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CLINICAL FEEDING AND NUTRITION MANUAL FOR USE IN THE CARE OF HIV INFECTED ADULTS

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Foreword

This document, prepared by the Ministry of Health's National STD and AIDS Programme and its General Food and Nutrition Coordination, received input from Nutrition and HIV/AIDS professionals from support services and networks from all over Brazil. Its purpose is to provide information to National Health System professionals involved in counselling and treating people living with HIV and AIDS, regardless of whether they are nutritionists or not. Its aim is to serve as a basis for nutritional evaluation and counselling.

The importance of diet / nutrition to people living with HIV/AIDS is of such relevance that many authors defend that the same degree of attention should be paid to it as is paid to laboratory analyses and viral load counts, whether because of the hypermetabolic characteristics of HIV infection, or because of the adverse effects of medication.

Professionals of this area have defended that nutritional control and accompaniment should be used systematically as a treatment, accompaniment and prevention strategy. If the diet of asymptomatic people, not taking specific treatment, should be carefully balanced; then double the care should be taken in the case of people on antiretroviral treatment.

This manual is intended to be used by and to assist health professionals in their daily activities when caring for people living with HIV and AIDS. Appendix 1 contains technical information on Nutritional Evaluation Methods.

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1. Introduction

In recent years nutrition has achieved worldwide recognition with regard to the importance of the role of healthy eating in promoting the health of all populations. It provides the basis for the strategic planning of the use of food to promote health, reducing harm and seeking solutions. Eating well in a constant manner is a human right.

When a person living with HIV/AIDS seeks a specialized health service, it is important to consider the possibility that he or she may not understand the relationship between food/nutrition/immunity/health. This may be an opportune moment to emphasize their health care and thus achieve the desired efficacy, thereby favouring their adherence to treatment.

The suffering caused by the impact of realizing that one has a disease that is not yet curable can, paradoxically, contribute towards one seeing diverse aspects of one's life in a positive manner, including changes to one's lifestyle and eating habits, if necessary.

Food and Nutrition Safety: Ensuring the Right to Adequate Food

The right to life involves ensuring the human right to adequate food, whilst respecting cultures and preserving dignity. This means achieving and satisfying, in addition to the bodily dimension, intellectual, psychological and spiritual well-being.

In Brazil, the evolution of the concept of food safety has accompanied all efforts towards making society more democratic and the struggle for a country with greater economic and social justice. Currently this concept is broadening, so that **Food and nutrition safety** "***consists of ensuring access, by all people, to safe quality basic food, in sufficient quantities, in a permanent manner and without compromising access to other essential needs, based on healthy eating practices, thus contributing towards a dignified existence within a context of integral individual human development*** ". Valente, 2002

Currently available epidemiological data demonstrate that our society faces both sides of this question: want - malnutrition, iodine deficiency, hypovitaminosis A, iron-deficiency anaemia, osteoporosis – and excess – overweightness and obesity, arterial hypertension, glucose intolerances and *Diabetes Mellitus*, dyslipidemias, different kinds of cancer and cardiovascular diseases. Therefore, in order to overcome these problems, food and nutritional safety cannot be separated from the quest for the right to adequate food.

The National Policy on Food and Nutrition

Within the National Health System, this policy comprises the set of government policies on food and nutrition safety and the fulfilment of the universal human right to adequate food and nutrition.

Actions aimed at ensuring food and nutrition safety therefore contribute in a practical manner towards the human right to adequate food and nutrition, thus extending beyond the health sector and taking on an intersectoral character.

The following directives exist so that the aims of this policy can be met: the encouragement of intersectoral actions aimed at achieving universal access to food; guaranteeing the safety and quality of food and of services provided in this context; monitoring the food and nutrition situation; promoting healthy eating practices and lifestyles; the prevention and control of nutritional disorders and diseases associated with food and nutrition; promoting lines of research; and human resource development and training.

Within the context of the HIV/AIDS epidemic the issue of food and nutrition safety takes on even greater relevance. It is one of the aspects that must be taken into consideration by health professionals providing care to people living with HIV/AIDS, from the point of view of broadening the perception of the scope of the vulnerability to which they may be exposed, and thus enhance the quality of health care.

2. Promoting Healthy Eating: principles, characteristics and considerations

The history of human eating habits is intertwined with the history of humanity itself. This implies recognizing that they have been built historically, evolving and differing from each other over time. Therefore, what humankind eats cannot be delineated as a preconceived and universal “recipe” for all people, since it must respect collective attributes – including cultural ones – and individual attributes, which are impossible to establish in a prescriptive manner. However, some basic principles can be identified that should govern the relationship between eating habits, health promotion and disease prevention.

Healthy eating should be based on eating practices that absorb the social and cultural signification of food as a conceptual principle. For us, both as individuals and collectively, eating has both signification and senses, in terms of consuming food (rather than nutrients): food has taste, colour, shape, smell and texture and all these components need to be taken into consideration in nutritional approaches and care.

Nutrients are very important. Food is comprised of them and provides nutrition through them. However, food cannot be reduced to or treated – whether on the collective or the individual level – as a mere means of transporting nutrients. Food has cultural, behavioural and affective significations that must never be underrated. As such, food must also be considered as a source of pleasure and this is a necessary approach in health promotion.

It is fundamental to encourage culturally endorsed eating practices and values, and also to encourage the production and consumption of healthy regional foodstuffs (such as fruit and vegetables), always taking into consideration the social, cultural, behavioural and affective aspects relating to eating practices.

Nutritional status and food consumption closely interact in a multifactoral and synergic manner with other risk factors for chronic non-transmittable diseases. The various risk factors, such as inadequate food, lack of physical activity, tobacco use, need to be approached in an integrated manner, during the development and evolution of a person’s life cycle, with the aim of favouring harm reduction rather than prohibiting choices and options. It is a person’s lifestyle, involving their conscious – or unconscious – actions, reactions and behaviours, that produces a health profile that can be adequate, or not.

It is the State’s responsibility, through its public policies, to promote social and environmental changes on a collective level, in order to encourage healthy choices on the individual or family level. Shared responsibility between society, the private productive sector and the public sector is the way towards building lifestyles the core aim of which is health promotion and disease prevention. The prerequisite of health promotion is, therefore, to increase and promote the ability to take autonomous decisions, by means of access to information, as to the choice and adoption of safe eating (and living) practices.

Healthy eating must encourage moving away from the consumption of unhealthy food towards healthier food, whilst respecting the food-related cultural identities of the populations or communities in question. Prohibitions or imposed limits must be avoided, unless they are part of individual or personalized nutritional guidance for people with specific nutritional diseases or disorders, and which have been correctly diagnosed and explained.

On the other hand, “idolizing” or mystifying a given food item or group of food items because of their nutritional or functional characteristics, should also not be used as a health promotion practice. Nutritionally or functionally rich food items must be valued and naturally included as part of the adopted diet, without the need to mystify one or more of their characteristics, as has been the case of the tactics used by many functional food and nutritional complement advertisements.

Characteristics of healthy eating:

1. **Accessible – physically and financially.** Contrary to popularly held ideas (encouraged in particular by the media), a healthy diet is not expensive, since it is based on natural food or food that has been subject to minimum processing, and which is accessible and produced regionally. Supporting and encouraging family and cooperative farming enterprises to produce and sell healthy products, such as vegetables, greens and fruit, is an important alternative which, in addition to improving food quality, also encourages income generation in terms of both small communities and also public policies on food production.

2. **Tasty –** Lack of taste is another taboo that needs to be demystified, since a healthy diet is, and pragmatically has to be, tasty. Ensuring taste as a fundamental attribute is a necessary investment in promoting healthy eating. Marketing practices often link healthy eating with the consumption of specialized industrialized foodstuffs to the detriment of unprocessed and less refined foodstuffs, such as legumes, other vegetables and greens, fruits and varied grains, which are healthy, tasty, very nutritious, typical and possible to produce in various regions of Brazil, including and above all by smallholders and family farming enterprises.

3. **Varied**: implies encouragement and providing guidance as to the consumption of various kinds of food that provide a wide variety of nutrients, avoiding monotonous food that limits access to nutrients needed to meet the body's needs, so as to ensure an adequate diet.

4. **Colourful**: aims to ensure the variety of food groups included in the diet, principally in terms of vitamins and minerals, as well as the attractive presentation of meals, to please the senses and encourage the consumption of healthy food such as vegetables and greens, fruit, grains and legumes in general.

5. **Balanced**: this refers specifically to ensuring that the food consumed is balanced in terms of quantity and quality in order to achieve adequate nutrition, taking into consideration that such factors vary according to the phase of the person's lifecycle and factors such as a person's nutritional status, state of health, age, sex, degree of physical activity and their physiological condition. It must also be emphasized here that interactions take place in the human body between different nutrients that can be either beneficial or prejudicial to a person's nutritional status and that, therefore, a balance must be maintained between what is eaten.

6. **Safe:** food must be safe from the point of view of avoiding physical, chemical, biological and genetic contamination and possible resulting health risks, either for individuals or for the collectivity. As such, adequate food production, processing and handling practices must be observed, right from the origin of such food, up to and including its preparation, both on a domestic level, in restaurants and food wholesaling and retailing enterprises, with the aim of reducing risks to health and, consequently, to people's nutritional status. Public policies to promote healthy eating must, therefore, ensure proper health surveillance, as well as guidance on adequate food selection and preparation practices.

Finally, it is important to note that while adequate diet and nutrition are basic requirements for ideal human growth and development, they must also be included within a context of integrated actions intended to promote healthy lifestyles, never forgetting that human rights (peace, food, housing, income, education, stable ecosystem, social justice and equality) are indivisible and interdependent.

3. The importance of healthy eating for people living with HIV/AIDS

A healthy diet, adequate to each person's individual needs, improves CD4 T lymphocyte levels, improves intestinal absorption, reduces harm caused by diarrhoea, loss of muscle mass, lipodystrophy syndrome and all the other symptoms which, one way or another, can be minimized or overturned by means of a balanced diet. Providing guidance on healthy eating is a way of collaborating towards improving the quality of life of PLWHA.

Gastrointestinal symptoms are common in PLWHA. Diarrhoea, with its varying degrees of severity, is often associated with enteric parasites. Poor intestinal absorption resulting from gastrointestinal diseases needs to be addressed through adequate nutritional therapy in order to minimize its harmful effects on health.

In order to achieve a healthy diet, one must seek to eat food from all the different food groups on a daily basis (see **Chart 1**). A healthy diet needs to provide carbohydrates, proteins, lipids, vitamins and minerals, which are nutrients necessary for the body to function well. Dietetic diversity is the basis of the concept of healthy eating and implies that no one specific food item – or group of food items – is sufficient to provide all the nutrients needed to achieve good nutrition and therefore guarantee and maintain an individual's health. The characteristics of a healthy diet should always be considered within the context of health and illness.

Chart 1 – Types of nutrients, their characteristics/functions and food that contains them

NUTRIENTS	CHARACTERISTICS/FUNCTIONS	FOOD CONTAINING THEM
PROTEINS	• Complex molecules comprised of amino acids joined together by peptide bonds; • Involved in the formation and maintenance of body and organ cells and tissues	• Milk, cheese, yoghurt, meat (poultry, fish, pork, beef), giblets and pluck, seafood, eggs, leguminous vegetables (beans, soya beans, chick-peas, peas, lentils). • Nuts (Brazil nuts, hazelnuts, cashew nuts, walnuts)
FATS	• Group of organic chemical compounds comprising triglycerides, phospholipids and steroids; • They are alternative sources of energy; • Influence the maintenance of the body temperature; • Transport liposoluble vitamins; • Give taste to food and provide a sensation of satiation.	• Olive oil, oils, margarine (unsaturated fats) • Butter, lard, dairy cream, mayonnaise, bacon (saturated fats) • Industrialized ice cream, hydrogenated vegetable oil
CARBOHYDRATES	• Group of compounds formed of carbon, hydrogen and oxygen; • One of the cheapest sources of energy; • Ensure the efficient use of proteins and lipids.	• Cereals (rice, maize, wheat, oats), flour, pasta, bread, tuber vegetables (potato, sweet potato, yam, cassava). • Simple sugars
VITAMINS	• Organic substances necessary in small quantities for growth and the healthy maintenance of the body; • Depending on their solubility, they are classified as water-soluble: vitamin B complex (B1,B2,B6,B12), folic acid and vitamin C; or fat-soluble: vitamins A,D,E and K; • Essential for transforming energy, although they are not sources of energy; • Help with metabolism regulation; • Promote immune responses, providing the body with protection.	• Greens, vegetables and fruit (such as spinach, vinegar plant, Chinese cabbage, rocket, lettuce, pepper leaves, chicory, heart of palm, tomatoes, beetroot, carrots, pumpkins, south american cherry (*jatobá*), cashew, hog plum, apples, pawpaw, oranges...)
MINERALS	• Inorganic chemical compounds needed in small quantities for human growth, conservation and reproduction. The most well-known are calcium, iron, magnesium, zinc, iodine. • Contribute towards tissue formation; • Help to regulate body processes; • Promote the transmission of nerve impulses and muscular contraction; • Help to maintain acid-base balance.	• Fruit, greens, vegetables and some foods of animal origin (milk, meat, seafood, being sources principally of calcium, phosphorous, iron and zinc), nuts.

Adapted from: *Nutrição Clínica no Adulto*, Lilian Cuppari, 2002.

Other important nutrients for a healthy diet:

Water – is essential for staying alive. It is needed to regulate the body's vital functions, such as digestion, the elimination of metabolites, the workings of the kidneys and the intestines. It controls body temperature, among other functions. A person should drink 2 to 3 litres of water a day.

Dietary fibres - are generally comprised of carbohydrates that the human body cannot digest. They have a regulatory function in that they increase faeces volume, reduce the amount of time food remains in the intestine and promote intestinal microflora. They are distinguished according to their solubility in water, and are classified either as insoluble or soluble. The adequate consumption of fibres as part of daily food intake has been associated with the prevention and/or treatment of diseases such as colon cancer, diverticulitis, obesity, diabetes and dyslipidemias.

Find out more about the diversity of Brazilian natural foods and their principal nutrients in the Ministry of Health publication Regional Brazilian Foods (*Alimentos Regionais Brasileiros*), available at www.saude.gov.br/alimentacao (file can be printed).

Types of Diets

The use of uncommon diets must be preceded by strict scientific evaluation, since any kind of diet that is subject to a large number of restrictions or whereby meals are not planned properly, may result in harm to a person's health.

Low calorie and protein ingestion can result in growth deficiencies in children and adolescents. Lack of vitamins and minerals can interfere with the body's main functions. Reduced amounts of liquid or excess metabolites may lead to kidney or liver dysfunctions, at any phase in a person's life cycle.

It should be stressed that a nutritionist has a fundamental role to play in advising people as to the appropriate choice of foods, as well as in emphasizing the consequences of the exclusion or overvaluing of given food items. Despite their technical role, nutritionists must also take into consideration all other related factors, including religious and symbolic values people attribute to food, and should suggest, in a non-prescriptive manner, adaptations to dietary planning to meet each person's specific nutritional needs.

Chart 2 presents some dietary practices from a technical nutritional point of view, with the aim of facilitating the evaluation and monitoring of the nutritional status of people living with HIV and possible harm to their health, resulting from adherence to uncommon dietary practices. **Chart 3** presents certain dietary fads, commenting on them and indicating aspects to be monitored.

Chart 2 – Types of Diets – characteristics/benefits/deficiencies

DIET TYPE	CHARACTERISTICS	BENEFITS	DEFICIENCIES
Strict Vegetarian (Vegan)	▪ No food of animal origin	▪ Rich in fibres ▪ Absence of animal fats ▪ Rich in antioxidants.	▪ Vitamins: B12 and D ▪ Minerals: calcium, iron and zinc. ▪ Poor in high biological value proteins. ▪ Hypocaloric ▪ Contraindicated for pregnant women, breastfeeding women and children
Lacto-vegetarian	▪ Vegetable and milk based foods	▪ Rich in fibres ▪ Rich in antioxidants	▪ Minerals: iron and zinc ▪ In the event of excess fibre, mineral absorption is compromised
Ovo-lacto-vegetarian	▪ Vegetable, milk and egg based foods	▪ Rich in fibres ▪ Rich in antioxidants	▪ Minerals: iron and zinc ▪ In the event of excess fibre, mineral absorption is compromised
Kosher (Jewish dietary laws)	▪ Meat and milk products are not used in the same meal ▪ Meat is soaked in water and salted before being consumed ▪ Animals such as pigs, crustaceans and fish that feed on decomposing matter are not eaten. ▪ Stipulates rules regarding sanitary conditions when slaughtering animals.	▪ Favours the bioavailability of calcium and iron ▪ Protects its followers from some forms of food poisoning and parasite infection because of rigorous sanitary control when slaughtering animals	▪ Tendency to contain higher levels of cholesterol, saturated fats and sodium.
Macrobiotic	▪ Attributes metaphysical properties to food, ignoring its nutritive ingredients. ▪ It is a stricter diet and contains no products of animal origin or raw food, being comprised basically of cooked cereals. ▪ Recommends that food be thoroughly chewed ▪ Restriction with regard to water.	▪ Rich in fibres ▪ Without animal fats. ▪ Favours digestibility since food is well chewed.	▪ Minerals: calcium, iron and zinc ▪ Vitamins: B (12), D, C, riboflavin ▪ Poor in high biological value proteins. ▪ Hypocaloric

Chart 3 – Dietary fads – characteristics/comments

DIET TYPE	CHARACTERISTICS	COMMENTS
Protein diet (Atkins)	▪ Without foods that are a source of carbohydrates	▪ Nutritionally imbalanced. ▪ Very high level of cholesterol, saturated fats and sodium ▪ Overloads the kidneys and the liver ▪ Low fibre content ▪ Metabolic ketosis owing to the use of proteins and fats as a source of energy. ▪ Probable symptoms include asthenia, nausea, irritability, headache and insomnia ▪ Probable calcium loss through urine – risk of osteoporosis ▪ High cost ▪ Contraindicated for pregnant women
Hypocaloric diets for weight loss	▪ Ingestion of food with low energy values	▪ Generally they are not based on achieving a balance between nutrients, nor on individual needs, and may lead to several kinds of vitamin, mineral and protein deficiencies if adhered to for a long time
Supplements such as "*Shakes*" for weight loss	▪ Fortified supplements used to replace meals	▪ Diverge from normal food ▪ Monotonous ▪ High cost
Supplements for gaining muscle mass	▪ Hyper protein supplements	▪ Promote kidney and liver overloading ▪ High cost

4. Principal aspects of nutritional evaluation and diagnosis

Nutritional evaluation, when well performed, provides elements for preparing nutritional diagnosis, the accuracy of which will depend on available resources and accumulated experience. Knowing a person's nutritional status enables the health professional to understand some of their body's physical ability to withstand illness and also to make a more appropriate nutritional intervention, aimed at recovering and maintaining health.

Various factors are directly or indirectly related to the nutritional status of a person living with HIV/AIDS (PLWHA) and as such the preferable care approach is an interdisciplinary one. Anaemia, malnutrition, diarrhoea, altered emotional state, hypovitaminoses, social isolation, as well as aspects of their personal life and economic, psychosocial and clinical aspects, can modify the expected clinical evolution of HIV/AIDS. See **Chart 4**.

Chart 4 – Risk factors influencing dietary/nutritional conditions of PLWHA

Risk categories	Risk factors
Social	▪ Level of education ▪ Living conditions: number of people living in the household ▪ Food preparation and storage
Economic	▪ Work ▪ Income ▪ Access to food
Cultural	▪ Religion ▪ Habits / Taboos
Family history	▪ Diseases
Prevalent pathologies	▪ Tuberculosis ▪ Opportunistic Infections ▪ Sexually Transmitted Diseases ▪ Non-infectious Chronic Diseases
Medication being taken	▪ ARV ▪ Antituberculostatic medication ▪ For opportunistic infections ▪ Supplements and/or Vitamins ▪ Other medication ▪ Interactions between drugs and nutrients ▪ Interaction with other medication ▪ Adherence
Functional ability	▪ Locomotion ▪ Eyesight ▪ Hearing ▪ Need and availability of a carer
Drug use	▪ Alcohol ▪ Tobacco ▪ Illicit
Emotional condition	▪ Emotional disturbances (depression, anxiety, compulsion, anorexia) ▪ Acceptance of being seropositive ▪ Extent of the diagnosis of the social and family environment
Condition of the digestive system	▪ Mouth ▪ Mastication ▪ Swallowing ▪ Nausea / vomiting ▪ Diarrhoea ▪ Constipation
Physical activities and practicing of sports	▪ Occupation ▪ Type of physical exercise ▪ Frequency and quantity
Anthropometric measures	▪ Body weight and composition (variations)

Based on Hammond, KA, in Mahan, LK; Escott-Stump, S.

Nutritional Evaluation Methods

A variety of nutritional evaluation methods are available, such as **anthropometry** and **body composition**; **biochemical and physical examinations**; as well as methods involving the **evaluation of food consumption,** as detailed in APPENDIX 1. These evaluation methods are complementary and none of them can be considered to be a complete method on their own. For this reason they must be interpreted together. Nevertheless, regardless of access to necessary resources and working conditions needed to perform each method, what is fundamental for obtaining a nutritional diagnosis as close as possible to reality is being aware of the importance of diet and nutrition for people's health as a whole and for the health of PLWHA.

Nonetheless, some issues relating to HIV infection itself are worthy of attention, such as significant changes in nutritional status, ranging from Wasting Syndrome, characterized by involuntary weight loss, weakening, fever and diarrhoea, malnutrition, to a series of metabolic and bodily alterations, such as alterations in glucose and lipid metabolism, alteration to the distribution of body fat, lactic acidosis, osteopaenia, among others.

The physiopathogenic mechanisms of these alterations are not yet well known and the principal hypotheses are the action of HIV itself on the human body and/or the side effects of antiretroviral drugs. However, even if it is proven that these alterations result from ART (Antiretroviral Therapy), the benefits, for some, such as the reduction in the incidence of opportunistic infection, viral load and wasting syndrome, have justified their use.

5. Guidelines for nutritional care

Safe Food

People living with HIV/AIDS, owing to their state of immune deficiency, are more vulnerable to health complaints if they consume contaminated food. Attention must be paid to the hygiene and sanitary conditions in the daily lives of these people, and guidance must be given as to the necessary care with the selection, hygiene, handling, preparation and conservation of food.

Several opportunistic diseases find their way into the body through a person's mouth, both through contaminated food and also through contact with unclean hands and utensils.

Care with food handling and safety must be considered:

A. In relation to the domestic environment:

- Adequate kitchen hygiene conditions.
- Meals should be eaten in a well lit and well ventilated place.
- Keep the household environment clean, dry and ventilated.
- Care with external hygiene conditions around the household is also important.

B. In relation to the person who handles the food:

- Personal hygiene (bathing regularly, wearing clean clothes, adequate teeth cleaning).
- Washing hands with water and soap before and during food handling.
- Using a clean apron, covering the hair with a net or kerchief.
- Not using nail varnish and keeping nails trimmed and clean.

C. In relation to the food itself:

- Cooked and raw food should not be mixed. Raw food can contain micro-organisms that contaminate cooked food (cross contamination).
- Fruit and vegetables must be washed in running water.
- The best way of protecting food is to cook it, since pathogenic micro-organisms cannot resist high temperatures.
- Food that is eaten raw (fruit and vegetables) must be disinfected by being left to soak in a solution of: 1 litre of water + 1 soup spoon of bleach (or 2 drops of sodium hypochlorite in 1 litre of water) for 30 minutes. Do not rinse. These are very efficient ways of disinfecting raw food.
- Food should be prepared and consumed as quickly as possible. Once food is ready for consumption it should not be left unrefrigerated for more than 2 hours. Pathogenic micro-organisms multiply very easily at room temperature, causing food poisoning.
- Food that has passed its sell by date must not be consumed.

D. In relation to places where food is sold:

- **Restaurants, snack bars and other places that sell food ready for consumption:**
  - Such places must be clean and have perfect hygiene conditions. Staff, especially those who handle food, must be wearing clean clothes, aprons, hairnets, masks and gloves.
  - In places where cold food such as salads is displayed, it must be kept under proper conditions of refrigeration.
  - Cutlery must be wrapped in individual plastic wrappers to ensure hygiene is preserved. Plates and trays must be clean and left in an appropriate place.
  - In cases of doubts about food preparation, the consumer has the right to visit the kitchen, storerooms, etc.

- **Butchers' shops, supermarkets, bakeries and the like:**
  - Food must be perfectly frozen, hard to the touch, and the packaging must not show signs of the food having softened or being damp. Water, excess ice or misshapen packaging indicate that freezers have been switched off for a given period of time, principally at night, thus compromising food conservation.
  - Bacon slicers, knives, refrigerators, refrigerated counters, shelves, or display units must not show signs of rusting or other signs of bad conservation.
  - Floors and walls must be clean and in a good state of repair.

- Staff must be wearing clean uniforms that are adequate for the job in question. If they handle food their uniforms must comply with the rules stated above.

Waterborne and foodborne diseases

Diseases caused by food are a problem that affects many parts of the world. In Brazil, the incidence of diarrhoea, fever, bacterial contamination, diseases caused by virus and intoxications caused by food are still quite high. Deficient conditions of basic sanitation, associated with inadequate hygiene habits and shortcomings in the control of food safety (production, transport, storage and commercialization), result in contaminations responsible for a large number of illnesses and even deaths.

The colour, smell, taste and texture of contaminated food do not always appear to be altered. However, changes to the natural characteristics of food items can indicate that they are improper for consumption. Foodstuffs with damaged packaging, outside their sell by date or showing visible signs of alteration should never be bought, nor should vegetables or fruit that is discoloured, mouldy, squashy or bruised. Leafy vegetables must be of their characteristic colour, free from yellowing or signs of age. Meat must have its characteristic colour, smell and aspects. Cereals and leguminous vegetables must not be mouldy or maggoty.

Chart 5 – Basic list of food types and how to conserve them

FOOD	PERISHABLE	SEMI-PERISHABLE	DURABLE
TYPES	Chicken, meat, fish, vegetables, fruit, eggs, cream cheese, yoghurt, ready meals (cooked spaghetti, rice, beans, etc).	Jelly, marmalade, jam, condensed milk, semi-ripe cheese, etc.	Rice, beans, cornflour, sugar, grains in general, tinned food.
CARE	Go off easily. Must be kept in a refrigerator or freezer.	Must be kept in a refrigerator, but last longer.	Last longer. Must be kept in a dry ventilated place, away from heat and damp. Once opened the wrapper should be kept well closed to avoid dampness

Nutritional deficiencies of People Living with HIV/AIDS

The malnutrition and undernourishment that affect PLWHA are basically marasmic (protein-energy malnutrition – PEN), characterized by the lack of carbohydrates and proteins. This occurs because of inadequate ingestion, because of the hypermetabolic characteristics of the disease, or both these factors. In such cases an accentuated loss in body fat can be observed whilst muscular mass is preserved to a certain extent. Loss of muscular mass may become accentuated if undernourishment worsens and becomes malnutrition. Weight loss of more than 10% of normal body weight in a short space of time is frequently observed in AIDS cases and coincides with the progression of the disease. The prevalence of weight loss has also been observed in asymptomatic people, although its progression is slower.

Hypovitaminosis A – is directly related to the immune system, and its consequences include greater susceptibility to infections. It may also indicate possible drops in CD4 T lymphocyte levels. Low serum plasma retinol levels (vitamin A) in HIV+ patients, whether they are symptomatic or not, have been constantly reported in diverse studies on the disease, even in populations with adequate ingestion. Studies have demonstrated a negative prognosis in the first two years of the manifestation of AIDS in cases of acute hypovitaminosis A.

There are various determinants of vitamin A serum levels: the ingestion of carotenoids and pre-formed vitamin A, intestinal absorption, hepatic retention and abnormal losses owing to a variety of factors. Constant diarrhoea makes it difficult for carotenoids and vitamin A to be absorbed and this worsens the problem. Measles and pneumonia are also associated with hypovitaminosis A, as well as with harm to the respiratory and digestive tracts, and mucous surfaces.

This matter is still subject to controversy; despite the correlation it still has not been possible to determine whether immunosupression provokes hypovitaminosis A directly, or if hypovitaminosis A is a factor that contributes towards immunosupression. Therefore, this new approach, albeit preliminary, demonstrates that vitamin A nutritional status in relation to HIV infection is very important and that supplements can be an intervention strategy in such cases. Given that vitamin A is associated with organic immunological factors, even

though international consensus does not exist as to the process that results in hypovitaminosis A, the consumption of food rich in vitamin A is recommended as an adequate preventive procedure.

Anaemia – is a clinical condition relatively common to PLWHA, whether they are symptomatic or not, and is related to protein-energy malnutrition. Studies show that anaemia appears not to be directly related to low iron intake. Such alterations to the nutritional status are related to anorexia, poor absorption associated with diarrhoea, metabolic alterations provoked by opportunistic infections, with an accentuated increase in the amount of energy burned by the body, which may or may not be associated with fever, and by the very hypermetabolic characteristics of HIV infection.

Zinc deficiency – this nutritional deficiency directly affects the palate and the sensorial perception of food. Although there are no studies that directly associate zinc deficiency with anorexia in PLWHA, providing a supplement through food rich in zinc (e.g.: fish, meat in general, wheat germ, brewer's yeast, pumpkin seeds, eggs and others) may help to improve the palate and encouraging eating.

Vitamin B12 deficiency - Perkins et al (1995) reported that the deficiency of this vitamin could be a potential cause of depression. Cyanocobalamin (vitamin B12) is found in products of animal origin. When considering the epidemiological profile of PLWHA, pauperization is a factor that has grown over time. The consumption of products of animal origin in populations with low purchasing power is generally insufficient. Monitoring vitamin B12 intake is important, given that its deficiency can worsen states of organic depression.

Interaction between drugs and food

Antiretroviral Therapy (ART) is recommended for all people infected with HIV and who are symptomatic, regardless of their CD4+ T-cell count, and also for those who are asymptomatic and whose CD4+ T-cell count is less than 200/mm^3. Therapy should also be considered when the CD4 count is between 350 and 200/mm^3. The aim of ART is to delay the progression of immunodeficiency and/or restore immunity as much as possible, thus increasing the length and the quality of life of the infected person (*Ministério da Saúde*, 2004). However, some adverse effects may occur through taking ART, such as: alterations to glucose metabolism, dyslipidemia, lipodystrophy, lactic acidosis, alterations to bone metabolism (Rodriguez, 2002).

Some ARV and drugs used to treat opportunistic infections can produce side effects that interfere with nutrient intake, digestion and absorption, possibly causing harm to the individual's nutritional status (Mahan, 2002). Furthermore, when nutrients interact with these drugs, they may by prejudicial to the effectiveness of the therapy (Moura, 2002).

Because of the possible adverse reactions of the human body resulting from medication such as ARV, antituberculostatic drugs, medication for opportunistic diseases, and their interaction with food, there are specific recommendations to be observed. **Charts 6, 7 and 8** have been compiled with the aim of facilitating the visualization of these processes, recommending the most appropriate form of administering the medication and suggesting dietary procedures, if necessary.

Chart 6 – Description of antiretroviral drugs / Interactions with food / Recommendations

	DRUG	INTERACTION WITH FOOD	POSSÍBLE ADVERSE REACTIONS	Recommendations	
				Administration	Dietary/Supplement
NRTI	Zidovudine (AZT)	▪ Fat rich diet reduces drug absorption.	▪ Anaemia ▪ Zn and Cu depletion ▪ D/N/V/A/LA/HS	▪ With or without food, avoiding high-fat foods	▪ Zn supplement may be necessary
	Abacavir (ABC)	_____	▪ Anaemia ▪ Mild hyperglycaemia ▪ D/N/V/A/HS ▪ LA: greater in women and the obese	▪ With or without food. ▪ With food, GI irritation may reduce	
	Didanosine (DDI)	▪ Food reduces drug absorption.	▪ Anaemia ▪ Increased uric acid ▪ Increased triglycerides ▪ Increased blood glucose ▪ Increased AP ▪ D/N/V/LA/HS/LA/PN	▪ 30min before or 2h after meals. ▪ Chew the tablet thoroughly, or dissolve in water. ▪ Do not use with antacids containing Al or Mg.	▪ Avoid alcohol (increases incidence of pancreatitis)
	Tenofovir	_____	▪ LA/HS	▪ With high-fat food.	_____
	Stavudine (D4T)	_____	▪ Anaemia ▪ PN/HS/LA/LA/A/D	▪ With or without food.	
	Lamivudine (3TC) + AZT	_____	▪ D/N/V/A ▪ May cause LA/HS, but it is among the safest with regard to this effect.	▪ With or without food.	
NNRTI	Efavirenz (EVF)	▪ Fatty food increases drug absorption.	▪ Dyslipidemia ▪ D/N	▪ With or without food. ▪ Avoid high-fat food.	▪ Alcohol consumption is contraindicated. ** ▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.
	Nevirapine (NVP)	_____	_____	▪ With or without food.	▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.
	Ritonavir (RTV)		▪ Dyslipidemia ▪ Increased blood glucose ▪ Increased uric acid ▪ Diabetes ▪ Lipodystrophy ▪ D/N/V/A	▪ With food.	▪ Alcohol consumption is contraindicated. ▪ Reduce purines. ▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.
	Indinavir (IDN)	• Food decreases drug absorption	▪ Nephrolithiasis ▪ Increased blood glucose ▪ Diabetes ▪ Lipodystrophy ▪ D/N/V	▪ 1h before or 2h after meals, taken with water and/or tea. ▪ Can be taken with a small snack (with little protein and no fat: bread and jam, cereal flakes	▪ Drink at least 1.5 litres of water a day, preferably when taking the drug. ▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.

	DRUG	INTERACTION WITH FOOD	POSSÍBLE ADVERSE REACTIONS	Recommendations	
				Administration	Dietary/Supplement
PI	Nelfinavir (NFN)	▪ Food improves drug absorption.	▪ Dyslipidemia ▪ Increased blood glucose ▪ Diabetes ▪ Lipodystrophy ▪ D/N	▪ With foods.	▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.
	Saquinavir (SQV)	▪ Without food there is little drug absorption.	▪ Dyslipidemia ▪ Increased blood glucose ▪ Lipodystrophy ▪ Diabetes ▪ D/N	▪ With a full meal. ▪ Generally administered together with RTV or LPV.	▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.
	Lopinavir (LPV) + RTV	▪ Food improves drug absorption.	▪ Dyslipidemia ▪ Increased blood glucose ▪ Diabetes ▪ Lipodystrophy ▪ D/N/V	▪ With food.	▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.
	Amprenavir (APV)	▪ Fatty food increases drug absorption.	▪ Dyslipidemia ▪ Increased blood glucose ▪ Diabetes ▪ Lipodystrophy ▪ D/N/V	▪ Administered together with antacid (1hour interval). ▪ With high-fat food.	▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea. ▪ Do not administer together with vitamin E.
	Atazanavir (ATZ)	_____	▪ Small GI intolerance	▪ With food.	▪ Do not administer together with St. John's wort (Hypericum), garlic capsules, Ginseng, Ginkgo biloba, Echinacea.

NRTI – Nucleoside Reverse Transcriptase Inhibitors, NNRTI – Non-Nucleoside Reverse Transcriptase Inhibitors, PI – Protease Inhibitor, D – diarrhoea, N – nausea, V – vomiting, A – anorexia,
GI – gastrointestinal, AP –arterial pressure, LA – lactic acidosis, HS – hepatic steatosis, LA – lipoatrophy, PN – peripheric neuropathy

Chart 7- Description of antituberculostatic drugs / Interaction with Food / Recommendations

Drug	Interaction with Food	Possible Adverse Reactions	Recommendations	
			Administration	**Dietary/Supplement**
Rifampicin (RMP)	▪ Food reduces absorption.	▪ Increased uric acid. ▪ Reduced vitamin D. ▪ Diabetics taking Sulphonylurea: Increases blood glucose.	▪ 1 hour before or 2 hours after meals, with a glass of water. ▪ Can be taken with a small amount of food if GI irritation occurs.	▪ Reduce Purines. ▪ Vitamin D supplement may be necessary. ▪ Avoid alcohol in order to reduce toxicity.
Isoniazid (INH)	▪ Food reduces absorption. ▪ Interferes with vitamin D and B_6 metabolism	▪ Increased blood glucose. ▪ Peripheric neuropathy. ▪ Pellagra.	▪ 1 hour before or 2 hours after meals. ▪ Can be taken with a small amount of food if GI irritation occurs.	▪ Pyridoxine supplement (25-50mg/day). ▪ Avoid food rich in tyramine and histamine: mature cheese and food containing mature cheese (e.g. pizza), smoked meat and fish, smoked sausage, salami, mortadella, meat extract, soya, soy sauce, tofu, wine.
Pirazinamid (PZA)	_____	▪ Increased uric acid. ▪ Do not use in cases of acute gout.	▪ Single daily dose always at the same time, generally combined with other antituberculosis drugs.	▪ Reduce purines.
Streptomycin (SM)	_____	▪ Risk of nephrotoxicity.	▪ IM or IV	▪ Drink 1.5 to 2 litres of water a day.
Ethambutol (ETB)	_____	▪ Increased uric acid. ▪ Contraindicated in cases of kidney failure.	▪ Administer with milk or food to reduce gastrointestinal intolerance.	▪ Reduce purines.
Ethionamid (ETH)	_____	▪ Difficultly in controlling diabetes. ▪ Peripheric neuritis.	▪ Administer with food to reduce GI intolerance.	▪ Pyridoxine supplement (50-100 mg/day) to avoid Peripheric Neuritis.

Chart 8 – Description of the main drugs for prophylaxis and/or treatment of opportunistic infections / Interaction with food / Recommendations

Drug	Interaction with Food	Possible Adverse Reactions	Recommendations	
			Administration	Dietary/Supplement
Amphotericin B	_____	▪ Loss of potassium. ▪ Anaemia. ▪ Increased blood glucose.	▪ IV	▪ Increase potassium intake. ▪ Ensure plenty of water is drunk ▪ Iron rich diet, in the case of Anaemia caused by lack of iron.
Azitromicin	_____	_____	▪ Capsule or suspension: 1 hour before or 2 hours after meals. ▪ Do not use with antacids or supplements containing Al or Mg.	_____
Ketoconazole	▪ Food increases absorption. ▪ Cola based soft drinks increase absorption by 65%	_____	▪ Take with food to increase absorption.	▪ Alcohol consumption is contraindicated. ▪ Take Ca, Mg supplement or antacid separately for 2 hours.
Claritromicin	▪ Food delays absorption but does not reduce it.	▪ May reduce AZT levels	▪ Administer with or without food.	.
Dapsone	_____	▪ Do not use in cases of severe anaemia or haemolytic anaemia ▪ Reduces haemoglobin ▪ Increased blood glucose	▪ Administering with food reduces gastric irritation.	▪ Take prophylactic doses of Fe, vitamin C and folic acid supplements.
Fluconazole	_____	▪ Precautions: Check for probable hypoglycaemia in diabetic patients taking Sulphonylurea	▪ Administer without food. ▪ With food if gastrointestinal irritation occurs.	_____
Itraconazole	▪ Food increases absorption.	▪ In cases of diabetes: increases the effect of oral hypoglycaemiants.	▪ With a full meal to increase absorption, accompanied with acidic drink (orange juice, cola based soft drinks)	▪ Take Ca, Mg supplement or antacid separately for at least 2 hours.
Sulphadiazine	No significant interaction.	• Reduces the action of oral hypoglycaemiants. • Anaemia • Leucopoenia • Thrombocytopaenia		
Endovenous Pentamidine	_____	▪ Hypoglycaemia followed by Hyperglycaemia. ▪ May cause or worsen Diabetes. ▪ Anaemia.	▪ IM, IV or aerosol	▪ Ensure plenty of water is drunk ▪ Iron rich diet, in the case of Anaemia caused by lack of iron.
Sulphamethoxazole + Trimethoprim	No significant interaction.	▪ Interferes with Folate metabolism. ▪ Haemolytic Anaemia. ▪ Do not use in cases of Megaloblastic Anaemia caused by folate shortage. ▪ Diabetic patients taking Sulphonylurea: hypoglycaemia.	▪ 1 hour before or 2 hours after meals with 1 glass of water. ▪ With food if gastrointestinal irritation occurs.	▪ Ensure that at least 1.5 litres of water a day is drunk to avoid urine crystals. ▪ Folate supplements may be necessary.
Nistatin	No significant interaction.	_____	▪ Tablets: with foods ▪ Oral suspension: retain in the mouth for several minutes, gargling and then swallow.	_____

Drug	Interaction with Food	Possible Adverse Reactions	Recommendations	
			Administration	Dietary/Supplement
Gancyclovir	———	▪ Anaemia ▪ Hypoglycaemia	▪ IV	▪ Ensure plenty of water is drunk. .
Acyclovir	———	▪ Nephrotoxicity	▪ Oral: With food and 1 glass of water. ▪ IM / IV	▪ Drink 1.5 to 2.5 litres of water a day.

O – Oral IM – intramuscular IV – intravenous

Interaction between ARV and phytotherapeutic medication

Garlic has been used in medicine for at least 5,000 years. It has antibiotic, antiviral and antifungal properties, as well as anticarcinogenic, antihypertensive and anticholesterolemic effects, in addition to strengthening immune activity by stimulating the proliferation of T cells. Researchers from several different countries have demonstrated that the use of garlic oil supplements is prejudicial to absorption, principally the absorption of Protease Inhibitors (Indinavir, Nelfinavir, Ritonavir, Saquinavir), lowering the concentration of drugs in the blood. Research has proved that taking two 5mg capsules of pure garlic oil, twice a day during three weeks, reduces drug concentration between 51 and 54%. Following tem days without taking garlic (washout), plasmatic concentration was still below 35%.

Saint John's wort (*Hypericum perforato*) is indicated for states of mild depression, sleep disturbances, exhaustion, headaches, muscular pains, melancholy, anguish and anxiety, and is widely used. National Institutes of Health (NIH) studies in America show that this herb reduces the plasmatic concentration of protease by 57% on average and by 81% at the 8h peak, in volunteers not infected by HIV.

This is because garlic, St. John's wort, ARV drugs and other drugs use the same pathway for metabolism in the liver, the Cytochrome P450 Enzyme System (CYP3A4), which is responsible for more than 90% of hepatic metabolism. These interactions are rarely considered as being the cause of side effects and/or treatment failure, and are generally not included as part of patients' medication records. The studies showed, however, that such interactions can occur, having considerable consequences from a clinical point of view, especially in terms of drug resistance, which can develop rapidly in the presence of suboptimal antiretroviral serum values.

Therefore, taking St. John's wort, garlic oil, ARV drugs (protease inhibitors and non-nucleoside reverse transcript inhibitors) and other drugs (cyclosporin, digoxin, methadone, theophylline and warfarin) at the same time cannot be recommended until further data is available. On the other hand, eating garlic cloves raw, cooked or fried or as part of other dishes can be continued as usual.

Adverse effects of ART and nutritional management

The quality of life and the well-being of PLWHA who are taking ART can be affected by a variety of situations, which as far as possible have been overcome, thus increasing their life expectancy. However, ART can produce undesirable secondary effects such as lipodystrophy syndrome which, because of the uncertainty of its diagnosis and management, has challenged health professionals involved in this area.

Lipodystrophy Syndrome

This syndrome is characterized by alterations in the distribution of body fat, whereby Lipoatrophy can be observed on the face and limbs (upper and lower), at the same time as fat accumulates in the central region (abdomen, chest and back of the neck). Its aetiopathogeny is still uncertain, there is no standardized diagnostic method and its exact prevalence is unknown. The significance of this condition arises because of its repercussion and impact (physical, psychological and clinical), and it can be associated with premature atherosclerosis, diabetes mellitus and other diseases. The onset of this condition is considerably variable. Clinical practice has observed the occurrence of symptoms between seven months and two years after the commencement of treatment with protease inhibitors (PI), which are one type of drugs used in antiretroviral therapy. Nevertheless, it may take longer for the symptoms to appear, or they may never appear. Although the symptoms may not be complete, the majority of patients taking ART do manifest some sort of lipodystrophy, to a greater or lesser extent.

The principal alterations with regard to the alterations to the **distribution of body fat** relative to this syndrome are:

- **the accumulation of fat** (abdominal obesity, increase chest circumference, mammary hypertrophy, increased fat around the neck, buffalo humps and generalized or localized lipomas);
- **loss of body fat** from the face, buttocks and legs; and
- **mixed alterations.**

Other metabolic alterations may also coexist which may or may not be related with this syndrome, such as: **alterations in glucose metabolism** (peripheral insulin resistance, glucose intolerance and *diabetes mellitus)***;**

alterations in lipid metabolism (hypertriglyceridemia, hypercholesterolemia – increased low density lipoprotein - LDL-c and reduced high density lipoprotein – HDL-c) **and increased apoliprotein B.**

It is still not known whether a relationship exists between the redistribution of body fat and glucose and lipid metabolic alterations, that is to say, whether they are related phenomena or whether they coexist in some individuals. Nutritional control, with periodic examinations and guidance as to the best and most adequate diet, helps to control the loss of fat mass and the formation of muscle tissue.

As Lipodystrophy Syndrome is still a recent phenomenon, standardized clinical management of it does not yet exist. Nevertheless, several general recommendations aimed at preserving individuals' health appear to have a quite positive effect, namely: a healthy diet, full adherence to treatment, regular physical exercise, as well as care with emotional health, especially states of dispiritedness and depression.

Ensuring healthy eating practices must be especially emphasized. Avoiding fatty foods, fried food, food that contains saturated and hydrogenated fat and eggs (yokes), helps to control cholesterol and preserve the individual's health. Excess desserts, sweet food and starchy food increase triglyceride levels and glucose in the bloodstream.

Glucose metabolism alteration management

Diabetes and insulin resistance must be controlled by means of specific diets, with reduced intake of simple carbohydrates (sugars), giving preference to complex carbohydrates (such as bread, pasta, potatoes, cassava) in a controlled and planned manner. In cases of kidney or liver complications, there must be rigorous control of protein intake in food.

There are various examples of dietary interventions being important in the control of morbidities, whether or not they are associated with HIV infection. To be effective, diets must be accompanied by a professional person qualified in this area, to ensure that the diet is adapted to each patient's individual needs.

Lipid metabolism alteration management

Dietary control, with periodic examinations and indications of the best and most adequate foods and eating habits helps to control fat mass loss and the formation of muscle tissue. A healthy diet plays an important role in keeping a person healthy.

High levels of cholesterol and triglycerides indicate that eating habits must be modified. Some specific nutritional measures, together with medical control and the control of medication (if necessary), need to be taken in order to reduce dyslipidemia and maintain the patient's overall health. Eating healthily, eating more fibre-rich food and avoiding other types of food is necessary for the recovery of the patient's clinical condition.

It is specifically recommended to reduce the intake of simple carbohydrates (sugars) in cases of high levels of triglycerides and glucose, and the reduction of food rich in saturated and hydrogenated fats (such as fatty cuts of meat, savouries, ice cream, chocolates...) as a cholesterol control strategy. In order to control excess weight, having a healthy diet must also be encouraged.

Bone metabolism alteration

Alterations to the bone remodelling process have been described, whereby it may contribute to bone mass loss, such as osteopaenia, osteoporosis and osteonecrosis. A clear relationship does not exist between ART use and the appearance of osteopaenia/osteoporosis.

Currently the management of this alteration is focussed on prevention, recommending regular physical exercise, the adequate intake of calcium and vitamin D, healthy eating and exposure to the sun, as well as the traditional treatment of osteoporosis with medication, if necessary.

Hyperlactatemia and lactic acidosis

This results from mitochondrial toxicity caused by the use of nucleoside reverse transcript inhibitors (NRTI). It refers to a clinical syndrome characterized by increased lactate production, with or without metabolic acidosis. The signs and symptoms can vary from asymptomatic hyperlactatemia to extreme tiredness, sudden weight loss, nausea, vomiting, abdominal pains, breathing difficulties, liver failure and arrhythmia. Therapeutic intervention consists in considering the interruption of NRTI use and metabolic management.

Vitamin and/or mineral supplements

A variety of manuals aimed at providing nutritional guidance for PLWHA, especially those produced internationally, advise and even recommend the daily intake of vitamins and mineral in the form of capsules or tablets. This is based on the principle that AIDS is a hypercatabolic disease which leads to the depletion of many vitamins, minerals and organic proteins. This, however, can be a dangerous procedure. In the majority of cases, vitamin and mineral overdoses have toxic effects on the body, in addition to making ARV absorption more difficult.

Health professionals must check to see whether patients are having problems in absorbing nutrients contained in their food. Diarrhoea, whether chronic or acute, prevents or hinders the absorption of much of the nutrients contained in food and in this situation it is fundamental to equilibrate the patient's bodily functions and prevent morbidity. The use of nutritional supplements should be recommended subject to criteria, if the patient's physical recovery is still in jeopardy.

The pharmaceutical industries, which supply food products and food supplements, offer several options aimed at patient recovery, at various different stages of physical deterioration. When the nutritional harm to the patient's health becomes difficult to overturn, the use of such supplements is of vital importance. Health professionals, nutritionists or doctors must not recommend their indiscriminate use, but rather must assess the need to take supplements and give guidance on the most appropriate form of using them.

6. Guidance on food and nutrition

Eating habits are a very complex issue and can be subject to personal, psychological, cultural, social, family and religious influences. Health professionals should, therefore, bear this in mind and adopt a broad scope and a democratic approach when giving guidance, listening with sensibility and proving clear orientation on dietary issues.

Nutritional guidance is currently understood as a gradual process whereby PLWHA adhere to changes in eating habits and lifestyle as they become aware of the relationship between food and health, thus taking on joint responsibility for their treatment.

A counsellor should accept PLWHA as they are, taking into consideration their feelings, doubts, potentials and limitations, before proposing changes to their eating habits. This initial stage is vital to the success of the guidance, since it strengthens trust and favours awareness-raising when there is a need to change habits. The counsellor needs to concentrate on a small amount of information in order to achieve the best understanding of and adherence to dietary treatment.

People generally benefit by becoming the subject of their own learning experiences and resist when they feel a posture of imposition on the part of the health professional. They respond better to their own internal motivating factors: self-esteem, fulfilment at work and quality of life.

As part of nutritional counselling, the goals to be attained should be set jointly, whether they are short-term or long-term ones, starting with a planned meeting with clear objectives. Tone of voice and the expression of ideas can, sometimes, reveal how clearly the proposals put forward have or have not been understood. Feelings and intervals of silence during the conversation can be used to reorganize thoughts and express them carefully, so as not to intimidate the client. Observing, asking, listening to the individual's concerns, making questions that facilitate reflection and the overcoming of difficulties, providing information, emotional support and helping with decision making with regard to adopting measures in the quest for a better quality of life are all fundamental aspects of this dialogue. Shortly after the consultation has finished, the principal aspects addressed must be recorded and care must be taken to tell the multidisciplinary team about the main issues covered.

Judgements by the counsellor, together with preconceived ideas and lack of friendliness, are obstacles to the progress of the relationship of help. The inclusion of the family or other carers during the nutritional counselling process may facilitate adherence to treatment. Food, in addition to being a factor that contributes towards the recovery of physical well-being, is above all a source of pleasure, essential for preserving quality of life. Whenever possible, educational material and demonstrations should be used, giving examples of the individual's habitual practices in order to illustrate and facilitate his or her understanding, such as posters, photos and drawings about the food groups and their nutritional content, adapting this to the individual needs of each person.

In the case of someone living with HIV/AIDS, an episode of food poisoning can cause even more harm to their immunity. Guidance should therefore be given about care to be taken when selecting food and cleaning, preparing and conserving it properly and how this helps to achieve a balanced diet, as well as preventing infectious diseases spread through food or the environment.

The possibility should be taken into account of the occurrence of adverse effects as a result of antiretroviral therapy, such as morphological changes (body mass depletion, lipodystrophy, obesity) which may increase anxiety, affect self-esteem or cause depression, thus hindering adherence to treatment even more.

Finally, in order to achieve success with **Nutritional Counselling**, the strategy adopted by the health professional must include constant motivation, encouraging and praising each small step of progress made.

BEHAVIOURAL ASPECTS OF THE PROMOTION OF HEALTHY EATING

A habit created through daily practice

Eating correctly is a kind of "exercise", whereby PLWHA need to be encouraged to see the need to eat, the advantages of a healthy diet, the importance of eating regularly at fixed times, as something that becomes a habit. Motivating the patient is the first step. Encouraging him or her to keep to regular feeding habits is the next

step after that. By perceiving the importance food has in preserving a person's health, the patient will adapt his or her habits to his or her feeding needs.

Frequently PLWHA taking ART refuse to eat first thing in the morning because of the indisposition associated with their medication. Prolonged periods of fasting increase the sensation of indisposition, as well as inhibiting the sensation of "hunger", thus leading to an increase in the habit of fasting. This is harmful to the patient's health and he or she must be motivated to eat. Small changes in eating habits, such as eating smaller meals more often, can stimulate the appetite, which is necessary for the patient to eat regularly.

The following are some steps that outpatient health professionals can take with the aim of encouraging a change of habits:

- Show the patient how eating well can help to maintain preserve their health.
- Encourage adhesion to changes in eating habits.
- Encourage the patient to eat, with a gradual increase in calorie levels, when necessary. Do not expect a PLWHA to be able to increase their consumption of calories rapidly, as he or she will need time to adapt.
- Always use encouraging words that praise the person's efforts.
- Encourage the taking of small meals several times a day. The ideal is to have 3 main meals interspaced with 3 small snacks per day.
- Meal times must be felt to be a moment of pleasure and not of suffering. Do not force the person to eat. Rather he or she should be encouraged with kind gestures and words. It should be recommended to family members that they avoid arguments, discussions or subjects capable of causing tension during meals.
- Encourage family and friends to eat with the patient. Stress the importance of social reinsertion in helping treatment.
- Discourage the person from eating while watching TV or doing any dispersive activity. A meal should be eaten with the aim of having pleasure from eating and tasting the flavour of the food.
- Listen to the person. Often difficulty in eating is concealing other problems that need to be addressed by the health professional.

TEN STEPS TO IMPROVE QUALITY OF LIFE OF PLWHA

1. Encourage the person to make eating a pleasurable activity, in the company of family or friends, avoiding having meals on their own. Ideally the person should do everything to avoid stress, depression, loneliness and isolation. Encourage participation in social activities, seeking support groups.
2. Encourage the person to eat at regular times, several times a day, even if they're not hungry. The ideal is to have 3 main meals interspaced with 3 small snacks per day. They should seek to eat healthy, varied and tasty food.
3. Encourage the person to eat fruit, vegetables and greens every day, preferably those that are in season. They should eat them rationally, seeking to make the most of vitamins and minerals.
4. Ideally, the person should eat animal or vegetable foods that are sources of protein, at least once a day, four times a week. Proteins are important for preserving the health of PLWHA.
5. Encourage the consumption of fibres and whole foods, as they are rich in B complex vitamins and minerals. Ideally, refined flour and polished rice should be replaced with whole foods, since they preserve the nutrients better. Brown rice and bread, grains such as beans, chick-peas, fruit, vegetables and greens are excellent sources of fibre.
6. Encourage the reduction of refined sugar in food, as well as the reduction of sweetened soft drinks and sweet things in general.
7. Recommend reduction in salt use. The ideal is to use herbs and seasoning to heighten the taste of food.
8. Ideally, animal fats should be avoided. Use olive oil or vegetable oil when cooking and to dress salads.
9. Encourage the patient to drink at least 2 litres of water a day, avoiding liquids during main meals.
10. Encourage the patient not to drink alcoholic beverages, to smoke or use drugs of any kind, since they can be harmful to his or her health as a whole and can be prejudicial to the action of ARV therapy.

NUTRITIONAL RECOMMENDATIONS FOR ALLEVIATING CLINICAL SYMPTOMS OF ANTIRETROVIRAL MEDICATION SIDE EFFECTS

Taking ARV can cause side effects that castigate HIV/AIDS patients, since the symptoms are constant and daily and can often lead to treatment abandonment. Furthermore, opportunistic infections in the oral cavity make regular eating difficult, causing pain and swallowing difficulties. Nutritional strategies can be used to minimize such discomfort.

The following are recommendations with regard to eating in the event of the appearance of these symptoms in PLWHA:

Nausea

- Nausea in the morning can be overcome by eating dry biscuits, like cream crackers, as soon as the person wakes up, and without drinking any liquids. Eat one or two biscuits, according tolerance.
- Sucking ice cubes can reduce the symptom.
- Eat small meals several times a day. Eating large amounts of food may worsen the symptom of nausea.
- Do not drink liquids during meals. It is best to drink one hour before or two hours after a meal.
- Avoid hot food; give preference to cold food or food at room temperature.
- Avoid fat-rich foods, fizzy drinks, milk, coffee and excess condiments.
- Void eating very sweet food. Blander food is easier for the patient to hold down.

Vomiting

- At the first sign of vomiting, the person should drink small quantities of oral rehydration solution (1 soupspoon approximately every 5 or 10 minutes). They can also take small sips of isotonic drinks. The liquid should be drunk chilled. Recipe for homemade oral rehydration solution: 1 soupspoon of sugar + 1 pinch of salt in a glass of filtered or boiled water.
- Ideally, small meals should be eaten several times a day.
- Do not lie down after eating as this may facilitate vomiting. If the person wants to rest, they should do so in a sitting position or with their back supported.
- In this situation, the person should avoid eating their “favourite” foods, since after the symptom has passed the sensation of feeling ill will remain associated with the favourite food and will be a cause of repulsion.
- Suck ice cubes and sip small amounts of chilled drinks several times a day.
- Avoid very hot food and prefer cold food or food at room temperature.
- Avoid fat-rich foods, fizzy drinks, milk, coffee and excess condiments.
- Avoid eating very sweet food.
- Even with vomiting, encourage regular feeding, prioritizing cooked blander tasting food, since blander food is easier to hold down.
- Do not drink liquids during meals. Liquids can be drunk 1 hour before or 2 hours after meals.
- The person should be advised to seek medical care, in order to get the correct treatment.

Indigestion

- Some foods are not easily digested, such as fats. Therefore fat-rich foods should be avoided, especially those of animal origin.
- It is better to eat white meat, foul or fish. Red meat can be consumed in moderation.
- Ideally food should be balanced. It is important to eat various kinds of food, in small portions, several times a day.
- Do not drink liquids during meals. Liquids can be drunk 1 hour before or 2 hours after meals.
- Do not lie down after eating. If the person wants to rest, they should do so in a sitting position or with their back supported.
- Indicate the use of digestive teas after meals, such as green tea used traditionally by oriental people to help digestion.

Pyrosis (heartburn)

- Indicate the use of digestive teas after meals, such as green tea.
- Avoid condiments, any kind of pepper and fat-rich foods.
- Small sips of chilled water can be drunk, as this helps to dilute the gastric juices.

- Do not lie down after eating. If the person wants to rest, they should do so in a sitting position or with their back supported.

Diarrhoea

- Some foods can cause diarrhoea in sensitive people. These foods include: milk, sweet food in large quantities, beans, fatty foods such as fried food or food of animal origin. Try and find out if it is some kind of food that is causing the diarrhoea.
- Advise as to eating cooked food, avoiding raw food and fibres. Fruit and vegetables should be cooked. Avoid eating sweet and fatty foods.
- Indicate small meals, increasing the frequency gradually.
- Indicate the consumption of food rich in potassium, such as bananas, potatoes and white meat. Large amounts of potassium are lost through diarrhoea. In the case of chronic diarrhoea, laboratory tests must be done to monitor the case.
- Indicate homemade or industrial oral rehydration solution, or isotonic drinks in order to maintain the body's hydroelectrolytic balance. Coconut milk can be used and it is very effective.
- Contraindicate milk consumption until the symptoms disappear. Curdled milk, yoghurt and cheese can be eaten.
- Increase liquid intake, in order to avoid dehydration.
- Indicate probiotic food, as it recovers intestinal flora, especially lactobacillus fermented milk.

Constipation

- Indicate increased fibre consumption. Salads with raw vegetables and lettuce or other foliage. Wheat bran, rice chaff or other natural fibres, can be added to meals to increase fibre intake.
- Increase water intake to at least 3 litres a day. Low liquid intake can increase constipation.
- Recommend physical activity. Movements stimulate the intestinal muscles.
- Advise as to the use of olive oil or vegetable oil on raw salad.

Flatulence

- Avoid eating food that causes wind, such as: fizzy drinks, beer, sweet food, broccoli, cauliflower, cabbage, beans, sweet potato, etc.
- Meals should not be missed. Meals should be eaten at regular times.
- Food should be chewed with the mouth closed and speaking while chewing food should be avoided, as this can cause increased air intake, thus increasing intestinal gas.
- The consumption of foods rich in insoluble fibres should must be reduced, such as grains and cereals like corn, chick-peas, fruit skins and greens such as lettuce, cabbage etc.

Fever

- Increase the intake of liquids, such as water, fresh fruit juice, vegetable juice or coconut milk.
- Food needs to varied and eaten at the same times. Meals should not be missed.

Night sweats

- Liquids must be taken frequently to avoid possible dehydration as a result of sweating.
- At least 3 litres of liquids must be drunk every day. Fresh fruit juice, vegetable juice or coconut milk can be drunk in large quantities in order to replace minerals lost during heavy sweating.

Difficulty in swallowing, inflammation in the mouth and/or oesophagus caused by *Candida albicans* (candida) or other infections

- Indicate the consumption of liquid or pasty foods, or foods of a soft consistency.
- Indicate favourite foods to stimulate the appetite, minced or beaten in the blender. Contraindicate the consumption of raw food.
- Indicate food such as mashed potato, soup, broth, yoghurt, ricotta, pasta with cheese, scrambled eggs, custards, porridge.
- Food should be eaten cold or at room temperature. Avoid hot food.

- Avoid acidic and spicy foods. Avoid the use of salt and pepper. Avoid citric fruit juice or acidic foods; oranges and tomatoes can cause irritation.
- Avoid fat and oil.
- Avoid chocolate, alcohol and beverages with caffeine (coffee, tea and fizzy drinks).
- The ideal is to have small meals, several times a day.
- Liquids can be drunk with a straw, to avoid pain in the oral cavity.
- In cases of **difficulty in swallowing**, preference should be given to well cooked food, avoiding liquids and pasty foods. Food that is more solid, but soft, passes more easily through the glottis.
- If the person has a **dry mouth**, they can chew chewing gum to increase saliva production.
- The person should clean their mouth regularly and rinse it gently.

Changes in the way food tastes

- Use products containing more herbs and seasoning, without increasing the normal amount of salt.
- If the person complains of a “metallic taste” when eating, indicate the replacement of red meat with foul, fish or eggs.
- Orange juice, lemonade, pickles, vinegar, lemon and lime can heighten the taste of food.
- Include onions as part of cooked food.
- A lot of food tastes better cold or at room temperature.

APPENDIX 1

Nutritional evaluation methods

1. Physical evaluation and examination

Physical examination involves clinical observation to detect the presence of signs and symptoms associated with malnutrition which appear in advanced stages of nutritional deficiency. As they are not specific, well kept clinical records are fundamental in order to be able to distinguish them from those of non-nutritional aetiology. **Chart 9** shows the principal physical signs indicating nutritional deficiency.

The bodily changes that take place in people living with HIV/AIDS can contribute towards an incorrect analysis of nutritional diagnosis and there is, therefore, a need to periodically evaluate and monitor these changes, taking as a reference the previously collected measurements of the patient. Special attention should be paid to the loss of peripheral fat on the upper and lower limbs; reduction in thigh circumference; increase in breast size in women; the increase in the dorsocervical region because of fats deposits, facial alterations (loss of fat from the side of the face, nasolabial folds and the temples) and increased waist measurements, since these are symptoms of lipodystrophy syndrome.

Chart 9 – Physical signs suggesting malnutrition

Points of observation	Normal appearance	Signs associated with malnutrition	Possible nutritional deficiency or disease	Possible non-nutritional problem
Hair	Strong; shiny; difficult to pull out	Dull; dry and lifeless; thinning. Pigmentation loss, vitiligo. Easy to pull out (without causing pain)	*Kwashiorkor* and, less commonly, marasmus.	Excessive hair washing. Alopecia
Face	Uniform skin colour; smooth; healthy appearance; free from oedema	Nasolabial seborrhoea (skin stratified around the nostrils)	Riboflavin. *Kwashiorkor*.	Common acne
Eyes	Shiny, clear, epicanthal folds free from lesions; moist pink membrane; free from prominent blood vessels, accumulated or hardened tissue	Pale conjunctiva. Bitot's spots. Conjunctival xerosis (dryness) Corneal xerosis (lifeless). Keratomalacia (denuded cornea). Reddened epicanthal folds with lesions. Corneal arcus (white ring around the eye). Xanthelasma (small yellowish growths around the eyes)	Anaemia (for example, iron). Vitamin A Riboflavin and pyridoxine. Hyperlipidemia	Red eyes because of exposure to the weather, lack of sleep, tobacco or alcohol.
Lips	Smooth, free from oedema or splitting	Angular stomatitis (pink or white lesions in the corners of the mouth)	Riboflavin.	Excess salivation because of incorrect prosthesis fitting.
Tongue	Deep red appearance; not oedematous or smooth	Magenta (purple) tongue. Atrophy and hypertrophy of the filiform papillae–red tongue.	Riboflavin. Folic acid. Niacin	Leukoplakia.
Teeth	Free from cavities or pain; shiny	Enamel stained. Caries (cavities), teeth missing	Fluorosis Excess sugar	Improper occlusion Periodontal disease. Hygiene habits
Gums	Healthy, red, free from bleeding or oedema	Spongy, bleeding. Receding	Vitamin C	Periodontal disease
Glands	Face without oedemas	Enlarged thyroid (oedema on the front of the neck). Enlarged parathyroid (oedema between the mandibles)	Iodine. Inanition. Bulimia.	Thyroid enlarged due to allergy or inflammation
Nervous system	Psychological stability and normal reflexes	Psychomotor alterations Mental confusion Loss of sensation. Movement weakness. Loss of sense of position. Loss of sensibility to vibrations. Loss of wrist and ankle contracture Tingling in the hands and feet (paresthesias) Dementia.	*Kwashiorkor* Thiamin Niacin, Vit B12	

Source: Hammond, KA - Chapter 16, pg. 362, in Mahan, LK; Escott-Stump, S. *Alimentos, Nutrição & Dietoterapia*. ed.10ª, 2002.

2. Anthropometric and Body Composition Evaluation

Anthropometric evaluation is an essential resource in the periodic determination of a person's nutritional status, such as possible weight alterations and alterations in lean body mass. It should be performed upon positive diagnosis of HIV infection, with follow up once a year or every six months in asymptomatic patients and between two and six times a year in symptomatic patients, or even more frequently in some cases.

The most frequently used measurements are: weight, height, triceps skinfold pinch, and the circumferences of the arm, waist, hips and breasts. They are applied using equations in order to obtain indicators of the patient's nutritional status and respective classifications.

Body Mass Index (BMI)

$$BMI = W / H^2$$

BMI Classification

Nutritional Status	BMI
Malnutrition G.III (severe)	≤ 16
Malnutrition G. II (moderate)	16 – 16.9
Malnutrition G. I (mild)	17 – 18.49
Normal weight	18.5 – 24.9
Pre-Obesity	25 – 29.9
Obesity G.I	30 – 34.9
Obesity G.II	35 – 39.9
Obesity G.III	≥ 40.0

Source: World Health Organization (WHO),1998.

In cases of significant weight loss, the extent of nutritional risk must be assessed, by analysing the following indicators:

A. Current Weight Deviation from Ideal Weight (% IWI)

$$\%IW = \frac{CW}{IW} \times 100$$

Ideal Weight Percentage Classification

%IW	Level of depletion
80 - 90%	Mild malnutrition
70 - 80%	Moderate malnutrition
<70%	Severe malnutrition

Source: Grant, 1981

Alterations in body weight in relation to ideal weight represent inadequate calorie intake. Weight loss reflects the individual's immediate inability to meet his or her nutritional needs and may signify nutritional risk (BERNARD, 1988).

B. Current Weight Deviation from Usual Weight

$$\%UW = \frac{CW}{UW} \times 100$$

Usual Weight Percentage Classification

%HW	Level of depletion
85 - 90%	Mild malnutrition
75 - 84%	Moderate malnutrition
<75%	Severe malnutrition

Source: Grant,1981

The relationship between current and usual weight, as an assessment of nutritional status, is a particularly interesting ponderal index, since it enables long term accompaniment of the evolution of an individual's weight. However, weight loss does not enable the identification of the level in which the variation occurred (lipidic, hydric or protidic). Only complementary clinical tests can provide this information (BERNARD,1988).

C. Recent Ponderal Loss or Weight Loss (%WL)

$$\%WL = \frac{UW - CW}{CW} \times 100$$

Weight Loss Percentage Classification

Mild	Moderate	Severe
< 5% / 1 month	< 2% / 1 week	> 2% / 1 week
< 7.5% / 3 months	> 5% / 1 month	> 20% / 6 months
< 10% / 6 months	> 7.5% / 3 months	
	> 10% / 6 months	

Source: Carvalho, 1992

The determination of percentage weight loss directly reflects the extent of the disease, and is more serious when weight loss is more than 20% in 6 months (CARVALHO, 1992).

2.2 Measurement of the Thickness of Cutaneous Folds

The measurement of the subcutaneous adipose tissues is obtained using a cutaneous fold calliper (adipometer). This technique indirectly estimates adipose body tissue reserves and, consequently, body calorie reserves. As these reserves alter slowly in cases of malnutrition, it reflects chronic inadequate nutritional intake (CARVALHO, 1992). It is currently one of the simplest, easiest and more accurate methods for assessing the composition of the body, and is satisfactorily comparable to other methods (hydrostatic weighing, bioimpedance, bone density measurement). The principal fold used is that of the triceps and the measurement can be obtained using the technique described in TBW (1999). It can be analysed in isolation by applying percentile tables (FRISANCHO, 1981) according to the following classification:

Triceps Cutaneous Fold Classification (CFC)

Percentile	Classification
< 5º	Malnutrition
5º - 15º	Risk of malnutrition
15º - 85º	Normal weight
> 85º	Obesity

Source: Frisancho, 1990

A. Arm Circumference (AC)

This measurement corresponds to the adipose, muscular and bone compartments on an individual's arm. Frisancho's (1981) percentile table is used for reference. In our routine, this data is only used to determine the arm's muscular circumference and for classification:

Arm Circumference Classification

Percentile	Classification
< 5º	Malnutrition

5 – 15º	Risk of malnutrition
15 – 85º	Normal weight
> 85º	Obesity

Source: Frisancho, 1990

B. Arm Muscular Circumference (AMC)

This is used to evaluate muscle reserve or lean body mass (muscle and bone mass), using Frisancho's (1981) table as a reference. It can be obtained through the following formula:

$$AMC = AC - (0.314 \times CFC)$$

With the following cut-off points:

Arm Muscular Circumference (AMC) Classification

Percentile	Classification
< 10	**Malnutrition**
10 – 90º	**Normal weight**
> 90º	**Obesity**

Source: Frisancho, 1981

In AIDS patients, AMC is usually reduced, indicating muscular protein degradation (especially branched chain amino acids), which occurs together with potassium depletion.

2.3 Waist and Hip Circumference

The circumference of the waist can be interpreted in isolation, because it appears to provide a better prediction of the visceral adipose tissue and its use has been observed in current clinical practice. Additional research is however needed owing to the lack of references for different populations (CUPPARI, 2002). The table below shows waist circumference reference values associated with the development of complications arising from obesity.

Risk of Metabolic Complications Associated with Obesity

	High	**Very High**
Men	≥ 94 cm	≥ 102 cm
Women	≥ 80 cm	≥ 88 cm

Source: WHO, 1998

This measurement can also be used to calculate the waist-to-hip ratio.

2.4 Waist-to-Hip Ratio

This is the most used method to verify fat distribution types, which is partially independent from total adiposity. The waist's circumference is measured at the narrowest part, above the navel. The circumference of the hips is measured at the most protuberant point of the buttocks. The ratio is classified as follows:

Waist-to-Hip Ratio (WHR) Classification

Sex	**Normal Rate**	**Risk Rate**
Male	< 0.9	≥ 0.9
Female	< 0.85	≥ 0.85

Source: FLASO (1998)

Higher rates are considered to be risk factors for cardiovascular diseases, and demonstrate a positive correlation with cardiovascular mortality, in both men and women (ASSIS,1997).

2.5 Bust Circumference

In women, one of the principal symptoms of lipodystrophy is the accumulation of fat in the bust region. This measurement must be taken at each consultation and compared to previous results so as to accompany its evolution. Another way of finding out if this alteration is taking place is to ask the patient if her bra size has changed (CONFRANCESCO, 2000).

2.6 Bioimpedance

This is based on a principle of electricity, i.e., the sending of low intensity and fixed frequency electric current though a person's body in order to determine the resistance (impedance) of the body's various tissues. It is, therefore, a method that is very sensitive to the hydric status of the patient being assessed, since 75% of the musculature is formed of water and the rate of fat hydration is practically zero (less than 10%), so that the electric current passes more easily though muscle than through fat. In this way, the individual's percentage of fat, lean mass, total body water and daily basal energy metabolism can be estimated.

For the population in general, the World Health Organization has established as a standard indicator of obesity percentage fat levels above 25% in men and above 30% in women.

2.7 Evaluation of the body composition bed or chair-bound patients

Several alternative measurements can be used to estimate the height and weight of individuals who are unable to stand upright, so that by using this data a minimum evaluation of the body composition of these patients can be made. The method used to obtain this data is:

Estimated height and weight of bed or chair-bound patients

Knee height (KH) is used to estimate the patient's stature. With the patient sitting with his or her feet flat on the ground, the distance is measured between the floor and the patient's knee, from the bottom of the foot to the top of the patella. Stature equivalent is then measured based on knee height:

WOMEN

Height = (1.83 x KH) – (0.24 x age) + 84.88

MEN

Height = (2.02 x KH) – (0.04 x age) + 64.19

To estimate the weight of bed-bound patients the circumference of the calf of the leg is used. The circumference of the calf (CC) at the widest point is measured with the patient lying on his or her back, with the left knee raised at an angle of 90º. This measurement is used together with three others (KH, AC, subscapular cutaneous fold - SSCF) to obtain estimated weight using the following equation (WILLIANS, 1994):

WOMEN

Weight = (1.27 x CC) + (0.87 x KH) + (0.98 x AC) + (0.4 x SSCF) – 62.35

MEN

Weight = (0.98 x CC) + (1.16 x KH) + (1.73 x AC) + (0.37 x SSCF) – 81.69

3. BIOCHEMICAL EVALUATION

Biochemical tests are the most objective means of measuring a person's nutritional status. Nevertheless, the accuracy of the results can suffer various interferences that can affect their validity. The tests used are those which predict and confirm an inadequate nutritional status.

3.1 Haemoglobin and Haematocrit

Haemoglobin and haematocrit levels are normally reduced as a result of the viral process, the side effects of AZT therapy and states of chronic anaemia. Iron supplementation is not indicated, unless this element is lacking.

Normal Haemoglobin and Haematocrit Levels

	Women	Men
Haemoglobin	12 - 16 g/dL	13.5 – 18.0 g/dL
Haematocrit	38 - 47%	40 - 54%

3.2 Lipid Profile

Triglycerides levels are frequently elevated, owing to the reasons described above, and their reference ranges are:

Triglyceride Ranges

Range (mg/dL)	Classification
< 150	Normal
150 – 199	Borderline
200 – 499	High
≥500	Very high

NCEP, 2001

Cholesterol levels are frequently elevated, usually due to the patient's eating habits, although this may also be caused by the side effects of drugs used to treat HIV infection. Cholesterol must be controlled because of the high cardiovascular risk. Cholesterol reference ranges are:

Total Cholesterol Classification

Range (mg/dL)	Classification
< 200	Desirable
200 – 239	Borderline
≥ 240	High

NCEP, 2001

LDL Cholesterol Classification

Range (mg/dL)	Classification
< 100	Excellent
100 – 129	Good
130 – 159	Borderline
160 – 189	High
≥ 190	Very high

NCEP, 2001

HDL Cholesterol Classification

Range (mg/dL)	Classification
< 40	High risk
≥ 60	Low risk

NCEP, 2001

3.3 Albumin, Prealbumin, Transferrin and Total Protein

These define the body's protein reserves, and that is why they can be used to monitor alterations in visceral protein levels. Usually, low levels indicate primarily malnutrition and secondarily processes relating to opportunistic infections.

Albumin is not a very sensitive indicator of malnutrition, as the body's albumin reserves are large and this protein has a long half-life (20 days); therefore albumin levels can both fall slowly and also recover slowly, depending on nutritional alterations. It is important to note that other non-nutritional factors can affect serum albumin levels, such as stress, traumatisms, surgical operations and increased extracellular fluid.

Prealbumin is a protein that quickly becomes depleted in any abruptly established hyperbolic state, since it has an average half-life of two days and a small body pool.

Transferrin is the most sensitive nutritional marker, since its average half-life is less than that of albumin (8 days), and its body pool is also smaller.

Retinol-binding protein is another very sensitive marker for assessing nutritional status as it has a half-life of 12 hours.

From the above it can be seen that the best markers for analysing visceral protein mass are prealbumin, transferrin and retinol-binding protein. Nevertheless, these tests are not performed routinely as part of the biochemical assessment of a person's nutritional status.

Interpretation of the Results of Visceral Protein Depletion

Level	Albumin	Prealbumin	Transferrin	Total Protein
Normal	>3.5 mg/dL	15.7 – 29.6 mg/dL	250 - 300 mg/dL	6.5 – 8.0 g%
Mild	3.0 – 3.5	10 – 15	180 – 200	6.0 – 6.5
Moderate	2.1 – 3.0	5 – 10	100 - 150	5.3 – 6.0
Severe	< 2.1	<5	<100	<5.3

(ANTUNES, 1994)

This data should be considered together with the arm's muscular circumference in order to confirm, or not, the existence of protein depletion.

3.4 Glucose

Both hyper and hipoglycaemia can occur. Patients with Pneumocystis carinii pneumonia (PCP) who are being treated with pentamidine can manifest hypoglycaemia. Hyperglycaemia can also occur through secondary resistance to insulin, normally associated with dyslipidemias, abdominal obesity and reduction in subcutaneous fat (DUBE, 2000); or as a result of the side effects of other medication, such as anabolic steroids, and secondary to diabetes.

Glycaemia Classification

Ranges (mg/dL)	Classification
70 – 110	Normal
110 – 125	Borderline
> 125	High

3.5 Blood urea nitrogen and creatinine

Poor kidney and liver function can occur in AIDS patients. Both can occur secondarily to HIV infection; nephritis or hepatitis; nephrotoxic or hepatotoxic drugs; and previously existing kidney or liver failure.

Normal Urea and Creatinine Levels

Normal levels	
Blood urea nitrogen	8 - 25 mg/dL
Creatinine	0.6 – 1.2 mg/dL

(ANTUNES, 1994)

MICRONUTRIENTS

Vitamin/ Mineral	Sources	Function
A (Retinol)	Broccoli, spinach, pumpkin, sweet potato, beetroot leaves, tomato, watermelon, kale, cabbage, cauliflower. Liver, kidney, cod liver oil, butter, margarine, cheese, eggs, carrots, yellow and dark green vegetables.	Essential for growth, healthy eyes and keeping the skin soft.
B1 (Thiamin)	Cereals, wheatgerm, oats, bean sprouts, brown rice, meat, potatoes, grains and vegetables.	Essential for releasing energy.
B12 (Cyanocobalamin)	Meat, liver, kidney, eggs, cereals, grains, milk and cheese.	Provides energy and keeps the nervous system healthy. Essential for red blood cell production.
B2 (Riboflavin)	Milk and milk products, liver, kidney, green vegetables, grains, cheese, eggs, broccoli and spinach.	Essential for releasing energy.
B5 (Pantothenic acid)	Vegetables, liver, kidney, eggs, brown rice, wholegrain cereals.	Essential for releasing energy from fats and carbohydrates.
B6 (Pyridoxine)	Legumes, grains, oats, liver.	Used in the metabolism of proteins and amino acids, helps to keep the nervous system and blood cells healthy.
B9 (Folic Acid)	Greens, carrots, liver, eggs, soya beans, avocado, oranges, beans, whole wheat.	Necessary for normal growth and body cell reproduction.
C	Fruit especially oranges (citric fruits), greenery, broccoli, cauliflower, apples, cabbage, potatoes.	Works as an antioxidant to control the formation of free radicals.
D	Fish liver oil, oily fish, margarine, eggs, exposure to the sun and some fruit such as bananas.	Needed for the absorption of calcium from food into the blood stream and for depositing calcium in the bones.
K	Green-leaved vegetables, cauliflower.	Used in blood cell production.
B3 (Niacin)	Green leaves, legumes and grains, milk and milk products. Brewer's yeast, wheat bran, kidney, chicken, soya beans.	Essential for releasing energy.
E	Found principally in wheatgerm. Also found in cereals and green leaves. Wheatgerm oil, sunflower oil, seeds, almonds, peanuts, egg yolks, spinach (leafy green vegetables), soya beans, cereals, beetroot and celery.	Works as an antioxidant, protecting cells from harm and keeping the blood vessels. It is the greatest defence against aging.
Beta-carotene	Carrots, sweet potato, capsicum, pumpkin and spinach.	It is transformed into vitamin A by the body when necessary. Works to control the formation of free radicals capable of damaging cells. It is an antioxidant. (Against aging)
Biotin	Eggs, milk products, cereals, fish.	Works as a coenzyme in several metabolic reactions. Helps with fat metabolism.
Calcium	Milk, cheese, kale, sardines, leafy green vegetables and seeds, parsley, sesame, sunflower seeds and seaweed.	Essential for bone growth and maintenance, muscle contraction and blood coagulation.
Copper	Green vegetables, fix, liver, whole grain cereals, carrots, brewer's yeast.	Necessary for a healthy nervous system, and healthy blood.

Iron	Meat, tripe, vegetables with dark green leaves, legumes, egg yolks, liver and spinach.	Iron takes part in the formation of haemoglobin, which carries oxygen around the body, as well as being necessary for muscular protein.
Phosphorus	Brewer's yeast, legumes, rye, grains, citric fruits. Present in most food.	Essential for healthy bones and teeth and for providing energy.
Iodine	Watercress, radish, wheatgerm, milk, vegetables and fish oils.	Essential for the normal working of the thyroid.
Magnesium	Fish, green-leaved vegetables, wheatgerm, grains, cereals, carrots, apples, beetroot, carrots, broccoli.	Helps with muscle and nerve functions. Keeps the metabolism stable. Against heart diseases.
Niacin	Brewer's yeast, wheat bran, kidney, chicken, soya.	Essential for releasing energy.
Selenium	Brazil nuts are rich in selenium.	Cuts cancer risks and protects the heart.
Zinc	Meat, mushrooms, eggs, brewer's yeast.	Needed for enzyme production and cell maintenance.

SEASONAL FOOD CHART (BRAZIL)

1. GREENERY AND VEGETABLES

Month / Food item	January	February	March	April	May	June	July	August	September	October	November	December
Aubergine	■	■	■	■	■							
Beans	■	■		■	■						■	
Beetroot	■	■						■	■	■	■	■
Broccoli	■					■	■	■	■	■		
Cabbage	■	■	■	■					■	■	■	■
Carrots	■						■	■	■	■	■	■
Cassava	■	■	■	■	■	■	■					
Cassava (*Mandioquinha*)	■	■	■	■	■	■	■	■	■			
Cauliflower								■	■	■		
Celery	■	■							■	■	■	■
Chicory	■							■	■	■	■	
Chinese cabbage						■	■	■	■	■		
Chives	■	■	■	■							■	■
Chayote			■	■	■					■		
Corn on the cob	■	■	■	■							■	
Courgette	■	■	■	■	■					■	■	■
Cucumber	■	■	■	■							■	■
Endive	■							■	■			
Fennel							■	■	■	■		
Ginger	■	■	■	■	■	■	■	■	■	■		
Green beans	■		■	■	■					■	■	■
Jiló	■	■	■	■	■							
Kale	■	■						■	■	■	■	■
Leeks	■	■	■							■	■	■
Lettuce				■	■	■	■	■	■	■	■	■
Mushrooms	■	■	■	■	■				■	■		
Mustard	■	■					■	■	■	■	■	
Okra	■	■	■	■	■							
Palm heart	■	■	■	■	■	■						
Parsley	■	■			■	■	■	■	■	■	■	■
Peas						■	■	■				
Pepper	■	■	■	■	■							
Pumpkin	■	■	■	■	■	■	■	■				
Radish	■						■	■	■	■	■	
Rocket	■				■	■	■	■				
Asparagus	■	■	■	■								
Spinach	■						■	■	■	■	■	
Squash	■	■	■	■								■
Sweet pepper	■	■	■	■	■							
Sweet potato	■	■	■	■	■	■	■					
Tomato	■	■			■	■	■					■
Turnip	■						■	■	■	■		
Watercress	■	■						■	■			
Wild chicory	■							■	■	■	■	■
Yam			■	■	■	■	■	■				
Yam	■	■	■	■	■	■	■	■	■	■	■	■

2. FRUIT

Month / Fruit	January	February	March	April	May	June	July	August	September	October	November	December
Apple	■	■	■	■								
Avocado		■	■	■	■	■	■					
Banana (*Banana Maçã*)	■	■		■	■	■						
Banana (*Banana-Prata*)					■	■	■	■	■	■		
Banana (dwarf)	■	■		■	■	■	■					
Cashew	■	■										
Fig	■	■	■	■								
Grapes (*Uva-Itália*)	■	■	■									
Grapes (*Uva-Niágara*)	■	■										
Guava	■	■	■	■	■							
Jabuticaba								■	■	■	■	
Jackfruit	■	■	■	■	■	■						
Lime	■	■	■	■	■	■						
Lime (*Limão Galego*)	■	■	■	■	■	■	■	■	■	■	■	■
Lime (*Limão Taiti*)	■	■	■	■	■	■	■					
Loquat									■	■		
Mango	■										■	■
Melon	■	■	■				■	■				■
Nectarine										■	■	
Orange	■			■	■	■	■	■	■			
Orange (*Laranja-Lima*)			■	■	■	■	■	■	■			
Orange (*Laranja-Pêra*)	■			■	■	■	■	■	■	■		
Papaya				■	■	■	■				■	
Papaya (*mamão Hawaii*)					■	■	■					
Passion fruit	■	■	■	■								■
Peach	■										■	■
Pear	■											
Persimmon		■	■	■								
Pineapple	■	■						■	■			■
Plum	■	■										■
Strawberry							■	■	■	■	■	
Sweetsop		■										
Tangerine				■	■	■						
Tangerine (*Ponkan*)					■	■						
Water Melon	■	■	■	■	■						■	■

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