Chapter 5

Homeostasis, Adaptation, and Stress
Homeostasis

- A relatively stable state of physiologic equilibrium
  - Body maintains homeostasis by adjusting and readjusting to changes in internal and external environment
Holism

• Implies that entities in physiologic, psychological, social, and spiritual areas contribute to the whole of a person

• Two commonly held beliefs of holism:
  - Both the mind and body directly influence humans
  - Relationship between the mind and body can potentially sustain health as well as cause illness
Stressors

• Stressors are factors that cause stress

• Types:
  – Physiologic
  – Psychological
  – Social
  – Spiritual
Adaptation

- Use of self-protective properties and mechanisms
- Purpose of adaptation is to regulate homeostasis
- Neurotransmitters mediate homeostatic adaptive responses
- Unsuccessful adaptation results in stress
Structures That Mediate Adaptive Response

• Neurotransmitters: allow chemical communication between neurons
  – Serotonin, dopamine, norepinephrine, acetylcholine, gamma-aminobutyric acid, and glutamate

• Neuropeptides: types of neurotransmitters
  – Substance P, endorphins, enkephalins, and neurohormones
Is the following statement true or false?

Norepinephrine stabilizes mood, induces sleep, and regulates temperature.
Answer

False.

Norepinephrine heightens arousal and increases energy. Serotonin stabilizes mood, induces sleep, and regulates temperature.
Structures That Mediate Adaptive Response (cont’d)

• Central nervous system
  - Composed of brain and spinal cord; brain divided into cortex and subcortex
    - Enables people to think abstractly, use and understand language, accumulate and store memories, make decisions
    - Reticular activating system is part of subcortex
Central Nervous System

- Cortex
- Midbrain
  - Basal ganglia
  - Thalamus
  - Hypothalamus
- Brain stem
  - Cerebellum
  - Pons
  - Medulla
- Pituitary gland
- Spinal cord
Structures That Mediate Adaptive Response (cont’d)

• Autonomic nervous system
  – Composed of peripheral nerves that affect physiologic functions that are largely automatic and beyond voluntary control
  – Subdivided into:
    o Sympathetic nervous system
    o Parasympathetic nervous system
Structures That Mediate Adaptive Response (cont’d)

- Endocrine system
  - Group of glands found throughout the body
  - Sustains the response of the autonomic nervous system
  - Maintains homeostasis by releasing and inhibiting hormones as needed
**Sympathetic and Parasympathetic Adaptive Response**

- In dangerous situations:
  - Sympathetic response: prepares body for fight or flight; accelerates physiologic functions that ensure survival
  - Parasympathetic response: restores equilibrium after danger is no longer perceived; inhibits physiologic stimulation created by sympathetic response
Question

- Is the following statement true or false?

   The sympathetic response restores equilibrium after danger is no longer perceived.
False.

The sympathetic response prepares body for fight or flight and accelerates physiologic functions that ensure survival.
Stress

• Physiologic and behavioral responses to disequilibrium

• Caused by:
  - Physical, physiologic, or emotional internal or external changes that disrupt homeostasis

• Has physical, emotional, and cognitive effects
Factors That Affect Response to Stress

- Intensity, number, duration of stressor(s)
- Physical health status
- Life experiences; coping strategies
- Social support; personal beliefs
- Attitudes
- Values
Physiologic Stress Response

- General adaptation syndrome: propounded by Hans Selye
- Study: collective physiologic processes of the stress response
  - Body’s physical response is always the same
  - Syndrome follows one-, two-, or three-stage pattern
Stages of the General Adaptation Syndrome: Alarm Stage

- Alarm stage
- Resistance stage
- Exhaustion stage
Stages of the General Adaptation Syndrome

1. Homeostasis
2. Stressor
3. Alarm Stage
   - Adaptive responses are mobilized via the autonomic nervous system
     - If stressor is not controlled
4. Stage of Resistance
   - Secondary defenses are activated via the endocrine system
     - If stressor continues
5. Stage of Exhaustion
   - Adaptation is unsuccessful and death ensues

Copyright © 2009 Wolters Kluwer Health | Lippincott Williams & Wilkins
Question

• Is the following statement true or false?

   The alarm stage is the last stage according to the general adaptation syndrome.
False.

The alarm stage is the first stage according to the general adaptation syndrome.
Psychological Stress Response

- Coping strategies
  - Coping mechanisms used by humans to prevent their ego, or reality base, from feeling inadequate
- Help to deal with stress-provoking events or situations
Coping Strategies

- Coping strategies can be:
  - Therapeutic: help the person to acquire insight, gain confidence to confront reality, develop emotional maturity
  - Nontherapeutic: using mind/mood-altering substances, hostility/aggression, excessive sleep; conflict avoidance; abandonment of social activities
Stress-Related Disorders

- Result from prolonged stimulation of autonomic nervous and endocrine systems
  - Many stress-related diseases involve allergic, inflammatory, or altered immune responses
  - Prolonged anger, feelings of helplessness, and worry can affect immune-system-mediated diseases
Nursing Implications

- Caring for stressed clients
  - Identify the stressors
  - Assess the client’s response to stress
  - Eliminate or reduce the stressors
  - Prevent additional stressors
Nursing Implications (cont’d)

- Caring for stressed clients (cont’d)
  - Promote client’s physiologic adaptive responses
  - Support client’s psychological coping strategies
  - Assist in maintenance of social support
  - Implement stress reduction/management techniques
Nursing Implications (cont’d)

- Assessment of stressors
  - Social Readjustment Rating Scale tool to assess the level of stress of patients

- Prevention of stressors
  - Primary prevention
  - Secondary prevention
  - Tertiary prevention
Stress-Reduction Techniques

- Provide adequate explanations in understandable language
- Keep client and family informed
- Demonstrate confidence and expertise when providing nursing care
- Remain calm during crises
Stress-Reduction Techniques (cont’d)

- Be available to the client
- Respond promptly to the client’s signal for assistance
- Encourage family interaction
- Advocate on behalf of the client
- Refer the client and family to organizations or people who provide post-discharge assistance
Stress-Management Techniques

- Therapeutic activities that reestablish balance between sympathetic and parasympathetic nervous systems
- Have a calming effect; stimulating tactics counterbalance parasympathetic dominance
- Teaching principles of time management and assertiveness techniques
Stress-Management Techniques (cont’d)

- Endorphins
- Sensory manipulation
- Adaptive behavioral activities to enhance adaptation
  - Alternative thinking
  - Alternative behaviors
  - Alternative lifestyles