



Body fluids, electrolytes and acid-base balance

Assessing clients for fluids, electrolytes, and acid-base imbalance:

Component of assessment include:

1. Health History: include

- ✓ A client's current and past medical history reveals condition such as COPD or DM that can disturb normal balance.
- ✓ Medication prescribes to treat acute or chronic conditions (e.g., diuretic therapy for hypertension).
- ✓ Treatment e.g., chemotherapy, mechanical ventilation, NG suction, and enteral feeding.
- ✓ Functional development and socioeconomic factors:
 - Older people and very young children.
 - People who do not have the means to cook food for balance diet (e.g., homeless people) .
- ✓ Data about foods and fluid intake, fluid output.
- ✓ The presence of signs and symptoms suggestive of altered fluid and electrolytes balance.

2. **Physical Examination:** to evaluate a clients fluid, electrolytes, and acid base balance status focuses on the skin, the oral cavity and mucous membrane, the eyes, the cardiovascular system, the respiratory system, and neurologic and muscular status.

A. Daily Weight: Changes in the body's total fluid volume are indicated by weight. Accurate measurement of daily weight requires the nurse to implement the agency's protocol to control certain variables. For example, the nurse should obtain the measurement at the same time each day, wearing the same clothing, and using the same scale.

B. Vital Signs:

- ❖ An elevated temperature places the client at risk for dehydration caused by an increased loss of body fluid.
- ❖ Changes in the pulse rate, strength, and rhythm are indicative of fluid alterations. Fluid volume alterations may cause the following pulse changes:
 - Tachycardia is an early sign of hypovolemia.
 - FVD increased pulse rate and weak pulse volume.
 - FVE increased pulse volume.
 - Irregular pulse rhythm may occur with electrolytes imbalances.



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- ❖ Respiratory changes are assessed by inspecting the rate and depth may be indicative of a compensatory response in metabolic acidosis or alkalosis.
- ❖ FVE can increase blood pressure, and FVD can lower the blood pressure with or without orthostatic hypotension. A narrow pulse pressure (less than 20 mm Hg) may indicate FVD that occurs with severe hypovolemia.

C. Intake and Output (I&O): Measurement and recording of all fluid intake and output for a 24-hour period to assess for an actual or potential imbalance. Measures of fluid intake includes:

- ✓ Oral fluids (e.g., water, milk, soup, and juice) taken by mouth.
- ✓ Liquids administered through tube feedings (nasogastric or jejunostomy), IV fluids, IV medication and blood or its components.

Measures of fluids output include: bleeding, urinary output, diarrhea or feces, vomitus, and drainage from tubes such as through gastric suction and wound.

D. Assessing of skin: assess skin color, temperature, moisture, turgor, and also for edema. Normal resiliency of the skin a reflection of hydration status.

E. Assessing for oral cavity: assess color and moisture for oral mucous membrane. With fluid volume deficit, saliva decreases, causing sticky, dry mucous membranes; dry & cracked lips; tongue dry and cracked.

F. Assessing for the eyes and anterior fontanel for infants:

- Sunken, dry conjunctiva, and decrease or absent of tearing, all signs of fluid volume deficit.
- Puffy eyelids (papilledema) are signs of fluid volume excess.
- Fontanel bulging are signs of fluid volume excess.
- Fontanel sunken are signs of fluid volume deficit.

G. Assessment of jugular and hand veins:

- Palpate the jugular veins in low Fowler's position, fluid volume excess causes a distension in the jugular veins.
- Place the clients hand below heart level and palpate the hand veins, fluid volume deficit causes decreased venous filling (flat hand veins)

H. Assessing neuromuscular system: e.g., calcium and magnesium imbalance causing an increase in neuromuscular irritability.

I. Diagnostic and Laboratory Data: includes:

1. Complete blood count (CBC): Hematocrit (Hct) is the volume percentage (%) of red blood cells in blood) increase in dehydration and decrease in overhydration. Normal values in men (40%-54%), and women (37%-47%).
2. Serum osmolality: when decreased indicates fluid volume excess, and when increased indicates fluid volume deficit.
3. Serum electrolytes.



Normal Electrolyte Values for Adults*

VENOUS BLOOD

Sodium	135–145 mEq/L
Potassium	3.5–5.0 mEq/L
Chloride	95–108 mEq/L
Calcium (total)	4.5–5.5 mEq/L or 8.5–10.5 mg/dL
(ionized)	56% of total calcium (2.5 mEq/L or 4.0–5.0 mg/dL)
Magnesium	1.5–2.5 mEq/L or 1.6–2.5 mg/dL
Phosphate (phosphorus)	1.8–2.6 mEq/L or 2.5–4.5 mg/dL
Serum osmolality	280–300 mOsm/kg water

*Normal laboratory values vary from agency to agency.

4. Urine specific gravity and PH:
 - Urine osmolality is high in fluid volume deficit, and urine osmolality is decreased in fluid volume excess.
 - Normal urine PH 4.6-8.0, in metabolic acidosis urine PH is decreased and increased in metabolic alkalosis.
5. Arterial blood gases (ABGs): normal ABGs value include:

Measurement	Normal Values	Clinical Significance
pH	7.35–7.45	Indicates acid-base balance
PaCO₂	35-45 mmHg	Partial pressure of CO ₂ ; indicates adequacy of alveolar ventilation; represents respiratory component of acid-base balance
HCO₃⁻	22–26 mEq/L	Bicarbonate level; indicates metabolic component of acid-base balance
PaO₂	80–100 mm Hg	Partial pressure of oxygen; represents oxygen dissolved in plasma
SaO₂	96%–98%	Saturation of hemoglobin with oxygen