Chapter Three:

Physical Well-Being: Physiological Changes and Health

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Biological Theories of Aging

- **Senescence**: The normal process of alterations over time in the body and its organ systems that eventually affect our functioning but does not necessarily result in disease or death is called senescence.

- Most biological theories of aging have one of two general orientations:
  - Aging occurs because of random genetic mutations and oxidative stress.
  - Aging is a result of programmed senescence.
Biological Theories of Aging

- **Wear-and-tear theory**: The theory that states that an organism wears out over time.

- **Cellular aging theory**: Aging occurs as cells slow their number of replications.

- **Immunological theory**: Aging is a function of the body’s immune system becoming defective.

- **Free radical theory**: The progressive, irreversible accumulation of oxidative damage to cells explains loss of physiological functions as we age. This theory is also referred to as oxidative stress model.
Biological Theories of Aging: Can Aging Be Reversed or Delayed?

- **Human growth hormone**: Genetic researchers have tested the effects of injecting growth hormones into aging animals and humans, finding that doing so increased lean muscle mass and bone density and reduced fat levels, leading to increased activity and vigor.

- **Caloric restriction (CR)**: Through reducing the intake of fat, protein, or carbs, the life span of experimental animals can be extended without causing malnutrition.

- **Prolongevity**: Instead of reversing aging, some biologists are focused on extending the length of healthy life and eliminating some diseases associated with aging.

- Can these ideas increase **healthy life span**—expanding the number of years we spend in good health?
“Normal” Physiological Changes With Age

- “Normal” refers to the general tendencies or patterns of physiological changes that are observed in the majority of people as they age.

- **Functional capacity** is the performance ability and efficiency of the heart, lungs, kidneys, and other organs.
“Normal” Physiological Changes with Age

- Changes in body composition
- Changes in skin and hair
- Organ systems
  - Musculoskeletal and kinesthetic systems
  - Respiratory system
  - Cardiovascular changes
  - Urinary system
  - Gastrointestinal system
  - Endocrine system
  - Immune system
  - Nervous system
Physiological Changes and Sexuality

- Women and Age-Related Physiological Changes
  - Menopause
  - Hot Flashes

- Men and Age-Related Physiological Changes
  - Male Menopause (or viropause)
  - Loss of testosterone
    - Reduced muscle size and strength
    - Decreased levels of calcium in the bones
    - Declining immune system response
    - Fatigue, irritability, indecisiveness, depression, loss of self-confidence, listlessness, poor appetite, and problems of concentration
    - Erectile dysfunction or impotence
Sleep Patterns

- Up to 40% of older people do not sleep well.

Tips for improving sleep:
- Increase exposure to natural daylight
- Drink less caffeine
- Avoid napping
- Improve the sleep environment (e.g., a quiet bedroom with heavy curtains or sleep mask)
Sensory Functions: Vision

- As we age, we cannot see, hear, touch, taste, or smell as well as we did when we were younger.

- Some common vision problems include:
  - **Presbyopia**: a physiological change in the lens’ shape and elasticity, making it difficult to see objects up close
  - **Accomodative ability**: not being able to see clearly when shifting focus from near to far
  - **Cataracts**: a disease that results in a severe clouding of the eye lens that prevents enough light from entering to see
  - **Glaucoma**: a disease that results when excess production of fluid occurs and causes pressure to the optic nerve
  - **Age-related macular degeneration (AMD)**: loss of acuity in the center of the visual field
Sensory Functions: Hearing

- **Presbycusis**: age-related hearing loss involving limited volume and range or distortion of sounds perceived

- Signs of hearing loss:
  - Difficulty distinguishing high-frequency consonant such as z, s, sh, f, p, k, t, and g, which negatively affects comprehension
  - Increasingly asking people to repeat what they said
  - Raising the volume of the TV or radio or moving closer to it
  - Withdrawing socially
Sensory Functions: Taste and Smell

- Some older people may complain that food does not taste as good as it once did, but these complaints are not due to age-associated changes.

- Age-related declines for smell are greater than taste; appreciation of food involves the sense of smell.
Sensory Functions: Touch

- Touch sensitivity deteriorates slightly with age due to change in the skin and to age-related loss in the number of nerve endings.

- These changes affect performance of daily tasks that require sensitivity of the fingertips, such as selecting medications from a pillbox.
Defining Health and Functional Ability

- **Good health** is a state of physical, mental, and social well-being.

- Being old does not necessarily mean being in “bad health.” Approximately 40% of persons age 65 and older in community settings assess their health as excellent or very good, compared to about 65% of younger adults.

- **Health status** is the presence or absence of disease and the degree of disability in level of functioning.

- **Activities of daily living/instrumental activities of daily living** is the measurement of functional ability that point to the level of care needed by an elder.

- **Disabilities** are impairments in the ability to complete daily tasks.
Defining Health and Functional Ability

- **Frailty** is another way of describing severe limitations in ADLs, such as unintended weight loss, slow walking speed, low physical activity levels, weak grip strength, and chronic exhaustion.

- **Chronic illnesses** last more than three months and require long-term management or care rather than a cure. **Acute illnesses** are short term and more readily treated.

- **Health disparities** are inequalities in health, well-being, and mortality across the life course.

- **Health care disparities** are the differences in access, quality and use of healthcare services; these typically result in health disparities.

- **Quality of life** encompasses an individual’s functional health, relative independence in performing daily tasks, and satisfaction with his or her circumstances.
Are Disability Rates Declining?

• In 2006, yes, the rates declined.

• But today, the answer is less clear cut, with some studies finding that after years of steady decline, disability rates among older adults have been rising since 2000.

• Why?
  – Doubling obesity rates over the last three decades, which brings other health issues.
  – People may be living longer, but many are also living sicker.
Chronic and Acute Diseases

• Although the risk of chronic disease increases with age, the incidence of acute (or temporary) conditions, decreases.

• Nearly 80% of older adults have one or more chronic disease.

• The reasons why many older adults are living longer but with higher rates of chronic illness:
  - Increased life expectancy
  - High rates of unhealthy behaviors
  - Treatment advances
  - Increased public awareness; illnesses that may have gone undetected in the past are now diagnosed and treated
Health Disparities

- Gender, race, sexual orientation, social class, education, and lifestyle factors all have a profound affect on physical well-being and create health inequities.

- Elders of color have higher rates of chronic illness and as a result, a higher percentage of hospitalization, longer hospital stays, and shorter life expectancy.
Primary Causes of Death in Old Age

- Two-thirds of deaths among older adults are due to heart disease, cancer, strokes, and diabetes.

- Healthcare disparities are also reflected in the fact that African American men age 55 to 64 are at the highest risk for death from heart disease and strokes.
Common Chronic Diseases

- Heart Disease and the Cardiovascular System
  - **Coronary heart disease** occurs when optimum blood flow to the heart is restricted because the cardiac vessels narrow; this may be caused by atherosclerosis, the accumulation of fatty deposits in the vessels.
  - **Hypertension**, also called high-blood pressure, is a major risk factor for heart disease and largely caused by lifestyle.
  - **Hypotension** is characterized by dizziness and faintness from exertion after a period of inactivity.
Strokes and Other Cerebrovascular Problems

- **Cerebrovascular disease** is the result of impaired brain tissue that occurs when blood cannot flow in sufficient amount to the brain.

- **Cerebrovascular accident (or stroke)** occurs when a portion of the brain is completely denied blood, such as through a blood clot.
  - CVAs are the primary cause of disability for older adults and fourth leading cause of death.
  - African American elders and men in general are at greatest risk of strokes, but after age 75, women across all races are at highest risk.
  - African American males are more likely to die of stroke than other groups.
Cancer

- Cancer is the second most common cause of death among elders.

- Almost 60% of all new cancers occur in older adults.

- Diagnosing cancer in old age is often more difficult because of the presence of other illness and symptoms.
Arthritis

- Arthritis is the second most common chronic condition diagnosed in about 50% of older adults; it is a major cause of limited daily activity.
  - **Rheumatoid arthritis** is a chronic inflammation of the membranes lining joints and tendons; characterized by pain, swelling, bone dislocation, and limited range of motion. Can cause severe crippling.
  - **Osteoarthritis** is a gradual degeneration of the joints most subject to stress, e.g., hands, knees, hips, and shoulders.
Osteoporosis or “Weak Bones”

- **Osteoporosis** is dramatic bone loss with increased brittleness. It can result in diminished height, slumped posture, backache, and susceptibility to fractures, particularly of the vertebrae and thigh.

- **Osteopenia** is a significant loss of calcium and reduced bone density, but without the risk of fracture.

- **Hormone replacement therapy (HRT)** was thought to prevent further bone loss in post-menopausal women. It is less popular now due to findings from national Women’s Health Initiative that pointed to increased risk of heart disease, breast cancer, and stroke.
Chronic Obstructive Pulmonary Disease or Respiratory Problems

- **Chronic obstructive pulmonary diseases (COPDs)** Chronic bronchitis, asthma, and emphysema are all COPDs; these illnesses damage lung tissue.
  - They increase with age, develop slowly, and are progressive and debilitating.
  - Causes are both genetic and environmental
Diabetes

- **Diabetes**: When insufficient insulin is produced by the pancreas, it can lead to diabetes. It is characterized by above-normal amounts of sugar in the blood and urine, resulting from an inability to use carbohydrates.
  - Primary risk factors include:
    - Age
    - Family history
    - Race/ethnicity
    - Health disparities
Problems with Kidneys and Urinary Tract

- **Cystitis** is caused in women when the bladder isn’t able to empty completely. It is an acute inflammatory state accompanied by pain and irritation.

- **Prostate Cancer** is a urinary tract disorder occurring in men.
Problems with the Intestinal System

- **Diverticulitis**: This is a condition in which pouches (or diverticula) in the intestines result from weakness of the intestinal wall, resulting in inflammation and infection. Nausea, abdominal discomfort, bleeding, and changes in bowel function can result.
Oral Diseases

- Tooth decay and periodontal gum disease increase with age.

- **Endentulous** occurs when one has no natural teeth remaining. It affects 26% of people 65 and older.

- Oral health is associated with living longer.

- Good dental care is important in old age.
HIV

• 25% of people with HIV/AIDS are 50 and older, a statistic largely due to unprotected sex and failing to learn about their partner’s sexual and drug use; to blood transfusions before blood was tested for HIV; or to surgery in a developing country.

• As with other illnesses, there are gender and racial differences in the incidences of HIV/AIDS, e.g., men over age 50 are at far higher risk than women.

• There are several reasons why HIV/AIDS goes undiagnosed in older adults, e.g., older people are often unaware of their risk for infection.
Accidents

- Mortality statistics may point to older people being less likely than the young to die from accidents but these numbers may mask the incidence of deaths due to accident-related injuries.

- **Older drivers:** Almost 90% of people over age 65 still drive but only account for 7% of all accidents. Although accidents by older drivers are more visible in the media, they cause fewer accidents than those under age 24.

- **Falls:** Falls are the leading cause of injuries and injury-related deaths and of about 95% of hip fractures for adults 65 and older.
Use of Physician Services

- Adults age 65 and older average approximately seven visits to a doctor annually, compared to 1.3 for younger adults. However, only a small proportion of older adults are high users of all healthcare services.

- **Hospital utilization:** Older people on average have three times as many hospital stays and for longer periods of time than younger populations.

- **Medication use:** Older adults’ increasing use of medications goes hand in hand with the growth of pharmacotherapy in treating health.
Health Promotion

- **Health promotion**: Health education and environmental changes are important to enhance people’s ability to improve their well-being, not just manage their diseases.

- **Exercise as central to health promotion**: The benefits of regular aerobic weight-bearing exercise such as brisk walking and strength training are numerous, even for people with chronic illnesses.

- **Nutrition**: A healthy diet has multiple benefits. For example, a moderate reduction in saturated and trans-fats can reduce cholesterol levels and the risk of heart disease.
Health Promotion: Programs That Work

- Researchers have found that health promotion initiatives can help empower older adults to take control of their health through increased self-efficacy and self-management.

- Programs can help with increased physical activity, falls management, and health programs that can assist older people with changing behaviors, improving their health status, and reducing the use of hospital services.
Improving the Results of Health Promotion Programs

- Health promotion, particularly increased physical activity, can save individuals and society significant dollars otherwise used to treat disease.

- However, only a small percentage of national healthcare funding is currently spent on prevention and wellness services.

- Sustaining health practices over time is difficult as habits have already been formed.

- Health promotion programs are sometimes criticized for their emphasis on individual responsibility for change.