HYDRATION AND ITS IMPORTANCE AS WE AGE

WHY HYDRATION IS IMPORTANT TO PRESERVING URINARY AND BOWEL FUNCTION

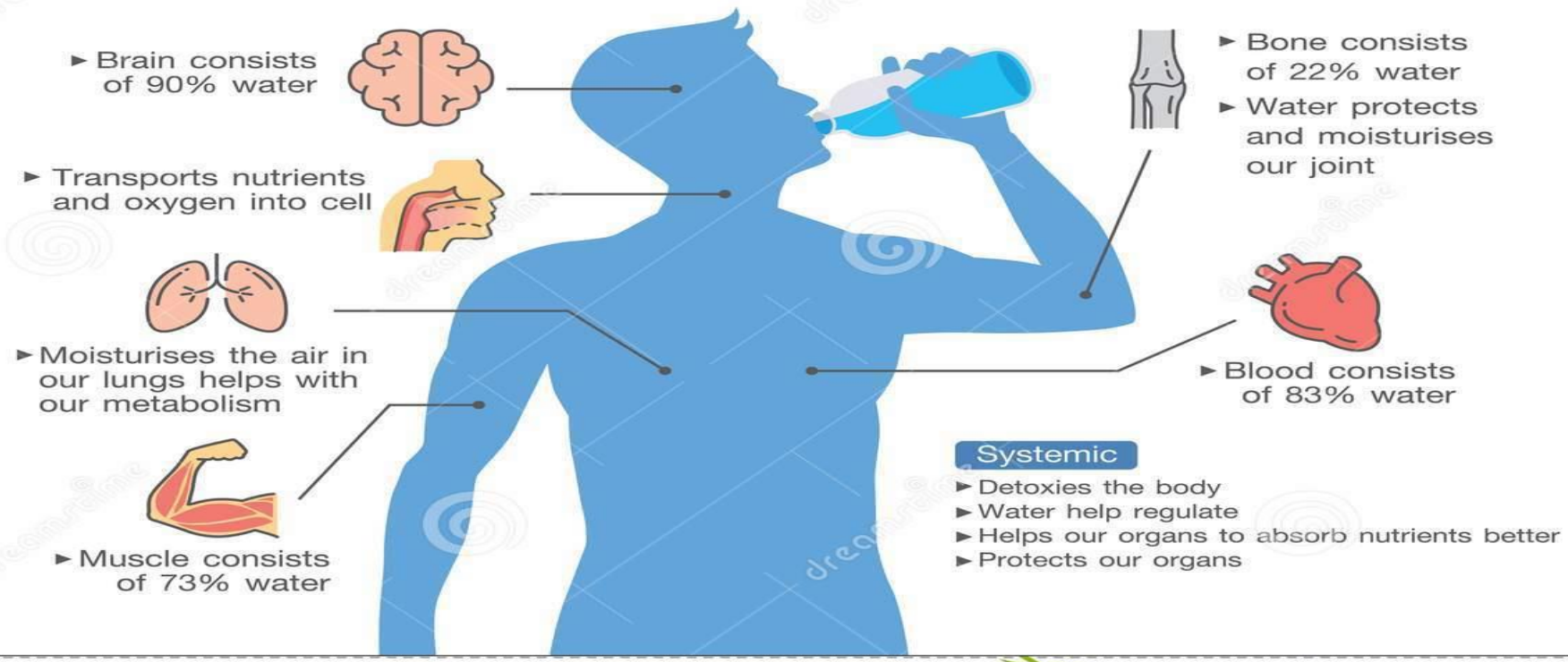
WHAT IS THE FUNCTION OF WATER IN THE BODY?

- 2/3 of the body's water is located in the cells of the body(intracellular fluid). muscle cells have a higher concentration of water(75%) versus fat(25%). Men in general have a higher muscle mass than women, and therefore, have a higher percentage of water.
- Water helps regulate body temperature(think of homeostasis and why we sweat)
- Aids in digestion and absorption of nutrients(approximately 7 to 9 L of fluid is excreted into the digestive tract daily to aid in digestion and absorption—for example saliva, gastric secretions, bile, and intestinal mucosal secretions) Approximately 110 ml's of fluid is excreted through feces.

FUNCTION OF WATER CONTINUED:

- Transportation of nutrients and oxygen in the body(Approximately 92% of blood plasma is water) Think also of hydrated-moistened lungs allowing for gas exchange for delivery throughout the body.
- Serves as the solvent for delivery of water soluble vitamins, minerals, glucose, and amino acids throughout the body(B complex vitamins, for example)
- Metabolic reactions within the body(synthesis of hormones and enzymes)
- Elimination of waste products from the body via feces, urine, and expirations.
- Is also a major component of lubricating fluids in the body(joints, around internal organs.

Function of water in the body



What Does Water do for You?

Needed by the brain to manufacture hormones and neurotransmitters

Forms saliva (digestion)

Keeps mucosal membranes moist

Regulates body temperature (sweating and respiration)

Allows body's cells to grow, reproduce and survive

Acts as a shock absorber for brain and spinal cord

Flushes body waste, mainly in urine

Converts food to components needed for survival – digestion

Lubricates joints

Water is the major component of most body parts

Helps deliver oxygen all over the body

HYDRATION NEEDS OVER TIME WITH AGING

- The total body water decreases from the time of childhood to old age.
- By older adulthood, body water composition has decreased by up to 50% of the older individuals weight. Mostly due to loss of muscle mass and an increase of body fat.
- Small fluctuations in water loss(say 1%) brings a higher risk of dehydration to the elderly.
- Thirst diminishes with age, partially due to decreased activity levels and altered thirst mechanism in older adults.
- Older kidneys have diminished ability to concentrate urine, so urine flow decreases as one approaches late adulthood.

Figure 3.
Risk factors of dehydration in the elderly

Body water stores

Physiology:	lean masse, fat masse

Water intake

Physiology:	Decrease in thirst sensation
Diseases:	Mental disorders
	Fear of incontinence
	Malnutrition
Functional:	Decreased mobility
	Reduced swallowing efficiency
Environment:	Inadequate medical assistance

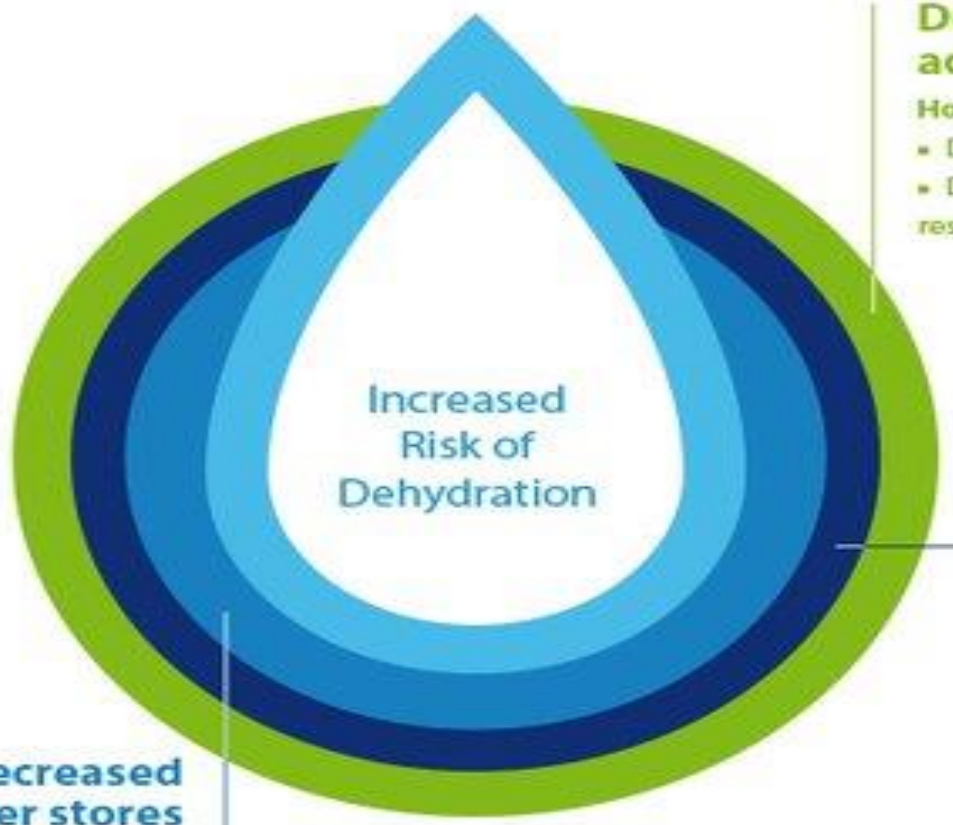
Water losses

Physiology:	Decline in renal function
Diseases:	Diarrhoe, fever, vomiting, diabetes
Environment:	Warm temperatures
Drugs:	Laxatives, diuretics ...

Other

Ethnicity, gender

Figure 2 - Age-related physiological changes increasing risk of dehydration



Decreased renal ability to adapt water & sodium losses

Hormonal changes:

- Decreased renal sensitivity to ADH
- Decreased renal secretion of renin

resulting in aldosterone levels

Decreased thirst sensation

Defect in osmo - and baro-receptors

Hormonal changes:

- Increased secretion of ANP
- Increased sensitivity to ADH
- Increased dopamine levels

Decreased water stores

Increased fat-free mass

Increased fat mass

ADH= Anti-Diuretic Hormone; ANP= Atrial Natriuretic Peptide

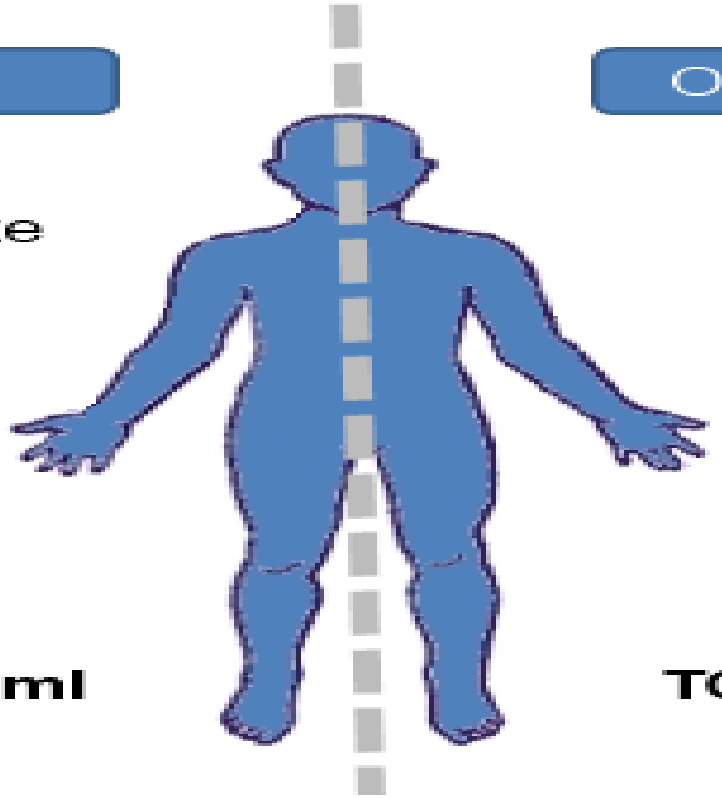
FLUID MEASUREMENT OF INTAKE AND OUTPUT

- Basically Fluid intake should equal fluid output in order to maintain fluid balance under normal conditions.
- Basically water loss is identified as Insensible(respirations and perspiration) which means loss of water that cannot be measured. The other form of water loss is called Sensible loss(includes loss of fluid in the urine or feces).
- Average intake of water averages around 2.5 L/day, of which approximately 80% is from fluids and 20% is from the foods we eat, like fruits and veggies for example. The body also produces a small amount of water from normal metabolism and this is called metabolic water

Table 19–1 WATER INTAKE AND OUTPUT

Form	Average Amount per 24 Hours (mL)
Intake	
Liquids	1600
Food	700
Metabolic water	200
Output	
Urine	1500
Sweat (and insensible water loss)	500
Exhaled air (water vapor)	300
Feces	200

Approximate daily values of fluid input and output in health



INPUTS	OUTPUTS
Oral fluid intake (~1500 ml)	Urine (~1500 ml)
Food (~500 ml)	Insensible loss - sweat - lungs - faeces (~1000 ml)
Metabolism (~500 ml)	
TOTAL ~ 2500 ml	**TOTAL ~ 2500 ml**

FLUID INTAKE TABLE BY GENDER AND AGE GROUP

Age Group	Gender / Life stages	Total water intake (Litres per day)
1 to 3	Children	1.3
4 to 8	Children	1.7
9 to 13	Male	2.4
14 to 18	Male	3.3
19 to 70 and above	Male	3.7
9 to 13	Female	2.1
14 to 18	Female	2.3
19 to 70 and above	Female	2.7
21 to 50	Pregnant women	3.0 – 3.8

WATER RECOMMENDATIONS: WATER AS AN ESSENTIAL NUTRIENT

- The body cannot produce nearly as much as it needs to function properly.
- The DRI committee (Dietary Reference Intake) on fluid and electrolytes did not establish an RDA (Recommended Dietary Allowance) for water because there is insufficient evidence linking a specific amount of water intake to health. There are variables that influence the requirements of fluid intake for health, which include diet, activity, temperature of the environment, and humidity.
- According to the IOM (Institutes of Medicine, 2005 survey) adequate intake for total water is based on the median total water intake from the US food consumption survey.

WATER RECOMMENDATIONS…….CONTINUED

- The IOM survey data recommends the following: For men 17 to 70 years, the AI is 3.7L/day, which includes approximately 3 liters from fluids. For women of the same age, the AI is 2.7L/day, which includes approximately 2.2 liters from fluids. Of course, amounts higher than the AI will likely be necessary when engaged in rigorous exercise, regardless of climate or altitude. Because the body cannot store water, it should be consumed throughout the day.
- Thirst is usually a reliable indicator of water need. However that is not universally true in certain conditions or age groups, like the elderly or the young.

WATER RECOMMENDATIONS…..CONTINUED

- The old adage that 8 glasses of water per day ought to meet ones needs may sound like good advice, but there is not enough evidence to support that assertion.
- Inadequate intake of water can lead to dehydration. Dehydration can lead to altered mental status, impaired motor control, increased body temperatures, even during mild exercise, abnormally increased HR when standing or lying down, and in some cases heat stroke. Water losses of anywhere from1 to 10 percent can bring on s/s that are anywhere from fatigue to exhaustion and collapse….and death if untreated or corrected.
- Clinical reasons include vomiting, diarrhea, fever, burns, hemorrhage, and renal disease.

HYDRATION/DEHYDRATION AND THE ELDERLY

- Older adults seem to sit on the edge of dehydration. Dehydration is the most common fluid and electrolyte disorder of frail elders in LTC and in the community.
- Dehydration is a serious matter, but for older individuals the consequences are much more serious. Infection, both urinary and pulmonary. are frequent consequences of dehydration. Constipation, incontinence, and pressure ulcers are also frequently seen in older individuals who are chronically dehydrated. Lastly, cardiovascular symptoms emerge or get worse in those with existing cardiovascular conditions. Dehydration is one of the top reasons for an increase in acute care admissions.

WHAT OTHER FACTORS IMPACT FLUID STATUS IN THE ELDERLY?

- Medications are frequently a risk to the older adult for complications in fluid status. Regular use of diuretics, sedatives, narcotics, and antipsychotics, and overuse of laxatives, are known to be contributors to dehydration and altered mental status, not to mention changes in blood pressure and mobility.
- The following s/s are usually present in order to clinically diagnose dehydration: A person puts out more than they take in. Dizziness and functional decline are usually present. A waste product ratio of BUN/Creatinine ratio must be >25:1. Orthostatic BP 20 mmhg on a change of position. And lastly a pulse greater than 100 in addition to an increase of 10 to 20 bpm upon change in position.

HOW IS DEHYDRATION ASSESSED IN OLDER ADULTS?

- Many of the s/s of dehydration(ALOC, Dizzy, low BP, loss of weight and dry mucus membranes) also look like s/s of other conditions in the elderly. Standard indicators ae unreliable in the elderly population. Clinical signs may not actually appear until dehydration is far advanced.
- Dry mucus membranes are unreliable in the elderly because many of the elderly are mouth breathers. Skin turgor testing and weight loss recordings, if not done properly, could miss dehydration. I/O are generally unreliable if not strictly maintained. Urine specific gravity is poorly correlated with chemistry panels because the older kidney has difficulty concentrating urine(could mean you aren't drinking enough water and urine looks more diluted or straw color---could indicate kidney damage).

TREATING DEHYDRATION IN THE ELDERLY

- Malnutrition and Dehydration seem to go hand in hand so assessment of both is important. Meals can provide 2/3 of the daily fluid needs.
- We can prevent dehydration by ensuring adequate fluid intake, preferably water, which is essential as we cannot make enough, nor can we store enough, water.
- Oral hydration is the first line approach, especially if one can ingest fluids.
- Sports drinks may be preferable, although high in sugar, are often recommended over simple tap water because it is easily absorbed in the stomach and is generally more palatable to patients. Pedialyte and other corrective drinks can also be used.

TREATING DEHYDRATION IN THE ELDERLY…….

- It has been suggested that unless contraindicated by a medical condition, for example heart failure, kidney disease, or liver disease, 30 ml of fluid per kilogram of body weight be consumed to maintain an adequate hydrated status.
- As a last resort intravenous fluids may be necessary, or another method called hypodermoclysis(fluid resuscitation through the subcutaneous route).
- In the end it is important to educate the elderly and caregivers about the s/s of dehydration, the importance of fluid intake, and ways to increase fluid intake.

DEHYDRATION AND CONSTIPATION IN THE ELDERLY POPULATION

- The most common gastrointestinal complaint to health care providers is constipation!
- At least 60% of community-based elders report using laxatives. Around 74% of LTC elderly are on laxatives on a daily basis.
- The very medications mentioned under dehydration impactors, diuretic, sedatives, narcotics, and anti-psychotics all contribute to constipation as well as decreased urine output and decreased fluid and food intake. The same age related factors appear to affect the bowels as they do fluid intake and output. That includes activity changes and dietary changes.

SOME COMMON CONTRIBUTORS TO DEHYDRATION IN THE ELDERLY

Constipation
Endemic in the Elderly

Causes of Constipation in the Elderly	
Aluminum hydroxide–containing antacids	Hypothyroidism
Anticholinergics	Immobility/Inactivity
Calcium channel blockers	Iron supplements
Dehydration	Low-fiber and carbohydrate diet
Diabetes mellitus	Narcotics
Diuretics	Parkinson's disease
Hypercalcemia/hypokalemia	Stroke

Approximately half of residents in nursing homes have constipation

De Lillo AR, et al. *Am J Gastroenterol*. 2000;95:901-905.
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NON PHARMACEUTICAL TREATMENTS

LAXATIVE AND ENEMAS IN THE ELDERLY WITH CONSTIPATION

- Laxatives may be used in addition to exercise, adequate fluids and increasing fiber in the diet.
- Examples used of bowel laxatives:
- Senna
- MiraLAX(a saline laxative)
- Dulcolax: oral or suppository
- Enemas of any type, but tap water and saline enemas are less irritating than the others

SOME CAVEATS TO USING LAXATIVES IN THE ELDERLY

- Senna is safe and non toxic in the elderly individual
- Stimulant laxatives should be used only in the short term to relieve constipation
- Dependency is a problem
- Cramping, gas, and fluid and electrolyte disturbances have been known to occur
- Emollient laxatives have been known to interfere with vitamin absorption(DSS)
- Renal function is a concern with those laxatives containing magnesium, sodium, and phosphate salts(MOM, Saline laxatives, and phospha-soda enemas)

SOME RESOURCES:

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- Nutrition Essentials for Nursing Practice, Seventh edition, Susan G. Dudek. Copyright 2014, Wolters Kluwer Health/ Lippincott Williams & Wilkins.
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