



Nutrition

PMTI Professional Course

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Outline

1. Nutrition – definition and integral components
2. Nutrition vs. nourishment
3. Nutrition as source of energy
4. Principles of good nutrition
5. Role of nutrition in health of body systems
6. Macronutrients
7. Micronutrients
8. Summary



Definition and integral components of nutrition

- The science of taking in and utilizing foods
- A nourishing substance, such as nutrients delivered via IV or NG tube in hospital
- Integral components - solids and liquids
 - a) solids: proteins, fats, carbohydrates, fiber
 - b) liquids: water, juices, tea, coffee, milk



Nutrition as source of energy

- Ultimate source of glucose. All foods consumed are broken down to molecules of glucose/fat
- calorie- measure of the energy-producing value of the food
- 1g of protein – 4 cal;
- 1g of fat – 9 cal;
- 1g of carbohydrates – 4cal;
- 1 g of fiber-0 cal.



Principles of good nutrition

- Adequate caloric intake – sustaining energy needs 1600 cal for adult woman, 2000 cal for adult man
- Adequate hydration – hydrating vs dehydrating liquids and solids
- Water requirements – body weight in kgs/divide by half/this amount in oz is daily water requirements



Principles of good nutrition

- Fresh and locally grown foods
- Seasonal foods – freshly picked vs. refrigerated
- Organically grown foods and purified water



Principles of good nutrition_(cont.)

- Whole foods are as close to their natural/unaltered state as possible (raw apple vs. apple sauce). Original nutrients that are found in the food are preserved.
- Processed foods – any alteration to the structure and nutrient/ingredient content of the food. Many levels of alteration/processing: removing husk from the grain/bleaching flour/adding minerals, preservatives; feeding chicken antibiotics/add preservatives to meat, etc



Role of whole and processed foods in diet

Class activity



Role of nutrition in health of body systems - MS

- Musculo-skeletal: growth, muscle mass, bone density, flexibility, joint mobility. Importance of proteins, calcium, hydration.
- Newly discovered role of skeleton in endocrine function



Role of nutrition in health of body systems - Endocrine

- Pancreas - sugar metabolism. Chromium, magnesium
- Reproductive function and health
- Thyroid - Energy metabolism, fat metabolism and storage. Iodine and magnesium.
- Pituitary, and pineal – essential amino acids, essential fatty acids, magnesium.



Role of nutrition in health of body systems - Circulatory

- Balance of fats, proteins and carbohydrates
- Essential fats, saturated fats, cholesterol and trans-fatty acids in heart and blood vessel health
- Hydration
- Essential nutrients for blood cells. Iron and copper.
- Blood pressure regulation – nutrition



Role of nutrition in health of body systems - Immune

- Proteins – immunoglobulin production
- Vitamins C, A, E, K – immune regulation
- Trace minerals: zinc, copper, manganese
- Processed sugars in suppression of immune function



Role of nutrition in health of body systems - Reproductive

- Protein: animal vs. plant in fertility
- Essential fatty acids
- Adequate caloric intake
- Vitamins A and D
- Lutein
- Bioflavonoids



Role of nutrition in health of body systems - Nervous

- Protein-essential amino acids – tyrosine, tryptophan, phenylalanine
- Essential fatty acids – omega-3
- Fats and metabolism of fats by brain
- Vitamins of B-group
- Adequate calories and stable blood sugar levels



Macronutrients

- Proteins
- Fats
- Carbohydrates
- Fiber



Protein

Daily requirements:

- Adult - 0.8 mg/kg of body weight
- Infant – 2.2 g/kg/d
- Child – 1-2 g/kg/d
- Adult woman - 45 g/d
- Adult man – 55 g/d
- Lactating woman – 65 g/d
- Pregnant woman – 75g/d

Typical US diet – 100 g/d



Fats

- General requirements: 30% of daily calories, based on 2000 cal diet
- Essential – body can not synthesize, needs to obtain from external sources. Need 4% of the total daily calories to come from essential fatty acids
- Omega-3, omega-6. Need ratio 2:1, typical ratio 30-50:1 of omega6:omega 3



Fats (cont.)

- Omega-3 deficiency: dermatological pathologies, increased inflammation, platelet dysfunction and CV pathologies, menstrual irregularities
- Sources: cold water fish, walnuts, flax, soy oil



Fats (cont.)

- Omega-6 deficiency: dermatological pathologies, reduction in fat-soluble vitamins, platelet dysfunction, menstrual irregularities
- Sources: vegetable, nuts, seeds, borage



Fats (cont.)

- Non-essential fats body can synthesize in modest amounts
- Omega-9 (olive oil, peanuts, avocado)
- Saturated fats – animal sources including dairy, coconuts, palm oil
- Trans-fatty acids – products of partial hydrogenation: margarine and vegetable oil



Carbohydrates

- Requirement – 300g/day based on 2000 calorie diet
- Simple carbohydrates: fruit, milk, candy, processed grains, sweeteners, etc.
- Complex carbohydrates: whole grain, vegetable, fruit, legumes



Carbohydrates (cont.)

- Fiber: 25g/day based on 2000 cal diet
- Soluble fiber –pectins, gums, mucilages.
Sources – fruits, legumes, vegetables,
whole grains, seaweeds
- Insoluble fiber: cellulose, hemicellulose.
Sources – wheat germ, root vegetables,
legumes, apples, pineapples



Micronutrients

- Vitamins (water- and fat-soluble)
- Minerals: Ca, Mg, Fe, I, K, Na
- Trace minerals: Cu, Zn, Cr, Se, Mn
- Bioflavonoids



Vitamins

- Water soluble – B-vitamins, C, Folic acid
- Sources: grains, vegetables and fruit, herbs, meat, poultry, fish, organ meat, dairy, eggs, mushrooms
- Fat-soluble – A, D, K, E
- Sources: dairy, liver, butter, fish, yellow and orange vegetable and fruit; eggs, sunlight; wheat germ, nuts, seeds, vegetable oils; oats, cabbage, dark green leafy vegetables



Minerals

- Calcium – adult man: 1200mg/d, adult woman: 800 mg/d. Sources – dairy, green leafy vegetables, tofu, almonds
- Magnesium – adult man: 350 mg/d, adult woman: 300 mg/d. Sources – hard water, wheat, millet, rye, rice, nuts and seeds, green vegetables



Minerals (cont.)

- Sodium – minimal requirement is 500 mg/d.
Typical diet contains 2400mg/day
- Sources: processed foods, pickles, smoked meats and fish, cheese, table salt
- Potassium – minimal requirement 2000 mg/d.
Typical diet contains 3,500 mg
- Sources: seeds, nuts, meats, dairy, dried and fresh fruit, potatoes, grains, all vegetables



Minerals (cont.)

- Iron – adult man:10 mg/d, adult woman:15 mg/d
- Sources: meat, kelp, tofu, molasses, sardines, prunes, oysters
- Iodine - adult man: 150 mcg/d, adult woman: 150 mcg/d, pregnancy: 200mcg/d
- Sources: fish,kelp,clams,eggs,iodized salt



Trace minerals

- Zinc
- Copper
- Selenium
- Manganese
- Silicon
- Chromium



Summary

- Application of integrative dietary concepts
- Sample individualized one-day diet plan