Chapter 17 – Life Cycle Nutrition: Adulthood and the Later Years

Learning Objectives
After completing Chapter 17, the student will be able to:
1. List the lifestyle behaviors that have an impact on health and aging.
2. Discuss the research on energy restriction and aging.
3. Describe physiological aging and lifestyle factors which can modify the process.
4. Describe the energy and nutritional needs of older adults.
5. Discuss the nutrition recommendations for vision changes that occur with aging.
6. Discuss the role of nutrition in the prevention and treatment of arthritic conditions.
7. Describe diseases of the aging brain and the role of nutrition in brain function.
8. Identify food assistance programs available for older adults.
9. Describe meal planning for single, older adults and the risks of food born illness.
10. Describe the medications that increase excretion of, alter requirements of, or interact with nutrients and the dietary changes recommended.

Lecture Outline
I. Nutrition and Longevity

Good nutrition and regular physical activity can increase life expectancy, support good health, prevent or prolong the onset of disease, and improve the quality of life. There are many healthy habits that can increase life span. A person’s physiological age and chronological age may be different. The benefits of energy restriction in humans in the later years are being studied.

A. Observation of Older Adults
   1. Healthy Habits
      a) Sleeping regularly and adequately
      b) Eating well-balanced meals, including breakfast, regularly
      c) Engaging in physical activity regularly
      d) Not smoking
      e) Not using alcohol, or using it in moderation
      f) Maintaining a healthy body weight
   2. Physical Activity
      a) Many benefits including lower weight, greater flexibility, increased endurance, better balance and health, and a longer life span
      b) Regular physical activity can prevent or delay the decrease in muscle mass and strength that occur with age.
      c) Active people benefit from higher energy and nutrient intakes.
      d) Start easy and build slowly
      e) Check with physician
B. Manipulation of Diet
1. Energy Restriction in Animals
   a) Shown to prolong life
   b) Shown to delay onset of or prevent disease
2. Energy Restriction in Human Beings
   a) Applying results in animal studies to human beings is problematic.
   b) Moderation of energy intake may be valuable.

II. The Aging Process
Physiological, psychological, social, and economic changes that accompany aging affect nutritional status. Everyday stress can influence physical and psychological aging. Stressors elicit the body’s stress response. Physical stressors include alcohol and drug abuse, smoking, pain and illness. Psychological stressors include exams, divorce, moving, and the death of loved ones. Malnutrition is common.

A. Physiological Changes
1. Body Weight
   a) Two thirds of the adults in the U.S. are overweight or obese.
   b) Older adults with low body weight may be unprepared to fight illness and disease.
2. Body Composition
   a) Sarcopenia is the loss of muscle mass.
   b) Nutrition and exercise play a role in maintaining muscle mass.
3. Immune System
   a) Compromised immune systems can occur with age.
   b) Chronic inflammation can occur along with frailty, illness, and death.
   c) Incidences of infectious disease increase.
4. GI Tract
   a) Slower motility resulting in constipation
   b) Atrophic gastritis impairs digestion and absorption of nutrients due to stomach inflammation, bacterial overgrowth, and a lack of hydrochloric acid and intrinsic factor.
   c) Dysphagia is defined as difficulties in swallowing and can result in nutritional deficiencies.
5. Tooth Loss
   a) Tooth loss and gum disease can interfere with food intake.
   b) Edentulous is lack of teeth.
   c) Conditions that require dental care
      (1) Dry mouth
      (2) Eating difficulty
      (3) No dental care in 2 years
(4) Tooth or mouth pain
(5) Altered food selections
(6) Lesions, sores, or lumps in mouth
d) Ill-fitting dentures

6. Sensory Losses and Other Physical Problems
   a) Vision problems can make driving and shopping difficult.
   b) Taste and smell sensitivities may diminish.

B. Other Changes
   1. Psychological Changes
      a) Depression and loss of appetite commonly occur together.
      b) Support and companionship of family and friends are helpful.
   2. Economic Changes
      a) Older adults have lower incomes and are at risk for poverty.
      b) Only 1/3 receive aid from federal assistance programs.
   3. Social Changes
      a) Loneliness is directly related to low energy intakes.
      b) Malnutrition is common.

III. Energy and Nutrient Needs of Older Adults

There are many nutrient concerns for aging adults. Supplements are not routinely recommended. Nutrient needs and health needs are highly individualized.

A. Water
   1. Dehydration increases risks for urinary tract infections, pneumonia, pressure ulcers, confusion and disorientation.
   2. Fluid needs are not recognized.
   3. Mobility and bladder problems
   4. Water recommendations: men 13 cups per day women 9 cups per day.

B. Energy and Energy Nutrients
   1. Energy needs decrease by around 5% per decade.
   2. Protein to protect muscle mass, boost the immune system, and optimize bone mass
   3. Carbohydrate for energy
   4. Fiber and water to reduce constipation
   5. Fat to enhance flavors of foods and provide valuable nutrients

C. Vitamins and Minerals
   1. Vitamin B\textsubscript{12} from fortified foods and supplements is especially needed for those with atrophic gastritis.
   2. Vitamin D from fortified milk and sunshine is needed to prevent bone loss.
   3. Folate status may be compromised by medical conditions or medications.
4. For those who avoid milk and milk products, calcium can be obtained from fortified juices, powdered milk, or supplements.  
5. Iron from red meats consumed with vitamin C-rich foods  
6. A deficiency of zinc can alter appetite and taste.  

D. Nutrient Supplements  
1. Vitamin D and calcium for osteoporosis and vitamin B₁₂ for pernicious anemia  
2. A multivitamin-multimineral supplement may be recommended.  

IV. Nutrition-Related Concerns of Older Adults  
Adults over 65 have many problems that might be preventable through good nutrition. There is a strong need to solve vision, arthritis, and brain related problems.  

A. Vision  
1. **Cataracts** are thickenings of the eye lenses.  
   a) Consuming foods or taking supplements of vitamin C, vitamin E, and carotenoids may decrease the risk or slow progression of cataracts.  
   b) Some association with obesity  
2. **Macular degeneration is a deterioration of the macula (center of the retina) area of the eye that leads to vision problems and blindness.**  
   a) Antioxidants, zinc, leutein, zeaxanthins, and omega-3 fatty acids are preventative factors.  
   b) Total fat intake may be a risk factor.  

B. Arthritis  
1. **Osteoarthritis (also called degenerative arthritis)**  
   a) Risk factors include age, smoking, BMI at 40, and lack of hormone therapy in women.  
   b) Painful deterioration of the cartilage in the joints  
   c) Associated with overweight  
2. **Rheumatoid Arthritis**  
   a) Immune system attacks bone coverage  
   b) Omega-3 fatty acids may reduce joint tenderness and motility.  
   c) Vitamin C, vitamin E, and carotenoids as antioxidants often help.  
3. **Gout**  
   a) Uric acid deposits in the joints  
   b) Purines are converted to uric acid.  
   c) There are increased uric acid levels when meat and seafood are consumed.  
   d) Milk products lower uric acid levels.  
4. **Treatment**  
   a) Relief from discomfort and improve mobility  
   b) No cure
Alternative therapies such as glucosamine and chondroitin may help but this is not confirmed.

Drugs and supplements may affect nutritional status.

C. The Aging Brain

1. Nutrient Deficiencies and Brain Function
   a) Neurotransmitters need precursor nutrients.
   b) Senile dementia
   c) Neurons diminish as people age.

2. Alzheimer’s Disease
   a) Abnormal deterioration of the brain
   b) Free radicals and beta-amyloid
   c) Senile plaques and neurofibrillary tangles develop in the brain.
   d) Acetylcholine breakdown may affect memory.
   e) Drugs are useful but are not a cure.
   f) Maintaining body weight is important; Alzheimer’s patients may forget to consume foods.

V. Food Choices and Eating Habits of Older Adults

Older people benefit from the social interaction and the nutrients provided through food assistance programs. Older adults should purchase foods carefully and prepare foods creatively.

A. Food Assistance Programs
   1. Congregate meals are group settings at community centers.
   2. Meals on Wheels is a home-delivered meal program.
   3. The Senior Farmers Market Nutrition Program allows low-income older adults to exchange coupons for fruits, vegetables, and herbs.

B. Meals for Singles
   1. Foodborne Illness
      a) Greater risk in older adults
      b) If severe, can cause paralysis, meningitis, or death
   2. Spend Wisely
      a) Buying proper quantities
      b) Buy foods with longer shelf life – ultrahigh temperature (UHT) for milk products
   3. Be Creative
      a) Use fresh foods for different recipes.
      b) Dine with others.
      c) Freezing meals
VI. Highlight: Nutrient-Drug Interactions

Both prescription and nonprescription (over-the-counter) drugs may have nutrition related consequences. Individuals need to consult with all of their physicians and pharmacists to avoid harmful drug interactions.

A. The Actions of Drugs
   1. Modifies one or more of the body’s functions
   2. Desirable and undesirable effects

B. The Interactions between Drugs and Nutrients
   1. Drugs alter Food Intake
      a) Altering appetite
      b) Interfering with taste and smell
      c) Inducing nausea or vomiting
      d) Changing oral environment
      e) Causing sores or inflammation of the mouth
   2. Drugs alter Nutrient Absorption
      a) Changing acidity of the digestive tract
      b) Altering digestive juices
      c) Altering motility of the digestive tract
      d) Inactivating enzyme systems
      e) Damaging mucosal cells
      f) Binding nutrients
   3. Diets alter Drug Absorption
      a) Changing acidity of the digestive tract
      b) Stimulating secretions of the digestive juices
      c) Altering rate of absorption
      d) Binding to drugs
      e) Competing for absorption sites
   4. Drugs alter Nutrient Metabolism
      a) Acting as structural analogs
      b) Competing with each other for metabolic enzyme systems
      c) Altering enzyme activity and contributing pharmacologically active substances
   5. Drugs Alter Nutrient Excretion May cause the liver to release enzymes that metabolize
      a) Altering reabsorption in the kidneys
      b) Displacing nutrients from their plasma protein carriers
   6. Altered Drug Excretion – by changing acidity level of the urine

C. The Inactive Ingredients in Drugs – Other ingredients in drugs may include sugar, sorbitol, lactose, and sodium.
1. Sugar, Sorbitol, and Lactose
   a) Sugar may be a problem for diabetics
   b) Sorbitol may cause diarrhea
   c) Lactose can be a problem for those with lactose intolerance

2. Sodium can be found in antibiotics and antacids