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### Effects of heavy metals contamination on health

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Water, the universal solvent, is an essential component of our body. About 60% of our body is made up of water, and it is used by everybody cell as it carries water, oxygen and nutrients into and out of cells. So, it is a crucial part of the body, and its quality matters to us because our health is directly linked with the quality of water we consume. Today the availability of clean drinking water is getting challenging, and its contamination is increasing day by day. It is not a country or nationwide problem. It has now become a worldwide threat. About 884 million people did not get access to drinking water (according to UNICEF progress on drinking water sanitation and hygiene 2000-2017) 1 in 3 people globally are unable to take safe quality drinking water.

Water gets unhealthy and contaminated due to certain pollutants, namely bacteria, viruses & heavy metals such as arsenic, lead, mercury and arsenic. Although all contaminants threaten life, heavy metals have more adverse effects on human life.

Several acute and chronic diseases occur due to heavy metal pollutants such as gastrointestinal and kidney malfunctioning, nervous system disorders, skin lesions, vascular damage, immune system dysfunction, congenital disabilities, and cancer-associated with heavy metals consumption. These metals get stored in tissues, cells, blood and bones. They do not get stored permanently in the body, but their effects worsen.

Lead causes several diseases such as abdominal pain, constipation, tiredness, anaemia, irritability, loss of appetite, memory loss, pain and tingling in hands and feet and weakness. If a person consumes lead over time, he may feel pain, constipation, depression, forgetfulness, nauseous and sick. Its prolonged consumption causes high blood pressure, heart disease, kidney diseases and reduced fertility.

The second one is arsenic, its concentration has been increased in groundwater due to toxic use of fertilizer pesticides in fields and the dyes industries that dyes release a high amount of heavy metals inland, and after leaching, they get dissolved in the groundwater. Arsenic is a highly toxic carcinogen. Its intake is as threatening as it can cause cancer, thickening and discolouration of skin can cause blood vessels problems, heart diseases and high blood pressure, numbness, alter many other cell functions and causes serious health issues. Its short-term absorption causes stomach problems such as nausea, vomiting, diarrhoea, headache and weakness and even can cause death.

The next one is chromium; it is an odorless and tasteless metal. Mainly found in rocks, soil and volcanic dust. Common forms in which it is present in water is trivalent chromium and hexavalent chromium. Trivalent chromium is an essential human dietary element found in many fruits, vegetables, fruits, meats, and grains. However, chromium 6 occurs naturally but

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is being released in the environment by leakage, poor storage, and inadequate industrial waste disposal. The current drinking water standard for total chromium is 0.1 mg/liter. Its intake causes an allergic and asthmatic reaction, diarrhea, stomach and intestinal bleeding, cramps and liver-kidney problems. Hexavalent chromium is more toxic than trivalent because it is mutagenic; its effects can pass to children through the placenta.

Mercury is also a naturally occurring metal, and when it gets dissolved in groundwater, it causes many human disorders when humans consume this water. According to the US EPA, mercury in drinking water has a high potential to cause kidney problems and renal damage on the short-term use of drinking mercury-contaminated water. The sources are the combustion of fossil fuel and industrial waste release. The high uptake can cause brain diseases such as irritability, shyness tremors. Effects the ability of hearing and vision.

After knowing the side effects of contaminated water, now come towards the problem's solution. We would not be able to purify all groundwater, but we can clean and detoxify our drinking water on primary levels to reduce the risk factor of diseases; the following methods can achieve this.

### **Boiling**

Boiling is a simple technique to make our drinking water safe. Water should be boiled for 3-5 minutes and left at a rolling boil. By doing this, the contaminants in the water get killed such that bacteria, Due to high temperatures and water, protozoa, viruses, and other microorganisms become safe for use.

### **Filtration**

Filtration is the most effective way to treat contaminated water. In this method, the water is purified by physical and chemical methods because multimedia filters are used. They eliminate all the microorganisms, toxic compounds, and heavy metals and clean and safe water for drinking and cooking purposes. Filtered water is healthier than water purified by other methods.

### **Chlorination**

Chlorine is used to purify tap water; it has been used for years to purify water. Chlorine is a cheap and

powerful chemical. The liquid chlorine or tablets forms are used to treat the contaminated water it kills all the pathogens and toxic compounds present in water. If you use chlorine tablets, apply warm water to dissolve quickly and purify the water. People suffering from thyroid they must ask their doctor before using chlorinated water.

### **Reverse osmosis**

Reverse osmosis is when a partially permeable membrane is present to separate the ions, unwanted pathogenic compounds and larger particles from drinking water. In this technique, the applied pressure is used to overcome the osmotic pressure. This process is used in industrial as well as production of portable water.