Water
Water

- Comprises 50-70% of the body

- Muscle contains 73% water (fat contains ~20%)

- Intracellular fluid
  - Fluid within the cell (2/3 of total)

- Extracellular fluid
  - Outside the cells (1/3 of total)
Water: Essential Nutrient

Death occurs

• Without food
• Without vitamins, minerals
• Without water
Functions of Water

• Almost universal solvent

• Dissolves
  • Nutrients
  • Wastes
  • Urea
  • Carbon dioxide
Functions of Water

Removal of body waste like Urea, Sodium

- Via urine
- Excrete 1-1.5 litres /day
- Avoid concentrated urine
  - Can promote kidney stones
• Body temperature regulation

  • Metabolism generates heat and Water absorbs any excess heat

  • Body secretes fluid via perspiration and Skin is cool as perspiration evaporates

• Lubricant for Joints, Synovial fluid

• Shock absorber - Amniotic fluid, Cerebrospinal fluid
Daily Water Losses

- Urine – largest loss
- Skin – ongoing evaporation
- Lungs – vapor
- Feces
Sources of Water

• Fluids – Water, Other beverages

• Food - Fruits and vegetables, Meat, All but dried foods

• Metabolism

  • Energy nutrients → carbon dioxide, energy, water
Factors affecting the water balance and its maintenance

The ability of the body to adjust fluids, electrolytes, and acid-balance is influenced by:

a) Age

b) Gender and body size

c) Environmental temperature

d) Lifestyle
AGE  Infants immature kidneys are less able to conserve water than adult kidneys, so they lose more fluids.

In adults higher metabolic rate increases fluid loss.

In elderly people normal changes of aging increase the risk of dehydration.

GENDER AND BODY SIZE - Women have proportionately more body fat and less body water than men.
ENVIRONMENTAL TEMPERATURE - Fluid losses through sweating are increased in hot environments as the body attempts to dissipate heat.

Lifestyle - Other factors such as diet, exercise, and stress affect fluid, electrolyte and acid-base balance.
• **Dehydration**, refers to a deficit of total body water, with an accompanying disruption of metabolic processes.

• It is also the reason for **hypernatremia**.

• The term *dehydration* must be distinguished from **hypovolemia** (loss of blood volume, particularly plasma).
• Most people can tolerate a three to four percent decrease in total body water without difficulty.

• A five to eight percent decrease can cause fatigue and dizziness.

• Over ten percent can cause physical and mental deterioration, accompanied by severe thirst.
• Dehydration occurs when free water loss exceeds free water intake, usually due to exercise or disease.

• A decrease more than fifteen to twenty-five percent of the body water is invariably fatal

• Mild dehydration is characterized by thirst and general discomfort and usually resolves with oral rehydration.
Water intoxication

- Water intoxication also known as water poisoning or dilutional hyponatremia,

- It is a potentially fatal disturbance in brain functions that results when the normal balance of electrolytes in the body is pushed outside safe limits by overhydration.
• Although water is essential to life, when a person drinks too much their blood becomes dangerously diluted of salts. According to Scientific American, this causes a condition called hyponatremia, and severe cases of hyponatremia lead to water intoxication. Some of the main symptoms of water intoxication are headache, fatigue, nausea, vomiting, frequent urination, and mental disorientation.

• When a person drinks too much water the kidneys cannot flush it out as well and this causes the excess water to enter the cells and cause them to swell. When the brain cells begin to swell the situation can turn lethal fast.
• Water, just like any other substance, can be considered a poison when over-consumed in a specific period of time.

• Water intoxication ( > 6 liters ) mostly occurs when water is being consumed in a high quantity without giving the body the proper nutrients it needs to be healthy.

• Even healthy people can get water intoxication.