Nutrition

- Nutrition: the study of nutrients in food, how the body uses nutrients, and the relationship between diet, health and disease.
- Major food manufacturers employ nutritionists and food. The food we eat determines the way we look, and to some extent the way we feel, think, and behave scientists.
- Nutritional disorders are not confined to children living in areas of famine and starvation, they are also found in children living in developed countries.
- Weight wise: nutritional requirement of children are relatively higher than in adult due to higher basal metabolic rate, active growth, building of store & more physical activity.

Why is nutrition important?

- Energy of daily living
- Maintenance of all body functions
- Vital to growth and development
- Therapeutic benefits
    - Healing
    - Prevention

Nutritional requirement:

- Denote physiological requirement of various nutrient to maintain normal metabolism.
- Basal metabolic rate (BMR): minimum energy requirement to maintain essential physiological function of the body at rest, is highest in infancy55cal/kg/day decrease with age 25-30cal/kg/day in late childhood
- Normal child spend: 50% of energy requirement for BMR, 25%for physical activity, 12% for growth, 5% for digestion of food, 8%for fecal losses
- Ideal diet should provide 50-60% as CHO,
- 20-30% as fat & 10-15% as protein
- Each gram of protein, fat, CHO provide 4, 9, 4 calories respectively.
- Normal energy requirement:
    - 1^{st} <10kg 100cal/kg
    - 2^{nd} 10-20kg 1000 + 50cal/kg
    - 3^{rd} >20kg 1500+20cal/kg

COMPOSITION OF FOOD

Food is composed of the same chemicals that make up our bodies (water, salts, proteins, and so on). When we talk about diet, foods are classified according to the kinds of nutrients they provide.

These nutrients classified as:

1. Macronutrient or proximate principles e.g.: proteins, fat, carbohydrate
2. Micronutrient e.g.: vitamin & minerals

PROTEINS

These are the basic substances of our bodies – constitute 20% of body weight, are important source of energy as well as required for:

A. Body building i.e. growth of muscle & tissue
B. Repair & maintains of tissue
C. Synthesis of substance e.g.: AB, enzyme, hormone, HB
D. Maintenance of osmotic

SOURCES: Milk, Dried peas, Nuts, Pulses, Soya beans

Protein requirement differ from age to age and from condition to another, usually: 1.8-1.5mg/kg. Amino acids are essential nutrients in forming cell protoplasm. There are 9 essential A.A. which are essential for the growth. Histidine is essential only for infants.

* Arginine, cystine, taurine are essential for low birth weight infants.

Deficiency of protein is especially harmful in childhood. It can lead to impairment of physical and mental growth. Children with deficiency are more likely to get frequent infections.

FATS

Fats are very concentrated sources of energy. They give twice as much energy as either proteins or carbohydrates. Those fats which exist in Nature in the solid state are called fats. Those which are liquid by nature are called oils.

a. As vehicle for fat-soluble vit.
b. Source of essential fatty acid
c. Temperature regulation.
d. Increase palatability of food

SOURCES (vegetable sources) include: groundnut, gingerly, rape seed, coconut oil). Ghee (animal source).

Some vegetable oils are hydrogenated. They are treated with particular temperature and pressure in the presence of a chemical. After this process they can be kept even in hot climates. During the process, the vegetable oils lose certain essential components which promote growth and keep the skin healthy.

CARBOHYDRATES

Carbohydrates are more commonly known as starches and sugars. They are consumed either as free-sugar e.g.: monosaccharides (glucose, fructose & galactose) & disaccharides (sucrose, maltose, lactose)or as complex-sugar i.e polysaccharides e.g. starch. They provide heat and energy. Glucose is the fuel for the activity of all the cells. Carbohydrates also provide bulk or fiber or roughage. This is in the form of cellulose, which is the fibrous material present in many fruit and vegetables.

SOURCES: glycogen, cereals, starchy vegetables such as potatoes

VITAMINS

Vitamins are complex chemical substances required by the body in very small amounts. There are about a dozen vitamins which are essential to good health. They act as co-factors in many enzyme systems & divided into 2 groups:

a. Fat soluble vitamins: ADEK
b. Water soluble: B complex group & vitamin C.

However, a well-balanced diet supplies all the vitamins, their actions, symptoms of deficiency, and sources have been given below

Some Vitamins in Relation to Man

Vitamins	Symptoms of deficiency	Action in body	Good sources
A	Night blindness	Normal vision, Maintenance of integrity of epithelium, Removal of free radical	Carrots, mango, papaya
B1	Weakness Altered nerve function Beriberi	Normal nerve function	Whole cereals, milk
B2	Pellagra (dermatitis, diarrhea, dementia)	Normal metabolism of proteins, fats and carbohydrates	Whole cereal, milk, egg
B6	Peripheral neuritis, seizure	Normal CNS function	Widely distributed
Folic acid	Anemia	Normal nucleic acid synthesis Production of red cells	Green leafy vegetables
Ascorbic acid/C	Scurvy-fatigue, hemorrhage, abnormalities of bones	Wound healing increased resistance of infection	Fresh fruit (oranges, lemons, 'amala' gooseberry)
D	Rickets-defective bones and muscles	Normal growth of bones and teeth Normal muscle tone	Milk and milk products

MINERALS

Minerals required by the body include calcium, iron, and iodine (though iodine is usually described as a 'trace element'.

- Calcium

It is necessary for the maintenance of the teeth and bones, for clotting of blood, and for muscular contraction.

Sources: milk and mild products, dried fruit (especially dates), fresh fruit ('sitaphal' or custard apple), and certain cereals, such as ragi.

- Iron

Is a component of hemoglobin (the red coloring substance in the blood), and of myoglobin (the red coloring substance in the muscles). It is concerned with oxygen transport and cellular respiration. Deficiency of iron affects the formation of Hb, which is present in lower than normal amounts. This is called anemia.

Sources: dried fruit, nuts, jaggery, dried peas and beans, and green leafy vegetables.

- Iodine

It is important as it is used by the thyroid gland to synthesize the hormones, thyroxine and triiodothyronine. These two hormones influence the body growth and metabolism. Deficiency of iodine leads to low levels of thyroid hormone in the blood. Hence the feedback or check on the anterior pituitary and hypothalamus is removed. Hence the hypothalamus releases the releasing hormone (RH), which brings about release of the stimulating hormones (SH) of the anterior pituitary. The SH stimulate the thyroid gland, which increases in size – this is called goiter. Though enlarged, it is unable to produce the hormones, till iodine is provided.

Sources: sea salt, sea food, cereals, and nowadays 'iodized salt'

- Zinc:

It is essential component of many enzymes e.g.: carbonic anhydrase, alkaline phosphatase. Widely distributed in tissue:

- 80-90Mg/dl normal plasma
- Zinc is essential for :
    - Normal growth
    - Normal immunity
    - Wound healing
    - Synthesis of hormone

Sources: meat, milk, nut, legume

- Flourine:

It is the most abundant element in nature, about 96% of body flourine is present in bone & teeth. Flourine is required for mineralization of bone & dental enamel. Drinking water is the principle source for it.

Healty Food

- Fruits (Apple, Grapes), Fish

Unhealthy Food

- Fast food, canned food, saturated fat