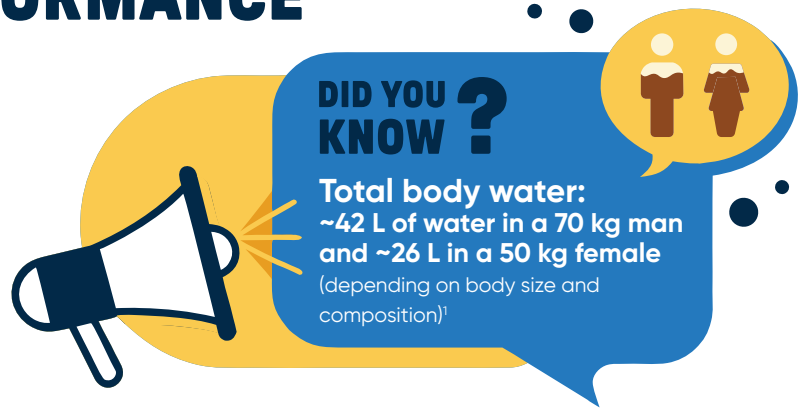


# Health & Nutrition Sciences

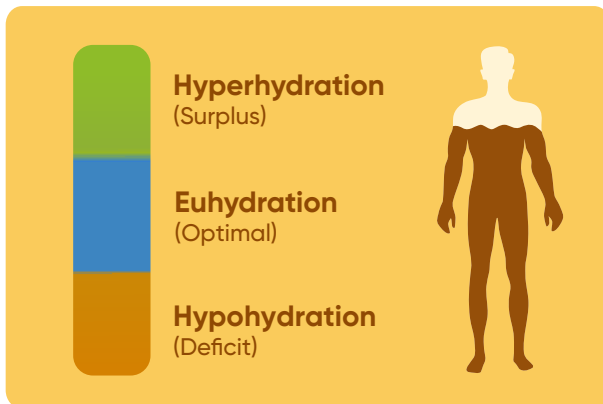
## IMPORTANCE OF HYDRATION FOR HEALTH AND PERFORMANCE

**Water is essential for life.** Humans can survive several weeks without food, but typically only **5–7 days without water**. The human body is composed of **~60% water in men and ~50% in women**, depending on body composition<sup>1</sup>. As lean tissue contains more water (~70%) than fat tissue (~20%), total body water varies between individuals.



Water is involved in every function of the body, supporting circulation, nutrient transport, waste removal, and temperature regulation. As water is lost throughout the day continuously through urine, sweat, breathing, and the digestive system, adequate hydration is required every day. Importantly, an individual's hydration status fluctuates throughout the day and exists on a spectrum.

### Hydration exists on a spectrum



**Euhydration** is the state of optimal total body water, maintained within a narrow physiological range, where the body's systems function most efficiently. Fluid balance is controlled through coordinated physiological mechanisms, including thirst, hormonal regulation, and adjustments in kidney function. When fluid intake and loss become significantly mismatched, hydration status shifts, resulting in either a total body water deficit (**hypohydration**) or total body water surplus (**hyperhydration**).

### Why is hydration important for exercise and sport performance?

#### Fluid and electrolyte losses can be substantial during exercise

During exercise, particularly endurance exercise in hot environments large amounts of fluid are lost through sweat. Sweat rates vary widely depending on exercise intensity, duration, environment and genetics, but can exceed 1.5–2 L per hour in hot environments with additional losses of key electrolytes particularly sodium.<sup>2</sup>




#### Inadequate fluid replacement leads to hypohydration

When fluid losses that occur during exercise are not adequately replaced, hypohydration occurs. Even relatively small fluid deficits can accumulate quickly during prolonged or high-intensity exercise.

# Health & Nutrition Sciences

## Small fluid deficits can impair performance

Research shows that hypohydration levels of over 2–3% of body weight can significantly decrease sports and exercise performance.<sup>2,3</sup>

 <p><b>AEROBIC PERFORMANCE</b></p> <p>Reduced endurance and exercise capacity</p>	 <p><b>ANAEROBIC PERFORMANCE</b></p> <p>Reduced sprint performance and power output</p>	 <p><b>SPORT-SPECIFIC SKILLS</b></p> <p>Reduced technical skills (passing, shooting, dribbling)</p>
--	--	--

## Why is hydration important for cognitive function and performance?

Hydration is often an overlooked factor in cognitive function and performance.

Research shows that even young healthy adults that work in high temperatures fail to replenish the total water lost during these activities.<sup>4</sup>

Certain populations may be more vulnerable to hypohydration.


Groups such as children, the elderly, pregnant women, infants, and athletes are more vulnerable to body-water loss.<sup>5</sup>

Importantly, research shows that even mild hypohydration (1–3% body weight) can reduce feelings of energy, vigour, and alertness, whilst increasing sensations of fatigue, tension, or anxiety.<sup>6,7</sup>

### Potential impacts of hypohydration (>2–3% body weight)

Inadequate fluid intake, exercise, and/or heat<sup>5,8</sup>

 <p><b>Short-Term Memory</b></p>	 <p><b>Attention &amp; Concentration</b></p>	 <p><b>Visual-motor tracking</b> (Hand-eye coordination)</p>	 <p><b>Mood</b></p>
---	---	---	--



Even mild hypohydration can impair cognitive and physical performance, particularly in the heat. Maintaining adequate hydration throughout the day and during exercise through regular fluid intake, starting exercise well hydrated, and replacing sweat losses is essential to support optimal performance.

#### References:

1. Benelam B, Wyness L. Hydration and health: a review. *Nutr Bull.* 2010;35(1):3–25.
2. Sawka MN, Burke LM, Eichner ER, et al. American College of Sports Medicine position stand. Exercise and fluid replacement. *Med Sci Sports Exerc.* 2007;39(2):377–90
3. Murray B. Hydration and physical performance. *J Am Coll Nutr.* 2007;26(sup5):542S–8S.
4. Chen Y, Liang Y, Lu Z, et al. Sweat Electrolyte Profiles During Daily Physical Activities Among Chinese Adults. *Nutrients.* 2026;18(10):1531.
5. Adan A. Cognitive performance and dehydration. *J Am Coll Nutr.* 2012;31(2):71–8.
6. Armstrong LE, Ganio MS, Casa DJ, et al. Mild dehydration affects mood in healthy young women. *J Nutr.* 2012;142(2):382–8.
7. Ganio MS, Armstrong LE, Casa DJ, et al. Mild dehydration impairs cognitive performance and mood of men. *Br J Nutr.* 2011;106(10):1535–43.
8. Wittbrodt MT, Millard-Stafford M. Dehydration impairs cognitive performance: a meta-analysis. *Med Sci Sports Exerc.* 2018;50(11):2360–8.