

NUTRITION AND HEALTH

Presented By

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- **Nutrition** is a branch of life sciences which deals with the process of receiving and utilising all the substances required for **growth and development as well as keeping the body healthy.**
- Organic and inorganic complexes contained in food are called as **nutrients.**

BASICS OF NUTRITION

- To promote the physical, mental growth and development of human beings.
- Building and repairing of tissues and cells damaged by infection and injuries.
- To provide energy for doing work.
- To protect human beings from infections and deficiency disorders.

OBJECTIVES OF NUTRITION

- Food can be classified as,
- **Origin :**
 - a) Animal origin : Examples like eggs.
 - b) Plant origin : Vegetables



CLASSIFICATION OF FOOD

- **Chemical Composition :**

Proteins, Fats, Carbohydrates, Vitamins, Minerals

- **Biological Function :**

- a) Body building foods like meat, pulses.
- b) Energy giving foods like cereals, sugar.
- c) Protective foods like fruits, vegetables.

- **Nutritional Value :**

Cereals, millets, Pulses, Vegetables, Fruits, Nuts and oils, Miscellaneous.

- It provides **calories** or **energy** to the body.
- Needed in **large quantity** for maintaining **function and carrying daily activities**.
- Its includes **carbohydrates, fats, fibres, proteins and water**.

MACRONUTRIENTS

- Its major component of food and main source of **energy 4 Kcal/gm.**
- The balanced diet provide **50-60%** of total **calories.**
- The **excess** carbohydrates converted to **body fat.**
- Three main source of carbohydrates are **starches, sugars and cellulose.**
- Daily requirement in **children is 60-250 gm, adolescents 400 gm, men 300-700 gm and women 240-500 gm.**

CARBOHYDRATES

- Energy production in the body.
- Useful in oxidation of fat.
- Absorption of minerals.
- Prevention of constipation.
- Synthesis of vit. B complex.

FUNCTIONS OF CARBOHYDRATES

- Proteins constitute **20%** of adult body weight and **made up** of amino acids.
- Proteins is the **building material for all body parts** such as muscle, brain, blood, skin, hair, nails, bones and body fluids.
- There are two main sources of protein are **animal and plant**.
- Proteins are made up of **amino acids**.
- A healthy diet should contain **9 essential amino acids** in sufficient amount.
- 9 essential amino acids are **Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Threonine, Tryptophane and Valine**.

PROTEINS

- Acts as building blocks of cells and tissues.
- Regulates haemoglobin.
- Act as source of energy (1gm of proteins give 4 Kcal).
- Regulates muscle contraction, formation of enzyme, hormones
- Produces digestive juices and antibodies.
- During pregnancy women required more proteins about 14 g per day and 25 g per day during lactation.

FUNCTIONS OF PROTEINS

Protein Requirements for Different Age Groups

Group	Duration	Proteins allowance (g/kg/day)
Infants	0 – 3 months	2.3
	3 – 9 months	1.8
	9 – 12 months	1.5
Children	1 – 3 years	1.83
	4 – 6 years	1.56
	7 - 9 years	1.35
Adolescents (M/F)	10 - 12 years	1.24/1.17
	13 – 15 years	1.10/0.95
	16 – 18 years	0.94/0.88

- Its composed **of smaller units** called fatty acids.
- Normal human being fat constitutes about **10-15 % of body weight**.
- Fats yields **fatty acids and glycerol** on hydrolysis.
- Fatty acids are divided into **saturated** and **unsaturated** fatty acids.
- Unsaturated fatty acids includes all vegetable oils except coconut and palm oils.
- Saturated fatty acids increases blood cholesterol level.

FATS

- Daily requirements of fat in **man is 20-60 gm** and in **women 20-40 gm**.
- A diet rich in fat can lead to obesity.
- Deficiency of fat causes drying in skin CHD (Coronary Heart Diseases), cancer, etc.

- Fats provide energy (1 gm of fat provide 9 calories of energy).
- Maintain body temperature.
- It supports many organs in body such as heart, kidney, etc.
- Dietary fats supplies essential fatty acids needed for growth and maintenance of skin.

FUNCTIONS OF FATS

- They are needed in **smaller quantities** include **minerals and vitamins**.
- Their deficiency may results in **severe** or **life-threatening conditions**.
- They perform many functions like **producing enzymes, hormones and for normal growth development**.

MICRONUTRIENTS

- Vitamins are **organic substances** that maintain **normal structure and function of cells**.
- They **cannot synthesised** in human body, they added in the **human diet** from external sources.
- It **obtained** from plants and animals.
- Two types of vitamins are **fat-soluble and water-soluble**.

VITAMINS

1. **Fat – Soluble Vitamins** : It includes vit. A, D, E and K.
2. **Water - Soluble Vitamins** : It includes vit. C and B.
 - A well balanced diet will provide all needed vitamins.
 - Infant requires **375** micrograms daily, breast-feeding women requires **1200** micrograms and healthy adult male requires **1000** micrograms.

- Vitamin A helps in proper functioning of **retina and vision**.
- Vitamin A helps in maintaining functioning and integrity of **glandular and epithelial tissues**.
- It helps in **skeletal growth** and has an **anti-infective** action.
- Vitamin D facilitates the absorption and utilization of calcium and phosphorus for **healthy bones and teeth**.
- Vitamin E maintains healthy **muscular system** and act as **antioxidant**.
- Involved in the **metabolism** of carbohydrates, fats and proteins.
- It maintains the **strength** of the walls of the blood capillaries.
- **Normal functioning** of skin and nervous system.

ROLE OF VITAMINS

Sources, Functions And Deficiency Of Fat-Soluble Vitamins

Vitamins & their Chemical Names	Sources	Functions	Deficiency Diseases
Vitamin A (Retinol)	Milk, butter, cheese, egg yolk, fruits, green vegetables, tomatoes.	<ul style="list-style-type: none"> - Proper functioning of retina & vision. - Maintenance of healthy epithelial tissues. 	Night blindness, Dryness of eyes, Stunted growth, xerophthalmia and keratinization.
Vitamin D (Calciferol)	Fish liver oils, milk, cheese, egg yolk.	Facilitates absorption & utilisation of calcium and phosphorous for healthy bones and teeth.	Rickets in children, osteocalcin in adults.
Vitamin E (Tocopherol)	Egg yolk, Milk, butter, green vegetables, nuts, oils, wheat.	Maintains healthy muscular system, act as antioxidant.	Anaemia in pregnant women, neurological disorders.
Vitamin K (Phylloquinone) <small>Ms. M. P. Maske</small>	Cabbage, cauliflower, fish liver, leaf vegetables and fruits.	Formation of prothrombin & factors VII, IX, X in liver.	Slow blood clotting, haemorrhages in new born.

Sources, Functions And Deficiency Of Water-Soluble Vitamins

Vitamins & their Chemical Names	Sources	Functions	Deficiency Diseases
Vitamin B1 (Thiamine)	Yeast, liver, cereals, nuts, rice, egg yolk, pulses.	Proper utilisation of carbohydrates in food and nutrition of nerve cells.	General fatigue and loss of muscle tone, ultimately leads to beriberi.
Vitamin B2 (Riboflavin)	Yeast, liver, milk, eggs, green vegetables.	Necessary for tissue oxidation and growth.	Angular stomatitis, cheilosis, dermatitis and eye lesions.
Vitamin B6 (Pyridoxine)	Meat, liver, vegetables, egg yolk, soyabeans.	Protein metabolism and formation of RBCs and WBCs.	Rarely observed because of wide distribution in foods.
Vitamin B12 (Cyanocobalamin)	Liver, milk, eggs, moulds, fermenting liquors.	Maturation of RBCs.	Pernicious, megaloblastic anaemia, degeneration of nerve fibre of spinal cord .
Vitamin B9 (Folic acid)	Dark green vegetables.	Formation of RBCs .	Megaloblastic anaemia and diarrhoea.

Sources, Functions And Deficiency Of Water-Soluble Vitamins

Vitamins & their Chemical Names	Sources	Functions	Deficiency Diseases
Vitamin B3 (Niacin or Nicotinic)	Metabolic functions pulses, synthesised in body from tryptophan, wholemeal cereals.	Metabolic functions in cells necessary for tissue oxidation.	Prolonged deficiency causes pellagra, dermatitis, diarrhoea and dementia.
Vitamin B5 (Pantothenic)	Liver, yeast, egg yolk, fresh vegetables.	Formation of RBCs .	Dermatitis and adrenal insufficiency.
Vitamin B7 (Biotin)	Liver, yeast, pulses and nuts.	Carbohydrates and fat metabolism and growth of bacteria.	Dermatitis and conjunctivitis.
Vitamin C (Ascorbic acid)	Citrus fruits, berries, green vegetables, potatoes.	Formation and maintenance of healthy intercellular matrix and maturation of RBCs.	Multiple haemorrhages, slow wound healing, anaemia, bleeding gums.

- Minerals are required for **various body functions.**
- About **50** chemical elements are found in human body.
- It required for **growth, repair and regulation** of body function.
- Divided into three major groups,
 - 1. Major minerals :** Calcium, phosphorous, sodium, potassium, etc.
 - 2. Trace elements :** Iron, iodine, fluorine, zinc, etc.
 - 3. Trace contaminants :** Lead, mercury, aluminium, etc.

MINERALS

Daily Requirement, Functions And Sources Of Major Minerals

Sr. No.	Minerals	Daily Requirement	Functions	Source
1.	Calcium	1 – 1.5 kg	Bone, teeth formation, for blood clotting, intracellular signalling, muscle contraction, etc.	Yoghurt, chees, beans, cabbage, milk, vegetables, etc.
2.	Sodium	2 – 5 gm	Muscle contraction, nerve impulses, electrolyte balance	Fish, meat, eggs, milk, bread, salt.
3.	Potassium	5 – 7 gm	Cellular function, functioning of heart and kidney.	Bananas, grapes, beans, milk, vegetables.
4.	Phosphorous	800 – 1200 mg	Maintain body fluids, bones, teeth formation	Dairy products, meat, fish, nuts, cereals, pulses
5.	Magnesium	350 mg	Formation of bones, vitamin B activation, muscle relaxation, blood clotting.	Green leafy vegetables, brown rice, nuts.

Daily Requirement, Functions And Sources Of Trace Elements

Sr. No.	Minerals	Daily Requirement	Functions	Source
1.	Iron	3 – 4 gm	Formation of haemoglobin, brain development, regulation of body temperature, muscle activity, metabolism.	Green leafy vegetables, fish, egg yolk, red meat.
2.	Iodine	50 mg	Formation, protection, and formation of thyroid hormones	Milk, seafood, table salt.
3.	Zinc	5 – 10 mg	Growth and fertility maintenance.	Dairy products, meat, fish, pulses, wholegrains.
4.	Fluorine	2.9 mg	Required for bone mineralisation and dental enamel formation.	Fish, tea, toothpaste, cooked spinach.

Sr. No.	Minerals	Daily Requirement	Functions	Source
5.	Copper	1-2 mg	Formation of RBCs	Whole grains, beans, nuts, potatoes, black pepper, green leafy vegetables.
6.	Selenium	10 mg	Normal growth and development, prevent liver cell necrosis & muscular dystrophy.	Cereals, fish, red meat, eggs, chees.

Government of India developed national Nutrition Programmes

1. Vitamin A prophylaxis programme.
2. Prophylaxis against nutritional anaemia.
3. Control of iodine deficiency disorders.
4. Balwadi nutrition programme.
5. Mid-day meal programme

- Fibres help in keeping **bowels working regularly and the large intestine healthy.**
- Fibres is the indigestible parts of plant foods like beans, fruits.
- The **sources** of fibres are bread, fruits, vegetables, pasta, cereals, beans, rice, potatoes, etc.
- Two main components of fibre are.

1. Soluble fibre : Its soluble in water, soft and easy to chew. It lowers the cholesterol level, reduce the risk of colon cancer, loose weight and prevent bowel syndromes. **Ex.** Nuts, oats, etc.

2. Insoluble fibre : Its insoluble in water, tough and hard to chew. It reduce the risk and constipation.
Ex. Grains, potatoes, etc.

FIBRES

- It provide some nutrients known as **roughage**.
- Help in **peristalsis movement** of intestine.
- High fibre foods reduce **BP** and **inflammation**.
- The weight and size of **stool increases and softness** because of dietary fibre.

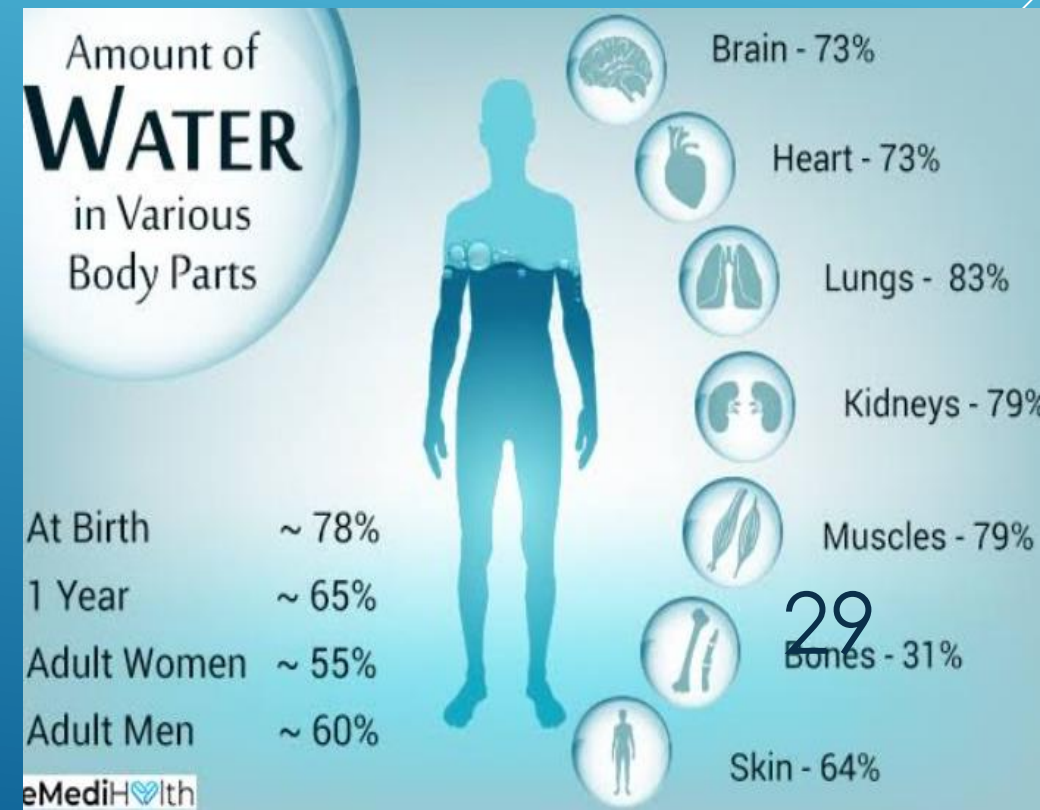
IMPORTANCE OF FIBRE IN DIET

- Reduce the risk of developing haemorrhoids.
- Soluble fibre reduce total blood cholesterol level.
- In diabetic patients, soluble fibre slows the absorption of sugar that helps improving blood sugar level.
- Increase in dietary fibre intake reduces the risk of death.

IMPORTANCE OF FIBRE IN DIET

- Most abundant compound in the body (**65-95%**) of water.
- Water is more essential than food, death usually results when **about 20% body** water is lost.
- **Lack** of water increase BP, malfunctions heart and failure of kidney.
- Water is also known as **silent nutrient** of the body.

WATER



Source of Body water :

- Fluids of the diet.
- Solid which contain water.
- Water produced by oxidation reaction in the body.
- Lung (water vapours)
- skin (sweating)
- Kidney (urine)
- Intestinal canal (faeces)
- Lactation (milk)
- Eyes (tears)

WATER EXCRETED BY MAJOR CHANNEL

- Helps in the transport of nutrients and waste products out of cells.
- It required for absorption, digestion, circulatory and excretory functions.
- Required for utilising water soluble vitamins.
- Maintain proper body temperature.
- Maintain health and integrity of cell.

IMPORTANCE OF WATER IN DIET

- It eliminate excess electrolytes, by-products of metabolism and urea.
- Regulate body temperature through sweating.
- It moistens mucous membranes of lungs and mouth.
- It lubricates joints.
- Prevent constipation, moisturise skin by maintaining texture and appearance.

