The main of food products.

Macronutrients and Micronutrients Phytonutrients, minerals and vitamins. Their impact on health

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After completing this lecture you will be able

- know about the main food product components

- able to analyze daily requirements

- assess the Currents Nutritional Status

- able to consult a person to improve diet plan

WHAT ARE NUTRIENTS

We enjoy eating food because of its taste, its smell, and the pleasure and comfort it gives us. However, we rarely stop to think about what our food actually contains.

The six groups of nutrients found in foods are:

- Carbohydrates
- Lipids (including fats and oils)
- Proteins
- Vitamins
- Minerals
- Water

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MACRONUTRIENTS

Carbohydrates, lipids, and proteins are the only nutrients in foods that provide energy.

https://www.freepik.com/

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Water

- Water is an inorganic macronutrient that is vital for our survival

Carbohydrates (rice, wheat, and other grains, as well as vegetables and fruits, Fiber)

- Are a Primary Fuel Source, particularly for neurologic functioning and physical exercise
- **Web The Dietary Guidelines For Americans Recommend That Carbohydrates Make Up 45% To 65% Of Total Daily Calories. Web in general, the recommended daily intake of carbohydrates is around 225 to 325 g**

Lipids are another important source of energy for the body

In foods, they are found in solid fats and liquid oils. Lipids include triglycerides, phospholipids, and sterols.

Recommended Daily Intake of Lipids

about 44 grams to 77 grams of fat per day

Proteins

Protein is an essential nutrient that plays a vital role in the growth, repair, and maintenance of tissues and organs in the human body. It is composed of amino acids, which are the building blocks necessary for the production of enzymes, hormones, antibodies, and various other molecules.

Recommended Daily Intake of Protein

Adult Men: 56–91 grams per day

Adult Women: 46–75 grams per day

MICRONUTRIENTS

Vitamins and minerals are referred to as micronutrients. That's because we need relatively small amounts of these nutrients to support normal health and body functions

They are also critical in building and maintaining healthy bone, blood, and muscle; in supporting our immune system so we can fight illness and disease; and in ensuring healthy vision

Overview of Vitamins

Type	Names	Distinguishing Features
Fat soluble	A, D, E, K	Soluble in fat Stored in the human body Toxicity can occur from consuming excess amounts, which accumulate in the body
Water soluble	C, B-vitamins (thiamin, riboflavin, niacin, vitamin B6 , vitamin B12, pantothenic acid, biotin, folate)	Soluble in water Not stored to any extent in the human body Excess excreted in urine Toxicity generally only occurs as a result of vitamin supplementation

Minerals

- Minerals include sodium, calcium, iron, and over a dozen more.
- Minerals have many important physiologic functions. They assist in fluid regulation and energy production, are essential to the health of our bones and blood, and help rid the body of harmful by-products of metabolism.

Overview of Minerals

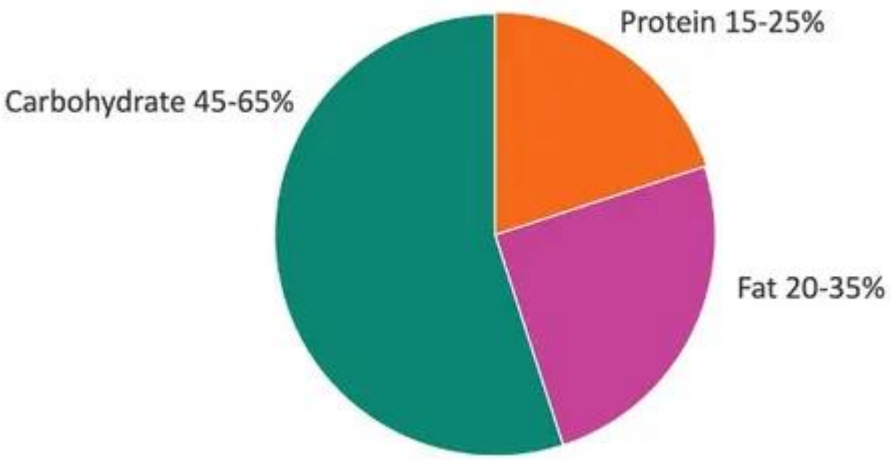
Type	Names	Distinguishing Features
Major minerals	Calcium, phosphorus, sodium, potassium, chloride, magnesium, sulfur	Needed in amounts greater than 100 mg/day in our diet Amount present in the human body is greater than 5 g (5,000 mg)
Trace minerals	Iron, zinc, copper, manganese, fluoride, chromium, molybdenum, selenium, iodine	Needed in amounts less than 100 mg/day in our diet Amount present in the human body is less than 5 g (5,000 mg)

CURRENT DIETARY INTAKE RECOMMENDATIONS

Dietary Reference Intakes (DRIs) are dietary standards for healthy people only. (USA and CANADA)

Macronutrient Distribution Range (AMDR)

jpshealthandfitness.com.au



How do the Nutritional Professionals Assess the Nutritional Status of Clients

- Before nutrition professionals can make valid recommendations about a client's diet, they need to have a thorough understanding of the client's **current nutritional status**, including his or her weight, ratio of lean body tissue to body fat, and intake of energy and nutrients

Current Nutritional Status

- The results of the nutritional-status assessment are extremely important, because they will become the foundation of any dietary or other lifestyle changes that are recommended and will provide a baseline against which the success of any recommended changes are evaluated.

Current Nutritional Status

- Nutrition professionals and other healthcare providers use a variety of tools to determine the nutritional status of clients. A combination of tools is used to confirm the presence or absence of nutrient imbalances

Health-history questionnaires

- ✓ Demographic information, including name, age, contact information, and self-reported height and body weight
- ✓ Current medication status, potential drug allergies, and history of drug use
- ✓ Family history of disease
- ✓ Personal history of illnesses, injuries, and surgeries
- ✓ History of menstrual function (for females)
- ✓ Exercise history
- ✓ Socioeconomic factors, such as education level, access to shopping and cooking facilities, marital status, and racial/ethnic background

Physical examinations

- Vital signs (pulse, blood pressure, body temperature, and respiration rate)
- Anthropometric assessments, body composition
- Examination of hair, skin, tongue, eyes, and fingernails.
- Health-history questionnaires

Table 4.2 : Standards for Upper Arm Anthropometry in Adults

Parameter	*Male*	*Female*
Triceps skin fold (mm)	12.5	16.5
Mid arm circumference (cm)	29.3	28.5
Mid arm muscle circumference (cm)	25.3	23.5

Measurement of Muscle Mass

Muscle mass can be measured not only by measuring arm muscle circumference but also Creatinine height index

Evaluation of mineral status

- Status with respect to the major minerals (Sodium, Potassium, Calcium and Magnesium) is commonly assessed using serum levels

Table 4.4 : Bio-Chemical Tests for Vitamin Intake and Stores

Vitamin	*Tests of intake levels*	*Tests of tissue stores*
A	Plasma or serum retinol	Liver retinol
D	-------	25 OHD, 1, 25 OH_2 D
E	Plasma tocopherols	Erythrocyte fragility test
K	-------	Prothrombin time
C	Serum ascorbate	Leukocyte, Urinary ascorbate load test
Thiamine	Urinary thiamine excretion	Erythrocyte transketolase
Riboflavin	Urinary riboflavin excretion	Erythrocyte glutathione reductase, erythrocyte riboflavin, pryridoxamine oxidase.
Pyridoxine	Urinary Pyridoxine excretion	Tryptophan load test. Erythrocyte transaminase, Plasma pryridoxal phosphate.
B_{12}	Serum B_{12}	Serum B_{12}, methylmalonic acid excretion.
Folacin	Plasma folacin	Erythrocyte folacin, formino glutamate excretion test.
Niacin	------	Urinary N-Methyl nicote namide 2-pyridone excretion.

Table 4.6 : Assays for Trace Minerals

Mineral	*Intake*	*Functions*	*Stores*
Zinc	Hair, nail zinc	------	Plasma zinc
Copper	------	Presence of iron deficiency like anaemia	Ceruloplasmin, plasma copper, hair levels
Iodine	Thyroid hormone Thyroid stimulating hormone level	Thyroid hormone Thyroid stimulating hormone level	------
Fluoride	Urinary fluoride level	-----	------

Contd...

Serum

Minerals	
Calcium, serum	9 – 11 mg/dl
Chlorides, serum	100 – 106 mEq/L
Iron, serum	70 – 140 mcg/dl
Magnesium, serum	75 – 175 mcg/dl
Phosphate	2–3 mg/dl or 1.6 – 2.4 mEq/L
Phosphorous, inorganic, serum	1.6 – 2.7 mEq/l
Potassium, serum	3 – 4.5 mg/dl
Sodium serum	16 – 20 mg/dl or 4 – 5 mEq/L

A diet history

- Generally included in the diet history are the patient's current factors affecting appetite and food intake;
- typical eating patterns (including time, place, dietary restrictions, frequency of eating out, and so forth);
- economic status; educational level; living, cooking, and food-purchasing arrangements; medication and/or dietary supplement use;
- physical activity patterns. A diet history can help identify any nutrition or eating problems and highlight a person's unique needs

The 24-hour dietary recall

- The 24-hour dietary recall (The person recalls all of the foods and beverages consumed in the previous 24-hour period)
- limitations: it does not give an indication of a person's typical intake; other limitations include reliance on a person's memory and his or her ability to estimate portion sizes.

Food-frequency questionnaires

- Food-frequency questionnaires can assist in determining a person's typical dietary pattern over a predefined period of time, such as 1 month, 6 months, or 1 year.

- questionnaire includes lists of foods with questions regarding the number of times these foods are eaten during the specified time period

Diet Records Involve Listing All Foods and Beverages Consumed

A diet record is a list of all foods and beverages consumed over a specified time period, usually 3 to 7 days.

Biochemical data

- —Laboratory values and results of organ function tests, X-rays, MRI scans, blood pressure etc.

Those whose preliminary assessment show the following:

- 1. Serum albumin less than 3.2 g/dl.
- 2. Total lymphocytes less than 1500 mm3.
- 3. Nonvoluntary weight loss.
- 4. History of nutritional deficiency.
- 5. Statement from client indicating change in appetite.

Nutrient Intake

- Once one has obtained the information on the foods consumed one of the several methods may be used to
- determine the nutrient content of foods. The method of choice would depend upon the accuracy desired. The
- nutrient content can be computed by following methods.
- q Chemical analysis of foods.
- q Use of Food Composition tables—Data banks, food composition tables, nutrient analysis of foods
- by industry.
- q Through exchange lists.
- q Nutritional labelling.
- q Calculation of nutrients in food supplements

Calculation of nutrients in food supplements

To calculate your daily calorie needs, follow these steps

- Step 1: Determine your Basal Metabolic Rate (BMR). This is the number of calories your body needs to maintain basic bodily functions at rest. You can use online calculators
- Step 2: Account for your activity level. Multiply your BMR by a factor that represents your activity level. Sedentary individuals should multiply by 1.2, lightly active by 1.375, moderately active by 1.55, very active by 1.725, and extra active by 1.9.

References

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4. Trust in Nutrition Science - American Society for Nutrition