurity, availability of water and fuel, and strength required to prepare food are other factors that could affect food intake among PLWHA.

- Food intolerance: Many PLWHA are unable to properly digest nutrients because of damage to the gut. They may be intolerant to lactose, for example (the sugar primarily found in milk and milk products). Lactose intolerance can cause a variety of digestive symptoms including stomach pain, bloating and diarrhoea. Lactose intolerance is diagnosed solely on symptoms and relief of those symptoms when dairy products are avoided. Soy milk and commercial lactase enzyme replacement (lactaid) added to dairy products should be recommended. Consumption of small amounts of milk or dairy products taken with meals may be better tolerated.

Interventions to Support Adequate Dietary Intake

- Educate clients on food, diet, nutrition and healthy eating so they can make the best choices from their available options. Explain the reasons for taking 10% or 20% to 30% extra energy; balanced and adequate protein; and micronutrients in the diet (see Chapter 3).

- Assist clients on how to make decisions to meet their nutritional requirements and build their capacity to implement their decisions (see Chapter 3).
- A client with clinical manifestations of deficiency of any nutrient should be given nutritional advice, supplements where appropriate, and/or referred to a clinician for further examination.
- In case of deficit key nutrients, recommend the following approaches:
  - Balanced dietary regimens.
  - A wholesome highly bioavailable multiple-micronutrient formulation of 1 Recommended Daily Allowance. On average, therapeutic supplementation for three months may adequately address a deficiency. This should continue for about three more months as preventive supplementation, or longer depending on the adequacy of dietary intake.
  - Always keep detailed records of observations and actions for each client. Refer to these records every time you review the client.

Common causes of reduced food intake and actions to take are detailed in Table 4.1.

If the cause of reduced intake is:	Then take this action:
Diseases and/or inability to eat.	• If OIs, refer the client for appropriate treatment of the infections. • For psychological disorders including depression, refer to counseling; provide reassurance and hope. • For medical toxicity in patients on HAART, counsel the patient. • Counsel if taking non-prescribed substances or too much alcohol. • Refer persistent cases for medical care.
Poor attitude on food intake or taboos that affect food intake in sickness.	• Provide nutrition counselling to both the client and care-givers to change attitude and any eating taboos.
Complex medical regimens (for treatment of OI or ARVs, renal disease, pancreatitis).	• Assist clients in making a plan for daily intake of foods that are locally available and meet nutritional needs. • Advise caregivers of PLWHA to regularly supervise their meals to ensure adequate food consumption.
Unavailability of food in the household, or not able to prepare food due to illness	• Refer "food insecure" client for supplementary food support or programs. • Refer or provide client with ready to use therapeutic food.
Voluntary intake is not possible due to disease.	• Enteral or parenteral feeding routes can be used by health staff to stabilize and improve nutrition status of the subject.
All PLWHA	• Advice PLWHA to drink at least eight glasses of clean and safe water every day. • Provide them with user-friendly, up-to-date pamphlets and literature on nutritional care. • Refer them to providers who address the comprehensive 'holistic' needs of PLWHA.

Table 4.1: Management of Common HIV-Related Problems

4.5 Assessing Living Environment

The environmental and psychosocial assessment will identify factors that might be supporting or weakening the resolve of PLWHA. Assessment of a client's living environment should accompany the nutritional management of PLWHA.

Educate and counsel PLWHA to change unfavourable lifestyle habits that may affect food intake and nutrient absorption and utilization, and to adopt a healthy living lifestyle.

4.5.1 Interventions to Support Good Sanitation

Assessment of:	Interventions
Personal hygiene, sanitation, housing environment, and food handling practices that affect susceptibility to infection.	• Always wash and rinse fresh fruits and vegetables in clean water or clean with mild disinfectants, and thoroughly rinse with clean water. [i] • Practice good hygiene, especially hand washing with soap and thoroughly rinsing before preparing and consuming meals and after visiting the toilet. • Store food appropriately to prevent contamination of food by bacteria and moulds. • Avoid eating any food that may seem spoilt, e.g. mouldy foods or stale left overs, even if they are reheated. • Avoid spending long hours in crowded rooms, poorly ventilated rooms, or interacting with TB infected persons.

Table 4.2: Interventions to Improve Sanitation and Hygiene

4.5.2 Interventions to Support Positive Living

Assessment of:	Interventions
Self-esteem, social support, stigma and isolation that affect appetite and access to food.	• Provide nutrition counselling to the client and care-givers and educate the general public to change attitudes towards PLWHA.
Access to health care amenities that stabilize health and address concerns of PLWHA.	• Refer to community based support groups and/or home-based care initiatives.
Poor habits such as smoking, alcohol consumption and drug abuse that may affect food and nutrient intake; increase oxidative stress; and decrease the efficacy of some medications and immunity.	• Counsel PLWHA to stop consuming alcohol, smoking or chewing tobacco and using illicit drugs and substances. Smoking increases the risk of heart disease and high blood pressure. • Recommend moderation in the consumption of tea, coffee, sodas or other related drinks that may interfere with food intake, absorption and utilization.
Risky sexual behaviour of the client and partners, as this can cause re-infection with different HIV strains.	• Practice safer sex (use condoms) in order to avoid infecting others and to avoid infection with new strains of HIV.

Table 4.3: Interventions to Improve Positive Living

[i] - Effective cleaning of fruits and vegetables is achieved by soaking them in bleach preparation such as Water Guard™ (2 parts per million chlorine) for 15 minutes. Rinse them thoroughly in clean and safe water.

4.6 Physical Activity and Quality of Life

Physical activity is a fundamental way to improve physical and mental health. It improves physical fitness, lessens depression, improves appetite, relieves constipation, improves intestinal absorption, improves muscle tone and eliminates excess fat. Progressively resistant exercises reduce fat levels in blood, hence decreasing the risk of heart disease and diabetes, and improving lean body mass (LBM). Therefore the impact of physical activity leads to a better quality of life. It is recommended that service providers assess a client's level of physical activity and encourage appropriate forms of physical activity.

Interventions to Improve Physical Activity

More activity may be required for weight reduction among the overweight. However, physical activity and exercise should always be within sufficient energy intake, otherwise it may cause unwanted weight loss. Service providers should assess a client's strength, and recommend suitable and various physical activities. For example, a hand grip will assess muscle strength and this measure correlates well with muscle endurance (glycogen levels) and hydration.

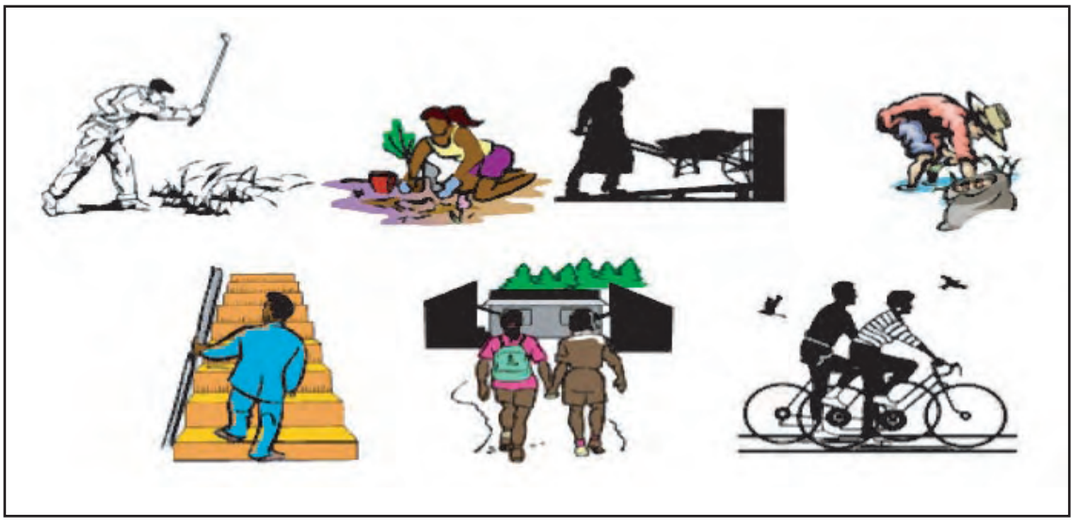


Figure 4.2: Physical Activities and Exercises for PLWHA

Weak, bed-ridden and hospitalized individuals should be encouraged or assisted to carry out light exercises to strengthen their muscles and prevent bedsores. These exercises include the following:

- Leg stretch exercises: repeat bending and stretching the legs 5 to 10 times.
- Arm stretch exercises: repeatedly raise the arms over the head, then lower sideways parallel to the trunk until they meet.
- Curl ups: repeatedly bend the knees while lifting the head and shoulders forward with stretched hands. To improve the exercise efficiency, retain that position for between 5 to 10 seconds.
- Abdominal exercises: lie on back with body and legs straight to permit repeated deep breathing to expand the chest and pull the abdominal muscles.

4.7 Prompt Treatment of OIs and Management of Diet-related Symptoms

Management of Diet-related Symptoms

- Nutritional practices can help PLWHA manage symptoms of OIs such as diarrhoea, oral thrush, and fever. Nutritional practices can also help manage side effects of ARVs and other medicine used to treat nausea, vomiting, anorexia, etc. Service providers should advise PLWHA who are experiencing symptoms or side effects about nutritional practices that can help, and assist PLWHA to find feasible nutritional practices they can follow. Table 4.4 provides information about nutritional management of specific symptoms.

- Advise PLWHA to report any symptoms and side effects to a clinician, especially when severe or persistent, so the underlying infection can be treated as well as the symptoms. Nutritional management is not a substitute for medical treatment, but can supplement treatment and help to reduce the severity of symptoms and improve functioning.

- Inform PLWHA on how to manage symptoms and side effects through dietary and nutritional actions. In cases where symptoms prevent adequate food intake, nutritional practices can help manage the symptoms and improve intake. Table 4.4 below offers medical and nutritional actions to address such symptoms.

For all PLWHA with unintentional declining weight or malnutrition (BMI<18.5 kg/m2), accompanied with chronic diarrhea (including ARV-induced diarrhea), the clinician should suspect malabsorption of essential nutrients. Actions to take include: a) treat the gastrointestinal OIs and b) supplement the patient with an energy-dense therapeutic food and provide multiple micronutrient supplements, especially and at least vitamins A and B12, zinc and calcium.

- For persistent diarrhoea induced by HAART that does not subside after several weeks, the clinician may consider a change in therapy if a suitable alternative is available. In most cases the clinician should consider supplementing the patient with calcium and fibre supplements.

- Altered metabolism may induce weight loss, because of ineffective or excessive use of energy and other nutrients, and should be suspected in the event of acute weight loss.

The clinician must always carry out a comprehensive medical evaluation for a PLWHA presenting rapid, unintentional **weight loss ≥10%** of usual body weight within weeks to two months; for example, a 55 kg person who has lost more than 5.5 kg over a two month period. Such weight loss is commonly associated with a life-threatening opportunistic infection or neoplasm.

Problem	Potential Causes	Interventions
Anaemia (pare hands and fingernails)	• Lack of adequate iron (or blood) in the bod • Malabsorption of B12 • Illness like malaria, worm infestation • Side-effects of some ARVs (zidovudine or lamivudine)	• Ensure they are treated for malaria and were dewormed in the last 4 to 6 months. • If taking Zidovudine or Lamivudine, you should recommend haemoglobin assessment at least ones a year. Recommend: • Increased consumption of: animal protein (red meat) ◦dark green vegetables, especially ◦traditional vegetables fruits rich in vitamin c, e.g. citrus ◦fruits, mangoes • Reduced consumption of tea, coffee after meals. • Iron/folate and B12 supplementation.
Anorexia (loss of Appetite)	• Side effects of medication • Chronic infections (e.g. OIs of the oral cavity, upper gastrointestinal tract, endocrine or central nervous system, especially if CD4<200) • Active substance abuse • Monotonous meals • Stress, anxiety, depression • Noxious smells	• Recommend: Small frequent meals. ◦Energy and nutrient-dense foods ◦Eat favourite foods ◦Nutritious snacks between meals and plenty of fluids Avoid smoking and alcohol. ◦Eating in the company of friends or ◦relatives • Advise simple exercise, if possible. Provide or prescribe multivitamins (e.g. vitamin B) • Prescribe appetite stimulants/drugs (Megesterol acetate and Dronabinol) for short term use and under the supervi-sion of a qualified clinician. • If related to depression or another psychological condition, refer to a counselor or psychiatrist.
Constipation (irregular passage of stool, or passing too small and hard stool)	• Side effects of medication. Eating highly processed, refined foods with little fibre and fluids	Recommend: • Maintain a regular eating schedule and don't skip meals. • Drink plenty of fluids (about 8 glasses/day), especially if on diuretics. • Eat foods high in fibre e.g. whole meal bread, vegetables and fruits, oats, nuts and avoid highly refined foods. • Exercise as much as possible. • Avoid laxatives as they cause loss of fluids from the body • *If dietary fibre does not resolve the problem you may prescribe fibre supplementation (e.g. methylcellulose or psyllium).*

Table 4.4 Nutritional Management of Specific HIV/AIDS Related Symptoms

Problem	Potential Causes	Interventions
Diarrhoea	• Bacterial, viral, or fungal infections (because of poor hygiene, waterr-borne OIs) • Effects of HIV on the gut • Side effects of medication • Food poisoning • Mal-absorption of nutrients e.g. lactose, fats, sugars • Intolerance of nutrients e.g. lactose	• Advise to drink plenty of fluids (boiled water, soups, herbal teas) • Provide ORT solution or if unavailable, advise how to make it (1 litre boiled water, 4 tsp. sugar, ½ tsp. salt) • Assess and advise on food/water safety and personal hygiene to ensure it is not cause of diarrhoea. • Advise to continue feeding during and after illness. • Treat for bacterial, viral and fungal infections. • Identify whether diarrhoea is an effect of drugs. Recommend: • Small frequent meals, with plenty of fibre from fruits and vegetables (e.g. mangoes, pawpaw, pears, oats, carrots, pumpkins, potatoes). • Foods rich in potassium, e.g. bananas. • Avoiding alcohol. • If there is blood in the diarrhoea or if symptoms persist, advise to immediately seek medical care. *If diarrhoea is chronic and nutrition interventions are not effective, refer for mal-absorption tests (e.g. D-Xylose Absorption test, 3 day faecal fat measurements), and lactose intolerance tests.*

Dry Mouth	• Effect of disease or medication
	• Eating very salty, dry foods like nyama choma; or drinking a lot of caffeinated drinks
		• Advise to
		  ○ rinse mouth with warm salted watero
		  ○ avoid very hot foods, sweets, caffeinated drinks like coffee, strong tea, sodas
		• avoid alcohol

Fatigue (tired, lethargy/general body weakness)	• HIV-infection • Side-effect of medication Stress caused by the virus • Depression and anxiety Malnutrition (inadequate intake of food) • Anaemia • Hormonal changes (e.g. testosterone and thyroid) caused by HIV-infection • Loss of body muscle	• Discuss possible causes of fatigue. Recommend: • Eat snacks between meals. • Eat high energy and protein foods: bananas, nuts, yoghurt. • Eat ready-to-eat foods from shops where possible. • Some exercise to increase energy. • Stretching. • Rest, with ready-to-eat food kept in closed containers next to the bed. • Drink plenty of safe water. *If symptoms persist. Recommend haemoglobin test.* *If you suspect psychological factors, refer for psychosocial care.*

Table 4.4 Nutritional Management of Specific HIV/AIDS Related Symptoms

Problem	Potential Causes	Interventions
Fever	• Disease (HIV, especially at high viral loads; malaria; ARIs, OIs)	• Advise to seek immediate care (have malaria and other OIs promptly treated). • Advise to drink plenty of fluids (safe water). • Eat foods rich in energy, like groundnuts, millet/maize porridge. • Rest in an area that is well ventilated and with cool air.
Mouth sores/ thrush	• Infection • Antibiotic therapy	Recommend: • Good oral hygiene and gargling with a pinch of salt in warm water (lemon juice can be used). • Eat garlic or drink raw garlic tea to relieve the pain. • Eat fermented foods like yoghurt. • Eat mashed, soft, smooth foods at room temperature. • Drink fluids with a straw to ease swallowing. • Avoid spicy, sugary and acidic foods and drinks. • Avoid alcohol and cigarettes. *Advise to seek medical treatment if the patient can t swallow food; if there is a burning pain in the chest; or deep pain on swallowing.*

Muscle wasting / Weight loss	• Effect of disease·
	• Inadequate intake or poor quality diet
	• Malabsorption
	• Disturbance in utilization of the nutrients (due to chronic infections)
	• Side-effects of certain drugs (lipodystrophy)
	• Hormonal changes in the body (e.g. testosterone and thyroid)
		• Refer for ARV assessment if Body Mass Index is less than 16.5.
		• Advise to prevent infections and treat infections promptly.
		• Assess possible causes of weight loss.
		• If due to dietary intake, recommend:o
		  ◦ Eating balanced meals and increase quantity of intake
		  ◦ Improving nutrient density of food by adding peanut butter, skimmed milk or eggs in porridge or soups
		  ◦ Taking snacks that are nutrient rich between meals,
		  ◦ Eating favourite foods
		• Advise simple exercises (walks) to improve muscle.
		• Weigh client at least every 2 months.
		
		Refer for assessment of hormonal replacement, or use of steroids to restore body weight and body cell mass.

Table 4.4 Nutritional Management of Specific HIV/AIDS Related Symptoms

Problem	Potential Causes	Interventions
Nausea and vomiting (feeling of vomiting when supposed to be eating)	• Infections (including malaria, candidiasis, etc. • Side effects of medication • Food with strong aromas Food intolerance • Food poisoning	Recommend: • Take small quantities of dry, bland or lightly salted foods (bread or toast), and boiled foods at frequent intervals. • Take plenty of fluids after meals such as diluted fruit juice, or water especially with lemon. • Sucking a lemon: the sour taste reduces nausea. • Avoid greasy, fried foods and foods with strong odour. • Avoid coffee and alcohol. If vomiting continues for more than a day; if there is blood in the vomit; or if there is fever, the client must seek medical care.
Overweight	• Energy intake is more than needs • Side-effects of medication • High levels of fat in the blood, also a side-effects of certain ARVs.	• Assess possible cause. • Advise exercise (or physical activity) at least three times a day. • Advise reduced portions of food. Recommend a variety of foods and limit foods high in fat, sugars and sweetened foods/fluids. Recommend r egular weight monitoring to detect early unhealthy weight gain.
Taste Changes (changes in taste of food, food tastes too sweet or too salty)	• Side effects of medication • Poor nutrition • Common cold or flu • Malaria	Recommend: • Good oral hygiene (e.g. rinsing mouth after meals) • Seasoning food for flavour and different varieties of foods. • Chew food well and move around in mouth to stimulate taste buds. • Use lemon, tonic water, vinegar or raw tomatoes to stimulate the taste buds· • Take small sips of liquid between meals

Table 4.4 Nutritional Management of Specific HIV/AIDS Related Symptoms

4.8 Nutritional Management of Acute HIV/AIDS Malnutrition

Patients with acute HIV/AIDS-related malnutrition are categorized by their inability to eat; their appetite changes; and the degree of gut impairment or inability to absorb nutrients. For these individuals, therapeutic nutrition interventions should be provided to reverse or prevent the worsening of malnutrition. The options available are voluntary oral sip feeding and non-voluntary therapeutic enteral and parenteral nutrition services. The service provider must ensure that the food contains nutrients in adequate amounts.

Sip feeding: This is suitable for severely malnourished and weak individuals who have an appetite and are able to feed. Sip feeding may also be used to supplement total nutrient intake. Foods for special medical purposes (FSMP) such as high-energy formulations (therapeutic milk – f75, f100 TM, BP100TM, NutrenTM, Plumpy nutTM, and FreseniusTM) among others may be used.

Enteral feeding: Enteral feeding is recommended for individuals who cannot take food or liquid orally. Enteral feeding is a type of nutritional support using liquid formula diets through naso-gastric tube feeding; a surgically introduced tube to the stomach (gastronomy tube); or jejunum (jejunostomy tube). Enteral feeds may be commercial preparations indicated under sip feeds or blended mixtures prepared from regular foods. Enteral feeding can also be used as a supplement to normal oral or sip feeding.

Parenteral feeding: Parenteral feeding (intravenous feeding) is recommended when the gastrointestinal tract is non-functional for example:

- Preparation for surgery,
- Severe protein-energy malnutrition, or
- Serious restrictions of oral feeding due complications such as:
    - profound anorexia,
    - intolerance to enteral nutrition,
    - severe diarrhoea,
    - AIDS enteropathy,
    - intractable vomiting,
    - acute pancreatitis,
    - major oral-pharyngeal lesions or
    - neurological disorders.

Parenteral route may be used to stabilize and maintain nutrition and hydration status. Parenteral feeding is partial when it is used as a supplement; total parenteral nutrition is required when oral-gastric system is not practical.

Chapter 5

Nutritional Care and Support for Pregnant and Lactating Women Living with HIV/AIDS

5.0 Introduction

Pregnancy and lactation are specific lifecycle periods that demand additional energy and nutrients for adequate gestational weight gain, growth and development of the foetus and for milk production related to infant feeding. The body gives the nutrient supply required to support the foetus and for breast milk production takes precedent in the pregnant woman over maternal nutritional needs. Pregnant and lactating women infected with HIV therefore require additional food to maintain their health and nutritional status as well as to support optimal foetal growth.

Counsel pregnant and lactating women:

- To know their HIV status. If they are confirmed as HIV-infected, to gather correct information on the need to use comprehensive PMTCT services;
- To seek early and periodic antenatal and postnatal care, and deliver in a health facility;
- Regarding their decision on the mode of infant feeding if HIV-infected; and
- To practice safer sex to avoid re-infection with new strains during pregnancy or lactation, which increases the risk of HIV transmission to the baby.

5.1 Nutritional Care for Women Infected with HIV

The following issues are pertinent to the nutritional care and support of women.

- Foetal growth and lactation impose high nutritional demands on the mother.
- HIV infection and related OIs impose additional energy and nutrient needs.
- The nutritional status of an HIV-infected woman before, during and after pregnancy may influence her own health and the risk of transmitting HIV to her infant.
- Pregnancy and HIV infection worsen nutritional deficits and increase vulnerability to several health dangers that are associated with pregnancy, for example:
    - HIV-infected pregnant and lactating women have a higher risk of malnutrition and mortality.
    - Anaemic pregnant women who are HIV-infected are six times more likely to die in the year after delivery than a woman with adequate iron, and also more likely to transmit HIV infection to their infant.

- Malnourished, lactating mothers may have difficulty producing enough breast milk.

> Nutritional care and support for HIV-infected women should be an integral part of antenatal and post-natal services and of PMTCT programs. Aim to support women to meet the additional energy and nutrient requirements of pregnancy/lactation, and those further imposed by HIV/AIDS.

5.2 Nutritional Requirements of HIV-infected Pregnant and Lactating Women

Daily Energy Requirements

Healthy pregnant women require 13% more energy (290 Kcal) than women who are not pregnant. If they have multiple pregnancies the requirement is increased by 15% (i.e. additional 320 kcal per day). Lactation demands an additional 20% (or 500 kcal) energy.

	Average energy intake	Additional energy required for pregnancy/ lactation	Additional energy requirements of HIV	Total energy intake
Pregnant				
Un -infected Pregnant	2140	280	0	2420
Asymptomatic	2140	280	210	2630
Early symptomatic	2140	280	430	2850
Symptomatic	2140	280	640	3060
Lactating				
Un -infected lactating	2140	500	0	2640
Asymptomatic	2140	500	210	2850
Early symptomatic	2140	500	430	3070
Symptomatic	2140	500	640	3280
Woman not breastfeeding				
Un -infected woman	2140	0	0	2140
Asymptoma tic	2140	0	210	2350
Early symptomatic	2140	0	430	2570
Symptomatic	2140	0	640	2780

Adapted from FANTA, 2004

Table 5.1: Energy Requirements per Day of a 28-Year-Old HIV-Infected Women under Different Physiological States

These additional energy and nutrient needs lead to significantly higher food requirements. Almost one additional meal is required daily to meet the extra nutrient demands of pregnancy, lactation and HIV infection (see Chapter 3).

Provide micronutrient-fortified food supplement providing not less than 40% of their daily caloric requirement to: 1) Pregnant, HIV-infected women who do not gain weight for 2 to 3 months, especially in the second and third trimester, or have a BMI < 18.5 kg/m^2 and 2) Women who are breastfeeding exclusively the first six months after delivery and have a BMI <18.5 kg/m^2. Or, suggest an appropriate Multiple Micronutrients Supplement and food ration to meet 40% of caloric needs.

Daily Protein Requirements

- Daily recommended protein intake is 1 g/kg body weight in healthy normal women.
- Non HIV-infected, healthy, pregnant and lactating women require an additional 6 g/day and 16 g/day of protein respectively.

Additional protein is reduced to 12 g/day for lactating mothers after the sixth month and to 11 g/day after the 12th month.

The protein should contain the entire range of essential amino acids. This requires consumption of a variety of plant source foods, and preferably a mixture of plant and animal source foods (see Chapter 4).

Micronutrient Requirements

An adequate intake of vitamins and minerals is crucial for pregnant and lactating mothers.

The government recommends the same micronutrient interventions for HIV-infected pregnant and new mothers as for uninfected women:

- Consume large quantities of vegetables and fruits; use fortified foods and nutrient-dense foods to meet micronutrient needs during and after pregnancy.
    - Recommend and assist the women to choose foods rich in both formed vitamin A and readily convertible pro-vitamin A; β-carotene rich foods such as coloured fruits; and vegetables that present a sound option in the control of VAD.
- Daily supplementation with 60 mg of elemental iron and 400 µg of folic acid for 6 months during pregnancy. In treatment of severe anaemia (Hb <7.0 g/dL), this dose is taken twice daily (120 mg of iron).
    - Advise pregnant women to a) adhere to intermittent presumptive treatment of malaria in the second and third trimester and to sleep under an insecticide treated mosquito net, b) get dewormed for hookworm in the second and third trimester.
- A single dose of vitamin A (200,000 IU) within eight weeks postpartum, irrespective of their HIV status.
- Consume iodized salt during and after pregnancy
    - Consumption of foods that are likely to reduce iodine absorption (goitrogens) should be avoided. Cassava leaves and soya should not be consumed with meals that are intended to deliver iodine requirements.

5.3 Actions by Service Providers

In addition to the recommendations for all PLWHA provided in the preceding chapters:

- Encourage pregnant and lactating women to use the Antenatal Clinic (ANC) / Maternal Child Health (MCH) services including compliance to micronutrient supplementation, malaria prevention, vaccinations and other adjunctive treatments. They are likely to receive the Essential Nutrition Actions for Women.
- Refer women to providers of reproductive health services where they can receive family planning services and treatment of Sexually Transmitted Illnesses. Birth spacing will provide an opportunity for stabilization of maternal nutritional between births and promote improved child care practices.
- Assist pregnant women to identify the probable causes of insufficient gestational weight gain or weight loss.
- Refer women gaining less than 1 kg body weight per month during the second and third trimesters to a health facility for immediate attention.
- Support women to consume adequate food to meet their energy, protein and micronutrient requirements. Identify factors that may limit adequate consumption of food, including the culture and belief systems on foods (e.g. food taboos and traditional therapies and practices). Stigma issues should also be discussed and addressed.
- Provide dietary counselling to women to enable them to plan meals that meet their dietary needs.
- Women who come with pale palms and inner eyelids should be assessed for anaemia and treated accordingly.

Chapter 6

Nutritional Care for Children Born to HIV-Infected Mothers and Children Infected with HIV

6.0 Introduction

Strategies to improve the nutritional status of children at risk of HIV infection, begins with the prevention of transmission of HIV to children. Service providers must work to prevent low birth weight (LBW), inappropriate feeding practices before six months of age, inadequate dietary intake during the introduction of complementary foods and prevention and care of infections, as well as address the reasons for inadequate attention to the care of a child. Further details of feeding practices to prevent and decrease transmission can be found in the Kenyan national guidelines for *Infant and Young Child Feeding in the Context and HIV and AIDS* (2004) and the *Kenya National Guidelines Prevention of Mother-to-Child HIV/AIDS Transmission (PMCT)* (2002).

6.1 Transmission of HIV Infection from Mother to Child

Infants can acquire HIV through mother-to-child transmission (MTCT), blood transfusion or infected blood products, and/or use of contaminated instruments. Transmission of HIV from an infected mother to her infant can occur during pregnancy or delivery, or after delivery. The risk of transmission from breast milk is about 15% for infants who are breastfed up to six months, and about 20% for children breastfed to their second year. Women who are infected with HIV or re-infected with a different strain of HIV during the breastfeeding phase have much higher risk (29%) of transmitting the virus to their child through breast milk.

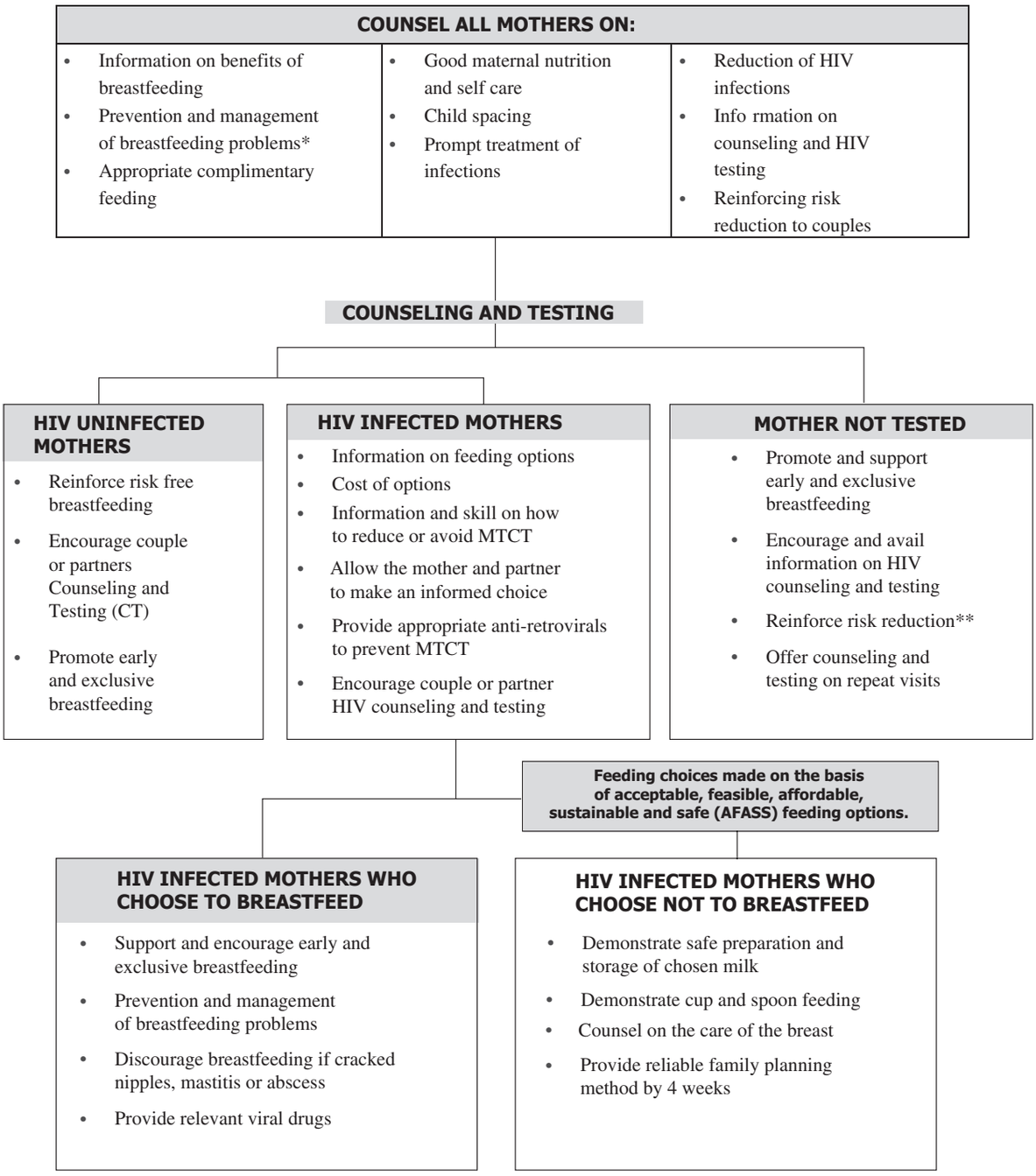
If the growth of a child born to an HIV infected mother is faltering, counsel the mother or caregiver to have the child's HIV status determined. If the antibody HIV tests are used, the infection state of the baby can only be confirmed at 18 months, following clearance of maternal antibodies. However, tests for HIV antigen or the virus itself, directly or by culture, can be done earlier using PCR method if accessible and feasible.

6.2 Feeding Infants (0-6 months) Born to HIV-Infected Mothers

- Counsel women during their last trimester of pregnancy to choose a feeding option. The Guidelines for counselling mothers during pregnancy and immediately after delivery are laid out in Figure 6.1.

> "All women and men, irrespective of their HIV status, have the right to determine the course of their reproductive life and health, and to have access to information and services that allow them to protect their own and their family's health. Where the welfare of children is concerned, decisions should be made that are in keeping with ***children's best interests.***"
>
> UNAIDS/WHO/UNICEF, 1997

Guidelines for Counselling on HIV and Infant Feeding



* Breastfeeding problems: Abscess, mastitis, breast and nipple disease

** For women who have features of clinical AIDS, manage as positive and encourage counseling and testing

Figure 6.1: Guidelines for Counselling on HIV and Infant Feeding

6.2.1 Exclusive Breastfeeding

'Exclusive breastfeeding' means to give the infant no food or drink other than breast milk. WHO recommends exclusive breastfeeding for non-infected mothers. from birth to 6 months for an HIV-infected mother for whom replacement feeding is not acceptable, feasible, affordable, sustainable and safe (AFASS).

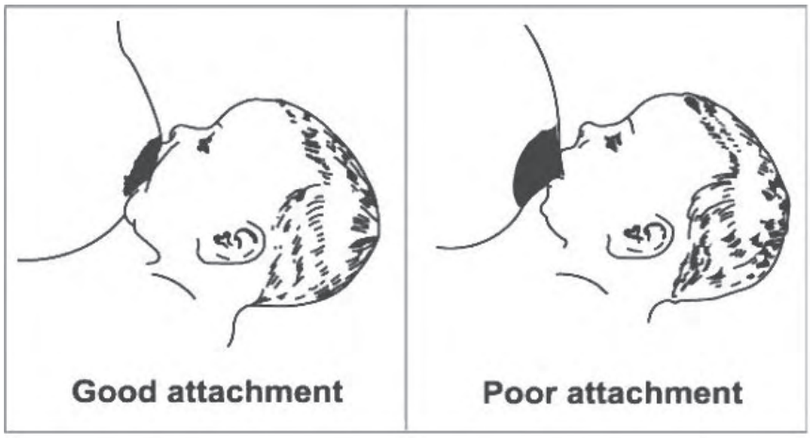
> WHO recommends: "When **replacement feeding** is acceptable, feasible, affordable, sustainable and safe (AFASS), it is best that HIV-infected mothers avoid breastfeeding. When replacement feeding is not AFASS, HIV-infected mothers should practice **exclusive breastfeeding** the first months of the baby's life and discontinue as soon as AFASS replacement feeding becomes practical."

Actions to Support Exclusive Breastfeeding of Infants (0 - 6) Born to HIV-Infected Mothers

- For mothers who choose exclusive breastfeeding, where an alternative is not acceptable, feasible, affordable, sustainable and safe (AFASS), promote early initiation of breastfeeding (within one hour after delivery). This is healthy for the infant, and it establishes healthy feeding patterns early on.
- Make sure that mothers know the risk of mixed feeding (giving both breast milk and other feeds, including water). The risk of HIV transmission significantly increases if mixed feeding is practiced.
- Make sure that mothers know good breastfeeding techniques to avoid cracked and sore nipples. Mastitis and breast abscesses increase the risk of transmitting HIV through breast milk. Mothers should be taught by demonstration correct positioning and latch-on (Figure 6.2).
- Make sure (by demonstration) that mothers who choose to express breast milk know the technique of expressing and how to store breast milk to avoid contamination.
    - Freshly expressed breast milk can be safely left to stand at room temperature up to 8 hours.
    - Milk should be given to the infant using a spoon or cup (not with a bottle or with the hand) to avoid contamination and "nipple confusion."
    - Heat treat the expressed milk if necessary.
    - Make sure that mothers know early identification of and actions to address infant feeding or breast problems, including promptly seeking medical care if the baby is not feeding well or has mouth sores, or if the mother has breast problems.

Heat-treating breast milk: Mothers express their milk by hand or by using a clean pump into a clean, sealable container. Milk is rapidly brought to boil and then very rapidly cooled, for example by immersing a heating pot in a large volume of cold water. Or it can be heated at 56 - 650C for 30 minutes and then allowed to cool. This may be useful in short term situations, such as during treatment of breast infection.

Figure 6.2: Good and poor child attachment to the breast



WHO/FCH/CAH/00.5

6.2.2 Exclusive Replacement Feeding for Those Meeting AFASS Criteria

"Exclusive Replacement Feeding" means that breastfeeding is completely replaced with suitable breast milk substitutes (BMS) that will provide the nutrients that the infant needs. A baby who is not breastfed will need about 150 ml of milk (in one form or another) per kg of body weight per day.

Exclusive replacement feeding can use commercial baby formula or home-based animal milk.

- Prepare commercial formula according to manufacturer's direction. Different infant feeding formulas contain macronutrients in varying amounts. Feed requirement for the first 6 months of life is about 20 kg of formula (44 tins containing 450 g each). This will cost on average Ksh 3,700 per month, or Ksh 22,000 for the 6 months period.
- Home-based formula can be made from milk from cow, goat, sheep or camel; whole powdered milk or unsweetened evaporated full cream milk; and soya-based milk. The amount of whole fresh milk required for six months is about 92 litres at a cost ranging between Kshs 2,000 and Kshs 5,000 (for the six months) depending on where it is purchased. To meet infant micronutrient needs, a multi-micronutrient formulation containing at least iron, zinc, selenium, folic acid and vitamins A, C and E should be added to the animal milk at 1 Recommended Daily Allowance levels. This costs an additional Kshs 12,000 for six months, for a total cost of between Kshs 14,000 and Kshs 17,000 for the 6 months period.
- The family must be able to support the AFASS principles which mean having adequate resources including clean safe water, fuel, utensils, skills and time to prepare replacement feeding correctly and hygienically.
- Ensure that the caregivers are aware of the need for early intervention of diarrhoeal illnesses.

Service Providers' Actions to Support Exclusive Replacement Feeding of Infants (0 - 6) Born to HIV-Infected Mothers

- Do a careful assessment of a mother's capacity for AFASS before recommending exclusive replacement feeding. To consider exclusive replacement feeding requires assessment of the following support:
  - Support for mothers to provide knowledge and skills to feed infants with BMS from birth to 6 months, followed by the addition of locally-available complementary foods for the next 18 months.
  - Appropriate capacity of health care providers to counsel on infant feeding options and implement the steps of the Baby Friendly Hospital Initiative (BFHI) – refer to Kenya National Guidelines for Infant and Young Child Feeding in the Context and HIV and AIDS (2004).
  - Availability of multiple micronutrients or multivitamins for children receiving modified animal milk.

- Demonstrate the preparation of the replacement feeding option that the mother or caretaker has chosen. In the event that another milk, such as modified animal milk, has to be used, keep the following factors in mind:
  - To meet water requirements for 0 to 3 month old infants, 1 portion of water is added to 2 portions of milk. Table sugar is added to increase energy content (added to taste). The mixture is boiled and cooled before feeding the infant.
  - For 3 to 6 month old infants, 1 teaspoonful sugar (to taste) is added to a cup of whole milk. The mixture is boiled and cooled before feeding the infant.
  - For 6 month old infants and older: in addition to breast milk substitute, start the infant on weaning foods at least three times a day for infants less than 12 months old, and increased to at least five times a day for those between 12 to 24 months.

6.3 Feeding Children 6 Months and Older Not on Breast Milk

After six months, breast milk and other forms of milk alone are not adequate to meet a baby's nutritional requirements. HIV-infected mothers should not breastfeed for more than six months.

> Inform and support HIV-infected mothers to introduce nutrient-dense, complementary food to breast milk substitutes when the infant is six months. If there is evidence of growth faltering, the mother should introduce high-nutrient complementary food as early as four months.

For breast-fed infants, the transition from breast milk to complementary foods and breast milk substitutes (like infant formula or modified cows milk) should be as short as possible to limit mixed feeding. However, abrupt cessation should be discouraged to avoid undue traumatic effects on both the mother and the infant.

Milk should continue as an important component of the diet. It should provide up to one-half or more of the nutritional requirements for children 6 to 12 months old and up to one-third of the requirements for children aged 12 to 24 months.

Complementary foods should be made from nutrient-enriched family foods. Children between 6 to 12 months should be fed at least three times a day while those aged 12 to 24 months fed at least 5 times a day. Those aged 24 months and above should be fed with three family meals and at least two snacks a day.

Preparation of the meals should take account of the following:

- Choice of food.
- Amount of food.
- Food safety and hygiene.

6.4 Nutritional Care and Support of HIV-Infected Children

Energy

Asymptomatic: Require 10% more energy to maintain growth than healthy children.
Symptomatic with no weight loss: Require 20 - 30% more energy than healthy children.
Symptomatic with weight loss: Require about 50 - 100% more energy than healthy children.

Protein

Protein requirements are the same as those for an uninfected child. They should be based on an individual's symptoms and needs.

Micronutrients

Micronutrient requirements are the same as those for an uninfected child. They should consider possible deficiencies.

The following should be considered in the nutritional care and support of HIV-infected children:

1. Periodic nutritional assessment and growth monitoring.
    - Growth is a very sensitive indicator of HIV progression in children: Poor growth normally precedes CD4 decline and the development of OIs (especially TB).
    - Weighing, charting on a health card and interpretation should be done by a trained staff member. The charting should start with the birth weight, if available. MUAC can be used where weighing tools are not available or weight measurement is not possible. (See Chapter 4).
    - In the first year, nutritional assessment is done every month in keeping with recommendation for all children. Thereafter, assessment can be done every three months. If there is growth faltering or problems with feeding, however, assessment should be done monthly.

2. Assess feeding practices and dietary intake with every contact, including dietary-related problems (e.g. poor appetite, chewing, swallowing, intolerance, food taboos and history of nutritional supplementation).

3. If the growth of a child is faltering:

- A clinician should carry out a physical examination to rule out thrush or oral ulcers, gastrointestinal bleeding, and signs of systemic infections.
- Support the mother/caregiver to ensure the child receives the adequate amount of energy, protein and micronutrients to meet increased demand. Intake should be based on locally available foods. Children should also receive universal vitamin supplementation and targeted multiple micronutrient supplementation, which include iron, if there are no contraindications.
    - Delay oral iron supplementation until the child regains appetite and starts to gain weight (usually after two weeks).

All children, including the HIV exposed and infected, should receive vitamin A, presumptive de-worming, and all vaccines according to the national schedule for children. It is also recommended that HIV-infected children are given a suitable multi-micronutrient supplement daily at one Recommended Daily Allowance.

4. If the child is losing or has lost LBM, it is possible he/she is having symptoms of AIDS. Take the following actions:

- Provide oral nutritional supplementation. If this is not possible, enteral and parenteral alimentation feeding option should be considered.
- Refer the child for ARV assessment and recruitment to the treatment program, if they meet the national criteria.

6.5 Nutritional Care for Severely Malnourished HIV-Infected Children

All other factors being equal, severely malnourished HIV-infected children under 5 years of age are about five times more likely to die than uninfected children; with children under two years old being most at risk.

The following are common features of severe malnutrition:

- Visible, severe wasting in the trunk and buttocks. The child looks thin and the skin sags.
- Possible swelling of both feet (oedema: when pressed gently with a finger, a depression forms and skin does not rebound).
- Possible pallor of the palms and mucus membranes due to anaemia: the child will appear pale; the insides of the mouth and the eyelids will be white.
- Weight-for-height of less than -3 Z score of NCHS, or weight Child Health Card below the minimum growth curve line.

The child may also present with the following complications:

- Hypothermia: low body temperature (below 35° C).
- Dehydration with or without diarrhoea.
- Hypoglycaemia or low sugar.
- Micronutrient deficiency, especially vitamin A or iron.

- Other infections such as TB, gastrointestinal tract infections, acute respiratory infections.
- Poor appetite and malabsorption of food.

Nutritional rehabilitation should be done by qualified staff (i.e. trained in severe childhood malnutrition rehabilitation), especially fitting naso-gastric tubes and parenteral nutrition. The rehabilitation diet should provide 150 to 200 Kcal/kg and 3 - 4 g protein/kg body weight per day. This diet should consist of a high protein and high energy preparation in semi-solid form to provide 2.5 - 3 g protein/100 ml and 1 - 1.5 Kcal/ml respectively.

6.6 Actions by Service Providers

- Keep the child warm.
- Assess for dehydration and ensure hydration. Hydrate done orally unless the child has signs of impending shock, then an intravenous transfusion (IV) can be used. Oral hydration should have less sodium and slightly higher potassium than the WHO re-hydration salt or cereal based solutions.
- Of there is reasonable belief of a threat of hypoglycaemia, prevent or treat it.
- Initiate micronutrient supplementation appropriately. Iron supplementation should not be done during stabilization phase, but after the child has regained appetite.
- Evaluate and treat any infections. Broad-spectrum antibiotic therapy is provided for the first seven days of admission.
- If the child is asymptomatic, provide 20 to 30% more energy than for an uninfected child. If the child is symptomatic, provide 50 to 100% increase in energy. The protein and micronutrient levels remain the same as for a child who is uninfected.
- Make sure mothers/caretakers know the importance of urgently seeking help from a health facility.
- Explain to mothers/caretakers how important it is to: rehabilitate the child's nutrition with frequent feeds of nutritionist-recommended energy and nutrient-dense foods; stimulate the child with play in order to maintain appetite and foster the child's development; and carry out regular follow-up after discharge.
- Mothers/caretakers must know the importance of taking children for growth monitoring and seeking health care and support.
- Refer severely malnourished children with HIV/AIDS who are not on ARVs to providers of antiretroviral therapy services.

HIV exposed or infected children with weight-for-height of less than -3 Z scores should be provided with institutional nutritional management for at least seven days and supported with ready to use therapeutic food for not less than a month

Chapter 7

Nutritional Care for PLWHA Who Take Medication and Herbal Remedies

7.0 Introduction

A range of drugs are used to manage the symptoms of HIV infection, opportunistic infections, and other common infections. Conventional pharmacological drugs, herbal remedies or their combination are used in Kenya.

7.1 Drugs and Food/Nutrient Interactions

Food and drug interactions may be positive or negative but primarily fall into the following categories:

- Drugs may alter nutrient absorption, metabolism, distribution and excretion thus affecting nutritional status of the patient.
- Food may affect efficacy of medications due to altered absorption, metabolism, distribution and excretion.
- Some drugs may lower food intake and/or absorption. For instance, most drugs have diet restrictions (e.g. avoiding milk and milk products when taking Tetracycline drugs). The side effects of many drugs affect the gastrointestinal tract: loss of appetite/ anorexia, change in taste, diarrhoea and alter food absorption. Side-effects such as fatigue, depression, loss of sleep and pain are also likely to lower food intake.
- Common OIs such as TB, malaria, diarrhoeal diseases, pneumonia, mucosa and skin infections, and the drugs used to treat them, may cause dietary constraints.
- The interaction of food and drugs, along with the nutritional status of the patient, affects drug efficacy, tolerability and adherence to recommended drug regimens.

7.2 Food and Nutrition Implications of ARVs

Highly active antiretroviral therapy (HAART) should improve overall nutritional status with an increase in total body weight and intracellular (relative to extra cellular) water. If weight has not changed within six to 12 months, consider the following possible explanations:

- Adherence to the drugs is <95%.
- Health complication, such as TB.
- Resistance to the ARVs.
- Not enough intake of energy and other nutrients.
- Drug-drug or drug-food interactions, which may reduce drug potency.
- Side effect of the drugs, e.g. lipoatrophy (see below).
- Weight was healthy before starting HAART.

The interaction between food and nutrition varies for different ARVs. This means that the PLWHA on ART need to be counselled on the food/nutrition implication of the ARVs they are taking.

HIV changes its structure over time as it replicates. These changes, or mutations, allow the virus to resist the effects of ARV drugs. Resistance when one drug is used alone may develop within months after treatment begins. Taking a combination of multiple ARVs delays resistance, but may increase potential nutritional considerations.

All PLWHA qualify for ARVs, but those with a BMI of less than 16 kg/m2 should be nutritionally stabilized—with therapeutic foods or nutritional rehabilitation—for no less than seven days before starting ARVs. Clients with BMI less than 18.5 kg/m2 should be supported with nutritional supplements of ready to use therapeutic foods .

Staff who provide ART must know the food and nutrition implications of the different ARVs and advise patients appropriately. The service provider should explain the dietary implications of each drug taken by the patient. Key points to note are that:

a) The interaction of certain dietary constituents, e.g. the amount of fat in a meal, may have different or opposing effects on different ARVs. For example:

- A high-fat meal increases the bioavailability of the Tenofovir, but the same lowers absorption of Amprenavir.
- High protein foods reduce absorption of Indinavir, but increase that of Nelfinavir.

b) Some interactions may be specific to ARVs:

- Grapefruit juice may inhibit intestinal enzymes that metabolize ARVs, especially protease inhibitors, resulting in poor bioavailability and slow cleansing of the drug from the body.
- Garlic may reduce the efficacy of Saquinavir.

ARV side effects and drug-food interactions may lead to poor adherence to drug regimens, especially during the early stages of HAART. Supporting clients to manage side effects and interactions can help ensure good adherence.

It is thus crucial that qualified and knowledgeable staff providing ART and are also fully versed with nutritional issues. They need to:

- Understand the specific food and nutrition implications of the medication a client is taking and help the client identify appropriate food and nutrition actions accordingly.
- Discuss with the ART patient how existing dietary practices can be maintained or improved to help ensure good nutrition and comply with recommendations for taking the regimen of ARVs.
- Inform AIDS patients of foods they must avoid or increase based on their specific drugs.
- Identify changes in eating patterns required to promote effectiveness of ARVs.
- Help the client make a drug-food schedule based on available foods and resources. Discuss the barriers to and enhancers of the available support needed to follow the schedule.

- Review the drug-food schedule with the client on every contact.
- Advise PLWHA on ARVs to avoid alcohol as it reduces the effectiveness of ARVs and may increase the severity of the side effects. They should also drink a lot of safe clean water to avoid side effects and to improve the kidney's functioning.

7.3 Nutrition-related Side Effects of ARVs

Like most medicines, ARVs have side effects. While ARVs contribute to improved nutritional status, in some cases they cause dietary and nutritional constraints that require nutritional interventions.

- **High blood cholesterol:** Interventions: reduce dietary fat intake and limit saturated and trans fats intake; increase daily vegetable and fruit intake; and exercise regularly.
- **High triglycerides:** Interventions: limit saturated and trans fats intake (low density lipoproteins); practice moderation in carbohydrate intake; and increase intake of whole grain cereals, fruits and vegetables. Regular exercise is a vital supportive measure.
- **Peripheral neuropathy:** This condition is felt as numbness, tingling, burning sensation in the toes, feet, fingers or hands, and may be caused by some medications used to treat opportunistic infections (e.g. Tuberculosis). Supplementation with B group vitamins may improve the condition.
- **Liver damage:** ARVs such as protease inhibitors can damage the liver. Detoxifying agents are available on the market, but require a doctor's prescription.
- **Kidney stones:** This condition manifests itself as severe pain in the lower back and side, as well as difficult and painful urination. Kidney stones may be caused by ARVs such as Indinavir. They can be prevented by drinking plenty of water (an extra 1.5 litres or 6 glasses).

Not all side effects are nutrition related. Some of the nutrition-related side effects of common ARVs used in Kenya include: loss of appetite, nausea/vomiting, diarrhoea, loss of taste/metallic taste, anaemia, constipation and changes in body composition. The suggested dietary management of these symptoms is given in Chapter 4.

However, in most cases, careful selection of food, well-planned meals and a drug schedule can minimize the side-effects and improve adherence to and effectiveness of ARVs. Encourage ART clients to inform the clinician of any side effects they experience while taking the drugs. Not all symptoms are due to ARVs or other drugs; a symptom may be due to the HIV infections or OIs. For example, not all diarrhoea is drug induced; it may be a result of a bacterial or viral infection.

7.4 Body Composition Side Effects of ARVs

The common and prominent signs of fat redistribution syndromes (lipodystrophy) include facial and limb fat wasting, central and/or localized adiposity, and visceral fat accumulation, e.g. increased fat around the abdomen and buffalo hump. Localized fat accumulation may also include enlarged breast in both men and women (see Chapter 4). Sometimes the manifestations include lipoatrophy syndrome, marked by predominant loss of subcutaneous fat, e.g. fat loss from limbs, buttocks, and face. This can lead to loss in total body weight, a side effect of HAART.

- Severe cases of lipoatrophy can cause a 5 to 10 kg decrease in body weight. The undesirable changes in body shape may increase stigma and psychological disorders.
- Other manifestations include an elevation of blood cholesterol and triglycerides, and changes in carbohydrate metabolism leading to insulin resistance. The consequence of these effects is increased risk of diabetes mellitus and coronary artery disease.

Lipodystrophy is common in individuals taking nucleoside reverse transcriptase inhibitors (NRTIs) and PIs. These ARVs are also associated with hyperglycaemia due to insulin resistance. However, lipodystrophy is predominantly associated with protease inhibitors.

Actions by Service Providers

Inform the patient, there are no established methods of treating lipodystrophy.

- Some improvement may be seen by encouraging regular medical review of care and side effects of medications.
- Encourage exercise to reduce fat accumulation and improve blood triglyceride levels.

7.5 Food and Non-ART Drug Interactions

Other medications used by PLWHA can negatively affect food and nutritional outcomes, such as causing bitter and unpleasant after-taste. For example Tetracycline may cause severe nausea and vomiting, and may also inhibit protein synthesis. And certain foods, such as dairy products, combined with Tetracycline lessen the drug's efficacy. Aspirin can relieve pain, but can also cause ulceration of stomach or gut mucosa and increase the risk of excessive bleeding. PLWHA should avoid taking medications that have not been prescribed by their clinician or service provider.

Foods rich in certain chemicals may cause severe side effects when taken together with certain drugs. For example, tyramine, which is in cheese, taken together with Isoniazid (anti TB drug) can cause a sharp rise in blood pressure. One can read more on these issues in other texts such as the FANTA Guide to Nutrition and HIV (see bibliography).

7.6 Herbal Remedies

Many Kenyans use herbal and traditional medicines to remedy ailments. Annex 7.1 lists the common herbs and spices, their benefits and preparation methods. Many of these have not been subjected to formal clinical research, however, and their effect on the course of the HIV infection is unknown. Their toxicity is also unknown. Besides treatment, herbs and spices are used to enhance food's taste and smell, and improve appetite. However, though herbs and spices are often beneficial, they may also interfere with of the effects of drugs; they may have negative effects on the body; or they may restrict food intake.

Herbs can be used by PLWHA as long as:

- They are used as supplements and not as replacement for standard therapy.
- They are not toxic and do not overburden the body's ability to metabolize and eliminate them (e.g. the liver or the kidney).

- They have no significant negative interactions with medications: for example, high doses of garlic may reduce the effectiveness of Saquinavir; and St. John's Wort (a herbal treatment for depression) reduces the effectiveness of a number of ARVs including Nevirapine, Indinavir, and Ritonavir.
- They have the potential to prevent, alleviate, and/or cure symptoms (e.g. lower blood pressure, increase energy, improve digestion, reduce severity of diarrhoea, or reduce depression).
- The clinician or health provider is continuously informed of what a client is taking. The clinician or health provider should:
  - Help the client maximize the benefits and minimize the negative side effects of the herbs.
  - Advise on the harmful effects of different herbal preparations.

7.7 Dietary Supplements

Dietary supplements are available as single or multiple micronutrients alone or with herbal formulations. Also available are supplements containing micronutrients and selected amino acids alone or with herbs. Selected health promoting bacterial cultures (probiotics) and materials that promote growth of bacterial associated with good gut flora (prebiotics) or their combination (synbiotics) may also play a significant role in nutritional care of PLWHA.

However consumers are likely to be on several of these formulations at the same time, which may increase the risk of overload and side effects. The risk with fat soluble vitamins is greater than with the water soluble vitamins.

7.8 General Actions by Service Providers

- With every contact, emphasize to the PLWHA the need to adhere to instructions on use of medications, including taking all the medicine and/or completion of the full course.
- Counsel PLWHA to avoid alcohol.
- Counsel PLWHA to avoid self-prescribed medications.
- Caution PLWHA about herbs that may be sold under the pretext of being a cure to HIV infection or opportunistic infections.
- For PLWHA in areas where malaria is prevalent, advise use of insecticide-treated nets and to promptly seek treatment for suspected malarial illness.
- Record side effects and actions taken for side effects, and refer all abnormal reactions to a health facility.
- Pay special attention to food and nutrition related factors that are likely to lead to non-adherence due to side effects and reduced efficacy. Intermittent doses of ARVs and sub-optimal levels of drugs in the body can lead to development of ARV-resistant strains of HIV.

> Service providers attending to PLWHA must receive or seek out regular updates on the possible side effects of drugs, drug-food or nutrient interactions, and best management practices.

Chapter 8

Food Security for Households Affected by HIV/AIDS

8.0 Introduction

Food security means that people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive life. HIV/AIDS can reduce the food security of PLWHA and affected households. Food insecurity limits the capacity for nutritional care and support.

"Household food security" requires that a household has access to enough quality and culturally acceptable food, for all people in the home (including young children), throughout the year. Household food security often depends on adequate income and assets, including land and other productive resources.

The following are components of household food security:

- Availability – An adequate amount and variety of foods are supplied consistently through production, import, or aid.
- Access - Every member of the household has resources to obtain an adequate quantity and variety of food.
- Utilization – Household members are able to properly use the food biologically, which depends on diet, overall health, sanitation, storage, processing, preservation, preparation, and marketing.

8.1 Food Security for PLWHA and HIV-Affected Households

A majority of households with PLWHA are chronically food insecure. HIV/AIDS reduces a household's productive labour, income and food stores, undermining food security. Where prevalence of HIV/AIDS is high, a whole community's ability to produce and buy food is reduced. As a coping strategy, PLWHA and their families are often forced to resort some of the following unfortunate measures:

- Reduce food intake at each meal, or skip meals.
- Adopt risky behaviours, such commercial sex, to raise cash for food.
- Withdraw children from school, which advances child labour practices, and escalates crime and migration.
- Disregard nutrition recommendations.
- Consume wild foods/fruits to cope with hunger.
- Sell key assets for short-term food security, thereby increasing poverty and long-term food insecurity.

> Not all households with PLWHA are food insecure and in need of food intervention or support.

Ways to improve food security for PLWHA and their affected families should be designed and implemented at the household and community level. Options include:

- diet diversification;
- increased production of nutrient rich crops (i.e. sukuma wiki, amaranthus);
- small, income generating activities;
- improve access to appropriate paid labour;
- rearing animals both as source of food and income.

Sometimes the actions may involve changes in use of household resources so as to buy additional food that may be useful to the nutrition of the PLWHA.

8.1.1 Actions to Improve Food Security of HIV-Affected Households

1. Assess the severity of the household's food insecurity and the factors that are causing it, including dietary practices. Take account of the following:

- Main sources of food: home production, purchase, remittances, begging, and/or food assistance/aid.
- Food production patterns: assess in terms of quantity of food produced, as well as food variety and seasonality, and also food availability in the neighbourhood or community in general.
- Food utilization: how is food used? Is it sold; shared with others; is there wastage? Assess any situation that limits the best use of available food.
- Assess the consequences of food insecurity, and the coping mechanisms of affected households.

2. Help PLWHA and their families to:

- Optimally use the available household resources to access food that is good for PLWHA.
- Use nutrient adding techniques such as pre-cooking, sprouting, fermentation, and household/community food fortification.
- Improve on intra-household food distribution to ensure good and adequate nutritious foods for the PLWHA.
- Address constraints on dietary practices such as social-cultural factors.

3. Link households to other programs that provide related services such as health care, water, growth monitoring and promotion, food assistance programs.

4. In rural areas, promote the production and consumption of indigenous foods, for example:

- Practice kitchen gardens and mixed cropping for production of micronutrient rich foods.
- Produce crops that are nutritious and require low agricultural inputs such as vegetables, cassava, sorghum and millet, and rear small animals like goats, rabbits, chicken.
- Dry and store vegetables and tubers for use during lean times.
- Assist affected households to plan for food lean periods, when availability of some foods is very limited or non-existent: for example to use traditional practices of harvesting and preserving edible insects, such as flying termites.

- Employ low cost agricultural techniques to improve yields and reduce inputs such as essential microbes to speed up compost formation, bucket irrigation and animal ploughing.
- Mobilize the community to support with labour for food crop production, and, where practical, maintain commercial farming for affected households.

5. Link clients to peer support groups of PLWHA and AIDS support organizations such as faith based organizations (FBOs), community based organizations (CBOs) and non-government organisations (NGOs) working in the area:

- Communicate information regarding HIV/AIDS, and the importance of nutrition in mitigation against the effects of AIDS on household resources, social networks, and food security.
- Help peer groups to assess local food resources and design food strategies that are appropriate to the community.
- Link these groups with agricultural extension officers and other relevant sectors to advise on new crop breeds and increase of crop yields.
- Link the support groups to micro-credit schemes to set up income generating activities among households with PLWHA.
- If necessary, link these institutions and affected and infected households to organizations that provide food assistance.

8.2 Food Assistance to Support Clinical and Social Objectives

In some cases, households require food assistance to prevent malnutrition of PLWHA and household members. This should be a short to medium term intervention. There should be criteria for recruitment into—and exit from—a food assistance program.

8.2.1 Purpose of Food Assistance

Depending on the country and policy context, food aid can strengthen interventions to:

1. Prevent HIV Infection

- Programs may help some people avoid HIV infection: help with access to nutritious food can save income which may avoid high risk situations or behaviour. Food acts as an income transfer and asset protection.
- Food as an incentive to counselling and testing.
- Food as an incentive to participate in PMTCT programs.

2. Support Positive Living with HIV through Care and Support

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

- Food to supplement daily nutritional requirements (e.g. proteins and micronutrients) and fulfil special dietary needs, such as increased energy requirements, which would otherwise not be met with usual food in the household.
- Food for nutritional management of symptoms of opportunistic infections (e.g. anorexia, diarrhoea, nausea).

- Food for use in hospitals and hospices as part of inpatient or palliative care.
- Food to provide a safety net, income transfer and asset protection.
- Food for training in life skills, life planning, alternative livelihood strategies (especially as a bridge in adopting new technologies and practices). This also applies for orphans and vulnerable children (OVC) and street children.
- Food for education—to encourage school attendance by OVC.
- Food as a guardian incentive or voluntary care providers—for people to come out to support and care for OVC or sick people.

3. Treatment Support

In most cases, the uptake and adherence to treatment protocols (e.g. ARVs and TB treatment) is improved when PLWHA have adequate food. Therefore, food can be used to:

- Improve adherence to drug intake, especially for TB drugs, but also for ARVs.
- Improve treatment efficacy.
- Help manage drug side effects.

4. Lessen the Impact of Illness

A secure supply of food helps minimize the impact of illness or death in a family or community by:

- Reducing the pressure to sell assets.
- Reducing the pressure to engage in activities that increase risk to HIV infection.
- Training in life skills, life planning and alternative livelihood strategies.

8.2.2 Who Needs Food Assistance?

Not all PLWHA or affected households need food assistance. By considering the specific purpose/objective of food assistance in a given context, those who will benefit can be determined.

> Targeting with food assistance should always be done with care, as non-HIV- affected households, who are equally vulnerable and/or poor, can be marginalized or denied assistance.

1. Food for Therapeutic Purposes

Food for therapeutic purposes, that is food to reduce mortality and severe malnutrition, should rely on nutrition and health indicators as criteria for inclusion.

Criteria include:

- Weight loss. However, although nutritional supplementation is indicated for all patients with weight loss, PLWHA should not receive supplementation without first addressing any reversible causes of weight loss.
- HIV-infected children whose weight-for-height are < -2 Z score, and HIV-infected adults with BMI cut-off point < 18.5 kg/m2 require food assistance. For those whose wt-for-ht and BMI cannot be taken:

[ii] - Commonly observed rates of adult PLWHA malnutrition will range between 5 % and 30 % depending on the BMI and related anthropometric cut-off points. This range is within that established for the general population (KDHS, 2003). For

- A recommended MUAC cut-off of < 25 cm for men and < 22 cm for women. (Or, a cut-off point of < 23.2 cm for both men and women.)
- For children less than 5 years old: Infants 6 – 12 months, < 12.9 cm; 13 – 24 months, 13.5 cm; 25 – 30 months, 13.7 cm; 37 – 48 months, 14 cm and 49 – 60 months, < 14.2 cm.
- PLWHA who need therapeutic food should be included in food assistance programs until there is evidence of reverse trend and stabilization of values above the cut-off points. On average, three months supplementation extending to six months should be sufficient.

2. Food to Improve Household Food Security and Prevent Malnutrition

Food can be provided as an income transfer to improve household's access to food, especially to address HIV-related causes of food insecurity such as reduced labour, savings, and productive assets. In this case beneficiary selection criteria should focus on identifying households who are food insecure or vulnerable to food insecurity. A range of indicators are available to assess household access to food. Food can also be used to prevent or reduce malnutrition and prevent malnutrition from becoming severe. In addition to household food security criteria, other criteria such as nutritional status (based on anthropometric and dietary assessments) may be used to target beneficiaries.

3. Food for Incentive Purposes

Food can be provided as an incentive for participation in particular services/education. In this case, criteria for beneficiary selection can include individuals/households who are most in need of the services/education offered, and those who require supplemental food.

8.2.3 What Food to Provide?

The kind of food and amounts to provide will depend on the objective of the food assistance. The common food ration package used by World Food Programme (WFP) and other agencies is composed of corn-soy blend fortified with micronutrients, cereal and a pulse and vegetable oil, which may be fortified with vitamin A and other micronutrient supplements like salt and blended food (such as corn soy blend). The package is normally supplied in quantities to last 15 days or a month.

Food supplements for PLWHA have the criteria:

- Easily digestible and tolerated by PLWHA and/or children who are in need in the house.
- Food that is energy dense, high in protein, and fortified with multiple micronutrients is preferred.
- Food that is culturally acceptable.
- The household's ability to process, store and prepare the food should be considered. Food that requires simple preparation and less cooking time, such as pre-cooked or blended foods, are advisable for PLWHA and their households.

BMI cut-off point of < 17 kg/m^2, the proportion of PLWHA requiring food aid is likely to be about 10%. In contrast, a cut-off point of < 20 kg/m^2 is likely to raise the proportion to 30%.

To calculate the size of the ration, consider the following:

- The objective of food assistance.
- The average household requirement in the catchments, including the increased energy needs of household members infected by HIV.
- Aim for food assistance to fill the average energy deficit in the area, or the food supplement to cater for 30 - 40% of energy needs for targeted beneficiaries.
- Take into consideration wastage, spoilage, and leakage of the food through selling and sharing.

Types of rations include:

- Take-home rations: Food is provided to the household to take home for storage, preparation, and consumption. A drawback is the risk that the food does not reach the targeted beneficiary as it may be sold, shared with other households, or spoilt.
- On-site feeding: Food is prepared in a central place and the beneficiaries consume the meal or snack at the site. The food will reach the targeted beneficiary, but logistics may be expensive.
- Food-by-prescription: Food is provided depending on individual assessment. It is packaged in small quantities (as a medicine) to take home and consume as prescribed. The best place for this is a health facility.

8.3 Integrate Food Assistance Activities with Local Services

Integrate food security and food assistance programs into existing local services as much as possible and where appropriate. However, sectors should not be over-strained; have each sector do what best fits its mandate.

Actions by service providers include:

- Make community programs and government sectors aware of the need for food assistance.
- Educate the recipients and families of the purpose of the food.
- Promote the inclusion of food assistance for PLWHA in other programs, especially community-based food and nutrition projects such as nutrition gardens, livestock rearing, and income-generating activities.
- Use community-based approaches as often as possible in the implementation of these actions.

Chapter 9

Communication about Nutrition and HIV/AIDS

9.0 Introduction

The success of nutritional care and support depends on how efficiently and effectively the information in these guidelines reaches the clients in ways that will encourage adoption and compliance. Commitment to effective and caring communication must come from everyone involved in the fight against HIV/AIDS: donors, health workers, policy makers, teachers, and families - each in their own way. Communication at the national and the local level is critical to successful nutritional care and support for PLWHA and requires significant financial investment.

The discussion of nutrition's role in the health of PLWHA should be integrated into messaging on HIV and AIDS, at both individual and national level. Each visit with a PLWHA or their caregivers must include a discussion about nutrition. On a broader level, when discussing HIV with donors, government or journalists, nutrition must be an integral part of the message.

The following objectives will guide the communication strategy that will need to accompany these guidelines:

1. Who needs to know? Identify the target. Be clear on the reasons as to why the different target groups need the information.
2. What is the current situation regarding nutritional knowledge and practice in your target group? An understanding of the prevailing situation and 'why' this is so, will assist in defining a focused communication strategy.
3. What information needs to be imparted? Not all the information may be needed for all the different groups. Emphasis may be placed on certain topics of the manual for certain target/user groups.
4. How does one reach the target group? Carefully assess all potential channels of communication that may be used to reach your target/user group.
5. How should the information be packaged? This will vary according to target group, levels of literacy, culture, means of communication and other factors.
6. How will the effectiveness of the strategy be monitored? As the appropriate strategy is being developed, there is also a need to develop a monitoring system that will be sensitive to changes in knowledge, attitudes and practices.

9.1 Communication about Nutrition and HIV/AIDS

9.1.1 Who Needs to Know?

The Kenyan National Guidelines on Nutrition and HIV/AIDS has been compiled to enhance the knowledge and skills of health providers, communities and the public at large. To be effective, the Guidelines' information must be shared with many people, in many sectors.

The information contained herein, can be packaged for decision makers at policy level given the critical role of nutrition in the management of HIV and AIDS.

Programme managers will find useful information on integrating nutrition into HIV and AIDS care and support interventions.

Service providers will benefit from re-orientation, and in some cases new training, on updated nutrition interventions. At the local level, service providers need to continually reinforce the Guidelines' information.

The general public will understand the importance of good nutrition in remaining healthy and those affected by HIV and AIDS will have important and practical information on how to adopt a healthier lifestyle and good nutrition practices.

9.1.2 What is the Current Knowledge among the Target Group?

Recognizing that in general, information on nutrition and HIV and AIDS is not widely available, known and applied in programmes, it is useful therefore, to determine what the current 'gaps' are within different target groups. The gaps should be identified with a clear understanding of the ROLE of the target group in advancing the nutritional care and support of HIV and AIDS.

9.1.3 Message Content

- The overall message will include:
  - The vulnerability of different population groups to HIV and malnutrition;
  - The interaction between HIV/AIDS and nutrition;
  - The opportunities available and the potential to improve nutrition, health, the quality of life and survival of PLWHA;
  - How to take action based on information provided in the Guidelines;
  - How to coordinate with existing interventions.
- The content of an information package can vary. For example, an information package for journalists, goodwill ambassadors and others willing to advocate may include the following: key facts on malnutrition, HIV and AIDS and the interaction of the two; how good nutrition is a critical part of HIV and AIDS management; how much a good simple balance diet may cost per person/day and so on.
- A booklet of essential information from the Guidelines for health workers may include other information including: key facts, practical tips, best practices by the community and service providers. The booklet would be part of a coordinated effort which includes posters, brochures, leaflets, and radio messages.
- Messages must be grounded in the reality of the population. If having meat in the daily diet is beyond the means of most, for example, stress instead the alternative protein sources and having a balanced diet from commonly available foods.

9.1.4 How to Get the Message Out

To effectively share the Kenya National Guidelines on Nutrition and HIV/AIDS, the following suggestions are made:

- At the national level, use television and newspapers to help advocate to government and donors for increased awareness and investment in food security, nutrition, health and HIV/AIDS; use radio as the key mass medium for reaching the most vulnerable populations. Engage local or popular radio stations as full partners to reach PLWHA. Make the messages about essential nutrition simple, clear and straightforward.
- Make simple information on essential nutrition available to every person with HIV/AIDS and all health workers. Present all written information (leaflets, newsletters, and posters) with engaging illustrations for those who have difficulty reading.
- Translate messages into local languages for broad outreach.
- Present information in a creative manner. Use a photo or an image that people value along with information on nutrition. (The image doesn't have to necessarily correspond with the subject of nutrition.) For example, a photo of a popular football player alongside nutrition tips may be valued and not discarded by young men.
- Use goodwill ambassadors, celebrities and opinion shapers to promote nutrition for PLWHA. Celebrities who have recognizable voices (e.g. radio morning show hosts) and do many spots on a subject could be effective.
- Identify special days for nationwide nutrition-promoting activities. Link the day with existing material and activities, such as the messages being broadcast by radio, stickers, posters and celebrity visits.
- Use existing recreational activities framework: youth HIV/AIDS football (soccer) programmes and cookery competitions as entry points for messages.
- Set up good, strong displays in health centres, schools and meeting places. Put up posters, with information that is renewed regularly, to use as a teaching aid in school, or to refer to during discussion in a health facility.
- Target activities to reach out to professional groups, programme managers, trainers and learning institutions. Advocate for nutrition as part of training of health professionals - doctors, nurses and volunteers and for nutrition to be part of the medical training curriculum.

9.1.4.1 Communicate to Children and Adolescents

In many cases, children are the caregivers of PLWHA at home, responsible for preparing food and water. A sound understanding of the importance of nutrition for the young generation, regardless of HIV status, will lead to healthier population in the future.

- Rely on schools to promote information on nutrition and HIV/AIDS to children and adolescents; integrate with existing programmes at the school (such as the school feeding program, life skills education etc.).
- Involve the subject of nutrition and HIV in existing youth programs such as guides and scouts (create a badge for nutrition and HIV!).
- Advocate for key nutritional messages to be included as part of a lesson on biology. Include questions on biology exams about nutrition, such as: 'Why is good nutrition especially important for people living with HIV/AIDS?'
- For out of school children use places where they may congregate such as community centres, vocational skills training places.

9.1.5 Network to Share Information Effectively

- Design strategies that take advantage of a network for information dissemination.
- Use inter-sectoral approach: ensure key messages are integrated in school health programmes, existing media, health promotion materials, and special day events.
- Form partnerships with other providers and develop a consensus on common strategies to disseminate information.
- Organize meetings for the network of nutrition service providers.

9.1.6 Document Information

- Organize and index existing materials so that service providers and PLWHA can easily access information.
- Collate reading materials about nutrition care and support collected from all sources and distribute these to strategic information outlets at the local level.

9.1.7 Monitor the Communication Strategy

- Keeping in mind your objective for the different target groups (e.g. greater resource allocation to nutrition by policy makers or improved and balanced food intake by PLWHA) develop simple indicators that can be used to monitor the desired changes amongst your target.
- Decide upon qualitative and quantitative indicators.
- Decide also on how often you wish to monitor the indicators. Remember that continuous feedback on the different avenues / approaches used for communication will help to sharpen your strategy and make it effective.

Chapter 10
Monitoring and Evaluation

10.0 Introduction

The National AIDS Control Council, in collaboration with various partners, has established a framework for the National Nutrition Intervention in the Fight against HIV/AIDS to coordinate the response in the fight against HIV/AIDS (see Annex 10.1), from the national to the community level. This framework will help harmonize nutrition interventions within the continuum of care and support services for PLWHA. The Kenyan National Guidelines on Nutrition and HIV/AIDS will help initiate new, or strengthen existing, coordinated nutritional care and support services for PLWHA.

To keep track of the Guideline's reach and impact, a systematic assessment, analysis, and documentation of the Guideline's dissemination and implementation is required. Continual monitoring and periodic evaluations are fundamental to assess the Guidelines' success and reach.

10.1 Monitoring and Evaluation of Kenya National Guidelines on Nutrition and HIV/AIDS

Monitoring is the continuous process of measuring progress in achieving specific results in relation to a programme or project plan. In this case we would like to monitor the progress made in the use of the Kenyan National Guidelines on Nutrition and HIV/AIDS Guidelines at the different levels of dissemination and application to nutritional care and support services. Monitoring activities assist national policy makers, district and provincial planners, programme managers and others in setting priorities for capacity building, service provision, resource allocations and standards of care.

The monitoring process **reports on the progress** made towards realizing the following objectives:

- Effective and widespread dissemination of guidelines.
- Practical application of the guideline recommendations in the on-going programmes and services.
- Proper implementation of the guidelines by the service providers and clients.
- Improved well-being of PLWHA due to improved nutritional practices.

A variety of indicators can be used to monitor the use of the national guidelines and to monitor the progress and outcomes of nutritional care and support. Examples of indicators that can be used are listed below. Programs should select and adapt indicators based on the outcomes desired and on the feasibility of measurement.

Types of monitoring indicators for these guidelines would include:

- Number of health programmes implementing nutritional care services for PLWHA in both public and private sectors (Annex 10.1).

- Number of training institutions with nutritional care and support incorporated in their training programmes
- Number of training sessions/workshops organized for service providers from both public and private sectors.
- Number of service providers (counsellors, health educators, extension workers, teachers, social workers) trained in the use of the guidelines.
- Number of initiatives such as home based care and workplace education initiatives in both public and private sectors that include nutritional care and support activities.

Footnote: A sample framework monitoring and evaluation for organizations is cited Annex 10.2.

Evaluation determines the worth of an intervention, strategy or policy. This will look at the relevance of the guidelines in Kenya, efficiency in dissemination and use, effectiveness of the guidelines in achieving set objectives, impact of the guidelines and sustainability of application of the guidelines.

Evaluating the effectiveness of these guidelines may include the following:

- Changes in policy and service provision supporting nutritional care and support for PLWHA.
- Increased resource allocation for nutritional action in support of efforts to combat HIV and AIDS. Costs of implementing the guidelines to measure efficiency or cost-effectiveness
- Changes in stake holder's knowledge and practice regarding nutritional care and support of PLWHA.
- Impact of strengthened nutritional care and support on the quality of life of PLWHA
- Inclusion of nutritional care and support as an integral part of comprehensive service provision to PLWHA.

Evaluation indicators for these guidelines would include:

- Changes in the proportions of PLWHA receiving nutritional care services
- Changes in the proportion of services in the public and private sectors that are offering nutritional support as part of an integrated service delivery for PLWHA.
- National policy statement(s) and changes in the allocation of funding for nutritional care and support of PLWHA.
- Changes in the percentage of PLWHA reporting dietary modifications based on adequacy of energy, protein and micronutrient intake.
- Proportions of households affected by HIV or AIDS with increased food access as a result of food security initiatives.
- Changes in the percentage of PLWHA with improved or stabilized weight and body mass index as a result of a nutritional intervention or programme.
- Changes in the percentage of PLWHA who report ability to perform basic work activities as the result of a specific nutritional intervention or programme.

- Changes in the percentage of PLWHA reporting reduction in frequency and severity of symptoms of opportunistic infections as a result of a specific nutritional intervention or programme.

Impact evaluation usually requires extra resources, trained people, time and equipment, and is generally undertaken in a few selected sites. Impact evaluations may be initiated by individual projects or the national programme. Formal evaluations require careful planning and protocols may require scientific and ethical review. Information from impact evaluations should be widely disseminated in order to improve practices, scale up good interventions, revise guidelines and inform policy.

10.2 Actions by Service Providers

- Use these Guidelines.
- Disseminate the Guidelines to public sector agencies, civil societies, professional organizations and the public sector.
- Monitor, audit, evaluate and report performance.
    - Continuously monitor the dissemination of the guidelines and implementation of specific actions.
    - Periodically audit the effectiveness of activities under implementation
    - Monitor the coverage of activities.
    - Periodically assess applicability and limitations in the implementation of the guidelines.
- Assess and document behaviour change among service providers and PLWHA.
- Assess and document the health outcomes of PLWHA.
- Analyze data and report to your organization and other stakeholders.
    - Report site specific and disaggregated results (according to gender and age) according to scheduled reporting format and time frame to managers of your programme.
    - Document outcomes and incorporate experiences in subsequent expanded and scaled up implementation plans.
    - Prepare short articles demonstrating the impact of the guidelines and nutritional interventions on PLWHA.

Annexes

Annex 3.1: Energy and Protein Requirements

	HIV negative	HIV Positive[1]				Proteins requirement (g/day)
Group of people	Energy requirement (kcal/day)	Asymptomatic Energy requirement (kcal/day)		Symptomatic Energy requirement (kcal/day)		
		10% extra	Energy	20% - 30% extra	Energy	
Adults						
Male (Light activity)	2580	260	2840	520 - 780	3100-3360	57
Male (Moderate activity)	2780	280	3060	560 - 840	3340-3620	57
Female (Light activity)	1990	200	2190	400 - 600	2390-2590	48
Female (Moderate activity)	2240	220	2460	440 - 660	2680-2900	48
Pregnant women	2280 (290 extra)	230	2510	500 - 750	2780-3030	55
Lactating women	2490 (500 extra)	250	2740	540 - 810	3030-3300	68
Children[2]				**20% extra**		
Boys						
6-11 months	760-970	80-100	840-1070	150 - 190	910-1160	10
1-3 years	1200-1410	120-140	1320-1550	240 - 280	1440-1690	25
2-5 years	1410-1690	140-170	1550-1860	280 - 340	1690-2030	26
5-10 years	1810-2150	180-220	1990-2370	362 - 430	2170-2580	35
10-14 years	2500-2800	250-280	2750-3080	500 - 560	3000-3360	64
15-18 years	3000-3100	300-310	3300-3410	600 - 620	3600-3720	84

Girls						
6-11 months	720-910	70-90	790-1000	140 - 180 8	60-1090	10
1-3 years	1140-1310	110-130	1250-1440	230 - 260	1370-1570	25
2-5 years	1310-1540	130-150	1440-1690	260 - 310	1570-1860	26
5-10 years	1630-1880	160-190	1780-2070	330 - 380	1960-2260	35
10-14 years	2300-2450	230-250	2530-2700	460 - 490	2760-2940	62
15-18 years	2340-2500	230-250	2570-2750	470 - 500	2810-3000	65

Source: Energy and protein requirements. Report of a Joint FAO/WHO/UNU Expert Consultation. WHO Technical Report Series, No. 724, 1985.
Garrow JS and James WPT (editors), Human nutrition and dietetics. Churchill Livingstone 9th edition, 1993

NB: Energy and protein requirement values may vary slightly among different sources.

[1]HIV-infected adults may require increased protein and micronutrient intake, but research has not yet proven this.
[2]Children figures (FAO/WHO) include an extra 5% energy for desirable level of physical activity.

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Annex 3.2: Important Micronutrients

Micronutrient	Sources	Functions	Markers of Deficiency
Vitamin A	Full-cream milk, fish oil, eggs, liver, carrots, mangos, papaya, pumpkin, yellow sweet potatoes, green leafy vegetables.	Maintenance of epithelial cells, mucous membranes and skin, immune system function, ensures good vision and bone growth.	Poor dark adaptation, night blindness, growth failure, reduced resistance to infection.
Vitamin B_1 (Thiamine)	Whole-grain cereals, meat, poultry, fish, liver, milk, eggs, oil, seeds, and legumes.	Energy metabolism, supports appetite and central nervous system functions	Beriberi, muscle weakness, anorexia, oedema, enlarged heart, confusion.
Vitamin B_2 (Riboflavin)	Milk, eggs, liver, meat, fish, yogurt, green leaves, whole-grained cereals, and legumes.	Energy metabolism supports normal vision, health and integrity of skin.	Inflammation of the tongue, angular stomatitis, oedema and hyperaemia of pharyngeal.
Vitamin B_3 (Niacin)	Milk, eggs, meat, poultry, fish, peanuts, whole-grained cereals, unpolished rice, mushrooms.	Energy metabolism supports health and integrity of skin, nervous and digestive systems.	Pellagra, (3D's – Dermatitis, Diarrhoea, Dementia)
Vitamin B_6 (Pyridoxine)	Legumes, potatoes, meat, fish, poultry, watermelon, oil seeds, maize, avocado, broccoli, green leafy vegetables.	Metabolism and absorption of fats and proteins, converts tryptophan to niacin, helps to make red blood cells.	Inflammation of the tongue, lesions on the lips and corners of the mouth, peripheral neuropathy.
Vitamin B_{12} (Cobalamin)	Meat, fish, poultry, shellfish, cheese, eggs, milk	Required for synthesis of new cells, maintenance of nerve cells, metabolism of fatty acids and amino acids.	Anaemia, inflammation of the tongue, degeneration of peripheral nerves, skin hypersensitivity, dementia weakness and confusion.
Vitamin C (Ascorbic acid)	Citrus fruits (guava, oranges etc); vegetables such as cabbage, green leaves tomatoes, peppers; Potatoes, yams and fresh milk.	Antioxidant, helps the body to use calcium and other nutrients to build bones and blood vessel walls, important for protein metabolism, increases non-heme iron and selenium absorption.	Scurvy, poor appetite, fatigue, retarded wound healing, bleeding gums.

Micronutrient	Sources	Functions	Markers of deficiency
Vitamin E (Tocopherol)	Liver, milk fat, peanuts, green vegetables, corn oil, vegetable oils, whole grain products, egg yolk, nuts, soya, sunflower seeds, cotton seeds, coconut, tomatoes, sweet potatoes	Protects red and white blood cells membranes (antioxidant), DNA synthesis, stimulates the immune system.	Anaemia in infants Abnormality of nerves and muscles, irritability, oedema.
Zinc	Organ meats, fish, poultry, eggs, whole grain cereals, legume, nuts, milk, yoghurt, vegetables, corn, guavas, pumpkin seeds,	Important for the function of many enzymes (antioxidant), involved in making genetic material, immune system function, smell and taste acuity, wound healing, important for growth and development,	Reduced resistance to infection, skin ulceration, stunted growth.
Selenium	Meat, eggs, seafood, whole grains, chicken liver, cooked sunflower seeds, plants grown in selenium rich soil.	Antioxidant, prevents the impairing of heart muscles, synthesis of glutathione peroxidase, phagocytic functions.	Reduced resistance to infection, joint deformities in children, damage to heart and skeletal muscles, lightening of skin and hair pigmentation.
Iron	Red meat, liver, fish, poultry. Eggs, legumes, peanuts, cereals and dried fruits. Vitamin C, heme iron foods and fermented foods increase non-heme iron absorption.	Synthesis of haemoglobin, energy metabolism and utilization, antioxidant.	Anaemia
Folate	Liver, green leafy vegetables, fish, legumes, groundnuts, oil seeds.	Synthesis of red blood cells, gastrointestinal cells and DNA.	Anaemia, neural tube defects in newborns.

Annex 3.3: Micronutrient Requirements for Adults [a]

Target micronutrient	Non pregnant, non lactating women	Pregnant women	Lactating mothers	Men
Vitamin A (µg RE)	500	800	850	600
Vitamin B_1 (mg)	1.1	1.4	1.5	1.2
Vitamin B_2 (mg)	1.1	1.4	1.6	1.3
Vitamin B_3 (mg)	14	18	17	16
Vitamin B_6 (mg)	1.3	1.9	2.0	1.3
Vitamin B_{12} (µg)	2.4	2.6	2.8	2.4
Vitamin C (mg)	45	50	70	45
Vitamin D (µg)	5	5	5	5
Vitamin E (mg)	5	7.5	7.5	10
Vitamin K (µg)	55	55	55	65
Calcium (mg)	1000	1200	1000	1000
Iodine (µg)	110	200	200	130
Iron[b] (mg)	20	[c]	32	9
Zinc[d] (mg)	6.4	1st trimester 3.4 2nd trimester 4.2 3rd trimester 6.0	0–3 months 5.8 4–6 months 5.3 7–12 months 4.3	9.4
Magnesium (mg)	220	220	270	260
Folic acid (µg)	400	600	500	400
Selenium (µg)	26	42	30	34

Source: Food and Agricultural Organization of the United Nations and World Health Organization: *Human vitamin and mineral requirements.* Report of a joint FAO/WHO consultation. Bangkok, Thailand 1998.

NB: Bioavailability is the degree to which a nutrient is absorbed or becomes available at the site of physiological activity after intake.

[a] Based on a 65 kg man and 55 kg woman.
[b] Based on 15% bioavailability
[c] It is recommended that iron supplements in tablet form be given to all pregnant women because of the difficulties in correctly evaluating iron status in pregnancy. In the non-anaemic pregnant woman, daily supplements of 37 mg of iron (e.g. as ferrous sulphate) given during the second half of pregnancy are adequate.
[d] Based on high dietary bioavailability.

Annex 3.4: Micronutrient Requirements for Children

Target micronutrient	0-3 months	4-6 months	7-9 months	10-12 months	1-3 years	4-6 years
Vitamin A (µg RE)	375	375	400	400	400	450
Vitamin B_1(mg)	0.2	0.2	0.3	0.3	0.5	0.6
Vitamin B_2(mg)	0.3	0.3	0.4	0.4	0.5	0.6
Vitamin B_3(mg)	2	2	4	4	6	8
Vitamin B_6(mg)	0.1	0.1	0.3	0.3	0.5	0.6
Vitamin B_{12}(µg)	0.4	0.4	0.5	0.5	0.9	1.2
Vitamin C (mg)	25	25	30	30	30	30
Vitamin D (µg)	5	5	5	5	5	5
Vitamin E (mg)	2.7	2.7	2.7	2.7	5	5
Folic acid (mg)	80	80	80	80	160	200
Vitamin K (µg)	5	5	10	10	15	20
Calcium (mg)	300	300	400	400	500	600
Iodine (µg)	15	15	135	135	75	110
Iron (mg)	a	a	a	10	6	6
Zinc [b](mg)	2.8	2.8	4.1	4.1	4.1	5.1
Magnesium (mg)	26	26	53	53	60	7.3
Selenium (µg)	6	6	10	10	17	21

Source: Food and Agricultural Organization of the United Nations and World Health Organization: *Human vitamin and mineral requirements.* Report of a joint FAO/WHO consultation. Bangkok, Thailand 1998.

NB: Bioavailability is the degree to which a nutrient is absorbed or becomes available at the site of physiological activity after intake.

[a] Neonatal iron stores are sufficient to meet the iron requirement for the first six months in full term infants. Premature infants and low birth weight infants require additional iron. Based on 15% bioavailability.
[b] Based on high dietary bioavailability

Annex 3.5: Summary of Energy and Protein Values of Commonly Consumed Foods in Kenya

	Common foods	Energy, Kcal per 100 g	Protein g per 100 g	Possible consumption amount per meal (g)	Nutrient output per meal	
					Energy, Kcal	Protein, g
Cereals	Whole maize meal	370	9	50	185	5
	Maize grain	370	9	50	185	5
	Rice	359	8	75	270	6
	Wheat flour (Home baking)	340	11	50	170	6
	Wheat whole grain	334	17	50	167	9
	Millet	336	9	60	202	6
	Sorghum	306	8	60	183	5
Roots and tubers	Cassava	375	2	75	281	2
	Arrow roots	125	2	75	94	2
	Sweet potatoes	131	6	75	98	6
	Irish/English potatoes	81	2	60	49	1
	Banana raw (matoke)	109	1	60	65	1
Others	Cane sugar	375	-	20	75	-
	Cooking fat	900	-	20	180	-
Animal source foods	Fish fillet	244	72	50	122	36
	Meat (beef)	180	20	75	135	15
	Chicken	163	25	75	122	19
	Egg	154	12	100	154	12
	Cow whole milk	73	3	200 mL	150	6
Plant source food	Green grams	352	24	50	176	12
	Lentils	350	24	50	175	12
	Beans	347	18	50	173	9
	Cow peas	297	23	50	151	12
	Soya	429	30	50	215	15
	Pigeon peas	399	23	50	199	11
Fruits	Avocado	128	1	100	128	1
	Banana ripe	94	1	50	47	1
	Oranges	89	1	40	36	-
	Passion	87	1	40	35	-
	Mangoes	60	1	60	36	-
	Pawpaw	32	0.4	40	12	0.2
Nuts and seeds	Ground nuts	554	10	50	277	5
	Coconut	544	6	50	314	17
	Cashew nuts	569	21	50	285	11
	Simsim	544	20	50	272	10
Vegetables	Spinach	32	3	200	64	6
	Cabbage	24	2	150	36	3
	Kales (Sukuma wiki)	52	4	150	73	6
	Cow peas leaves	43	6	100	43	6
	Amaranth (terere)	45	5	100	45	5
	Pumpkin leaves	36	5	100	36	5

Adapted from: Sehmi JK. National food composition tables and the planning of satisfactory diets in Kenya. Ministry of Health, Government of Kenya, 1993

Annex 4.1: Estimation of Z-Score Using the NCHS/ WHO Reference Curve

1. Weight for age — all ages
2. Length for age — < 24 months
3. Weight for length — < 24 months
4. Height for age — > 24 months
5. Weight for height — > 24 months (limit 10.5 years)

Calculating Z-scores

$$\text{Z score} = \frac{\text{actual values (weight, height/length)} - \text{expected values (weight, height/length)}}{\text{Standard deviation}}$$

The expected values (weight, height/length) are represented by the 50th percentile. Standard deviation is estimated from the difference between the 97th and 3rd percentile values divided by four (4) i.e.

$$\text{SD} = \frac{\text{97th percentile} - \text{3rd percentile}}{4}$$

Example A boy child aged 6 months is 67 cm long and weighs 6.4 kg. Estimating his nutritional status using Z-scores for length-for-age is as follows:

$$\text{Length for age Z score: } \frac{\text{Actual length} - \text{Expected length}}{\text{Standard deviation}} = \frac{67 - 67.8}{2.53} = -0.32$$

The Z-score for length for age = -0.32 hence the child is within the normal range i.e. between 2 and -2 Z – score

Length (cms) for age for children under 24 months

Age in months	Male, percentiles			Standard Deviation	Female, percentiles			Standard Deviation
	3rd	50th	97th		3rd	50th	97th	
0	46.2	50.5	54.8	2.15	45.8	49.9	53.9	2.03
1	49.9	54.6	59.2	2.32	49.2	53.5	57.9	2.18
2	53.2	58.1	62.9	2.43	52.2	56.8	61.3	2.27
3	56.1	61.1	66.1	2.50	54.9	59.5	64.2	2.32
4	58.6	63.7	68.7	2.52	57.2	62.0	66.8	2.40
5	60.8	65.9	71.0	2.55	59.2	64.1	69.0	2.45
6	62.8	67.8	72.9	2.53	61.0	65.9	70.9	2.48
7	64.5	69.5	74.5	2.50	62.5	67.6	72.6	2.52
8	66.0	71.0	76.0	2.50	64.0	69.1	74.1	2.52
9	67.4	72.3	77.3	2.48	65.3	70.4	75.6	2.57
10	68.7	73.6	78.6	2.48	66.6	71.8	77.0	2.60
11	69.9	74.9	79.9	2.50	67.8	73.1	78.3	2.63
12	71.0	76.1	81.2	2.55	69.0	74.3	79.6	2.65
13	72.1	77.2	82.4	2.58	70.1	75.5	80.9	2.70
14	73.1	78.3	83.6	2.63	71.2	76.7	82.1	2.73
15	74.1	79.4	84.8	2.68	72.2	77.8	83.3	2.78
16	75.0	80.4	85.9	2.73	73.2	78.9	84.5	2.83
17	75.9	81.4	87.0	2.77	74.2	79.9	85.6	2.85
18	76.7	82.4	88.1	2.85	75.2	80.9	86.7	2.88
19	77.5	83.3	89.2	2.92	76.1	81.9	87.8	2.93
20	78.3	84.2	90.2	2.97	77.0	82.9	88.8	2.95
21	79.1	85.1	91.2	3.02	77.8	83.8	89.8	3.00
22	79.8	86.0	92.2	3.10	78.7	84.7	90.8	3.03
23	80.6	86.8	93.1	3.13	79.5	85.6	91.7	3.05

Annex 7.1: Sample of Common Herbs and Spices

Name	Benefit	How to use
Aloe vera	• Relieves constipation • Soothing and healing to wounds	• Use as extract; boil and drink concentrated water. Stop use if it causes cramps/ diarrhoea. • Apply fresh gel on wounds May cause diarrhoea. Use for a maximum of 10 days. Should be avoided during pregnancy.
Cinnamon *Cinnamon zeylanicum*	• Relieves nausea, colds and flu • Stimulates digestive juices • Stimulates appetite • Anti-diarrhoeal • Antiseptic	• Add to meals or teas particularly ginger and cinnamon tea. Should be avoided during pregnancy.
Garlic *Allium sativum*	• Antibacterial, antifungal, antiviral effects in gut, intestines, lungs, vagina. • Aids digestion • Thrush and throat infections	• Use in food as spice • Prepare tea or energy drink Should not be taken by those on ARV Saquinavir. It reduces efficacy of the ARV
Cloves *Eugenia caryophyllus*	• Relieves nausea, vomiting • Aids digestion, anti-diarrhoeal • Stimulates appetite • Mild anesthetic	• Use in soups, stews, fruit juice and tea • Put a clove near the tooth and keep it in the mouth
Ginger *Zingiber officinale*	• Stimulate appetite • Relieves diarrhoea • Improves digestion • Treats common cold, flu, nausea	• Use as a spice in meals • Use in tea
Lemon	• Helps digestion • Antibacterial effect	• Add lemon juice to foods or drinks
Mint	• Helps digestion • Anti-inflammatory effect • Relieves mouth sores	• Use as a tea • Gargle for mouth sores • Chew mint leaves to aid digestion
Neem *(Mualobaini)*	• Brings down fever	• Cut a fresh twig, remove leaves and boil the bark. Drink as tea. Chew the bark
Coriander	• Increases appetite • Reduce flatulence	• Add to meals
Peppermint *Mentha piperata*	• Relieves nausea • Reduces abdominal pain and cramps • Controls diarrhoea and vomiting • Relieves tension and sleeplessness	• Prepare as tea by boiling leaves for 10 minutes • Add to food
Rosemary *Rosemarinus officinalis*	• Stimulate appetite • Aids digestion • Antiseptic and antibiotic • Anti-inflammatory effect • Anti-inflammatory effect • Stimulates the digestive, respiratory, nervous and circulatory systems	• Use leaves to make tea • Add fresh leaves to food or juice • Steam inhalation for asthma

Name	Benefit	How to use
Basil	• Relieves nausea • Aids digestion • Antiseptic for mouth sores	• 1 teaspoon to a cup of boiling water and drink 3 times a day. • Add fresh or dry leaves to food. • Gargle in warm water.
Calendula	• Flower heads have antiseptic, anti-inflammatory and healing function • Helps with infections of the upper digestive tract	• Prepare as tea. • Use as a compress to treat wounds.
Cardamon	Pain, diarrhoea, nausea, vomiting, loss of appetite • Helps with digestive problems	• Add to food during cooking. • Prepare as food.
Cayenne *Capsicum*	• Stimulates appetite • Aids digestion • Antiseptic	• Add a pinch to raw or cooked food. • Add to fruit juice or water. Avoid in cases of peptic ulcers, gastric hyperacidity. Wash hands after use.
Chamomile *Chamomilla recutita*	• Aids digestion • Stimulates appetite • Nausea • Anti-inflammatory	• Prepare tea from the leaves and flowers and drink 3 times a day • Inhale as steam
Eucalyptus *Eucalyptus globus*	• Antibacterial effect on lungs • Relieves respiratory congestion • Bronchitis, asthma, fever • Aids digestion • Anti-inflammatory	• Prepare tea from the pounded leaves.
Fennel *Foeniculum vulgare*	• Aids digestion • Stimulates appetite • Combats flatulence • Anti-inflammatory • Antiseptic	• Add as spice to food. • Prepare tea from its seeds.
Lemon grass	• Aids digestion • Soothing and stress alleviation	• Use as a tea.
Parsley *Alchemilla arvenis*	• Reduces intestinal cramps and indigestion • Stimulates appetite • Stimulates stomach secretions	• Add raw or cooked to food.
Sage *Salvia officinalis*	• Stimulates appetite • Aids digestion • Anti-inflammatory effect • Stimulates the digestive, respiratory, nervous and circulatory systems	• Use leaves to make tea. • Add fresh leaves to food or warmed juice. • Gargle tea made using 2 tablespoons to a cup of boiling water. • Steam inhalation for asthma.
Thyme *Thymus vulgaris*	• Antiseptic and antifungal function • Stimulates digestion • Stimulates growth of intestinal flora • Increases mucous secretion in the gut	• Use leaves to make tea. • Add fresh or dry leaves to food or warmed juice. • Gargle tea made using 2 tablespoons to a cup of boiling water.
Turmeric/ yellow root	• Aids digestion	• Use powder in cerals. Gives yellow colour to curry and rice.

Sources: Living well with HIV/AIDS. A manual on nutrition care and support for people living with HIV/AIDS. World Health Organization (WHO) and Food and Agricultural Organization (FAO), Rome 2002.

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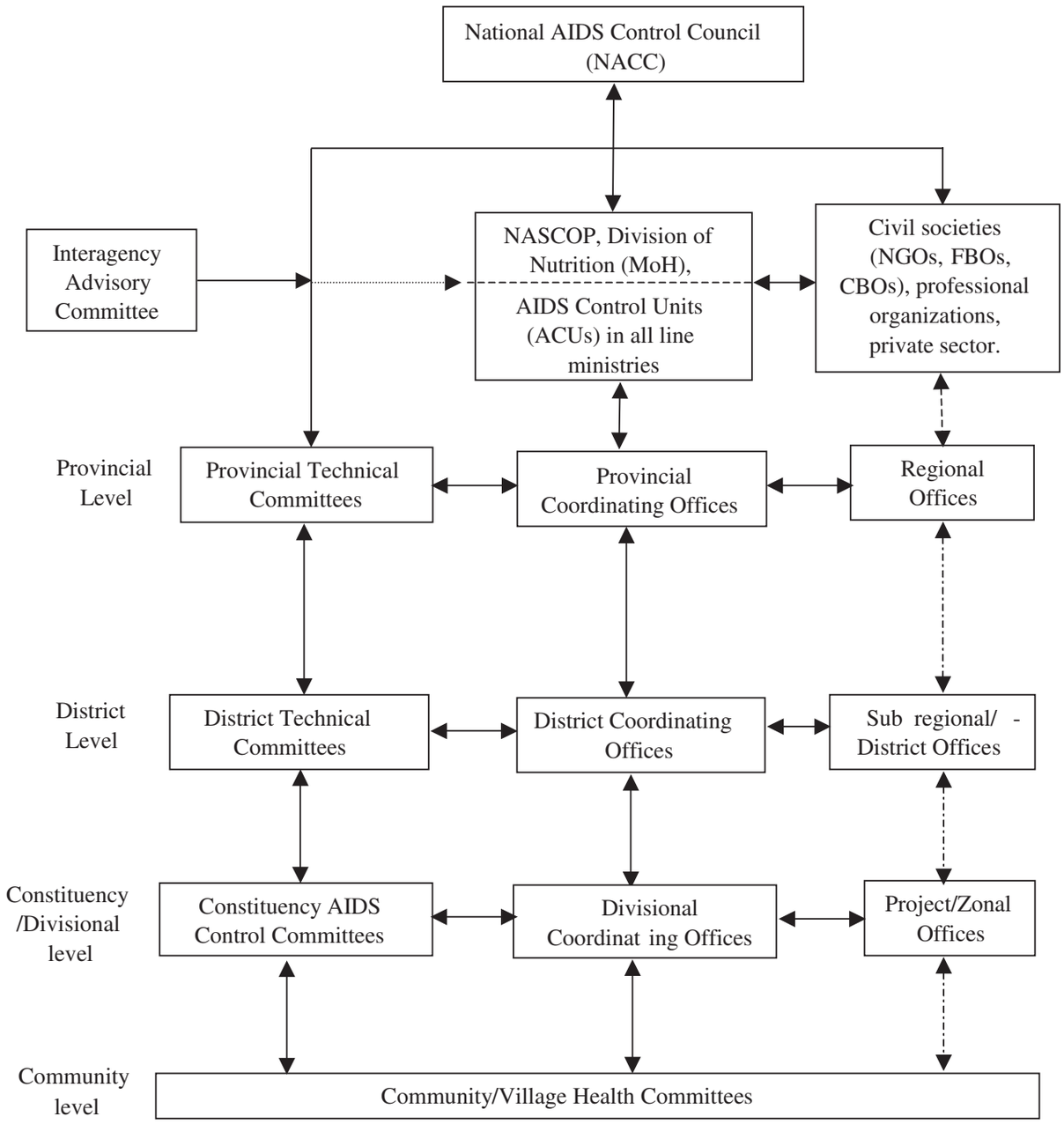
Herbal remedies derived from the following plants are commonly used locally for therapeutic purposes: Aloe, Ajuga remota (Wanjiru rurii), neem (Mualobaini), Warbugia ugadensis (Muthiga), Prunus Africana (Muiri), Zanthoxylum spp (Muheheti, Mugushua, Mukenia).

Annex 10.1: Framework for the National Nutrition Intervention in the Fight against HIV/AIDS



Annex 10.2: Indicators for Monitoring and Evaluation

Component	Objective	Indicators	Assessment method
Dissemination	To assess the effectiveness of the dissemination strategies	• Number of service providers with copies of the Guidelines • Number of service providers who are aware of the existence of the Guidelines • Number of strategies used to disseminate the Guidelines and recommendations • Availability and accessibility of Guidelines and other nutrition-promoting materials (such as posters and pamphlets) at various institutions and organizations. • Number of translations of the Guidelines into local languages.	Review of records and community based sample survey
Implementation	To incorporate and put in practice the guideline recommendations in the on-going programmes and services	• Number of health programmes implementing nutritional care services for PLWHA in both public and private sectors (Annex 10.1). • Number of training institutions with nutritional care and support services incorporated in their training programmes· • Number of training sessions/ workshops organized for service providers at different levels • Number of service providers (counselors, health educators, extension workers, teachers, social workers) trained in the use of the Guidelines. • Number of initiatives such as home based care and workplace education initiatives in both public and private sectors that include nutritional care and support activities. • Number of PLWHA receiving nutritional care services· Amounts of funds allocated to nutritional care and support of PLWHA.	Review of records and community based sample surveys

Behaviour change among service providers, PLWHA and families	To assess the acceptance of the Guidelines by the service providers and clients.	• Proportion of service providers expressing willingness to adopt or continue implementing the guideline recommendations • Number of PLWHA reporting changes in dietary behaviour based on adequacy of energy, protein and micronutrient intake.	Sample survey and observation
		• Number of PLWHA reporting modification of lifestyles such as avoidance of alcohol and cigarettes. • Number of PLWHA who report behaviour change in frequency of eating, type of food, dietary diversity and practice of recommended dietary response to symptoms such as nausea.· • Number of families growing nutritious foods.	
Health outcome of PLWHA	To monitor the health effects of nutritional care and support Guidelines	• Number of PLWHA with improved or stabilized weight and body mass index. • Number of PLWHA who report ability to perform basic work activities. • Number of PLWHA reporting reduction in frequency and severity of symptoms of opportunistic infections.	Longitudinal sample survey and observation

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Kenyan National Guidelines on Nutrition and HIV/AIDS

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