Unit7
Nutrition

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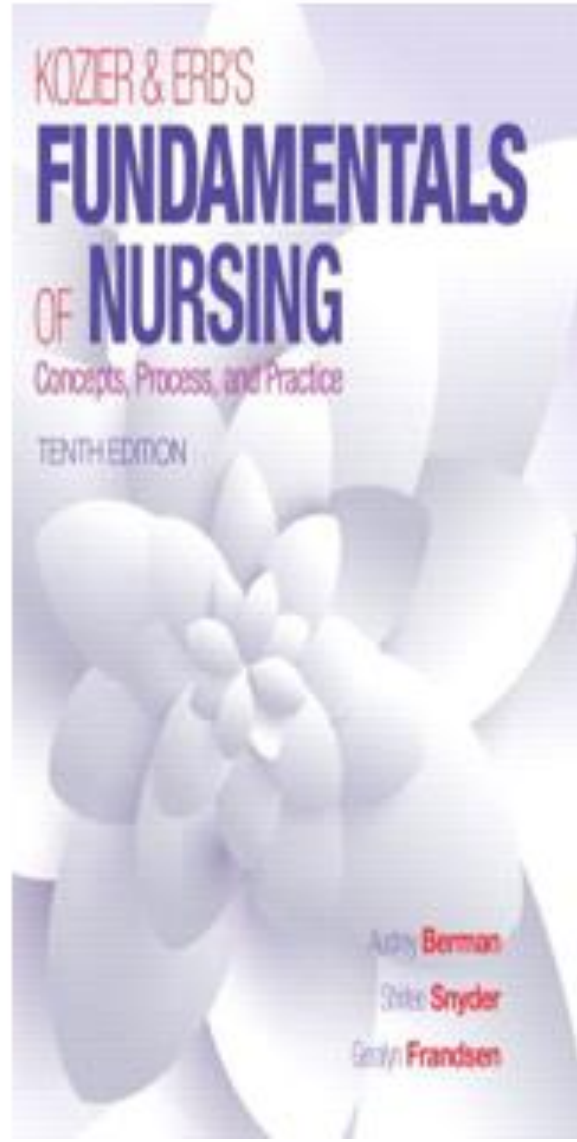

Essential Nutrients

Nutrients have three major functions:

1) Providing energy for body processes and movement,
2) Providing structural material for body tissues,
3) Regulating body processes.

- Nutrients provide fuel, or energy e.g carbohydrates, fats, proteins (macronutrients)
- Non-energy providing nutrients, include vitamins and minerals (micronutrients).

Water

-40%-80% of water makes up body

Main Functions:

-Helps to dissolve the nutrients

-Helps to control the temperature of body.

-Is a carrier of nutrients

-Causes chemical reactions.

Carbohydrates

-Made of sugars, starches, cellulose, and lignin.

-Are chemically composed of carbon, hydrogen, and oxygen. Easily digested.

-75% of feed is carbs.

- **Main Functions:**

-Gives energy.

-Pavers muscular movement e.g heartbeat, walking, breathing, and digestive

-Produces body heat

Sources of carbohydrate : Cereal Grains, Corn, Wheat

Fats / lipids

-Have 2.25 times the energy of carbs.

-Are chemically composed of carbon, hydrogen, and oxygen, easily digested.

Main Functions:

-Provide energy and body heat

-Carry fat-soluble vitamins

Sources of fats/lipids : oils, cereals, dried grains, wheat, animal sources.

Protein

-Is essential in fetal development

-10 essential amino acids

Main Functions:

-Build body tissues

-Form ligaments, hair, skin, internal organs, and muscles.

Sources of Protein : vegetable, meat, fish meal

Minerals

-Inorganic (Trace and micro) minerals and (macro and major)

-If it decease it lead to a deficiency or disease.

-Calcium, iron, potassium. Magnesium, sodium, Phosphorus, copper , nickel, Zinc

Main Functions:

-Provide materials for growth of bones, teeth, and tissue.

-Regulate many of the vital chemical processes of the body.

-Aid in muscular activities, digestion, repair or body tissues, formation of new tissue and release of energy for body heat.

Sources of minerals: Meat. cereals., fish., milk and dairy foods., fruit and vegetables., nuts.

Vitamins

- Organic
- Fat-soluble vitamins include: A , D , E , K
- Water-soluble vitamins include: C, B ,folic acid

Main Functions:

-Helps develop bones

-Minerals balance in blood

-Helps reproduction and muscle development

-Helps gullet body function

Sources of vitamins : Meat, poultry, fish, nuts, seeds, vegetable oils, cheese, eggs, cereals, dairy products fruit , sunlight

Factors Affecting Nutrition

1- Age and Development. Rapid growth during first 2 years of life, adolescence, and pregnancy increase need for calories. Elderly usually require fewer calories.

2- Gender. Men have larger muscle; need more calories and proteins. Women require more iron

3- Ethnicity and Culture.

4- Beliefs about Health Effects of Food. honey is healthier than sugar, yoghurt is more nutritious than milk

5- Personal Preferences and Uniqueness

6- Religion. Islam prohibit pork and alcohol.

7- Life-Style.

Factors Affecting Nutrition

8- Economic Status.

9- Peer Groups

10- Health Status: lack of teeth, difficulty swallowing surgery of gastrointestinal tract diseases of liver, pancreas

11- Alcohol Abuse

12- Advertising

13- Psychologic Factors. Anorexia nervosa and bulimia are severe psychophysiologic conditions

14- Therapy. (e.g. chemotherapy and radiation)

15- Medications

Altered Nutrition

Malnutrition:

- Lack of necessary or appropriate food substances includes both undernutrition and overnutrition (obesity).

a. Undernutrition

Intake of nutrients insufficient to meet daily energy requirements as a result of inadequate food intake or improper digestion and absorption of food.

Altered Nutrition

b. Overnutrition

✓Calorie intake excess of daily energy requirements,

✓Resulting in storage of energy in form of increased adipose tissue.

✓As amount of stored fat increases the individual becomes overweight or obese.

- Overweight : when body weight exceeds ideal body weight (IBW) by 1 to 20 percent.
- An obese when body weight exceeds IBW by more than 20 percent.

Clinical Signs Associated with Malnutrition

- **General appearance:** Looks tired, easily fatigued,
- **Weight:** Over weight or under weight
- **Skin:** Dry, peeling, pale or pigmented, lack of subcutaneous fat.
- **Nails:** Brittle, pale, spoon-shaped
- **Hair;** Dry, thin, loss of color, brittle
- **Eyes:** Pale or red conjunctiva, dryness,

Clinical Signs Associated with Malnutrition

- **Lips:** Swollen, red cracks at side of mouth
- **Tongue:** Swollen, beefy red colored, decrease or increase in size.
- **Gums:** Swollen, inflamed, bleed easily
- **Muscles:** Underdeveloped, flaccid, wasted, soft
- **G.I.T:** Anorexia, indigestion, diarrhea, constipation, enlarged liver
- **Nervous:** Decrease reflexes, sensory loss, burning and tingling of hands and feet, mental confusion or irritability

Body Weight and Body Mass Standards

- **Height**
- **Weight**
- **% weight loss** = Usual weight- current weight X 100

  Usual weight

Significant weight loss: -5% over 1 month

-7.5% over 3 months

-10% over 6 months

Direct Measurements include:

1- Skin fold measurement:

- Indicates amount of body fat, and determines fat stores.
- Fold of skin measured includes subcutaneous tissue but not muscle.
- It measured with special calipers.
- The most common site for measurement is the triceps skin fold (TSF).

Direct Measurements include:

2- Mid arm circumference (MAC)

- Is an index of skeletal muscle mass and protein reserves.
- It is a measure of fat, muscle and skeleton.
- Measure the circumference at the midpoint of arm, recording measurement in centimeters, to nearest millimeter.

Calculated Measurements include:

Body Mass Index (BMI)

- Indicates whether the person's weight is appropriate for height and provides a useful estimate of obesity.
- A body mass index of 27 or greater is equated with obesity.
- To calculate the BMI, the following steps can be followed formula:

$$BMI = Weight \ X \ 100 / Height\ (m)\ 2$$

Laboratory Data or Biochemical Data

It provides objective data.

1- Serum proteins provide visceral protein stores. Hemoglobin, albumin, transferring, total iron-binding capacity.

2- Urinary tests: Urinary urea nitrogen (UUN) measure protein catabolism and state of nitrogen balance.

Urinary creatinine reflects a person’s total muscle mass.

3- Total lymphocyte count. total number of lymphocytes decreases as protein depletion occurs.

Enteral Nutrition

Alternative feeding methods to ensure adequate nutrition through the gastrointestinal system

Routes of EN administration

1- Short-term nutrition

❖Nasoenteral: Nasogastric, Nasoduodenal , Nasojejunal

2-Long-term nutrition

❖Tube enter-ostomy: Gastrostomy, Jejunostomy

Nasogastric Tube (NGT)

- NGT inserted through one of nostrils, down the nasopharynx and into the alimentary tract.
- Nasogastric tubes firm large-bore larger than 12 Fr in diameter. e.g.

a. Levin tube that is a flexible rubber or plastic, single lumen tube with holes near the tip,

b. Salem sump tube, with a double lumen.

- **Purposes of Inserting NGT**

✓To administer feedings and medications. (Gavage)

✓For suctioning stomach content or to (**lavage,** wash) stomach in cases of poisoning or overdose of medications.

✓To collect stomach contents for laboratory analysis

Total Parenteral Nutrition

- Parenteral nutrition (total parenteral nutrition (TPN)) or intravenous hyperalimentation, is the IV infusion of dextrose, water, fat, proteins, electrolytes, vitamins, and trace elements.
- Because TPN solutions are hypertonic (highly concentrated in comparison to the solute concentration of blood), they are injected only into high-flow central veins, where they are diluted by the client’s blood.

Total Parenteral Nutrition

- TPN is a means of achieving an anabolic state in clients who are unable to maintain a normal nitrogen balance.
- Such clients may include: those with severe malnutrition, severe burns, bowel disease disorders (e.g., ulcerative colitis or enteric fistula), acute renal failure, hepatic failure, metastatic cancer, or major surgeries where nothing may be taken by mouth for more than 5 days.

Total Parenteral Nutrition

- TPN is not risk free.
- Infection control is of utmost importance during TPN therapy.
- The nurse must always observe surgical aseptic technique when changing solutions, tubing, dressings, and filters.
- Clients are at increased risk of fluid, electrolyte, and glucose imbalances and require frequent evaluation and modification of the TPN mixture.

Total Parenteral Nutrition

- TPN solutions are:

❑ 10% to 50% dextrose in water,

❑ plus a mixture of amino acids and special additives such as vitamins (e.g., B complex, C, D, K), minerals (e.g., potassium, sodium, chloride, calcium, phosphate, magnesium), and trace elements (e.g., cobalt, zinc, manganese).

Total Parenteral Nutrition

- Additives are modified to each client's nutritional needs.
- Fat emulsions may be given to provide essential fatty acids to correct and/or prevent essential fatty acid deficiency or to supplement the calories for clients who, for example, have high calorie needs or cannot tolerate glucose as the only calorie source.
- Note that 1,000 mL of 5% glucose or dextrose contains 50 grams of sugar. Thus, a liter of this solution provides less than 200 calories!

Total Parenteral Nutrition

- Because TPN solutions are high in glucose, infusions are started gradually to prevent hyperglycemia. The client needs to adapt to TPN therapy by increasing insulin output from the pancreas
- For example, an adult client may be given 1 liter (40 mL/h) of TPN solution the first day; if the infusion is tolerated, the amount may be increased to 2 liters (80 mL/h) for 24 to 48 hours, and then to 3 liters (120 mL/h) within 3 to 5 days.

Total Parenteral Nutrition

- Glucose levels are monitored during the infusion. When TPN therapy is to be discontinued, the TPN infusion rates are decreased slowly to prevent hyperinsulinemia and hypoglycemia.
- Weaning a client from TPN may take up to 48 hours but can occur in 6 hours as long as the client receives adequate carbohydrates either orally or intravenous

Total Parenteral Nutrition

- Peripheral parenteral nutrition (PPN) is delivered into the smaller peripheral veins.
- PPN cannot handle as concentrated a solution as central lines, but can accommodate lipids. For example, a 20% lipid emulsion can provide nearly 2,000 Kcal/day through a peripheral vein.
- PPN is considered to be a safe and convenient form of therapy.
- One major disadvantage is the frequent incidence of phlebitis (vein inflammation) associated with PPN.
- Substituting glycerol for dextrose may reduce vein irritation (Julian, 2013).

Total Parenteral Nutrition

- Peripheral parenteral nutrition is administered to clients whose needs for IV nutrition will last only a short time or in whom placement of a central IV catheter is contraindicated.
- It is a form of therapy used more frequently to prevent nutritional deficits than to correct them.
- Enteral or parenteral feedings may be continued beyond hospital care in the client’s home or may be initiated in the home