



มหาวิทยาลัยราชภัฏนครปฐม
Nakhon Pathom Rajabhat University

Nursing Care of Patients with Fluid Imbalance



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Learning Objectives

- Explain the meaning of fluid, electrolytes, and acid-base imbalance
- Describe the steps for assessing fluid, electrolyte, and acid-base imbalance.
- Describe the signs and symptoms of fluid, electrolyte, and acid-base imbalance.
- Describes the treatments of fluid, electrolyte, and acid-base imbalance.
- Describe nursing care for fluid, electrolyte, and acid-base imbalance patients.



Basic fluid physiology

- Total Body Water (TBW) = 60% of BW = 42 L in 70 kg
- TBW = Intracellular fluid (ICF) +
Extracellular fluid (ECF)
- ICF = 40% of BW = 28 L in 70 kg
- ECF = 20% of BW = 14 L in 70 kg



Compartment of body fluid

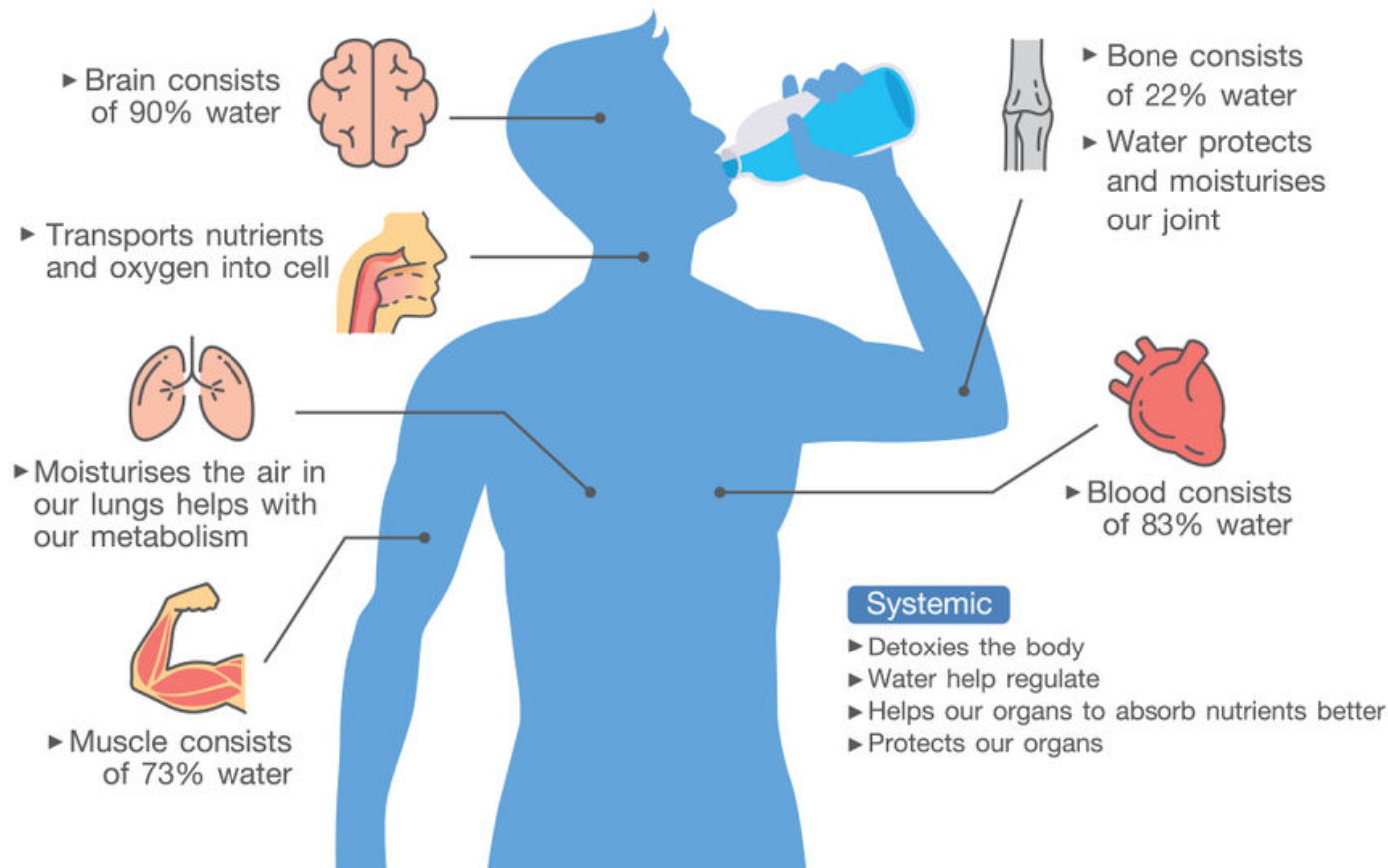
Intracellular fluid = 40% of BW

Interstitial Plasma fluid = 15% of BW

Plasma = 5% of BW



Function of water in the body



fittr.com/article/what-role-does-water-play-in-your-body-123/



Water balance

Water Gain 2,500 ml

MMetabolic Water ~ 10%

MPreformed Water

MFood ~ 30%

MDrink ~ 60%

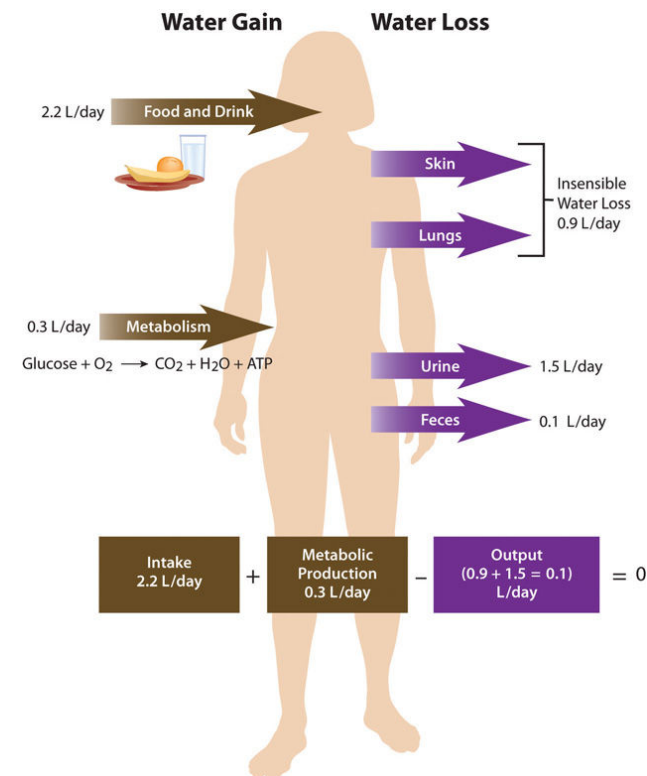
Water Loss 2500 ml

MLungs

MSkin

MUrine

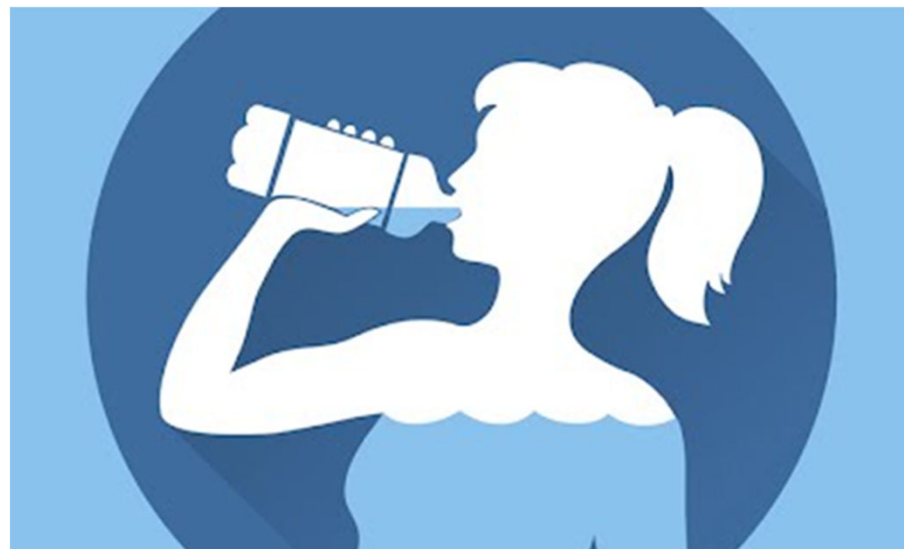
MFeces





Classification of body fluid change

- Volume change
- Concentration change
- Composition change





VOLUME DEFICIT





Volume deficit/ Dehydration

Common causes

GI loss e.g. vomiting, NG suction, fistula drainage, etc.

Non-GI loss e.g. non-oliguric renal failure, diabetes insipidus, etc.

Fluid sequestration “Third Spacing” e.g. burn, peritonitis, etc.



Volume deficit/ Dehydration

Manifestations

- CNS signs e.g. apathy, sleepiness
- CVS signs e.g. narrow pulse pressure, tachycardia, hypotension
- Tissue signs e.g. skin perfusion, **Skin turgor**, dry lips, **Dry mucus membranes**, sunken eyeballs
- Other signs e.g. **↑hematocrit (Hct.)**



What does dehydration feel like?

MILD-MODERATE SYMPTOMS



THIRSTY



DRY MOUTH



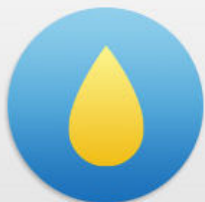
HEADACHES



MUSCLE CRAMPS



DRY SKIN



DARK URINE

SEVERE SYMPTOMS



LOSS OF STRENGTH



CONFUSION



DIZZY



RAPID HEARTBEAT



RAPID BREATHS



FAINING



RECOVER.
REFRESH.
RELAX.



Skin turgor





Summary of signs and symptoms of dehydration

| % Dehydration | signs and symptoms |
|-------------------------|---|
| 2 | Thirsty |
| 6 | Anxiety, dry throat, dry tongue, no saliva, difficulty swallowing, little urine output. |
| > 7 | Delirium, hallucinations, unconsciousness |
| If not corrected | Hypotension, shock, and respiratory failure |



Treatment of Dehydration



The dehydration treatment is seen to be depending on the severity of the situation, some of the ways are as follows:

M For Mild Dehydration: Consumption of Water and ORS solution

M For Low Electrolyte Level: Sports Drink and Rehydration solution

M For Severe Dehydration: Intravenous (iv.) Fluid intake



Nursing care of patients with dehydration

- Encourage oral fluid intake, as tolerated. Provide fluids the patient prefers within easy reach.
 - Minimize intake of drinks with diuretic or laxative effects (e.g., coffee, tea, alcohol, prune juice).
 - Administer IV fluids as ordered and monitor the patient's response. Generally, isotonic fluids are ordered for hydration. Monitor for the potential development of excessive fluid volume.
 - Monitor weight and watch for sudden decreases, especially in decreased urine output.
-



Nursing care for patients with dehydration



Monitor total fluid intake and output every four hours. Report urine output equal to less than 30 mL/hour or 0.5 mL/kg/hour to the provider because this may indicate kidney injury in addition to deficient fluid volume.



Monitor pulse, respirations, and blood pressure every 15 minutes to one hour for unstable patients and every 4 hours for stable patients.



Recognize and report signs of impending hypovolemic shock, including elevated pulse and respirations; decreased blood pressure below baseline; cold, clammy skin; weak, thready pulse; and confusion. Patients progressing towards hypovolemic shock require emergent care.



Nursing care for patients with dehydration

- Check orthostatic blood pressures with the patient lying and standing. To perform this procedure, have the patient lie down for 5 minutes. Measure blood pressure (BP) and pulse rate. Have the patient stand. Repeat the BP and pulse rate measurements after standing 1 and 3 minutes. A decrease in systolic blood pressure ≥ 20 mmHg or a decrease in diastolic blood pressure ≥ 10 mm Hg, or if the patient reports feeling light-headed or dizzy, is considered abnormal. Orthostatic hypotension should be reported to the provider and safety measures implemented to prevent falls.



Nursing care for patients with dehydration

- Recognize and address factors contributing to deficient fluid volume, such as diarrhea, vomiting, fever, diuretic therapy, or uncontrolled diabetes mellitus. Administer medications such as antidiarrheals and antiemetics as appropriate.
- Monitor lab results relevant to fluid status such as serum osmolarity, urine specific gravity, hematocrit, and BUN.
- Educate the patient and family members about signs of dehydration to watch for at home. Remind older adults that thirst sensation often decreases with age.



BACKGROUND

- * **LOW EXTRACELLULAR VOLUME**
~ OFTEN INVOLVES ↓↓ in SODIUM & WATER



TREATMENT

- * ORAL HYDRATION & DIET MAINTENANCE
- * IV FLUIDS
- * BLOOD TRANSFUSION



SIGNS & SYMPTOMS

- * WEAKNESS
- * FATIGUE
- * DIZZINESS
- * ↑↑ THIRST



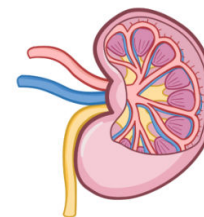
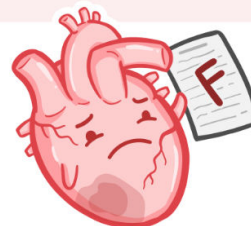
DIAGNOSIS

- * **BLOOD TEST**
~ CBC
~ CHEMISTRY PANELS
- * **URINE TEST**
~ ↑↑ BUN, CREATININE, URINE SODIUM CONCENTRATION, URINE pH
- * X-RAY or MRI



CAUSES

- * DEHYDRATION
- * TRAUMA
- * EXCESSIVE FLUID ACCUMULATION between CELLS
- * **MEDICAL CONDITIONS:**
~ RENAL DISEASE
~ CONGESTIVE HEART FAILURE





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VOLUME EXCESS





Volume excess



Common causes

- Iatrogenic
- Renal failure
- Heart failure



Course of Edema

MHigh capillary hydrostatic pressure

M>> Pulmonary edema

MProteins ↓

>> Albumin

MOcclusion of Lymphatic circulation

Capillary permeability ↑



Signs and symptoms of Edema

Early:

M Swelling

M Pitting edema

M Increased body weight

M Functional impairment

M Pain

M Impairment of arteriole circulation ---> **Late: pulmonary edema**



Pitting edema





Pitting score



0+ No pitting edema

1+ Mild pitting edema. 2 mm depression that disappears rapidly.

2+ Moderate pitting edema. 4 mm depression that disappears in 10–15 seconds.

3+ Moderately severe pitting edema. 6 mm depression that may last more than 1 minute.

4+ Severe pitting edema. 8 mm depression that can last more than 2 minutes.



Nursing care for patients with Volume Access

1. Restrict salt and fluid

2. Diuretic drug

3. V/S, I/O, BW

4. Follow Lab.

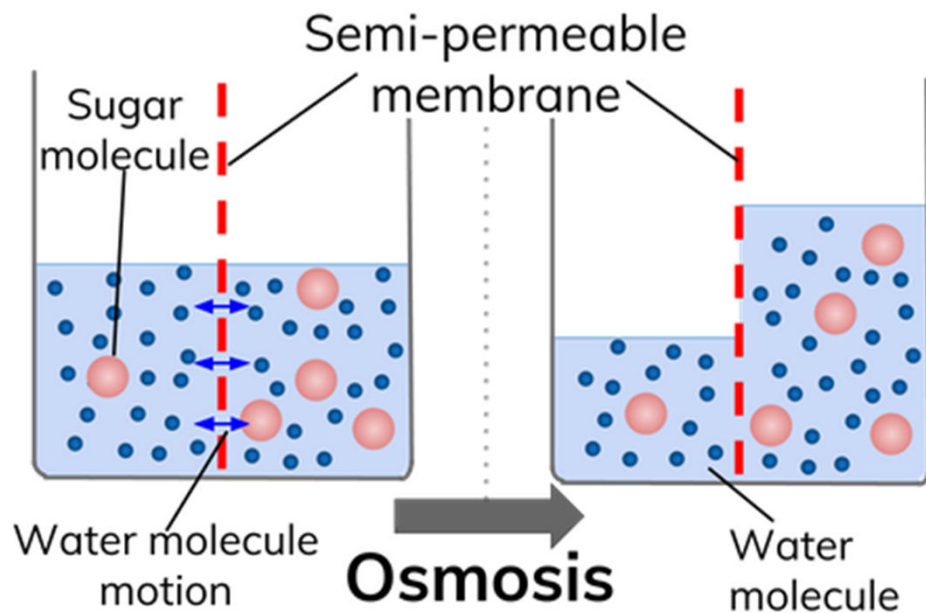
5. Position: Semi fowler's position



Concentration change

Sodium concentration responsible for the serum osmolarity

$$\text{Serum Osmolarity} = 2 \times \text{Sodium} + \text{Glucose}/18 + \text{BUN}/2.8$$



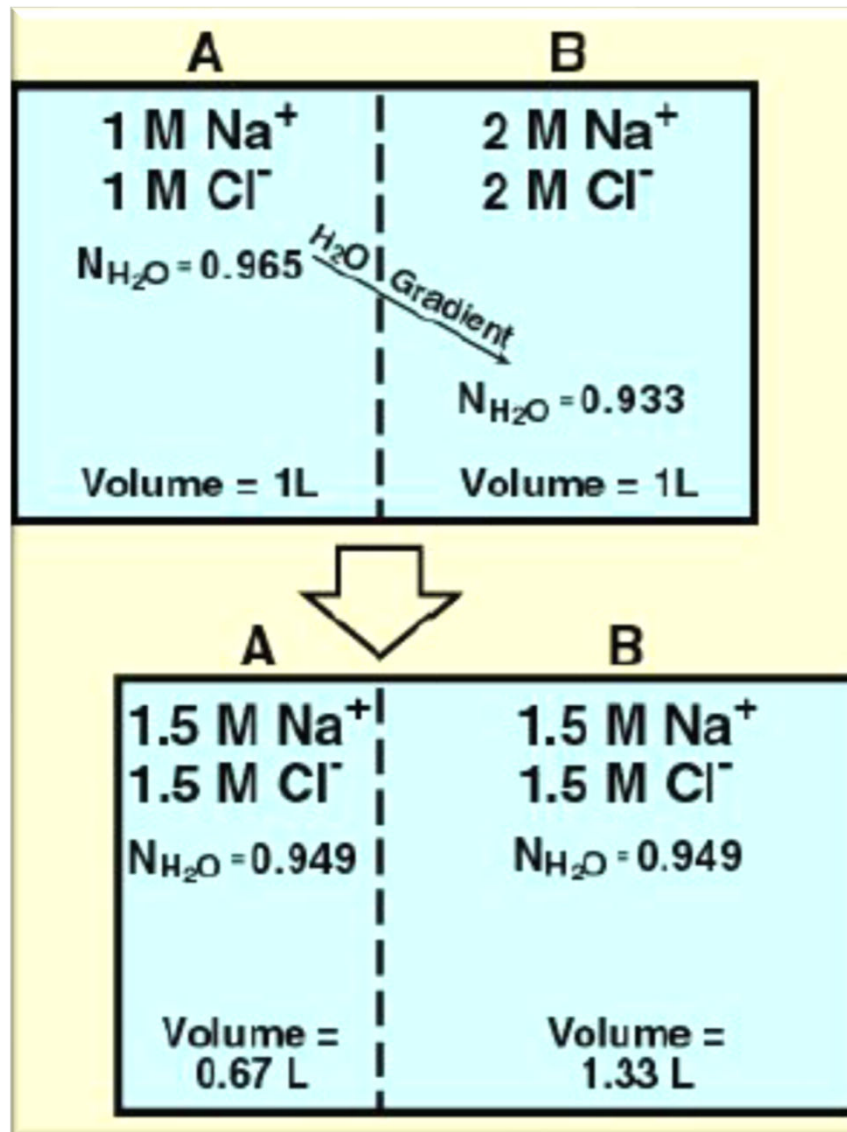
Osmosis

It is the movement of substances from the side of low concentration to the side of high concentration.

>> Rate increases with concentration.

>> Temperature

>> Capacity



Osmosis



Osmolarity

- Hypertonic Ex: D5NS; D5RL; 3% saline

Osmotic pressure > RBC

>> Pulls fluid from cells

>>>> Shrinks cell

- Isotonic Ex: NS and Ringer's Lactate

>> osmotic pressure = RBC

>>>> No fluid shift

- Hypotonic Ex: D5W; ½ NS

>> osmotic pressure < RBC

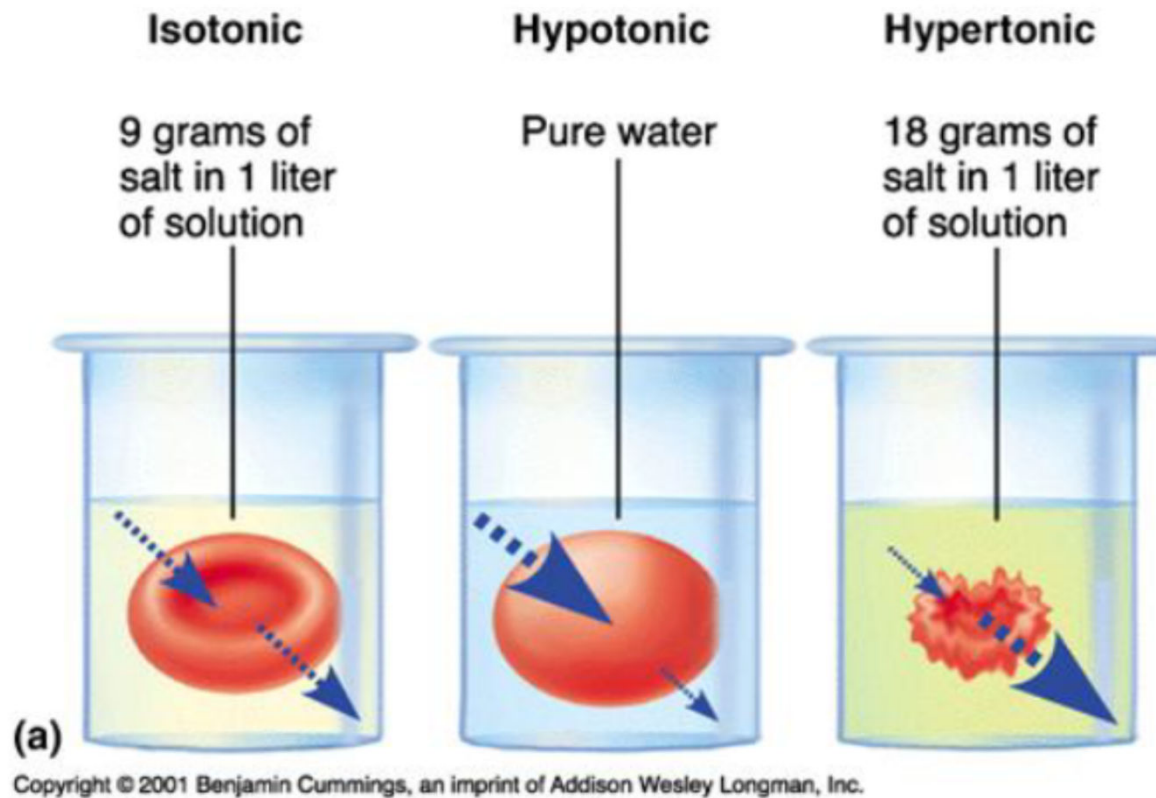
>>>> Fluid moves into cells

>>>> Enlarges cell





Osmolarity





Complications of fluid administration

MInfiltration

MThrombosis

MThrombophlebitis

MPain

MNecrosis

MCirculatory overload

MPyrogenic reaction



Notice on Concentration Disturbances Management

- Clinical manifestations are usually not specific to a particular electrolyte change, e.g., seizures
- Implies an underlying disease process
- Treat the electrolyte change, but seek the cause



Notice on Concentration Change Management

- Clinical manifestations determine the urgency of treatment, not laboratory values
- Speed and magnitude of correction dependent on clinical circumstances
- Frequent reassessment of electrolytes require



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THANK YOU