NebGuide
University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources
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Water: The Nutrient

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Everyone needs to consume an adequate amount of water to stay healthy. That amount can vary depending on a person's age, health, and activity level.

Nutrients are those elements from food and drink that perform a sustaining or metabolic function when taken inside our bodies.

Essential nutrients must be supplied from an outside source because they cannot be made by the body in sufficient amounts. Water is an essential nutrient. Without it human life cannot survive. Water deprivation kills faster than lack of any other nutrient.

If water is something you rarely think about, you are not alone. It is seldom thought of as a nutrient. Many people don't realize the important part water plays in major body functions.

Water: Vital Link to Life

Water serves as the body's transportation system. It is the medium by which other nutrients and essential elements are distributed throughout the body. Without this transport of supplies the body factory would stop. Water also works as the transport for body waste removal.

Water is a lubricant. The presence of water in and around body tissues helps defend the body against shock. The brain, eyes, and spinal cord are among the sensitive structures that depend on a protective water layer.

Water is present in the mucous and salivary juices of our digestive systems. This is especially important for moving food through the digestive tract. Those who experience reduced salivary output soon will realize that foods taste differently and are harder to swallow. As a lubricant, water also is helpful for smooth movement of bone joints.

Water participates in the body's biochemical reactions. The digestion of protein and carbohydrates to usable and absorbable forms depends on water as part of the chemical reaction.

Water regulates body temperature. Our health and well-being are dependent on keeping body temperature within a very narrow range. The human body, which is made of 60 to 75 percent water, serves this function quite well. Water itself changes temperature slowly and helps regulate body temperature by serving as a good heat storage material.

Evaporation of water from body surfaces also helps cool the body. Sweat loss that is barely noticeable occurs every day and night. Individuals may lose up to a pint of water each day in this manner. In hot, humid weather or during exercise, increased sweating and losses of water are more visible.

Water Balance

Each day water losses are balanced with water intake. The body has a sophisticated system that works to maintain water balance. Few of us ever experience malfunctioning of this system. Thirst is a trigger that reminds us to take in more water. At the same time our kidneys regulate urinary output.

Is There a Daily Requirement?

Unlike many of the nutrients, there isn't a specific daily recommendation for water intake. Part of the reason is the variability in individuals related to the climate in which they live, physical activity, age, state of health, and body size. Under typical circumstances, adults may replenish up to six or eight cups of fluid each day.

Typical water output is two quarts or more of water each day. Water losses in urine account for about three-fourths of daily losses. Remaining losses come from sweat, as tiny water droplets in the air we exhale, and through feces. Infrequent urination or dark yellow urine may indicate you could use more fluid intake each day.

Water Sources

Water comes from a variety of sources. All beverages or fluids are a source of water. Even solid foods contain water. Lettuce, celery, and other crisp vegetables are composed of 90 percent or more water. Protein-rich foods such as meat, fish, or chicken may contain as much as one-half to two-thirds their weight in water. Even grain products, which don't seem watery at all, may be up to one-third water.

Fats, such as butter or margarine, and sugar are among the foods that contain the least water.

Some water, perhaps one to two cups per day, comes from inside our bodies as a byproduct of energy metabolism. This amount is small but significant.

It is important to be aware of fluid intake. Even though solid food is a source of water, additional water from drinking fluids is needed. Besides plain water, juices, milk, or other beverages boost fluid intake.

Special Needs

Under special circumstances, fluid intake and output should be more carefully monitored. Examples of people with special fluid needs include:

• ***Infants, young children, and older folks.*** Children have lower sweating capacity than adults. They tolerate high temperatures less efficiently. Frequent vomiting and severe diarrhea in infants and young children can quickly lead to water dehydration.

Older folks may be at increased risk for dehydration because their thirst mechanism may not be as efficient as at younger ages. The influence of medications and the presence of disease are other factors that affect fluid intake and water balance.

Encourage water intake often for both the young and the old.

• ***Athletes.*** Of all nutritional concerns for athletes, the most critical is adequate water intake. The athlete's immediate need for water is to control body temperature and to cool working muscles.

Lack of water, above all other nutrients, has the ability to hinder performance and lead to serious complications. For example, fluid loss of 2 to 3 percent of body weight by sweating impairs performance. Fluid losses of 7 to 10 percent of body weight result in heat stroke and death.

A fluid loss of 2 to 3 percent in a 150-pound individual represents 3 to 4 ½ pounds of body weight or 1 ½ to 2 quarts lost water. Marathon runners and other long distance athletes may lose up to 3 quarts (or 6 pounds) of sweat per hour.

To prevent dehydration during exercise, athletes should drink fluids before, during, and after activity. Even exercise in cold weather produces sweat and requires adequate fluid replacement.

Although electrolytes such as sodium are lost through perspiration, the immediate need is for water alone. Seasonings (especially salt) on foods at regular meals will usually replenish what has been lost. Following athletic activity lasting more than 60 minues, one may want to consume a sport drink containing 4 to 8 percent glucose. Glucose helps spare glycogen and glucose. Sodium is added to help the body absorb the glucose and water.

During exercise or athletic events thirst is not always a reliable gauge of fluid needs. The best approach is to go into the event with adequate fluid intake. *Table I* outlines six basic steps for keeping fluid levels up during sports activities.

Water balance in children involved in sports or physical activities is a special concern. Children have lower sweating capacity and less tolerance for hot temperatures. They need frequent fluid intake in order to regulate body temperatures. A water bottle or ready water supply should be handy during all sports activities.

Parents, coaches, and others should remember that younger children also take longer than adults to adjust to warm weather following cool winter temperatures. It is especially important to watch fluid intakes during the adjustment time.

• ***Outdoor workers.*** The combination of hot, humid temperature and physical activity places outdoor workers at special risk. Anyone who works or plays hard outside, especially in hot weather, needs to keep water handy.

Sipping throughout the work period is better than saving up for scheduled meals or breaks. Pay particular attention as you shift from cool weather to warm weather because it takes a few days for your body to adjust to the warmer temperatures.

Table I. Six basic rules for fluid replacement during sports events.

1. Cool water between 40° and 50°F is best.
2. Plain water is best. Sugar and electrolytes in fluids may slow emptying from the stomach.
3. Don't depend on thirst. Drink ahead of your thirst.
4. Drink water before a sporting events or activity. Two cups of water about two hours before an event is about right. Follow this with one cup of water about 15 minutes before the event.
5. Sip water during an event (1/3 to 3/4 cup every 10 to 20 minutes). The body cannot absorb more than about one cup every 20 minutes.
6. Weigh before and after a sporting event or heavy workout. After the event, replace two cups water for every one pound lost.

Water and Other Elements

We often hear recommendations for increasing fiber intake in our daily diets. Adequate fiber intake helps regulate bowel movements and, possibly, helps lower serum cholesterol levels.

Persons with low fiber intakes who wish to increase their use of fiber-rich foods should increase fluids as they increase fiber. If not, they can experience extreme discomfort and risk having an impacted bowel.

Dentists recommend fluoridated water to reduce tooth decay. If community water is not naturally fluoridated, fluoride may be added. Fluoride concentration of one part per million (ppm) is considered safe while helping to increase the hardness of tooth and bone tissue. In some areas, natural waters are known to contain too much fluoride which can result in permanently discolored and mottled teeth.

Water purity in relation to nitrate content[1], bacterial contamination and other substances is a concern in some areas. Individuals who use private wells or water systems should have their water quality tested on a regular basis.

Adapted from a NebGuide originally written by Kay McKinzie, former University of Nebraska–Lincoln Extension Educator, and Linda Boeckner.

[1]Safe levels of nitrate in water are 10 parts per million or less.

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