

LINCOLN MEMORIAL UNIVERSITY
Caylor School of Nursing
Nursing 124/125
Spring 2010

LESSON PLAN: Fluid and Electrolytes

DATES & TIMES: See Class Syllabus

OBJECTIVES: Upon completion of the unit the student will demonstrate mastery of the following objectives in clinical/campus laboratory, in individual and group conferences and on written materials, the ability to:

1. Explain the distribution of fluid and electrolytes in the body.
2. Identify the compartments for water in the body.
3. Identify ways adult human persons lose fluids and nursing measures to replace fluid loss.
4. Recognize the mechanism and routes by which fluid is transported in the body.
5. Identify the major electrolytes of the body and the primary function and purpose of the electrolytes.
6. Identify common electrolytes and water imbalances, signs and symptoms of these imbalances and nursing interventions to prevent and correct such imbalances.
7. Accurately calculate intake and output.
8. Describe the relationship between normal fluid intake and output.
9. Identify common diagnostic tests regarding fluid and electrolyte balance.
10. Identify stimuli which may affect fluid and electrolyte balance in different the young adult and older adult.
11. Utilize the Roy Adaptation Model (RAM) nursing process to develop a plan of care for the adult with fluid and/or electrolyte imbalance.
12. Identify the physiologic action, use, side effects, and nursing implications of medications utilized in the pharmacologic management of fluid balance needs.
13. Identify appropriate interventions for the adult receiving parenteral fluid therapy.
14. Correctly calculate medication dosage and administration.
15. Identify the various acid base disorders, causes and interventions.
16. Describe the process of administering blood, assessing and evaluating complications.

TOPICAL OUTLINE

- I. Review of Fluid and Electrolyte Balance
 - A. Distribution of Body Fluids
 - B. Electrolytes
 1. Major Cations (Na⁺, K⁺, Ca⁺, Mg⁺)
 2. Major Anions (Cl⁻, HCO₃⁻, PO₄⁻)
 - C. Movement of body fluid and electrolytes
 1. Osmosis
 2. Diffusion
 3. Active transport
 4. Filtration

- D. Routes of gains and losses
 - 1. Gains – dietary, enteral, parenteral
 - 2. Losses - Sensible vs. insensible, kidneys, skin, lungs, GI tract, other
 - 3. Intake and output
 - 4. Daily weights
- E. Regulation of body fluid and electrolytes
 - 1. Kidneys
 - 2. Cardiac
 - 3. Lungs
 - 4. Hormones
 - 5. Thirst mechanism

II. Diagnosis

- A. Common tests
 - 1. CBC (complete blood count)
 - 2. Serum electrolytes
 - 3. Blood urea nitrogen (BUN)
 - 4. Creatinine
 - 5. Osmolarity/osmolality
 - 6. Urine pH & specific gravity

III. General Risk Factors

- A. Age related differences
 - 1. Gerontological
 - 2. Pediatric

IV. IV Therapy

- A. Site selection and initiation
- B. Complications
- C. Isotonic, hypertonic and hypotonic fluids
- D. Blood transfusions

V. Utilize the RAM nursing process for fluid volume imbalances, which includes risk factors, assessment, analysis/nursing diagnosis and evaluation/expected outcomes.

- A. Fluid volume deficit (FVD): hypovolemia/dehydration
- B. Fluid volume excess (FVE): hypervolemia

VII. Utilize the RAM nursing process for electrolyte imbalances, which includes risk factors, assessment, analysis/nursing diagnosis and evaluation/expected outcomes.

- A. Hyponatremia
- B. Hypernatremia
- C. Hypokalemia
- D. Hyperkalemia
- E. Hypocalcemia
- F. Hypercalcemia
- G. Hypomagnesemia

- H. Hypermagnesemia
- I. Hypophosphatemia
- J. Hyperphosphatemia
- K. Hypochloremia
- L. Hyperchloremia

- VIII. Utilize the RAM nursing process for acid base imbalances, which includes risk factors, assessment, analysis/nursing diagnosis and evaluation/expected outcomes.
 - A. Metabolic acidosis
 - B. Metabolic alkalosis
 - C. Respiratory acidosis
 - D. Respiratory alkalosis

REQUIRED READINGS:

Kee, J., Hayes, E., & McCuiston, L. (2009). *Pharmacology a nursing process approach* (6th ed.). St. Louis, MO: Mosby. Ch. 15.

Smeltzer, S., Bare, B., Hinkle, J. & Cheever, K. (2008). *Brunner and Suddarth's textbook of medical – surgical nursing* (11th ed.). Philadelphia: Lippincott Williams & Wilkins. Ch. 14 & Ch. 33 pp. 1103-1113.

Silvestri, L. A. (2005). *Saunders comprehensive review for NCLEX-RN* (4th ed.). Philadelphia, PA: W.B. Saunders Company.
 Chapter 9 Fluid and Electrolytes p. 87, Questions 1-20
 Chapter 10 Acid-Base Balance p. 107, Questions 1-10
 Chapter 14 Intravenous Therapy p. 158, Questions 1-15
 Chapter 15 Administration of Blood products p. 173, Questions 1-12

Wissmann, J. (2000-2007). *Adult medical-surgical nursing RN edition 7.1. Current mastery series review module*. Assessment Technologies Institute. Unit 3 (pp. 233-240) & Unit 4.

Wissman, J. (2000-2007). *Fundamentals of nursing edition 6.1. Current mastery series review module*. Assessment Technologies Institute. Unit 5 (Ch. 73 & 74).

CLINICAL OBJECTIVES:

1. Assess hydration status.
2. Accurately calculate intake and output on an adult with compromised or ineffective responses to fluid and electrolyte balance.
3. Correctly calculate IV flow rate.
4. Identify signs and symptoms of fluid and/or electrolyte imbalance.
5. Develop teaching/learning strategies for the adult with fluid and/or electrolyte imbalance to promote adaptation.
6. Using the Roy Adaptation Model nursing process, develop a plan of care for the adult with fluid/electrolyte imbalance and acid base imbalance.
7. Participate in administering blood.