NUTRITION

PARTICIPANTS GUIDE

FIRST EDITION

FOREWORD

All people have universal right to food and adequate nutrition. They must have access to food security. Putting nutrition at the center of the health is a priority because nutrition and diet affect how you feel, look, think and act. Actually a good nutrition boosts the health and protects against the diseases especially infections. Providing a good nutrition to people is one way to increase their energy on work, stimulate the intellectual development and makes people able to get welfare. An unbalanced diet results in malnutrition that impairs the immune system and is the gateway to the infections of all forms, to the diseases and is consecutive to the other many consequences with negative health effects. Poor nutrition can be also due to the food insecurity. So the health entrepreneurs can play a helpful role aiming at providing guidance and advices to people for accessing to food for example by designing a project of food security or of kitchen garden.

OBJECTIVES OF LEARNING

At the end of this module, every participant will be able to:

- Define the nutrients and identify their sources
- Describe the process of calculating and establishing a balanced diet
- Demonstrate the relationship between nutrition and health
- Identify the problems of malnutrition and their main causes essentially in Rwanda
- Give insight in the assessment of chronic malnutrition by making use the Body Mass index (BMI)
- Determine the effects of nutrition on reproductive health in particular, on health and socio-development in

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UNIT 1: NUTRITION

NUTRITION

It is the study of food nutrients and the process by which food is taken into the body and used to produce energy, build the body, protect body from disease and help chemical processes (biochemical reactions) take place in the body. The food contains also minerals and vitamins that protect the body against different diseases. Nutrition also includes how people obtain their food and everything that influence it.

In relation to food scarcity and famine, nutrition is concerned with the processes leading to hunger and malnutrition visible in different forms as well as the state of being malnourished itself. In the case of over-intake of food, nutrition is also concerned with the health problem leading to the overweight and obesity.

MALNUTRITION

According to UNICEF, malnutrition is a broad term commonly used not only as an alternative to under-nutrition but technically, it also refers to over-nutrition.

People get malnourished if their diet does not provide adequate quantity of energy, proteins and fats including vitamins and minerals for proper growth and maintenance or they are unable to fully utilize the food they eat due to illness (under nutrition). They are also malnourished if they consume too many calories (over nutrition), which result into obesity.

UNDER-NUTRITION

It is caused primarily by an inadequate dietary intake, resulting into deficiency of required/essential nutrients. This results into stunting, underweight, wasting, micro nutrient deficiencies etc.…

Other physical functions that may be affected include:

- Resistance to disease,
- The ability to work,
- Pregnancy and
- Lactation.

The under-nutrition is a form of malnutrition divided into three categories: the stunting, underweight and wasting.

STUNTING OR SHORTNESS

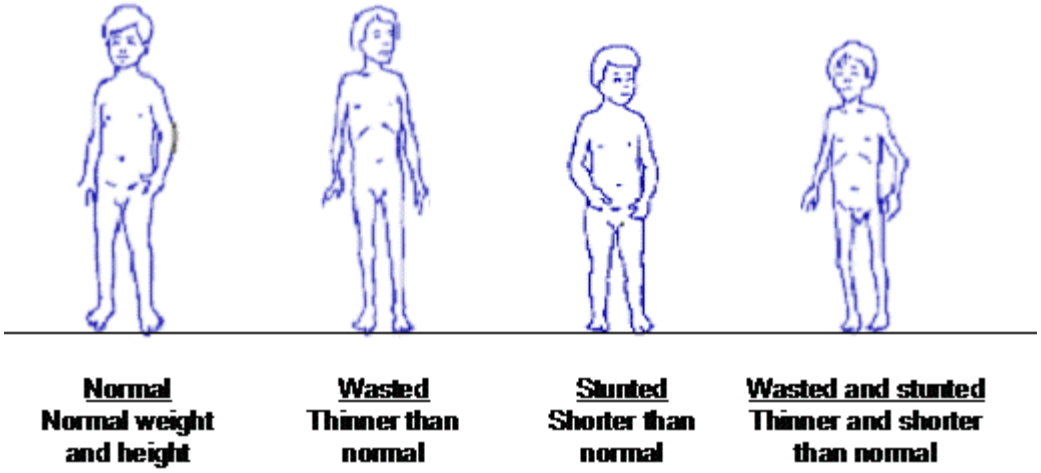
Stunting is very low height for age. It is an indicator of inadequate nutrition over long period of time leading to failure of linear growth and decreasing of mental and physical productivity capacity. It's measured by comparison of height to age.

UNDERWEIGHT

It is a composite indicator meaning a combination measure, which could occur as a result of wasting, stunting or both. Underweight is measured by means of weight compared with age.

WASTING OR THINNESS

It is an indicator of inadequate nutrition leading to rapid weight loss or failure to gain weight normally. Recovering a normal body composition requires the intake of larger quantities of energy, proteins, and nutrients needed for the synthesis of muscle and fat tissue. It is measured using weight compared with height.



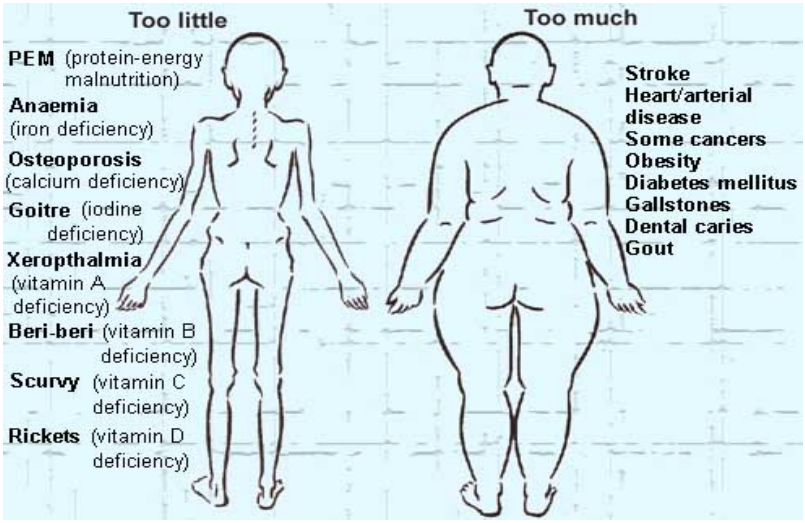
According to the definition of wasting, stunting and underweight (combination of both wasting and stunting), this figure allows the comparison between these three indicators of under-nutrition with reference to the normal person at the left.

OVER-NUTRITION

The over-nutrition is another form of malnutrition under two categories: the over-weight and obesity.

The deficiencies in proteins, fats and carbohydrates is qualified" protein-energy malnutrition or deficiencies in macronutrients" because they are needed in a great quantity compared to the micronutrients.

The deficiencies in minerals and vitamins are called" deficiencies in micronutrients" because they are needed in small quantity in comparison with the macronutrients.



The first person at the left with underweight is characterized by the failure to gain weight, risks of protein-energy malnutrition and micronutrient deficiencies. The second is characterized by the excess of weight with the risk of the outbreak of the other diseases linked to the nutrition like dental caries, gout, diabetes etc.

OVER-WEIGHT

Overweight is when fat excess of moderate level: defined as a BMI of 25,0 to 29,9

OBESITY

Over-fatness (excess of fats) with adverse health effects, as determined by reliable measure and interpreted with good medical judgment. Obesity is officially defined as a BMI= 30 or higher.

BODY MASS INDEX (BMI)

BMI is the index of a person weight in relation to height. It is determined by dividing the weight (in kilograms-kg) by the square of height (in meters-m). It is an indicator of chronic malnutrition in adult persons.

Using the BMI formula, the result obtained enables to classify the individual either as a normal, overweight, obese or very obese person referring to the above cut-off values.

BMI (Kg/m2) / Nutrition status	Cut-offs
Severe chronic energy deficiency	< 16.0
Moderate chronic energy deficiency	16.0-18.49
Normal	18.5- 24.9
Overweight	25.0- 29.9
Obese	30.0- 40.0
Very obese	> 40.0

OTHER DIFFERENT FORMS OF MALNUTRITION

PROTEIN-ENERGY MALNUTRITION

This is due at the same time to the lack of energy, protein. It's divided into 3 groups as you can meet them in the community:

DEFICIENCIES IN MICRONUTRIENTS (LACK OF BOTH VITAMINS AND MINERALS)

The forms due to the lack of micronutrient currently found in Rwanda are:

- Goiter: lack of iodine, which impairs also the intellectual development. The commercialized salt in Rwanda is rich in iodine.
- Anemia: lack of iron which causes fatigue and headache
- Deficiencies in vitamin A: lack of vitamin A which impairs vision and immune system
- Scurvy: vitamin C deficiency disease due to the lack of vitamin C. It is also characterized by bleeding of gums.
- Ricket: Vitamin D deficiency due to the lack of vitamin D. It can due also to insufficient exposure of the body to the sunlight before 8 o'clock because after that time the sunlight is plenty of ultraviolet rays.

UNIT 2: NUTRIENTS AND THEIR SOURCES

Nutrients are the substances obtained from food and used in the body to provide energy and structural materials and to serve as regulating agents to promote growth maintenance and repair. Nutrients may also reduce the risks of some diseases.

ESSENTIAL NUTRIENTS

The essential nutrients are: Carbohydrates, lipids, proteins, vitamins, minerals and water. They are called essential because the body itself is not able to make them. They must be absolutely supplied by the food intake.

The group of proteins, fats and carbohydrates are ”macro-nutrients” because they are needed in a great quantity if compared to the micronutrients required in the body.

The group of minerals and vitamins is called ‘micro-nutrients’, are needed in a small quantity compared to macronutrients required in the body. They are biochemically the trace elements.

Carbohydrates are the basic source of energy. They range in complexity from simple sugars to complex starches. Sugars are found in sweet foods such as honey, and in milk and fruits. Major sources of starches include cereals, root vegetables, pulses (beans, lentils, peas) and some fruits such as plantains and bananas.

Dietary fats and oils are rich sources of energy and provide essential fatty acids. They can be obtained from both animals and plants. Animal sources include fatty meats, chicken, butter, oily fish. Plant sources include oil seeds, nuts (sunflower, sesame) and legumes (peanuts, soybeans).

Proteins, which are long chains of amino acids, form much of the basic structural material or muscles of the body; they are necessary for its growth, functioning or maintenance and repair. The body can make many amino acids but some, called essential amino acids, must be obtained from food. Different foods contain varying quantities of these. Animal products are a prime source, but a mixture of vegetable sources can also satisfy the body's needs. Rich sources of proteins include meat, fish, dairy products, pulses, nuts and cereals.

Vitamins are essential to allow chemical processes and maintain health and integrity of body tissue. They are usually required in small quantities, but must be consumed regularly because many are not stored well in the body. Vitamin A is found only in animal products, particularly liver, eggs and milk, but many fruits and vegetables such as carrots, mangoes and papaya contain carotenes, chemicals that the body can convert into vitamin A. Good sources of vitamin C are fruits and vegetables. The B complex is found in cereals, legumes, meat, poultry and dairy products.

Minerals are essential to structures such as bones and teeth (calcium) and processes such as energy transfer (iron) and functioning of the body and brain (iodine). We need comparatively large amounts of some minerals, such as calcium -found in peas and beans, milk, meat and cheese - and much smaller amounts of others, such as iron - found in meat, fish and shellfish, dark green leafy vegetables and nuts.

Water is one of the essential components of our body beyond 70%. It should be in your body, merely when it is good and healthy water. Otherwise water can be of danger. So it’s preferable to keep your water clean or treat it with methods like filtering or chemical treatment like aqua prove.

UNIT 3: BALANCED DIET AND ITS COMPOSITION

NUTRITION REQUIREMENTS

Nutritional requirements vary from person to person. Everyone needs to pay attention to the quality, quantity and diversity of food sources to have a balanced diet.

There are around 5 different groups of food that are needed to compose a balanced diet:

1. Food rich in carbohydrates: sugar, cereals, and roots
2. Food rich in lipids: fats and oils
3. Food rich in proteins: beans, pulses and animal food sources.
4. Food rich in vitamins and minerals: fruits and vegetables
5. Water: pure drinking water and water from the decomposition of food into its components in the body.

The balanced diet is expressed in terms of energy needed by the body. A measure of energy amount that carbohydrates, fats and proteins release is expressed in terms of kilocalories written "kcal" meaning the unit of energy to fuel our foods in the body. According to FAO1 and WHO2, the energy needed by the human being during 24 hours is around 2100 kcal per day.

1g of protein produce 4 kcal

1g of lipids releases 9 kcal

1g of carbohydrates releases 4 kcal

1g of alcohol equal 7 kcal. NB: this kind of calories is considered empty because it's not useful for the body demand. So alcohol is not a nutrient because it cannot support the body's growth, maintenance or repair.

There is a food composition to refer to during the calculation if needed.

THE COMPOSITION OF A BALANCED DIET

1. Carbohydrates provide 55-75 % either 60% of total energy (of 2100 kcal per day)
2. Lipids (fats and oils) provide 15-30% either 30% of total energy (2100 kcal per day)
3. Proteins provide 10-15% either 10 % of total energy (2100 kcal per day)

It is needed to add minerals, vitamins and water but they don't provide energy. But have a protective measure.

The needs in energy depend on the activity. There are 3 categories of activity:

- Sedentary activity (watching TV or movies): this is done in a rest position
- Moderate activity (biking, swimming, basketball, football, running…): this is done few days a week (3-4 days a week).
- Strong/vigorous activity: athletic competitions, doing garden, wash and wax a car, walk or bike to school: this is done everyday.

UNIT 4: RELATIONSHIP BETWEEN NUTRITION AND HEALTH

Several times people make food choices, which can either improve their health or harm it. Each choice may influence your health only a little but when these choices are repeated over years, theirs effects become significant. The choices made by people each day affect not only their physical health but also their wellness which means all characteristics that make a person strong, confident, and able to function well with family, friends and others. People, who constantly make poor lifestyle choices, on a daily basis, increase their risk of developing diseases.

CAUSES OF MALNUTRITION

The causes of malnutrition are grouped in 3 categories:

- Immediate causes
    - Insufficient food intake
    - Infections diseases
- Intermediate or underlying causes
    - Household food insecurity
    - Inappropriate care for children and women
    - Inappropriate access to clean water and to hygienic facilities.
- Fundamental or root causes
    - Economic imbalance and weaknesses
    - Inadequate institutional support to nutrition intervention
    - Adverse climate changes
    - Lack of arable land
    - Ownership and control over family resources
    - Low literacy rate particularly among women

CONSEQUENCES OF NUTRITION

RELATION OF NUTRITION RELATED TO HEALTH

A good nutrition provides the wellness and a healthy life meaning optimal physical, mental, emotional, spiritual and social health. Whereas malnutrition can lead to a negative influence on your health.

The physical effects of malnutrition include:

- Fatigue, low energy and dizziness.
- Underweight, muscle weakness and poor growth.
- Poor immune function leaving the body vulnerable to infection.
- Problems with organ function failure, that may lead to disease states such as Coronary Heart Disease or Osteoporosis
- Diet with low nutritional value, e.g. high fats and sugar content can result in Diabetes.
- Diseases such as Marasmus and Obesity result from under or over- eating respectively.
- Poor cognitive functions such as learning memory and attention deficit disorder.
- Eating certain foods and additives that are high in carcinogens increases Cancer risk.
- Muscle function failure

- Cardio-respiratory function failure
- Cardio-respiratory function failure
- Impaired immunity system and wound healing power
- Psychosocial effects such as apathy, depression, anxiety and self-neglect.
- Poor nutritional status affects survival, morbidity and mortality.

RELATION OF NUTRITION ON REPRODUCTIVE HEALTH

The positive effects of nutrition on reproductive health are:

- Protracted breastfeeding is one of the natural contraceptive method
- The store of fats during pregnancy is used to produce breast milk for the child
- The reproductive system involves expenditure of energy from food nutrients
- Nutrition influences the ovulation, fertilization, implantation of fetus and fetus development.

The negative effects of nutrition on reproductive health are:

- The obese pregnant women are likely to give birth to the obese child.
- Undernutrition may delay the menstruation cycle.

CONSEQUENCES OF NUTRITION ON SOCIO-ECONOMIC DEVELOPMENT

The positive effects of nutrition on socio-economic development are:

- Improved nutrition is an important first step in developing human capital and reducing poverty.
- Better nutrition status improves immunological integrity and helps prevent non-communicable diseases such as diabetes.
- A good nutrition improves a child's cognitive development, psychosocial stimulation and the involvement of children in early childhood education because underweight, stunted children have a much lower cognitive development score than that of normal children

The negative effects of nutrition on reproductive health are:

- Malnutrition causes the absence from the school associated to the high drop out rate
- The malnutrition like an illness causes the lost of days for work and implies the lack of physical productivity.