Hydration and Healthy Aging

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Outline

1. Water – Our most important nutrient
2. Water regulation
3. Dehydration
4. Underhydration
5. Recommended intakes
6. Assessing hydration status

Water

- Water is essential for all main functions of the human body.
- But the body has no mechanism for storing water, requiring frequent intake to maintain water balance.
- A person may only survive a few days without water.

Water Regulation

- Mechanisms to regulate water balance and adequate hydration are very complex.
- As one becomes underhydrated, the blood becomes more concentrated.
- This leads to an increase in what is referred to as osmotic pressure.
- A higher osmotic pressure causes water to flow from the cells into the blood vessels.

Water Regulation

- Specialized sensory neurons called osmoreceptors detect changes in the osmotic pressure of body fluids.
- These receptors are primarily located in the hypothalamus and regulate osmotic pressure by
  1) increasing the sensation of thirst to increase water intake, and
  2) deceasing the loss of water from the kidneys through increased reabsorption.

Water Regulation in Older Adults

- However, this mechanism is altered in older individuals.
- Aging results in a decrease of thirst sensation and a decrease in the kidney's ability to concentrate urine.
- Certain medications, such as diuretics, may negatively affect water balance.
- Some older adults may intentionally reduce their water intake because of the fear of incontinence or reduced mobility.

Causes of Dehydration

- The cause of dehydration is straight forward in most cases - losing more water than one consumes.
- Dehydration is a water deficiency.
- There are several reasons why dehydration is particularly problematic for older individuals.
  - As just noted, aging affects the complex homeostatic mechanisms that regulate water balance.

Causes of Dehydration

- Other reasons why dehydration is particularly problematic for older individuals include:
  - Decreases in the amount of total body water by approximately 15% between the ages of 20 and 80 years.
  - Use of certain medications (including diuretics, ACE inhibitors, SGLT2 inhibitors like Jardiance, laxatives, caffeine and others) that negatively affect water balance.
  - Intentional reduction of water intake by some older adults because of the fear of incontinence or reduced mobility.

Consequences of Dehydration

- The symptoms of dehydration include dry mouth, dizziness, confusion, headaches, and loss of strength and stamina.
- These can exacerbate existing health conditions and increase the risk of falls.
- There are high rates of dehydration among older adults in hospitals and other healthcare institutions.
- Studies show that chronic dehydration was present in 48% of older adult patients with emergency department visits.

Consequences of Dehydration

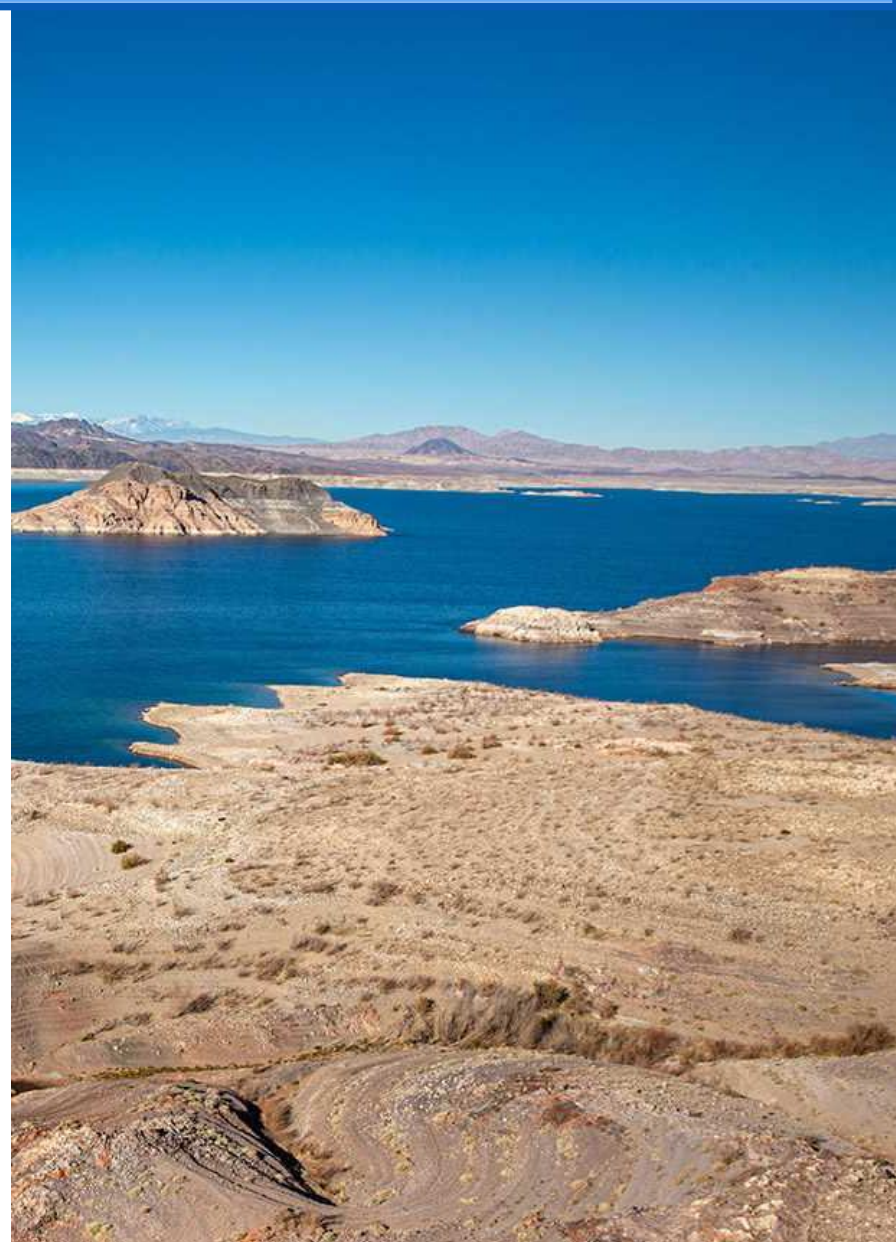
- 6.7% of older adult Medicare beneficiaries had dehydration listed a reported diagnoses.
- Acute infections, such as pneumonia and urinary tract infections, are diagnoses frequently associated with dehydration.
- About 50% of elderly Medicare beneficiaries hospitalized with dehydration died within a year of admission.

Consequences of Underhydration

- The state of hydration that is suboptimal but not dehydration is referred to as underhydration.
- An analogy might be nutrients, such as vitamins, where deficiency is recognized by acute clinical symptoms, but we can also have vitamin intakes below recommended intakes levels that may be associated with increased risks of some age-related health outcomes.

Consequences of Underhydration

- Evidence is accumulating to suggest that underhydration is associated with:
  - Increased development and progression of chronic kidney disease
  - Greater age-related declines in kidney function among individuals with normal kidney function
  - Greater risk for developing elevated glucose and diabetes



Recommended Water Intakes

In setting recommendations for water intake, the Dietary Reference Intake Panel of the National Academies of Sciences, Engineering, and Medicine indicated it was not possible to set a Recommended Dietary Allowance (RDA) or established an Adequate Intake (AI) reference level because there is not a single level of water intake that would ensure adequate hydration and optimal health for half of all apparently healthy persons in all environmental conditions.

Recommended Water Intakes

The current US dietary reference intakes for water are:

- 2.7 liters (90 fluid ounces or 11.25 cups) per day for women,
- 3.7 liters (125 fluid ounces or 15.5 cups) per day for men

These recommendations include water from food, which constitute about 20% of total water intake.

Water in Commonly Consumed Foods
(precent of weight)

Fruits:

- >90% - watermelon, strawberries
- >85-90% - peaches, apples, blueberries, oranges
- >80-85% - oranges
- ≤80 - bananas (74%)

Vegetables:

- >90% - cucumber, celery, romaine lettuce, summer squash, tomatoes, bell peppers, spinach, cabbage, cauliflower
- >85-90% - broccoli, green beans, onions, carrots
- ≤80 - baked potatoes (75%), sweet corn (70-75%)

Meat/Fish:

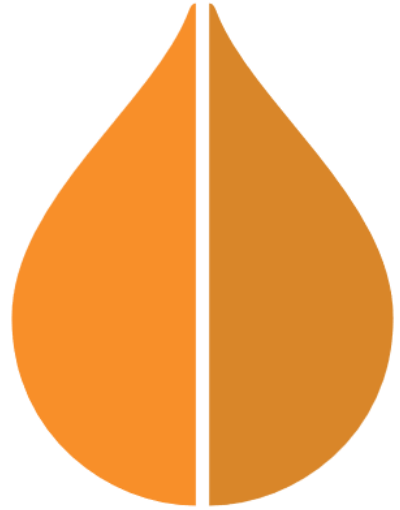
- Canned Tuna in water, drained (~70%), baked salmon (~65%), grilled steak (60-65%), baked chicken breast (~60%), hamburger (50-60%)

Assessing Hydration Status - HydraScale

HYDRATION FOR HEALTH.

Are you well hydrated?

Simple: take a look at your urine color!

PALE YELLOW	STRAW-COLORED YELLOW	ORANGE OR STRONG YELLOW
		
good job!	*Almost there!*	*You are dehydrated!*
You are well hydrated.	Get some more water in.	Your body lacks water, let's hydrate!

REFERENCES

Armstrong et al., J Acad Nutr Diet, 2012
Perrier et al., Br J Nutr, 2013
Perrier et al., Eur J Nutr, 2016

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Questions