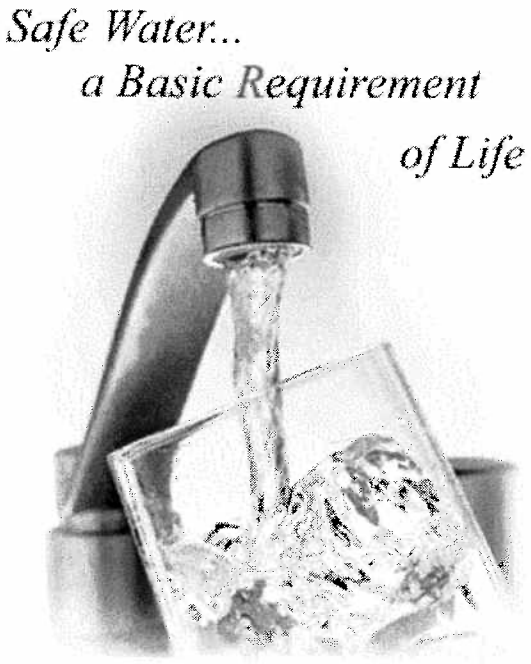
ALL THAT WE NEED TO KNOW ABOUT DRINKING WATER

Water is the most abundant molecule on Earth's surface, composing of about 70% of the Earth's surface as liquid and solid state in addition to being found in the atmosphere as a vapor. Many substances dissolve in water and it is commonly referred to as the universal solvent. Because of this, water in nature and in use is rarely pure, and may have some properties different from those in the laboratory.



The safety and accessibility of drinking-water are major concerns throughout the world. Health risks may arise from consumption of water contaminated with

infectious agents, toxic chemicals, and radiological hazards. Improving access to safe drinking-water can result in tangible improvements to health.

The following paper discusses mainly about drinking water and its resources, contaminants in drinking water, concerns about water safety, purification / treatment methods of water, distribution of drinking water, water quality and human health.

INTRODUCTION

Drinking water is so important for good health. Each molecule of water is made up of two hydrogen atoms and one oxygen atom. It is important to know how much water we need in order to be a healthy human being.

Why do we need to drink water?

The human body is estimated to be about 60 to 70 percent water. Blood is mostly water, and the muscles, lungs, and brain all contain a lot of water. The body needs water to regulate body temperature and to provide the means for nutrients to travel to all your organs. Water also transports oxygen to the cells, removes waste, and protects the joints and organs.

Signs of Dehydration:

Water is lost through urination, respiration, and by sweating. Active people lose more water than sedentary. Diuretics such as caffeine pills and alcohol result in the need to drink more water because they trick the body into thinking you have more water than we need.

Symptoms of mild dehydration include chronic pains in joints and muscles, lower back pain, headaches and constipation. A strong odor to your urine, along with a yellow or amber color indicates that you may not be getting enough water. Note that riboflavin, a B Vitamin, will make your urine bright yellow. Thirst is an obvious sign of dehydration and in fact, you need water long before you feel thirsty.

Health benefits of water:

Water is the body's principal chemical component, comprising, on average, 60 percent of your weight. Every system in the body depends on water. For example, water flushes toxins out of vital organs, carries nutrients to the cells and provides a moist environment for ear, nose and throat tissues.

Lack of water can lead to dehydration, a condition that occurs when the human body don't have enough water to carry out normal functions.

How much water do you need?

Every day water is lost through the breath, perspiration, urine and bowel movements. For the body to function properly, its water supply must be replenished by consuming beverages and foods that contain water.

A couple of approaches attempt to approximate water needs for the average, healthy adult living in a temperate climate.

Replacement approach. The average urine output for adults is 1.5 liters a day. An additional liter of water is lost a day through breathing, sweating and bowel movements. Food usually accounts for 20 percent of the total fluid intake, so if you consume 2 liters of water or other beverages a day (a little more than 8 cups) along with the normal diet, you will typically replace the lost fluids.

Dietary recommendations. The Institute of Medicine advises that men consume roughly 3.0 liters (about 13 cups) of total beverages a day and women consume 2.2 liters (about 9 cups) of total beverages a day.

Even apart from the above approaches, it is generally the case that if you drink enough fluid so that you rarely feel thirsty and produce between one and two liters of colorless or slightly yellow urine a day, your fluid intake is probably adequate.

Beyond the tap; Other sources of water:

Although it's a great idea to keep water within reach at all times, you don't need to rely only on what you drink to satisfy your fluid needs. What you eat also provides a significant portion of your fluid needs. On average, food provides about 20 percent of total water intake, while the remaining 80 percent comes from water and beverages of all kinds.

For example, many fruits and vegetables — such as watermelon and cucumbers — are nearly 100 percent water by weight. Beverages such as milk and juice are also comprised mostly of water. Even beer, wine and caffeinated beverages such as coffee, tea or soda can contribute, but these should not be a major portion of your daily total fluid intake. Water is one of your best bets because it's calorie-free, inexpensive and readily available.

Dehydration and complications:

Failing to take in more water than your body uses can lead to dehydration. Even mild dehydration — as little as a 1 percent to 2 percent loss of your body weight — can sap your energy and make you tired. Common causes of dehydration include strenuous activity, excessive sweating, vomiting and diarrhea.

Signs and symptoms of dehydration include:

- Mild to excessive thirst
- Fatigue
- Headache
- Dry mouth
- Little or no urination
- Muscle weakness
- Dizziness
- Lightheadedness

Mild dehydration rarely results in complications — as long as the fluid is replaced quickly — but more-severe cases can be life-threatening, especially in the very young and the elderly. In extreme situations, fluids or electrolytes may need to be delivered intravenously.

Staying safely hydrated:

It's generally not a good idea to use thirst alone as a guide for when to drink. By the time one becomes thirsty, it is possible to already be slightly dehydrated. Further, be aware that as you get older your body is less able to sense dehydration and send your brain signals of thirst. Excessive thirst and increased urination can be signs of a more serious medical condition. Talk to your doctor if you experience either.

To ward off dehydration and make sure your body has the fluids it needs, make water your beverage of choice. Nearly every healthy adult can consider the following:

Drink a glass of water with each meal and between each meal.

Hydrate before, during and after exercise.

Substitute sparkling water for alcoholic drinks at social gatherings.

Though uncommon, it is possible to drink too much water. When your kidneys are unable to excrete the excess water, the electrolyte (mineral) content of the blood is diluted, resulting in a condition called hyponatremia (low sodium levels in the blood). Endurance athletes — such as marathon runners — who drink large amounts of water are at higher risk of hyponatremia.

CONTAMINANTS IN DRINKING WATER

Since water is capable of dissolving or suspending a tremendous variety of materials there is simply no way to get "*pure*" water (H_2O and nothing but H_2O) out of the faucet.

Are all water contaminants bad for our health? Not at all. Many of the naturally occurring compounds in water are benign or even good for our health. Some minerals, like calcium and magnesium are essential to human health, and some reports indicate that drinking water can provide a dietary source for these minerals.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. U.S. EPA (Environmental Protection Agency) sets standards for approximately 90 contaminants in drinking water. The contaminants can be categorized as below

1. **Microbial Pathogens:** Pathogens in drinking water are serious health risks. Pathogens are disease-producing micro-organisms, which include bacteria

(such as giardia lamblia), viruses, and parasites. They get into drinking water when the water source is contaminated by sewage and animal waste, or when wells are improperly sealed and constructed. They can cause gastroenteritis, salmonella infection, dysentery, shigellosis, hepatitis, and giardiasis (a gastrointestinal infection causing diarrhea, abdominal cramps, and gas). The presence of coliform bacteria, which is generally a harmless bacteria, may indicate other contamination to the drinking water system.

2. **Organics:** People worry the most about potentially toxic chemicals and metals in water. Only a few of the toxic organic chemicals that occur drinking water are regulated by drinking water standards. This group of contaminants includes:

- Trihalomthanes (THMs), which are formed when chlorine in treated drinking water combines with naturally occurring organic matter.
- Pesticides, including herbicides, insecticides, and fungicides.
- Volatile organic chemicals (VOCs), which include solvents, degreasers, adhesives, gasoline additives, and fuels additives. Some of the common VOCs are: benzene, trichloroethylene (TCE), styrene, toluene, and vinyl chloride. Possible chronic health effects include cancer, central nervous system disorders, liver and kidney damage, reproductive disorders, and birth defects.

3. **Inorganics:** These contaminants include toxic metals like arsenic, barium, chromium, lead, mercury, and silver. These metals can get into your drinking water from natural sources, industrial processes, and the materials used in your plumbing system. Toxic metals are regulated in public water supplies because they can cause acute poisoning, cancer, and other health effects.

Nitrate is another inorganic contaminant. The nitrate in mineral deposits, fertilizers, sewage, and animal wastes can contaminate water. Nitrate has been associated with "blue baby syndrome" in infants.

4. **Radioactive Elements:** Radon is a radioactive contaminant that results from the decay of uranium in soils and rocks. It is usually more of a health concern when it enters a home as a soil gas than when it occurs in water supplies. Radon in air is associated with lung cancer.

WATER PURIFICATION

The process of water purification goes through a number of stages before it actually reaches our homes. Then some people choose to use a water purifier to filter out a taste in the water or maybe other additives that are put into the water that they don't agree with.

Water is normally gathered from a location close to the area in which you live. After that, it will be contained in an area where water filtration and purification takes place. From here it will be delivered to your homes via pumps which run from underground facilities. During the delivery of water to your homes, the process of purification continues. When it comes out of your faucet, you then have the choice to add extra purification if you think it is necessary. This article will go through the steps in more detail.

Water Purification In Dams:

The first process of water purification actually happens in dams. The systems of sanitizing water is different for each local area, each region and each country. In

many cases the federal or local governments set standards on how the water is to be purified and if any additives should go into it.

An example of a typical process that happens at the Dam and other water storage facilities is UV light or Ultra filtration. Other techniques involve treating the water chemically to "cleanse" the water or remove parasites and bacteria from the water.

More often than not, the UV light technique is used twice on the vast water supply to ensure that all the smell, taste and dirt from the water has been removed. Another sanitizing technique would be the use of Carbon filters; through this system, the water soluble contaminants from the water can be removed.

Most of these early measures are performed in the dams. However, water still needs to be treated in some storage facilities to guarantee water that's safe and potable enough for people to drink.

Water Purification In Treatment Facilities:

The second step of water purification takes place in treatment facilities. During this step, harmful chemicals that may exist in the water are removed. Because these harmful substances are present during water purification in dams, it needs to be removed in this next step. Chlorine is often present in water after dam treatment; so it needs to be filtered, along with other harmful chemicals and metals that got through the first stage of processing in this step.

After which, cysts and other bacteria will be removed again through the use of sub micron filters. All these steps will ensure that water is clean enough to be used by people.

Water Purification at Home:

Lastly, you can take responsibility for purifying the water yourself by adding a home purification system to the faucet or the water tank. You may even have a simple filter system in a jug of drinking water that you store in the fridge.

Home water purification systems can be a simple as a filter or as complex as a chemical processing system. The costs of each will obviously differ greatly but it really depends what and why you need to purify the water you use in your home.