

Therapeutic nutrition

Lecture One

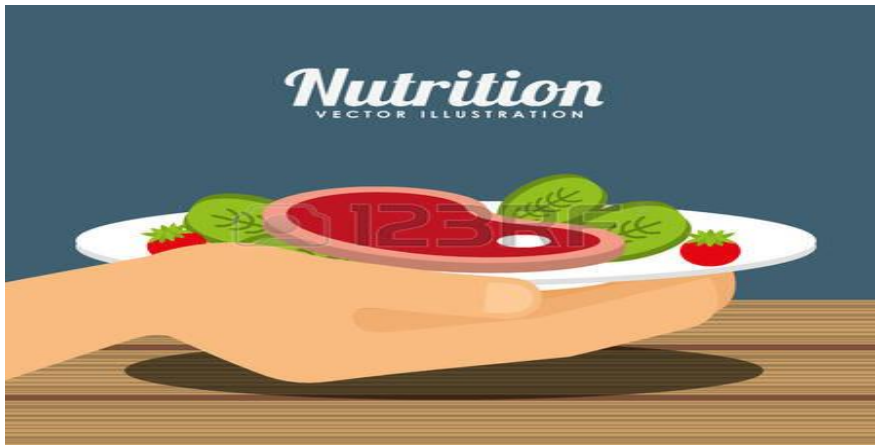


Learning objectives

At the end of this lecture student would be able to :

- 1-Define science of nutrition & food .
- 2-Determine functions of food .
- 3-Identify relation of nutrition to health & disease .
- 4-Outline food constituents .
- 5-Determine energetic value of nutrients .
- 6-Analyse feeding behavior control .
- 7-Determine factors affecting nutritional requirements.





Nutrition

Nutrition: Is the science of food and its relationship to health.

It is concerned primarily with the part played by nutrients in body growth, development, and maintenance .



It deals with :

1-Physiological dietary requirements of man .

2-The capacity of different foods to supply those requirements .

3-The pathological changes that may arise from qualitative or quantitative deficiency of food .



Food

Is any liquid or solid which when swallowed can provide the human body with materials enabling it to function in one or more of the following :

1. Production of energy .
2. Building of the body .
3. Participation in mechanisms regulate body activities .

Nutrient

Nutrient (**food factor**) is a term used for specific dietary constituents such as proteins , vitamins and minerals .

Dietetics is the practical application of the principles of nutrition , it includes the planning of meals for the well and the sick .

Good nutrition means maintaining a nutritional status that enables us to grow well and enjoy good health .

Nutrients

Nutrients are organic and inorganic complexes contained in food.

There are about **50** different nutrients which are normally supplied through the foods we eat .

Each nutrient has specific functions in the body .

Most natural foods contain more than one nutrient



Nutrients can be classified to :

1- Macronutrients : These are proteins, fats and CHO which are often called (proximate principles) because they form the main bulk of food .

2- Micronutrients : These are vitamins and minerals

They are called micronutrients because they are required in small amounts which may vary from a fraction of a milligram to several grams .

Relation of nutrition to health

- It is evident that nutrition is specifically related to both physical and emotional health.
-  Survival depends on air , water and food . These basic life supporting materials , supply the body with certain essential chemicals that enable it to do its work.
-  Essential nutrients supply the fuel and building blocks for carrying on body activities

Specific nutritional diseases were identified and try to control them as for example :

Protein energy mal nutrition , endemic goiter , nutritional anemia, nutritional blindness and diarrhoeal diseases .

Significant advances have been made during the past two decades .

The association of nutrition with :

1- infection

2- immunity

3- fertility

4- maternal and child health and family health
have been engaged scientific attention

5- pathogenesis of non- communicable diseases
such as coronary heart disease, diabetes and
cancer .

Signs of good nutrition

1. Well developed body with average weight for body size and good muscles with no skeletal malformations.

2. Smooth , clear , slightly moisture skin , with no discoloration.

3. Shiny hair with healthy scalp and no brittle nor de-pigmented hair.

4. Eyes are clear and bright with no signs of infection or increased vascularity , no thickened conjunctivae.

5.Regarding the general appearance , it permits person to be alert , responsive with good attention.

6.Good appetite , with no digestive problems including regular elimination (no diarrhea , no constipation).

7.Gums are pink , not swollen , no bleeding , straight teeth and well shaped jaw .

Classification of foods

There are many ways of classifying foods :

A- Classification by origin

- 1- foods of animal origin
- 2- foods of vegetable origin

B- Classification by chemical composition

1. Carbohydrates which provide the body with energy and may be converted into fat.

2. Fats which provide the body with energy and may also form body fat.

3. Proteins which provide materials for growth and repair of body tissues. They can also provide energy and sometimes can also be converted to fat.

4. Minerals, which are substances that provides materials for growth ,repair and regulation of body processes.

5. Vitamins and other **accessory substances** that regulate body processes.



C- Classification by predominant function

- 1- body building foods , e.g :milk, meat , poultry , fish, eggs, pulses, groundnuts, etc.
- 2- energy – giving foods e.g : cereals, sugars,.
Roots and tubers, fats and oils .
- 3- protective foods e.g : vegetables, fruits, milk .

D- Classification by nutritive value

- 1- cereals and millets
- 2- pulses(legumes)
- 3- vegetables
- 4- nuts and oilseeds
- 5- fruits
- 6- animal foods
- 7- fats and oils
- 8- sugar and jaggery
- 9- condiments and spices
- 10- miscellaneous foods

Other classification of food

Energy-yielding foodstuffs

- Foodstuffs form the great bulk of the ordinary diet.
- They supply energy to keep the body warm and are hence known as 'fuel-food.'
- A few examples of energy-yielding foodstuffs are cereals starchy vegetables, pulses, nuts, sugars, and oils.

Body-building foodstuffs

- Contain a satisfactory amount of the nutrients needed to build the body and replace the worn-out tissues.
- Milk and its products, meat, fish, and eggs are the best representatives of this group of foodstuffs.
- The other examples are legumes, dals, dried beans, peas and nuts.
- Cereals also contain some body-building nutrients.

Protective foodstuffs

- Provide large number of the protective substances needed by the body.
- Almost all natural foodstuffs contain one or more of these protective nutrients.
- There is no single foodstuff in which all the different protective substances are present in quantities sufficient to meet the daily needs of the body.
- This is why a combination of different kinds of foodstuffs is essential in a diet.



BALANCE DIET

- In order to obtain adequate amounts of each of the different nutrients, our daily diet should include appropriate quantities of a variety of different foodstuffs.
- An un-varied diet is not only distasteful but may have serious consequences on health and recovery from disease.
- A diet in which various foodstuffs are mixed in suitable proportions to carry out adequately the three functions described above, is known as a balance diet.
- Balance diet provides all nutrients in required amounts and proper proportions.

calorie

Is the unit of energy needed to raise one gram of water one degree centigrade.

-cal-

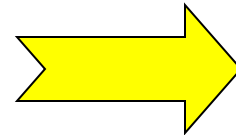
kilocalorie

Energy needed to raise one kilogram of water one degree centigrade.

-Kcal, Cal-

Energetic value of nutrients

1 gm carbohydrates



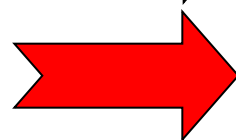
4 Calories

1 gm fat



9 Calories

1 gm protein



4 Calories

Normal chemical composition of man weighing 65 Kg

	<u>Kg</u>	<u>Percentage %</u>
Protein	11	17
Fat	9	13.2
Carbohydrates	1	1.5
Water	40	61.6
Minerals	4	6.1

Function of food in human body

1. Tissue building (proteins , minerals , vitamins).
2. Bone building (calcium , phosphorus and vitamin D).
3. Vitality and protection from diseases (vitamins and minerals) .
4. Energy production (fats , carbohydrates) .
5. Antibodies formation (proteins) .

Feeding behavior control

The control of feeding behavior in brain is by centers situated in the hypothalamus through:-

- 1.Nervous stimuli in the stomach → contraction of stomach when it is empty.
- 2.Chemical stimuli through the role of insulin and its relation to blood glucose level . Also free fatty acids raised during hunger.
- 3.Thermic stimuli, in cold weather , person feel more hungry.

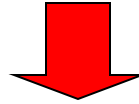
Nutritional requirements (caloric requirements)

Is a term that indicates the amount of proteins , fat , carbohydrates , minerals , vitamins and water .

Factors affecting nutritional requirements

1. Age .
2. Sex .
3. Physiological status (developmental stage).
4. Physical activity .
5. Climate .
6. Body weight .

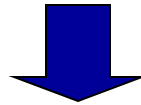
Each 10°C rise in temperature



5% reduction in the requirements

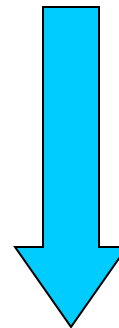
Each 10 years increase in age

30 -50 years



3% reduction in requirement

>50 years



7.5% reduction in requirement

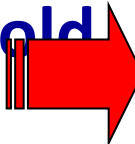
Special groups

Pregnant 

400 Calorie daily rise in requirements.

Lactating 

1000 Calorie daily rise in requirements.

Children (1-3) years old 

1300-1500 Calorie rise in requirement

Nutrition & Health

⊠ Proper nutrition is the most important single factor in the maintenance of health and efficiency. It encourages diseases prevention and prolongation of productive life.



⊠ The standard of nutrition is an index for the degree of development in any country.

Nutrition & diseases

 The causation of majority of human illnesses are:-

- 1. Hereditary factors .**
- 2. Environmental factors .**
- 3. Dietary habits .**

Relation of food to diseases

- 1. Deficiency  **Quantity**
- 2. Obesity.  **Quality**
- 3. Sensitivity.
- 4. Chemical poisons (arsenic and lead)
- 5. Bacteria and parasites.

Thank you