

Wise up
on water!



Water in the
workplace

Introduction

Water is a vital nutrient for life, but in a busy working environment it is easy to overlook the importance of good hydration for our daily health. Everybody wants to be healthy at work and a healthier workforce leads to improved productivity and lower sickness absence. Figures from the CBI show that sickness absence costs UK employers £12bn a year, with 168 million working days lost in 2004.

Good hydration contributes to workers' health and safety. Even mild levels of dehydration adversely affect both physical and mental performance, but these effects can be made worse by the physical demands of the job, a hot working environment, intake of caffeinated drinks, or the need to wear protective clothing.¹ Good hydration also has many long-term health benefits, making it an essential part of any healthy lifestyle.

What is good hydration?

There is currently no agreement about how much water we should drink each day.² Some estimates do exist and these range from 1.2 litres,³ to 3 litres (for men) or 2.2 litres (for women). These amounts represent about 81 per cent of our total daily water requirement, since on average about 19 per cent of the water we need comes from the food we eat.⁴

Dehydration is defined as a 1 per cent or greater loss of body weight as a result of fluid loss. We usually feel thirsty when dehydration reaches 0.8-2 per cent.⁵ This means that you can't rely on thirst to tell you when it is time to have a drink, because by the time you feel thirsty, you are already slightly dehydrated. The key is to keep topping up with water throughout the day.⁶

Look out for some of the early signs of dehydration which include light-headedness, dizziness, tiredness, irritability, headache, sunken features (particularly the eyes), flushed skin, heat intolerance, dry mouth, throat and eyes, and skin that is loose and lacks elasticity. There may be a burning sensation in the stomach, urine output will be reduced, and may appear darker than usual.^{7,8,9,10}

Water is mainly lost from the body as urine, but we also lose water through evaporation from our lungs and skin when we breathe and sweat. A small amount of water is lost in faeces. In hot weather, or when we are active, the body loses more water and so we need more to drink. In order to remain healthy, water gains and losses must be balanced – this is what constitutes good hydration. Our bodies are very efficient at regulating daily water balance provided adequate food and the right fluids are available.

Benefits of good hydration

Preventing and relieving headaches

Getting a headache is one of the early signs of dehydration, together with feelings of tiredness and light-headedness.⁵ Headaches resulting from mild dehydration can often be relieved quickly (within 30 minutes) by drinking between 200ml and 1.5 litres of water.¹² Drinking an extra litre of water per day, has been shown to help reduce headache duration and intensity in individuals who are susceptible to headache, or migraine.¹³

Concentration and mental performance

Mild dehydration adversely affects mental performance, reduces alertness, and increases feelings of tiredness and perceived effort.^{14,2}

Once thirst is felt, mental performance can decrease by about 10 per cent.¹⁵ The functions affected include memory, attention, concentration and reaction time. As the degree of dehydration increases, mental

performance deteriorates further^{16,2} and this may compromise safety particularly for those operating machinery or driving. Hand-eye motor coordination is also impaired even at 1 per cent dehydration, making it more difficult to perform delicate or detailed work.¹⁷ Drinking water can have an immediate “alerting” and “revitalising” effect.¹⁵

Prevention of cancer and the risk of chronic diseases

Drinking enough water can help to protect the body against certain chronic diseases. Individuals who maintain good hydration levels have been shown to have a reduced risk of developing the following conditions:

- breast,¹⁸ colorectal,¹⁹ urinary tract cancer^{20,21}
- coronary heart disease²²
- thrombosis²³
- stroke²³
- gallstones²⁴
- kidney and bladder stones^{25,26}

Maintaining a healthy workforce and helping employees avoid long term health problems will become increasingly important as the Employment Equality (Age) Regulations 2006 come into force in Great Britain.²⁷ These will introduce a national default retirement age of 65 and make compulsory retirement below age 65 unlawful (unless objectively justified). The regulations will widen the age range of the workforce by placing a duty for employers to consider an employee’s request to continue working beyond retirement. They will help to ensure that the contribution of older individuals is valued in the workplace and put an end to age discrimination at work.

Preventing urinary tract infections

Water helps to keep the urinary tract and kidneys healthy. Urine is formed by the kidneys to get rid of water-soluble waste products. Adults normally pass about 1.5-2 litres of urine per day. The kidneys play a vital role in controlling the amount of water in our bodies by increasing urine dilution to remove excess water and reducing urine dilution to retain water and prevent dehydration.²⁸

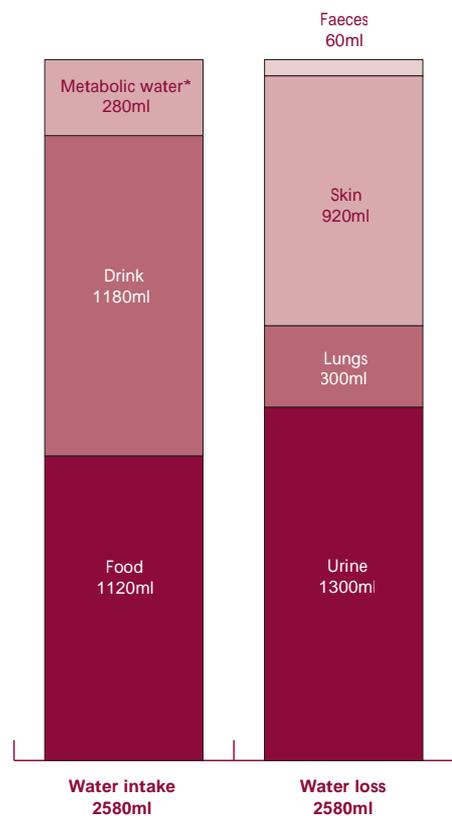
Urinary tract infection (UTI) is more common in women than men, with some 5-10 per cent of women suffering from recurrent attacks. In the majority of cases, UTI is confined to the lower urinary tract, the bladder and urethra and although uncomfortable, does not cause serious harm. Occasionally, the infection may spread to the kidneys where other complicating factors such as kidney stones or urinary obstruction can lead to kidney damage.²⁹

When fluid intake and urination frequency are reduced the risk of getting a UTI can be doubled.³⁰ Low urine output is also associated with recurrent UTI.²³ These observations are of particular concern for individuals, such as call centre staff and drivers, whose access to drinking water or toilet facilities may be restricted during working hours. One of the most important measures for preventing recurrent UTI is to maintain good hydration levels throughout the day.³¹ Water intake should be at least two litres in 24 hours, or enough to pass two litres of urine daily. Frequent and complete bladder emptying is also necessary to prevent the establishment of bacteria in the bladder. If symptoms are severe or do not disappear completely within 24-36 hours you should consult your doctor.²⁹

Relief of constipation

Inadequate fluid intake is one of the most frequent causes of chronic constipation.³² In individuals who are not adequately hydrated, drinking more water can increase stool frequency and enhance the beneficial effect of daily dietary fibre intake.³³ Water intake should be maintained if saline laxatives are used to treat constipation, because these can have a dehydrating effect which reduces the effectiveness of the treatment.³⁴

Example of average daily water gains and losses¹¹



*water produced when the body uses food for energy

Maintaining a healthy weight

Water is a vital component of any healthy diet, including weight loss regimens. Drinking more water is often recommended to help weight loss^{35,36} because, for example, drinking water before a meal can help to fill the stomach and decrease appetite.³⁷ Early signs of dehydration may include a burning sensation in the stomach,⁵ stomach pain³⁸ or the feeling of an 'empty stomach'⁸ which can be mistaken for hunger pangs. Water is the ideal alternative to soft drinks because it contains no calories. In addition, it has been found that drinking 500ml of water can increase the metabolic rate by 30 per cent. This means that drinking an extra 1.5 litres a day could increase daily energy expenditure by approximately 200kJ. Although only a small increase, over the course of a year, this additional metabolic activity would burn 17,400kcal.³⁶ Some of these calories are used by the body to warm the water from 22 to 37°C, so drinking colder water could use up even more calories! There is also some evidence to suggest that increased hydration encourages the body to breakdown fat.^{39,2}

One theory linking mild dehydration to obesity suggests that low fluid intake may stimulate a preference for a high fat diet. Of all the nutrients, fat generates the most metabolic water when it is broken down by the body. A high fat diet could, therefore, be part of a compensatory mechanism to deal with perpetually low water intakes.⁴⁰

Physical performance and exercise

Mild dehydration of 1-2 per cent can reduce physical work capacity by a quarter. Both aerobic and endurance activities are affected and the drop in performance becomes worse in a hot environment and as the level of dehydration increases.^{4,41} Muscle strength is relatively unaffected by moderate dehydration, but when muscle strength does decline, the upper body muscles are affected more than the lower body muscles.⁴¹ Individuals with physically active jobs may experience a reduction in work capacity and could be more susceptible to heat stress when they are dehydrated. In physically demanding circumstances workers should ensure proper hydration by drinking water before, during and after the job.¹

Health-conscious employers often provide access to gym and sports facilities for their staff. In addition, more individuals are choosing to visit the local gym before or after work because of the health benefits of exercise. The amount of water lost during exercise depends on sweating rates and evaporative water loss from exhaled air. Water loss can be quite high, particularly during long periods of exercise or if the environment is hot. This can quickly lead to dehydration and a decline in physical performance.⁴²

It is important to be well hydrated before you begin exercising, and then during exercise, aim to drink at frequent intervals (about every 10 to 15 minutes). There is no standard recommended amount of water consumption during exercise, but estimates suggest that you should consume about the equivalent of a full glass every 30 minutes (approximately 200ml) for most forms of recreation and competitive exercise. More would be required for superior athletes competing at higher intensities in warmer environments.⁴³ For exercise up to an hour, water is adequate for fluid replacement as long as sufficient salt is available from a balanced diet. You should continue to drink water after exercising to ensure sweat losses are fully replenished.⁴⁴ Swimmers also need to maintain good hydration levels since water immersion makes you less sensitive to thirst. This coupled with exercise means that you could be more susceptible to dehydration.⁴⁵

Oral health

Having a dry mouth is one of the early signs of dehydration, but a reduction in saliva production can be a risk factor for dental disease. Saliva is essential for good oral health because:

- it neutralizes the acid created by the bacteria which cause tooth decay
- lubricates oral membranes
- contains minerals that enable tooth repair, and
- contains antibacterial agents that inhibit the growth of oral bacteria and help prevent gum disease.⁴⁶

Water is the best alternative to fizzy drinks, squashes and "juice drinks" because these contain a lot of sugar which can damage teeth. Sports drinks can also contribute to tooth decay and are usually very high in calories.⁴⁷

Healthy pregnancy

Pregnant women have a slightly increased water requirement due to the needs of the fetus and the amniotic fluid. This has been calculated to be an extra 30ml of total fluid intake per day (including water in foods), or approximately 2.3 litres consumed as beverages. The actual amount is likely to vary between individuals and would be higher in hot weather.⁴

Poor hydration during pregnancy can reduce the amount of amniotic fluid surrounding the baby in the womb. As a result, the baby may receive too few nutrients and oxygen, and may not be able to turn to the head-down position before birth. Good hydration during pregnancy is very important, since drinking water is an effective way of restoring amniotic fluid volume.⁴⁸

Caffeine and alcohol

Caffeine

Ninety three percent of workers drink at least one caffeinated beverage a day.⁴⁹ Caffeine acts as a stimulant to the nervous system, and whilst its mild action may help to prevent a feeling of fatigue, it is also a weak diuretic. This means that it makes the body produce more urine, which in turn can lead to dehydration.

- A cup of fairly strong coffee contains about 60-100mg caffeine.
- The average cup of tea made from 5g tea contains 50-80mg caffeine.
- Cocoa also has about 20mg of caffeine in an average cup.
- Caffeine is also present in some carbonated soft drinks.¹¹

The extent to which caffeine acts as a diuretic varies between individuals, and regular caffeine drinkers appear to be least susceptible to the dehydrating effects.⁵⁰ However, large doses of caffeine (eg 350mg or 3-4 cups of coffee) can also cause lapses in concentration and increased stress levels.⁴⁹ Since the process of drinking has been shown to alleviate the feeling of thirst, consumption of caffeine can not only result in mild dehydration, but also reduces the desire to drink.⁵¹ Coffee drinking can also increase the risk of bladder cancer.⁵² If you like to enjoy a cup of coffee at work, just be sure to drink plenty water or other non-caffeinated drinks in order to help counteract any negative effects of the caffeine.

Caffeine consumption during pregnancy increases the risk of having a miscarriage or a baby of low birth weight. The Food Standards Agency advises pregnant women not to consume more than 300mg of caffeine a day.⁴⁷

Alcohol

Alcohol is a diuretic and, taken in excess, can lead to dehydration. For every 1g of alcohol consumed, urine excretion increases by 10ml.⁵³ In addition, long-term, habitual consumption of alcoholic beverages blunts the thirst response. This means that you won't feel thirsty until you are much more dehydrated than normal.⁵⁴

Ways to cut down your drinking:

- don't start drinking alcohol if you are thirsty – quench your thirst with water or a non-alcoholic drink first
- avoid salty snacks such as crisps and nuts because these make you thirstier
- drink water or non-alcoholic drinks throughout the evening
- always have a glass or bottle of water with you as well as your alcoholic drink
- think about the strength of your drink – choose beers or lagers that contain less alcohol and are less dehydrating.

Drinking alcohol in moderation is not harmful, but problems can occur if

you drink too much. Alcohol is also high in calories and so it can make you put on weight. Heavy drinking can lead to a wide range of health problems, including cancer, liver disease, stroke, high blood pressure and can affect mental health. In order to counteract the dehydrating effect of alcohol, you should have plenty of other non-diuretic drinks such as water.⁵⁵ If you are susceptible to a hang-over, try drinking a glass of water before going to bed and when you get up, then have another glass every hour during the day.

Environmental factors

Hot environments

Prolonged work in a hot environment leads to water loss as a result of sweating, and increased respiration. The rate of sweating varies among individuals and depends on environmental conditions, but in protective clothing and very hot conditions, sweating rates can reach 2.25 litres per hour.⁵⁶ Such high levels of sweating can quickly lead to dehydration if fluid is not replaced. However, sweating will only cool the body if the moisture is removed from the skin by evaporation. Some forms of protective clothing, particularly full encapsulation, may prevent evaporation and lead to overheating.⁵⁷

Dehydrated workers are more likely to suffer heat exhaustion because without adequate water, the body's sweating ability is impaired.⁵⁸ 'Voluntary dehydration' is said to arise when thirst does not stimulate sufficient fluid intake, but 'involuntary dehydration' may also result if, for example, fluids are not readily available, or if workers are unable to drink because of the need to wear a protective mask or in other hazardous environments.⁵⁶

In hot and humid conditions some individuals have a tendency to pant in order to get rid of excess heat. This hyperventilation can cause the person to become blue, have tingling sensations in the lips, muscle cramps, feel dizzy or even collapse. Hyperventilation may also lead to dehydration due to excessive water lost in exhaled air. Drinking a small amount of water and taking deep slow breaths is recommended to help recovery.⁵⁹

Access to drinking water at work: The law requires employers to provide an adequate supply of wholesome drinking water for all persons at work in the workplace. This must be readily accessible at suitable places and conspicuously marked by an appropriate sign. Drinking water taps should not be sited where contamination is likely, eg in a workshop where lead is handled, or in toilet facilities or washrooms.⁶⁰ Workers should be encouraged to drink water regularly in small amounts throughout the day, rather than just responding to thirst, or drinking at mealtimes.⁶¹

Workers and their supervisors need to be vigilant about recognising and treating the signs of dehydration and heat stress. Education about the importance of good hydration is vital for anyone exposed to a hot working environment.

It should also be noted that the consumption of large volumes of water for prolonged periods could lead to hyponatraemia, where there is a low concentration of sodium in the blood. This is because both water and salt are lost in sweat, but if you only replace the water, particularly by drinking large quantities in one go, your body does not have time to adjust and so your body fluids can become more dilute. This can result in feelings of lethargy, muscle cramps and nausea.⁶²

Frequent re-hydration with smaller volumes, is better than one large intake of liquid.⁶³ This should be accompanied by a balanced diet to replace lost salts.

In hot environments where heat stress is likely, a risk assessment should be carried out. More information is available from the Health and Safety Executive (www.hse.gov.uk). Some possible solutions include:

- Controlling the temperature using engineering solutions.
- Providing mechanical aids where possible to reduce the work rate.
- Regulating the length of exposure to hot environments.
- Preventing dehydration.
- Providing personal protective equipment, eg personal cooling systems or breathable fabrics.
- Teaching workers about the risks of heat stress associated with their work, what symptoms to look out for, safe working practices and emergency procedures.
- Allowing workers to acclimatise to their environment.
- Identifying employees who are more susceptible to heat stress.
- Monitoring the health of workers at risk.⁶³

Cold environments

Our bodies can lose as much fluid in cold environments as in hot environments because of the high rates of energy expenditure to keep warm and the use of heavy clothing. Fluid losses are commonly thought to result from increased urination induced by the cold, and greater respiratory water losses due to higher rates of evaporation from the lungs in exhaled air. If exercise or heavy work is carried out whilst wearing highly insulating clothing, heat stress can occur.⁴

Indoor environments

In some indoor environments there may be a risk of low relative humidity, for example, if there is a poor air conditioning system, or a large number of computers operating on one room, such as in call centres. This can dry the air to unacceptable levels leading to dehydration which, in turn, can contribute to sore eyes, voice loss and headaches. Skin rashes may also appear. The relative humidity for an office should be between 40 per cent and 70 per cent with the lower end being the most comfortable in warmer offices.⁶⁴

A similar occupational hazard occurs in aircraft where cabin air may have a low water content, leading to dehydration. In addition, low atmospheric pressure in the cabin forces more water to be stored under the skin, contributing to dehydration of the central organs. These conditions may be linked to an excess risk of breast cancer which has been observed in airline cabin attendants.⁶⁵

Maintaining a good level of hydration is important in these environments. Employees should be provided with information on the risks of low relative humidity, their potential effects on physical and mental well-being, and how these risks may be reduced.

Ten tips for drinking more water

- 1** On a sedentary day, try to drink around two litres of water.
- 2** Start by drinking a glass of fresh water when you get up in the morning.
- 3** If you are not used to drinking water regularly, try initially replacing just one of your other drinks a day with fresh water, increasing your consumption as the weeks go by.
- 4** Ask for a glass of tap water to go with your coffee and tea in cafés.
- 5** Drink a glass of water before and during each meal.
- 6** Hot water with fresh mint, lemon balm or a piece of fruit in - like lime, lemon, orange etc - often helps those who want a hot drink.
- 7** Carry a bottle filled with chilled tap water with you whenever you leave the house.
- 8** During exercise, drink at 10 to 15 minute intervals or think of it as a full glass every 30 minutes - drink slowly and drink early, it's physically easier to do this when you are still feeling fresh.
- 9** Keep a check on your urine. As a general guide to hydration, it should be plentiful, pale in colour and odourless.
- 10** Ask for a jug of iced tap water with your meal when in restaurants and with your alcohol when in bars – good establishments will be happy to provide this.

All relevant medical practice and care guidance must be observed before considering these suggestions.

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