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Hydration, health and performance

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Abstract

This paper aims to highlight the role and significance of water in human body. Human body uses water in all its cells, organs, and tissues to help regulate its temperature and maintain other bodily functions. This paper also focuses on the importance of rehydrating the body by drinking fluids and eating foods that contain water.

Keywords: water, hydration, health, human body, physical and mental work

Introduction

Water plays many important roles within the body and hydration refers simply to the amount of water present. An excess of water (hyperhydration) and a shortage of water (hypohydration or dehydration) both prevent optimum functioning of the body. Water is the main constituent of the human body, representing about 60% of body weight in adult males and 50 – 55% in females due to their higher proportion of body fat compared with men.

Good hydration essential for health and wellness, and body water is usually maintained within 1-2% of the ideal level on a daily basis. Balance depends on the rates of water intake (water from all sources in the diet, including foods, plus the water generated by metabolism of fat, carbohydrate, protein and alcohol) and water losses (urine, faeces, loss through the skin and from the lungs and sweating). Balance may be achieved at high or low turnover rates but increased losses must be matched by an increased intake. Severe vomiting or diarrhea, or hard exercise in a warm environment for example, will greatly increase the rate of loss, so there must be a corresponding increase in intake. Failing to ensure a sufficient intake of water over prolonged periods of time may increase the risk of a number of disease states, including:

- Constipation
- Urinary tract infection and Kidney stones
- Hypertension, Coronary heart disease, Stroke
- Bladder and Colorectal Cancer

There may also be an increased risk for some other diseases. Though the evidence is not totally conclusive, it does seem sensible not to take the risk. How strong does the link have to be before its worth doing something about it?

The European Food Standards Agency has identified levels of adequate water intake for sedentary individuals living in temperate climates and set these at 2.5 liters per day for men and 2.0 liters per day for women. Some individuals will need more than this though and some will need less and the requirement will vary from day to day for any individual so these should not be seen as absolute values that must be met. Water can be obtained from all foods and drinks in the diet. In the typical diet about 20-30% of the daily water intake comes from foods and the remaining 70-80% comes from drinks. The water content of some commonly consumed foods is:

- 80+% Soups, fruit, Most Vegetables
- 40-70% most hot meals
- <40% cereal products
- <10% Savoury snacks, Confectionery

In addition, the oxidation of the energy nutrients in foods will add about 200-400 ml of water per day, depending on how much you eat.

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Plain water is fine, but all drinks will contribute to meeting the body's water needs (except strong alcoholic drinks – see section 10 on alcohol). Caffeine is a mild diuretic, stimulating and increase in urine output but most caffeinated drinks will result in a positive fluid balance the caffeine content is low and the water they contain will more than match any losses. Consuming a variety of drinks will help ensure that requirements are met and drinks should be chosen to meet individual needs after taking account of their content of energy, Sugar and micronutrients. This may be especially important for the elderly or for young children who may not feel thirsty or who may forget to drink.

Even low levels of dehydration as a result of not drinking enough are associated with a number of unwanted symptoms: these include headache, inability to concentrate, low levels of alertness, impairment of cognitive function and an increased sensation of tiredness. Simply increasing fluid intake can alleviate some of these symptoms. If it does not there may be another cause and medical help may be needed.

There is no simple and reliable way to assess hydration status with a high degree of precision but keeping an eye on urine losses will give a good idea. If you visit the bathroom only two or three times a day and pass only small volumes of dark-colored urine, then you probably need to drink more. If you need to pass urine every 15 minutes and pass large volumes of colourless urine, you are probably drinking too much.

It is clear that dehydration, if sufficiently severe, can lead to impairments in.

Mental performance

- Cognitive tasks
- Skilled movements
- Judgement

Physical performance

- Athletic performance
- Health – related activity
- Occupational tasks

The level at which these effects will appear is variable – it depends on how quickly the body water level has been reduced on the ambient temperature and on the characteristics of the individual in general through some effects may be apparent when the level of body water loss reaches about 2% of the starting body weight – that a loss of 1 kg for a 50 kg person and 2 kg for someone who weighs 100 kg. Most serious athletes will get into the habit of weighing themselves before and after a training session at least until they learn to recognize how much they need to drink. If you have lost more than 2% of your body weight, you should probably drink more next time. If you have drunk so much that your weight has gone up then you should drink less next time.

For short exercise sessions, these are probably no benefit from taking drinks during the session, provided that you are well hydrated when you start. If you are planning to exercise for more than about 40 minutes, taking drinks may help the session feel easier and more enjoyable. Water will help, but carbohydrate electrolyte sports drinks are probably better. After any exercise session that has caused significant sweat loss, replacement of both the water and the salts lost in the sweat is essential. Mostly the salts can come from the foods eaten at the next meal (unless the sweat loss is very high), but prompt replacement of water losses can help ensure rapid and effective recovery.

Follow these three simple steps to check on your hydration

1. Start exercise sessions well hydrated. If you are passing urine less often than normal, you may be dehydrated. If urine colour becomes darker than what is normal for you, then you may not be drinking enough. The aim should be to keep the urine a pale straw colour.
2. Monitor your sweat losses and the success of your drinking plan during training sessions in different situations. How did you feel? How did you perform? What was your weight loss over the session? For exercise sessions lasting more than about 40 minutes you should weigh yourself before and after: weight loss should generally not exceed about 1-2% of your starting body weight. If you lost more than this, you probably did not drink enough. Drink more next time. If you lost less, you might have drunk too much. Did it make you feel uncomfortable? Did you take time out to drink that was unnecessary?
3. Most people should reduce their salt intake, but if you are a “salty sweater”, you may need drinks with more salt and may need more salt in food when sweat losses are high. To check whether you are a salty sweater, wear a black T-shirt in training and look for salt stains (white powder) under the arms and on the chest. High salt losses are a contributing factor in some cases of muscle cramp. Sports drinks with higher salt (sodium) levels (e.g. 300 – 500 mg sodium per 500 ml liquid) may help reduce the risk of cramps.

Conclusion

There's no hard and fast rule, and many individuals meet their daily hydration needs by simply drinking water when they're thirsty, according to a report on nutrient recommendations from the Institute of Medicine of the National Academies. In fact, most people who are in good physical health get enough fluids by drinking water and other beverages when they're thirsty, and also by drinking a beverage with each of their meals, according to the Centers for Disease Control and Prevention.

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