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Review article

Water quality and their water-borne diseases

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ASBTRACT

We cannot conceive surviving on this planet, or anywhere else in the cosmos, without water since it is so essential to our existence. According to the CIA World Fact Book, our planet contains around 71% of all water, yet just 0.3% of it is fresh water. Water's quality is a crucial component to consider because it is the element that supports life the most. As an element that sustains life, water quality is being deteriorated by both natural and manmade impacts; as a result, its quality naturally becomes a crucial metric to be examined. Rock weathering, evapotranspiration, and the leaching of harmful substances into the soil are examples of natural forces that hasten the process. In this essay, we focused on both the health effects of water-borne illnesses and the quality of the water.

Keywords: Water, Disease, Quality, Parameters,

INTRODUCTION

In India, drinking water is mostly obtained via public water systems and hand pumps. The physical, chemical, and biological features of the water may be used to check its quality. If these parameters' values are determined to be greater than their limitations, it is dangerous for human health. To examine the current water quality, the characterisation of water quality is required. Sampling, analysis, and characteristics are all included in the evaluation of water quality [1, 2]. If these parameters' values are determined to be greater than their limitations, it is dangerous for human health. A sufficient supply of new illnesses brought on by drinking tainted water. All living creatures have a basic requirement for access to fresh, clean water. Water quality management, conservation, and pollution of drinking water have become increasingly complicated issues. Given its extensive effects on human health, attention to water pollution and its control is now urgently needed.

The Himalayas in the north, the Shivalik Hills in the south, the Ganga in the east, and the Yamuna in the west encircle Uttarakhand. The weather there is temperate and winters last from November to February, while summers stretch from April to July. River water pollution with hazardous waste and wastewater is becoming a widespread issue due to the fast increase of agricultural, mining, urbanisation, and industry activities [3, 4]. Human health and water quality are intimately intertwined. Domestic garbage from society is dumped into open sewers and gutters, coupled with the wastewater of small-scale companies, which finally enter the rivers. The major cause of the water's poor quality is illicit activity. The state of Uttarakhand has created a number of modern businesses, including those in medicines, textiles, toy manufacturing, and colours. They either directly or indirectly dispose of the trash into the water, which contaminates it and results in physicochemical changes.

Water-Borne Diseases

Diseases that are transmitted by water are those that can be lethal to people. They are mostly brought on by water-borne pathogenic bacteria. When bathing, washing, drinking, or eating food that has come into contact with contaminated water, diseases might spread [5, 6]. The polluted water contains a wide variety of dangerous bacteria, viruses, chemical contaminants, and dissolved impurities. Even our naked eyes cannot see these infections. We get ill when we consume water that isn't pure. People are intentionally eating contaminated water that is delivered to their homes since many cities lack water purification facilities. The primary causes of death in both urban and rural areas are water-related illnesses and a lack of access to clean water. Some of the most important water – borne diseases [7, 8] is as follows-

- ✓ CHOLERA- Diarrheic in nature, cholera is a waterborne illness. By consuming food or water tainted with the Vibrio cholerae bacteria, a person might get cholera. Every year, thousands of individuals become ill with this terrible disease, and many of them pass away. Cholera may affect both children and adults, and some symptoms include vomiting, cramping in the abdomen, diarrhoea, and fever.
- ✓ TYPHOID- This is a different illness that is spread by consuming tainted water that contains the "Salmonella typhi" bacterium. Fever, lack of appetite, headache, constipation, tiredness, drowsiness, and nausea are a few of the symptoms. Close physical contact with an infected individual can potentially spread it.
- ✓ DIARRHEA- One of the most prevalent illnesses transmitted by water mostly affecting young children under the age of five is diarrhoea. Eating tainted food and drinking tainted water are the two main ways that the diarrhoea illness is disseminated. Dehydration, extreme wooziness, loss of focus, pale complexion, bloody stool, and little to no urine are a few of the symptoms of diarrhoea. Diarrhoea attacks can cause severe dehydration and linger for up to two weeks. If left untreated or if the patient is not transported to the hospital promptly, the illness can potentially result in fatalities.
- ✓ Hepatitis A- Hepatitis A is another illness spread by water and is brought on by the liver-damaging Hepatitis A virus. It often spreads by the oral-faecal route, through close contact with an infected person, or through consumption of tainted food or drink. Frequent vomiting, nausea, and fever are a few signs.
- ✓ Giardiasis- Another infection that develops in the small intestine is giardiasis. *Giardia lamblia*, a tiny parasite, is the major culprit. Giardiasis illness spreads mostly through contact with sick persons; however it can also happen through consuming contaminated food or water. Giardiasis can cause a number of symptoms, including exhaustion, nausea, and vomiting, excessive gas, headaches, and stomach discomfort.
- ✓ Malarial Fever- The mosquito that carries the Plasmodium parasite is what spreads the disease. These dangerous parasites breed in bodies of water like lakes and still water. Malaria symptoms include body chills, vomiting, headaches, and fever.
- ✓ Viral Gastroenteritis- A kind of stomach and intestinal irritation known as viral gastroenteritis can be brought on by a wide variety of viruses. It is an infectious infection that may be contracted by consuming contaminated food or consuming tainted water. Viral gastroenteritis can cause symptoms such as watery diarrhoea, fever, chills, headache, nausea, vomiting, stomach discomfort, and more. It primarily causes digestive issues.
- ✓ Amebiasis - *Entamoeba histolytica*, a protozoan, is the cause of the intestinal parasitic illness known as amebiasis. The one-celled protozoan often gets into people's bodies when they swallow cysts in food or drink. Cysts are a dormant parasite type that can survive for several months in the environment or in the soil, especially on the face. Additionally, faeces are a route via which the parasite might enter the body. Loose stools, stomach ache, and abdominal cramps are a few of the signs and symptoms of amebiasis.
- ✓ Legionellosis- Even in water heating systems, evaporative coolers, fountains, and other devices that can condense water into a fine mist, the Legionella bacteria may flourish in warm water settings. The individual who has been exposed to this foul creature's spray may ultimately get symptoms similar to pneumonia and lose coordination.
- ✓ Shigellosis- Shigellosis is an infectious illness caused by the bacterium Shigella. Fever, diarrhoea, and stomach pains are among the symptoms this illness causes in its victims.

- ✓ Campylobacteriosis- Another infection brought on by the Campylobacter bug is called campylobacteriosis. The majority of frequent bacterial infections cause the body to become inflammatory. Dysentery or bloody diarrhoea, together with a fever and discomfort, are occasionally side effects.

The fact that most water-borne illnesses affect people is a known. By taking good care of yourself and by adhering to and maintaining good hygiene, you may avoid them.

Water quality problems in India

People's life and the surroundings of them are beginning to be impacted by the country's water scarcity [9-12]. Among the pressing challenges that require immediate responses are-

- ✓ Fluoride, arsenic, and selenium are three chemical pollutants that pose a major threat to the nation's health. It is believed that excessive fluoride exposure puts 70 million people in 20 states at danger, while excessive groundwater arsenic exposure puts 10 million people at risk.
- ✓ For a sustainable drinking water programme, an increase in the levels of chloride, TDS, nitrate, and iron in groundwater is quite concerning. All of them require a comprehensive approach.
- ✓ The concentration of dissolved components and ionic concentrations are rising as a result of excessive groundwater extraction.
- ✓ Overdrawing of groundwater causes seawater to accumulate in the coastal aquifers, making water supplies increasingly salty and unfit for drinking and irrigation.
- ✓ In both rural and urban areas, about 10% of the population lacks regular access to clean drinking water, and many more are in danger. To satisfy their daily requirements, the majority of them rely on contaminated water sources. In addition, water shortages in towns and cities have forced the use of pipelines and tankers to carry massive amounts of water across long distances.
- ✓ The contamination of surface and groundwater by agro-chemicals (fertilizers and pesticides) and industry poses a serious risk to the nation's environmental health as well as possible financial burdens.
- ✓ According to a World Bank assessment, India's overall yearly cost of environmental degradation is $9.7 billion USD, or 4.5 percent of the country's GDP. The effects of water contamination on health account for 59% of this.

Anthropogenical effects on water quality

Human intervention has already been cursed for water resources, especially in rural areas, which contribute most to the degradation of water quality. The reason behind this is a lack of water treatment plants and the involvement of high doses of chemicals in the agriculture sector. The amount of Nitrogen and Phosphorous in surface water pollution is mainly influenced by amount of Nitrogen and Phosphorous in surface water pollution is mainly influenced by number of inputs associated with land cover, land use and point sources. The use of such a large amount of chemicals has raised concern for the assessment of water quality. These chemicals pollute the water, either directly affecting it or splitting into their by-products [10-12].

Water quality parameters

Depending on the intended water parameters, these parameters, which include chemical, physical, and biological characteristics, can be evaluated or tracked. Table 1 lists the three categories of water quality [10-14].

Table 1.1: Water Quality Parameters

Physical Parameters	Chemical Parameters	Biological Parameters
Total dissolved Solid (TDS)	pH	Bacteria
Odour	Iron and Magnesium	E.coli
Colour	Nitrogen	Algae
Temperature	Acidity	Viruses
Turbidity	Hardness	

The majority of the testing for water quality must be conducted in a lab. You must fulfil certain standards for the water quality that you ingest or utilise in industrial or municipal procedures. For instance, the EPA has established legal limitations for more than 90 distinct water pollutants. These restrictions are important to make sure that drinking water doesn't contain any impurities that might harm your health or lead to the spread of waterborne illnesses.

CONCLUSION

Water quality is a major issue for all of us. Due to the risk of water-borne infections, care must be taken while evaluating the water quality of drinking water samples obtained from government hospitals and businesses.

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