

# 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 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 avocados. 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.

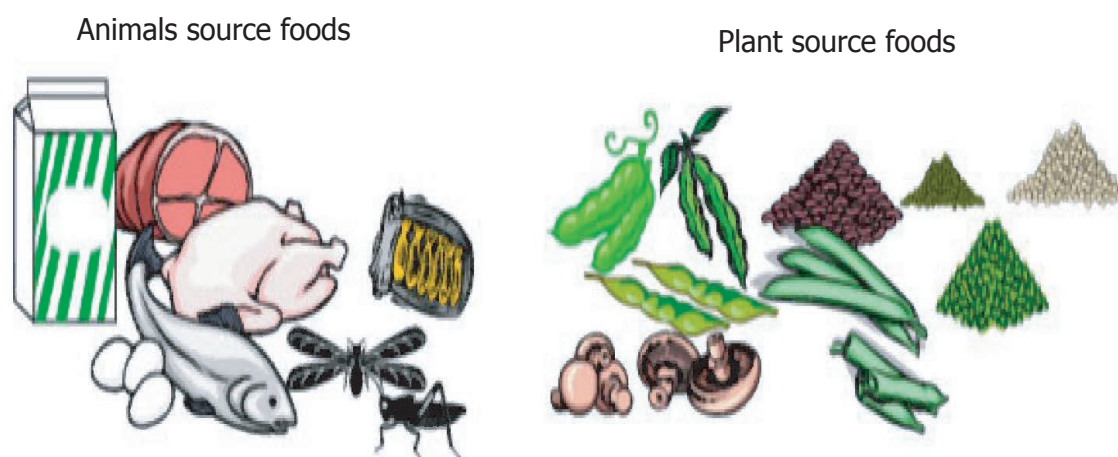
- According to WHO, there is insufficient evidence to support the need for increased protein requirements for PLWHA over and above that of un-infected persons.
- As in the case of healthy non-HIV-infected individuals, protein intake is recommended at 12 to 15% of the total energy intake. On average, 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 vulnerable to a micronutrient 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.

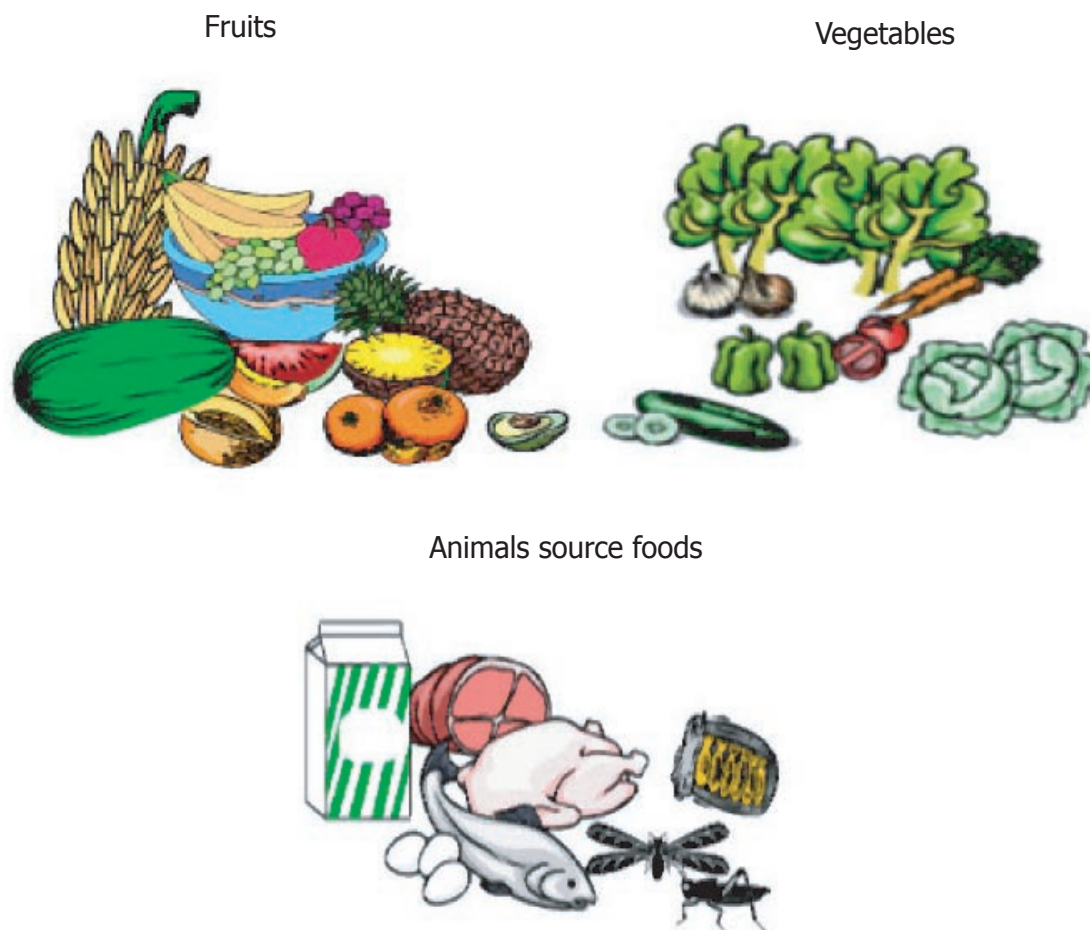
### **Vegetables**

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 nettle (*Urtica massaica*) have a high micronutrient value.

### **Fruits**

- The most common fruits in Kenya are oranges, passion fruit, mangoes, pineapples, avocados, 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  $\beta$ -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
  - 1/2 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:
  - 1/2 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
  - 1/2 cup of fruit juice or
  - one cup of raw chopped vegetables or
  - 1/2 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 1/2 cup =275 kcal, 17 g protein)	1 1/4 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)	2 servings of fruit e.g. oranges (or 2 pieces =88 Kcal)
	1 serving of milk (or 1 cup =73 Kcal, 3 g protein)	

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