

Water Pollution is the Main Problem for Human Health

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Abstract

Human health is jeopardised by the widespread problem of water contamination. Polluted drinking water caused more deaths per year than all other types of violence combined. Human groundwater resources, on the other hand, are limited, with just a fraction of the world's fresh water available to humans. The difficulties will only become worse if nothing is done by 2050 when the international stream requirement is likely to be one-third above average than it is now. Water contamination is the leading cause of water-borne diseases across the world, particularly in underdeveloped countries. Because of its long-term impacts, contaminated water has an impact on both current and future generations. In India, about 60% of the population does not have access to safe drinking water. Genetic disorders, malignancies, and illnesses of the skin, lungs, kidneys, and liver are much more common in India than everywhere else. Ground usage and socioeconomic structure are both influenced by river drainage. Staple crops, urbanisation, and industrialisation in the economic liberal region have all increased their need for river water in recent years. Pollution and health issues have long been linked.

1.Introduction

When dangerous chemicals, such as pesticides or bacteria, enter a stream, river, reservoir, sea, or other body of rain water, water contamination occurs. It decreases water quality and endangers human health and the environment. Water contamination has always been an issue in India. People have been unloading trash into streams and other remains of water for millennia. The drinking of poisonous water has been associated with numerous of serious illnesses. In India, uncontrolled and fast population increase is a major contributor to water pollution. It covered exponential population growth, the process of contaminants accumulating in water, water pollution causes, and diseases caused by water intake. Pathogens are disease-causing microorganisms that transfer from person to person. Pathogens can be located in a range of places throughout the world. Humans can contract a variety of water-borne illnesses. Infections have been induced by severe rains and floods in industrialised, emerging, and underdeveloped countries (Afroz, et al., 2014). A per cent of the population grows food and vegetables with polluted water. As a result of pollution, some aquatic infectious diseases are spread via the faecal-oral mode of transmission. Water pollution can induce cancer, clinical symptoms, breathing problems, cerebral perfusion, and heart disease, to name a few maladies. Nitrogenous compounds increase the risk of cancer and birth complications. Rural locations have a greater cancer fatality rate than large cities. Because the city's population consumes prepared water, whilst the countryside population does not have access to water purification and must rely on untreated water. Unsanitary conditions, cleanliness, and water supply make poor people prone to illness. Whenever pregnant women are subjected to toxins in polluted water, they are in increased danger and have a detrimental effect, increasing the rate of low-birth-weight babies. The formerly river's condition has degraded rapidly in recent decades, posing a major threat to the safety of those who live along its banks.

2.Categories of Water Pollution

Groundwater

Ground water and enters the fissures, crevices, and porous sections of an aquifer, generating groundwater. This is one of the most undervalued natural resources, despite its crucial importance. Approximately 40% of Americans get their water through subsurface pipelines that are piped to the surface. This is the only source of fresh water for some people who live in remote areas. Pollutants such as chemical fertilisers and garbage spilling from dumps and wastewater treatment plants damage aquifers, leaving them unsuitable for human consumption (Chaudhry and Malik, 2017). Groundwater pollution cleaning can be difficult, if not unachievable, as well as exorbitant. A contaminated aquifer may

lose its value over decades, if not thousands, of years. As rainwater penetrates rivers, ponds, and seas, pollution can travel far ahead of the initial infecting source.

Surface water

Freshwater, which covers over 70% of the planet, powers the seas, lakes, tributaries, and other turquoise spots on the global map. Aside from the ocean, rivers and lakes bring water to American houses. However, a massive portion of that freshwater is in jeopardy. As per the most contemporary water quality measurements conducted by the EPA, more than half of the bodies of water, and some more than a third of the ponds, are filthy and unsuited for sunbathing, rowing, or drinking (Inyinbor Adejumo, et al., 2018). The breakdown of fertilisers, mainly phosphorus and nitrogen, is a major source of illness in such rivers and lakes. Agricultural deposits and fertiliser runoff have made these natural resources a serious contaminant, regardless of the factual information that flora and fauna require them for growth. Municipal sewage and wastewater also greatly contribute to pollution. Corporations and people also dump garbage straight into rivers and streams.

Ocean water

It has been found that 80 per cent of ocean pollution (also known as water contamination) begins on the ground, whether near the coast or further inland. Chemicals, fertilisers, and hazardous substances are carried from farms, industries, and towns into coastal rivers and ultimately out to sea. Similarly, marine trash, particularly plastic, transported by the wind gets pushed into stormwater drainage systems. Oil spills and leaks of all sizes pollute the oceans on a regular basis, and they are constantly absorbing carbon pollution from the sky (Haseena, et al., 2017).

3.Point source

Point source contamination occurs when poisons come from an only one source. Sewage released legally or illegally by industries, oil firms, or industrial wastewater comprises contamination from faulty septic systems, industrial pollution, and improper disposal. From food production to product manufacture to power generation, almost everything people do has the potential to harm the environment. Environmental regulatory authorities divide pollution into two types: point-source contamination and untreated wastewater pollution. It is simple to identify pollution from a sole source. Pollution that happens from many suppliers at the same time is referred to as multi-source pollution. The Environmental Protection Agency (EPA) of the United States defines harmful emissions as any pollutant that enters the environment from a single, easily identifiable source. Smokestacks, discharge pipes, and water channels are examples.

4.Nonpoint source

Toxins are disseminated across a large region in nonpoint-source pollution, as opposed to point-source pollution. Water gathers up natural and man-made pollutants when it travels through land or through the earth, and these pollutants end up in lakes, rivers, wetlands, coastal waterways, and even groundwater. Water from natural processes like rain or snowfall, as well as human operations like agricultural irrigation or lawn maintenance, can transport nonpoint-source pollutants (Mateo-Sagasta, et al., 2018). Pollution from nonpoint sources is frequently dispersed across a vast region. Because these pollutants are produced by a range of human activities on land, as well as natural soil, temperature, and geographic features, pinpointing their particular source is sometimes difficult. The most common untreated wastewater pollutants include sediment, pesticides, microorganisms, and toxics. Mud can pollute surface and groundwater and clog breeding grounds for fish and other aquatic species, reducing water quality. Nutrients, germs, and other toxic compounds can endanger human health and marine organisms (Jayaswal, et al., 2018).

5.Transboundary

Of course, a line on a map cannot manage water contamination. When polluted water from one country pours into the oceans of another, this is referred to as transboundary pollution (Owa, 2014). Pollution can occur as a consequence of a natural calamity, such as an environmental disaster, or as a consequence of rapid encroachment of industrialized, agricultural, or municipal discharge farther downwards.

6. Most Common Types of Water Pollution

Chemical pollution seems to be the most frequent form of waterborne diseases, and it may influence both underground and external water supplies. Agriculture-related pesticides and fungicides are expected to be a key supply of chemical pollutants, which consists of metals and hydrocarbons from factories and sites that will also be important polluters. Surface water pollution affects all water sources above ground, including rivers, lakes, oceans, and beaches, and can occur naturally, by accident, or on purpose. Control is critical in environmental catastrophe response, which can lead to reduced mineral water excellence, and also accidental oil spills and negligent enterprises that unload trash into masses of water.

7. Sewage and wastewater

Wastewater is a term that refers to water that has been utilised earlier. Business, industrial, and agricultural activity, as well as our sinks, showering, and toilets (sewage) all contribute to its production. Drainage system happens when rain transports road salts, oil, grease, chemicals, and debris from impermeable surfaces into our waterways. These facilities reduce the number of pollutants in sewage, such as viruses, carbon, and nitrogen, as well as toxic substances and dangerous compounds contained in industrial waste, before delivering the processed waters to rivers (Jayaswal, et al., 2018). That is if everything goes according to plan. According to the EPA, this nation's economic ageing and easily overcrowded sewage treatment facilities discharge upwards of 850 billion gallons of wastewater discharges each year.

8. Radioactive waste

Radioactive waste is produced through the mining of radioactive minerals, nuclear power plants, military weapon development and testing, and medical research and treatment institutions that use radioactive materials (Sharma and Bhattacharya, 2017). If toxins are accidentally released or improperly disposed of, they can harm surface water, groundwater, and the ocean. Some radionuclides discharged can take thousands of years to decay, inflicting a significant burden on governments and businesses throughout the world.

The 2011 Fukushima nuclear power plant disaster, which discharged radioactive contaminants into the ocean and spread as far as the United States, was the most recent occurrence. Polluted sewage is still accumulating a decade later, according to The Guardian, and must be disposed of. Depending on the individual agents, as well as the amount and duration of exposure, radioactive waste components in water can have a variety of health effects on humans. Uranium can induce acute kidney damage and cancer when it decays radioactively. Kidney function markers fluctuate when patients are exposed to high quantities of uranium in their potable water, putting them at risk of organ insufficiency (Reddy and Rawat, 2013).

9. Substances with radioactivity:

Any contaminant that emits more radiation than the environment produces naturally is classified as radioactive waste. Uranium is produced through uranium mining, nuclear power plants, the surface to air missile development and testing, as well as research and medical institutes and hospitals. Water supply, stormwater runoff, and marine resources are all harmed by contaminants that have been accidentally released or improperly disposed of (Vasudevan and Oturan, 2014).

10. Effects of Water Pollution On human health

Contamination of water has the potential to be fatal. It was responsible for 1.8 million fatalities in 2015. Contaminated water has a high probability of making someone sick. A billion people fall ill each year as a result of contaminated water. Because their homes are frequently located near polluting enterprises, low-income individuals are particularly exposed. Human and animal waste-borne disease-causing bacteria and viruses are a significant source of sickness from polluted drinking water. Diseases including cholera, giardia, and typhoid can spread through contaminated water. Even in affluent nations, sewage treatment plant discharges, as well as agricultural and urban runoff, can pollute streams with harmful pathogens (Verma and Dwivedi, 2013).

Legionnaires' disease, a severe form of infection spread by freshwater resources such as cooling towers and piped water, sickens thousands of people year after year, with cases reported from Disneyland in California to the Upper East Side of Manhattan.

Conversely, the residents of Flint, Michigan, whose recent environmental contamination catastrophe was precipitated by cost-cutting efforts and insufficient water infrastructure, serve as a stark warning of the dangers of chemical and other industrial toxins in our water (Wang and Yang, 2016). Arsenic and mercury, as well as insecticides and nitrate fertilisers, are contaminating our water systems, and the disease is far more widespread than in Flint. Contaminants potentially cause a number of health issues, including cancer, hormone disruption, and decreased cognitive function, when eaten. Pregnant women and children are particularly vulnerable. Swimming may sometimes be dangerous. According to the Environmental Protection Agency, sewage-contaminated shallow areas lead to skin cancer rashes, pinkeye, respiratory infections, and hepatitis in 3.5 million Americans each year.

Its impact on one's health Rainwater collected from these bodies of water contains a variety of contaminants as well as higher quantities of some chemical compounds, which can have a variety of negative health impacts. When a substance in an unacceptable concentration that is not ordinarily present in water, such as bacteria, chemicals, garbage, or sewage, enters the water, it pollutes it and renders it incompetent for its intended purpose. 1 Rainwater delivers suspended particles from the atmosphere as well as dissolved (O₂), (CO₂), and other gases. As the water falls to the ground and begins to run over the soil and rock, it dissolves clay, mud, and organic and inorganic particles to varying degrees. As it passes through streams, it comes into contact with rotting vegetation as well as dead human and animal remains (Sharma and Bhattacharya, 2017). As a result of this interaction, organic matter interacts with rainfall, enhancing its potential to disintegrate. Calcium, potassium, and sodium limestones, as well as sulphates, chlorides, and fertilisers dissolve in water at concentrations of more than one milligram per litre as a result. On a regular basis, water contains microscopic and trace levels of metals such as aluminium, mercury, iron, chromium, and zinc. Pesticides and fertilizers used in excess can contaminate water sources. The injection of these compounds into the water causes the rainwater to become hard, alkaline, and saline, making it hazardous for use in domestic applications. In addition to this, pathogenic micro-organisms, which cause water-borne diseases and outbreaks, are occasionally introduced into the water supply. Even minor contact and transmission can induce diseases caused by microorganisms in the faeces. Waterborne infections are the leading cause of death worldwide.

11. Groundwater and its contamination

Many areas of groundwater and surface water have been polluted with heavy metals, POPs, and fertilisers, providing a health concern. Inadequate and inefficient water resource management is to blame for the bulk of water-borne illnesses and water-related health problems (Vasudevan and Oturan, 2014). Everyone will have access to safe water only when access, sustainability, and impartiality are all assured. Access may be identified as the quantity of individuals who have appropriate access to clean drinking water. It will need a deliberate effort, as well as a fair and equitable diversion of resources to all segments of society, to keep it functioning. Safe drinking water is more readily available in cities than in rural regions. There are inequalities even within a geographical area: those who can acquire the services have access to clean drinking water, while others who are unable to afford the services must rely on submersible pumps and certain other suppliers.

Water in urban areas is polluted in a variety of ways, the most prevalent of which is insufficient water pipe couplings in locations where the water and sewage lines cross. Water may be contaminated at the source for a variety of causes, with sewage being the most prevalent.

Groundwater can be contaminated by a variety of factors, some of which are listed below:

12. Pesticides: Pesticides such as DDT can damage water when they run off from farms, backyards, and golf courses. Landfill leachate is another big pollutant source. Ecosystem and human health consequences include endocrine and reproductive damage in animals. Pesticides can pollute groundwater because they are mobile in the soil. The persistence of these compounds in soil and water has been an area of tension (Afroz, et al., 2014).

Unprocessed or insufficiently preserved community manure is a major cause of groundwater and surface water contamination in evolving countries. Organic garbage put in watercourses with municipal trash consumes a substantial quantity of oxygen, causing rivers and lakes to lose their natural balance. Microbial pathogens found in sewage are responsible for disease transmission.

Nutrients: Phosphorus and nitrogen can be found in home wastewater, stormwater run, and industrial discharges, as well as fertiliser run-off and animal dung, all of which contribute to nutrient enrichment in lakes, rivers, and coastal regions by increasing the number of nutrients in water bodies (Reddy and Rawat, 2013). The largest source of nitrates is fertiliser, which is applied to crops. Excessive fertiliser usage contaminates groundwater, causing nitrate levels in drinking water to exceed the permitted limit. By decreasing nitrate levels in the soil, productive agricultural practices can help reduce ammonium percentages in water.

The following are examples of synthetic organics: Many of today's 100,000 synthetic chemicals can be found in the aquatic environment, where they build up in the food chain. The most serious threat to the human health and the environment is elements to be considered or polychlorinated biphenyls. Among them are industrial chemicals and agricultural pesticides. Toxins can gather in fish and produce serious physical condition issues in humans. When copious amounts of pesticides are sprayed, groundwater becomes contaminated, resulting in chemical pollution of drinking water (Haseena, et al., 2017).

Long-distance air pollution transportation causes acidification of surface water, mostly lakes and reservoirs, which is a serious environmental effect. Sulphur dioxide from electricity production, other heavy industries such as steel mills, and automobiles, for example. The problem is more serious in the United States and parts of Europe.

13. Conclusion

It is general knowledge that drinking water that is free of contaminants is essential for a healthy living. Having enough fresh, clean drinking water is a basic requirement for all people on the earth, yet substantial numbers of people do not have it. Overexploitation, poor management, and environmental degradation are putting freshwater resources in jeopardy everywhere in the universe. The main sources of freshwater contamination are untreated sewage discharge, industrial effluent dumping, and agricultural run-off. Industrialization, urbanisation, and the rising use of synthetic chemical compounds have all had major and detrimental consequences on freshwater systems. In industrialised nations, chemical discharge into water sources, mostly groundwater, is a well-known concern, whereas agricultural run-off into water sources is an issue in developing countries. Water pollution, such as pollutants in drinking water, is hazardous to one's health and can lead to water-borne illnesses that can be avoided in the household. Water pollution is the major source of water-borne illnesses worldwide, especially in developing nations. Contaminated water affects both present and future generations due to its long-term effects. Genetic abnormalities, cancer, and ailments of the skin, lungs, kidneys, and liver are far more frequent than elsewhere. River drainage has an impact on both land use and social structure.

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