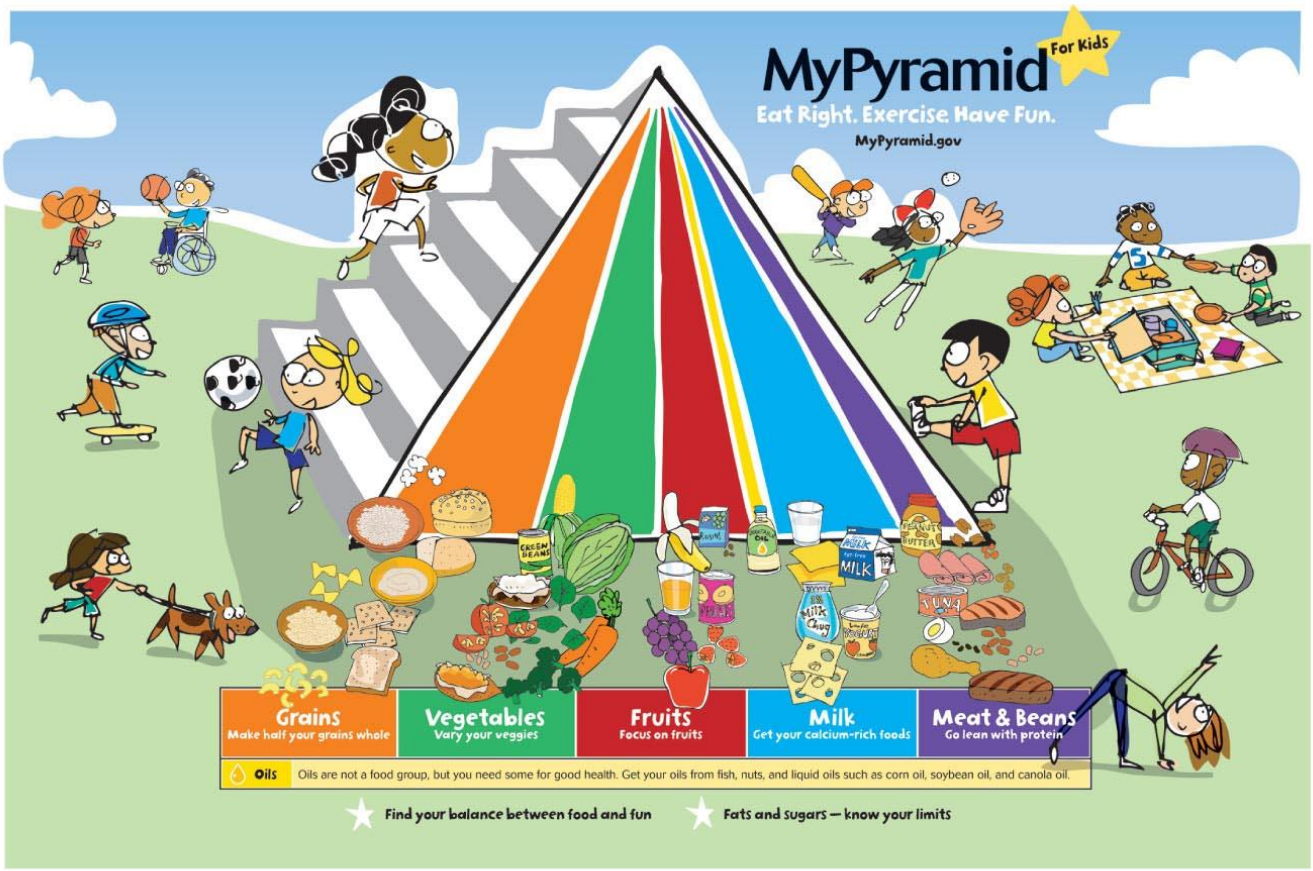
Principles of Human Nutrition



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Principles of human nutrition

- Food is a basic need of human.
- Food provide energy (calories), nutrients, and other substances needed for growth and health.
- Health problems related to nutrition originates within cells.
- Poor nutrition can result from both inadequate and excessive levels of nutrient intake.
- Humans have adaptive mechanisms for managing fluctuations in food intake.

Principles of human nutrition

- Malnutrition can result from poor diets and from disease states, genetic factors, or combinations of these causes.
- Some groups of people are at higher risk of becoming inadequately nourished than others.
- Poor nutrition can influence the development of certain chronic diseases.
- Adequacy, variety and balance are key characteristics of a healthy diet.
- There are no “good” or “bad” foods.

Principle # 1. Food is a basic need of humans.

- Human need enough food to live and the right assortment of foods for optimal health.
- Access to all times to a sufficient supply of safe, nutritious foods is **food security**.
- Limited or uncertain availability of safe, nutritious foods, or the ability to acquire them in socially acceptable ways is **food insecurity**.

Figure 18.1

Principle # 2. Foods provide energy (calories), nutrients, and other substance need for growth and health.

- People eat food for calories, nutrients and other substances supplied by foods for growth and health.
- A **calorie** is a measure of the amount of energy transferred from food to the body.
- **Nutrients** are chemical substances in food that the body uses for a variety of functions that support growth, tissue maintenance and repair, and ongoing health.
- The six categories of nutrients are carbohydrates, proteins, fats, vitamins, minerals and water.

- There are many substances in foods in addition to nutrients that affect health e. g. phytochemicals.
- Phytochemical are chemical substances in plants, some of which affect body processes in human that may benefit health.
- Phytochemicals act as antioxidant in the human body.
- Antioxidants are chemical substances that prevent or repair damage to cells caused by exposure to oxidizing agent.
- Intake of foods rich in phytochemical may help prevent certain types of cancer, cataracts, type 2 diabetes, hypertension, infections, and heart diseases.

Principle # 3. Health problems related to nutrition originate within cells.

- The function of each cell are maintained by the nutrient it receive.
- Disruptions in the availability of nutrients, or the presence of harmful substances in the cell's environment, initiate diseases and disorders that eventually affect tissues, organs, and system.
- For example, folate, a B vitamin, is required for protein synthesis within cells. When too little folate is available, cell produce proteins with abnormal shapes and functions.
- Abnormalities in the shape of red blood cell proteins lead to functional changes that produce loss of appetite, weakness, and irritability.

Principle # 4. Poor nutrition can result form both inadequate and excessive level of nutrient intake.

- Each nutrient has a range of intake level corresponding to its optimum function. Intake below or above this range are associated with impaired functions.

Development of nutrient deficiencies:

1. Inadequate nutrient intake
2. Depletion of tissue reserves of the nutrient
3. Decreased blood nutrient level
4. Insufficient nutrient available to cells
5. Impaired cellular functions
6. Physical signs and symptoms of deficiency
7. Long-term impairment of health

Development of nutrient toxicity:

1. Excessive nutrient intake
2. Saturation of tissue reserves of the nutrient
3. Increased blood nutrient level
4. Excessive nutrient available to cells
5. Impaired cellular functions
6. Physical signs and symptoms of toxicity
7. Long-term impairment of health

Principle # 5. Human have adaptive mechanisms for managing fluctuation in food intake.

- When energy intake exceeds need, the extra is converted to fat----- and to a lesser extent, to glycogen-----and stored for later use.
- If too few calories are consumed, the body will obtain energy from its glycogen, and fat stores.
- If calorie intake remain low, significant amount of body weight is lost, body regulates its need by lowering body temperature and the capacity for physical work.
- Some nutrients such as iron, calcium, vitamin A, B_{12} can be stored in the body.
- Some nutrients such as vitamin C and water eliminated through urine or stools.

Principle # 6. Malnutrition can result from poor diets and form disease states, genetic factors, or combination of these causes.

- **Malnutrition** is a poor nutrition resulting from an excess or lack of calories or nutrients.
- **Primary malnutrition** is the malnutrition that results directly from inadequate or excessive dietary intake of energy or nutrients.
- **Secondary malnutrition** is the malnutrition that results from a condition(e.g. disease, surgical procedure, medication use) rather than primarily from dietary intake.

- The study of nutrient-gene interacti0o and the effect of these interactions on health is called **nutrigenomics or nutritional genomics.**
- Genes provide a codes for enzymes and other protein synthesis and affect body functions.
- 99.9% human genes are identical, the 0.1% difference in genetic codes makes everyone unique.
- Variation in gene (genotype) contribute to disease resistance and development and to the way individual respond to various drugs.
- Examples of single-gene disorder that effect the nutrient need are **Phenylketonuria** (lack of the enzyme phyenlyalanie hydroxylase), **Celiac disease** (Gluten intolerance), **Lactose intolerance** (Lack of enzyme lactase) and **Hemochromatosis** (lack of protein that help regulate iron absorption).

Principle # 7. Some groups of people are at higher risk of becoming inadequately nourished than others.

- Women who are pregnant or breastfeeding, infants, children, people who are ill, and elderly persons are at a greater need for nutrients than healthy adults.
- As a result, they are at higher risk of becoming inadequately nourished than others.

Principle # 8. Poor nutrition can influence the development of certain chronic diseases.

- Heart diseases, cancer, stroke------high saturated fat, trans fat and cholesterol intake, excessive body fat.
- Type 2 diabetes------excessive body fat, high saturated fat, refined grain-product intake.
- Hypertension-------Excessive sodium and low potassium intake
- Iron-deficiency anemia-----Low iron intake
- Tooth decay------excessive and frequent sugar consumption, inadequate flouride intake
- Obesity------excessive calorie intake

Principle # 9. Adequacy, variety, and balance are key characteristics of a healthy diet.

- Healthy diets contain many different foods that together provide calories, nutrients and other beneficial substances in amounts that promote the optimal functioning of cells and health.
- Consumption of an assortment of foods from each of the basic food groups increases the probability that the diet will provide enough nutrients.

Principle # 10. There are no “good” or “bad” foods

- All foods can fit into a healthful diet as long as nutrients need are met at calorie-intake levels that maintain a healthy body weight.