Water contamination: Burden and stratagems for control.

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Abstract-
It is tough to explain the exact degree of the significance of water to man in his strenuous climb up of the civilization ladder. It is certain, conversely, that without water there would be no life of any form in the world and that, without water readily accessible in ample quantity and free of pathogenic creatures, man's advancement is enormously hindered. Though with no actual counting possibility, billions of man-days of labour are indubitably lost yearly because of sickness and death from water-borne diseases. Ill-advisedly, the regions which can least afford this economic damage are the dwellings where such illness and death are most proliferating. The obligation for decreasing this terrific waste falls on governments and, precisely, on health managements. It is the aim of this critique to assist the government executives who must meet this task among the health medicals officers, public health administrators and civil or sanitary engineers who engaged in public health, and sanitarians.

Key words: pollution, water, sanitary engineer, public health.

1. Introduction
Water the most indispensable natural resources, source of life which covers most of human daily activities. Approximately 98% (ninety-nine percent) of this water is seawater (salt-water) and is unusable for drinking and cooking as a result of the high concentration of salt. Almost 2% (two percent) of the planet’s water is fresh, while 1.6 % (one-point six percent) is sealed up in polar ice caps and glaciers [1]. Extra 0.36 % (point three six percent) is found underground in aquifers and wells. Thus, only roughly 0.036% of the planet’s total water source is available in rivers and lakes. Since all biological life reliant on water, it must be gotten at close intervals by all plants and animals, so that life develops around this necessity [2]. Early men built most of their communities nigh to the waterways which served their physiological, economic and social wants. As technology advanced, it became conceivable to transport water for physiological purposes as well as exploit more cost-effectively other resources and structures, such as topography for community location improvement [3]. From the antiquity records, men have used water since creation; but the realization of its significance and, in some occasions, its danger, to health is a relatively current development. Till today this knowledge is not comprehensive, especially the correlation which apparently exists between the quantity of water accessible per person and the frequency of certain communicable sicknesses [2], [4]. Numerous industries throw their daily waste into the surface water like seas and oceans, and therefore further polluting the water bodies besides, oil-spill issue which leads to accidental discharge of petroleum hydrocarbon into the environs which results in staid environmental consequences. Many populaces are not aware that these contaminants can take hundreds to thousands of ages to wane [5]. Hence, action needs to be taken to limit the direct negative influences which transform to decline in water quality, for instance in United State of American, 1.2 trillion gallons of unrefined storm water, industrial and sewage waste are pour into USA waters yearly, which leads to pollution of river at forty percent and lakes at forty six besides has greater effect...
on fishing, swimming, or aquatic life [6], [7]. Contaminated drinking waters are a problem for roughly half of the universe’s populace since every year there are roughly two hundred and fifty million cases of water-based sicknesses, ensuing in approximately five to ten million deaths.

2. Literature review.

2.1 Water pollution as contamination of water physiques

Water contamination is the second most imperious environmental concern beside air pollution. Water contamination occur as a result of any alteration in the biological, physical and chemical properties of water which have a harmful consequence on living things [8]. Though, water covers over seventy percent (70%) of the universe, it is an imperative resource for populaces and their environment. Water contamination affects rivers, clean water, oceans and lakes all over the sphere, for example in developing nations, it is frequently a leading cause of death, by populaces drinking from contaminated water sources and the entire operational ecosystems that present in the waters [1]. Water physiques like groundwater and surface water (oceans, lakes, rivers), are contaminated consistently by human activities. This normally happen when contaminants (particles, chemicals) are released directly or indirectly into water physiques without sufficient treatment so as to eradicate detrimental compounds. Contaminants get into water through human causes or factors, which can be a Transperiphery, Point source or Non-point source in nature [2], [4], [9]. Growing number of pollutants enter water supplies from development and human action such as pharmaceuticals, heavy metals, insecticides, pesticides, dyes, fluoride, pesticides and phenols. Significance of clean water as a foundation for life have been realized by humans, also water experts, councils and organisations working hard to educate, safeguard, restore water course and inspire habits that help keep waters from contamination, as well as preserve water ecosystems from obliteration [3].

![Figure 1: The major sources of water pollution](image)

2.2 Practicalities about water pollution
World Health Organisation specialists certify that there is a slightly intensified threat of some cancer categories for populaces who were exposed to the contamination. These encompassed individuals living and working in the region as shown in Table 1. The largest lifetime risks were observed in those exposed as infants, likened with children or adults.

Table 1: Pollution impacts from BBC website

| Nations               | Pollution Impacts                                                                                                                                                                                                 | Source                        |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| America by BP 2010    | In the 400 miles of Louisiana coastline, roughly one hundred and twenty-five miles have been adulterated by the oil spill. Above one thousand animals (mammals, birds and turtles) have been described dead, plus several on the imperiled species list. Roughly six percent of the animals affected by the spill have been described cleaned, but numerous biologists and other experts guess that they will die too. A serious instance from Flint, Michigan in the USA. | Wikipedia 2018                |
| Developing nations    | Seventy percent of industrial trashes are discarded unprocessed into waters thereby sully the usable water supply. Almost seventy percent for irrigation, twenty-two percent for industry and eight percent for domestic usage.                                      | WWAP (World Water Assessment Programme). |
| SANDRP, 2016          | Delhi produces three thousands eight hundred MLD of waste and has only two thousand, six hundred and ninety-three point seven MLD installed treatment capacity with actual utilization of one thousand, five hundred and seventy five point eight MLD. Therefore, only forty one percent wastewater is treated and the remaining fifty-nine percent | Shahid and Saba 2018          |

2.3 Kinds of water contamination.

**Nutrients Pollution:** High level of nutrients from sewage, wastewater and fertilizers that end up in water physiques, hearten weed plus algae growth in the water make the water unclean, and even choke colanders. Too many algae will likewise consume every oxygen in the water which in turn leads to death of other marine organisms in the water as a result of oxygen famishment.

**Surface water contamination:** Surface water comprises of natural water found on the world's surface, such as lagoons, rivers, oceans, lakes and lagoons. Harmful elements come in contact with this surface water, liquefying or mixing physically result to surface water contamination.

**Oxygen Depleting:** Water physiques have micro-organisms such as aerobic and anaerobic creatures, present of too much decomposable matter in water boosts more microorganism growth, which increase usage of more oxygen in the water. Depletion of oxygen causes death of aerobic organisms besides anaerobic organisms propagate further to produce risky toxins like ammonia and sulfides.

**Ground water pollution:** Application of chemicals and pesticides to soils through humans that pounded deep penetrate into the ground by rainwater, then infiltrate to underground water,
instigating pollution underground. This implies that after digging bore holes and wells to get water from underground, it needs to be tested for ground water contamination.

**Microbiological:** People from numerous community in the universe drink unprocessed water (straight from a stream, ponds or river). Occasionally there is natural contamination initiated by microorganisms such as protozoa, viruses and bacteria. This natural contamination can cause fishes and other water life to die besides cause serious sickness to individuals who drink from such waters.

**Suspended Matter:** Contaminants like chemicals, matters and particles do not easily liquefy in water but later liquefy beneath the water physique. This can hurt and even execute water organisms that reside at the bottommost of water physiques.

**Chemical Water Pollution:** Chemicals used by several industries plus agriculturists work usually end up inside water. This serves as the main source of Point-source contamination especially chemicals that were utilized in controlling pests, weeds and insects, also metals plus solvents from industries can contaminate water physiques. These are noxious to numerous kinds of aquatic life and could slow their growth besides make them unproductive as well as exterminate them.

**Oil Leakage:** Lubricant slicks generally have only a confined impact on wildlife nonetheless it can spread for miles. Lubricate can result to the loss of several fish and get stuck to the plumages of seabirds making them lose their capability to fly.

**Sewage and waste water:** In numerous developed nations, water from every day use such as waste water, liquid waste (cooking, toilet flushing, bathing, and laundry), soluble waste or sewage is treated and discarded into the river, sea or ocean. Although they are treated, they can never be the same as fresh water. While in some undeveloped nations, the sewage was not treated but swiftly dumped into the sea or water physiques. This is very hazardous since they infect the environment and water physiques besides convey countless deadly diseases to human beings.

**Septic Tanks:** All home toilette is joined to septic tank normally positioned outdoor of the house. Every time poop is flushed down the toilette, it enters into the cistern, where the solid portion is disconnected from the fluid portion. Biological methods that are utilized to break down the solids and the fluid is normally drained out into a land drainage structure, which in turn leak into the soil and nigh water physiques.

**Underground storing and tube leaks:** Uncountable liquid products such as petroleum products are kept in metal and steel ducts underground, which oxidize and begin to drip over the period. If that occurs, they infect the soils besides the fluids in them terminate in various nearby water physiques.

**Atmospheric decomposition:** This is the contamination of water physiques instigated by air pollution. Every time the air is contaminated with nitrogen oxide and sulphur dioxide, there is fusion with water units in the air and form a noxious matter. This drops as acid rain to the ground and gets eroded into water physiques, which result to pollution of water bodies besides affects animals and water creatures.

### 2.4 Impacts of water pollution on living things.

**Death of water creatures:** Major problem created by water contamination is loss of the all organisms that depend on these water physiques. Dead birds, fish, sea gulls, crabs, dolphins, and numerous other animals frequently wind up on seashores, exterminated by contaminants in their habitation.
Interruption of food-chains: Contamination disturbs the natural food chain for instance cadmium and lead are eaten by miniature animals. After, these creatures are eat-up by shellfish and fish, which causes persistent disruption of food chain at all higher stages.

Diseases: Ultimately, human being are pretentious through this process since people can acquire diseases like hepatitis by ingestion of seafood that has been infected. In countless underprivileged countries, there is continuously cholera epidemic and sicknesses because of poor clean water treatment from adulterated waters.

Annihilation of ecosystems: Since the interface of living things in a home, reliant on each other for life, therefore the ecosystem could be ruthlessly changed or ruined by water effluence. Numerous regions are currently being affected by unconcerned humanoid contamination which also comes back to hurt humans in several ways.

3. Averting of water contamination
There are several simple and implementable methods in controlling water contamination and for better result must be practice by everyone including governments and local boards. These activities can be taken discretely or communally but must be done recurrently so as to diminish the impacts on the water structures [9]. Firstly, always throw garbage inside precise waste bin around places like beach, waterside and water physiques, in case of no bins, the trash should be taken home to one’s trash can.; use water during washing and bathing prudently by not keeping tap running when not in use thereby significantly thwart water unavailability besides lessen the quantity of dirty water that requires treatment. Also, avoid throwing of medicines, paints, chemicals and oils down the toilet or sink drain. Check with local management for chemical discarding plan for local residents in some cities were local environment agency help with the discarding of medicines and chemicals [10]. Likewise, buy more ecologically safe cleaning liquors which are less hazardous for uses at home and other unrestricted places. Chemicals and pesticides must be used moderately for parks and farms so as to avoid overdo besides reduce chemical runoffs into proximate water sources or make use of composting and organic manure as a substitute. Finally, people staying nearby to water body should plant a lots of flowers and trees round their homes as a preventing measure again chemicals easy drain into the water when it rains [5], [6].

4. Solution to water contamination
Firstly, there must be austere laws that help curtail water effluence from governments, which will usually focused at schools, industries, markets, and hospitals regions on how to handle, dispose and manage sewage. Local experts must be heedful and nippy to deal with water concerns of their community to inhibit hazard. Developed nations have countless organizations and groups that help tutor people on the vulnerabilities of water contamination, it is great to join the groups as they frequently inspire other members of the societies to have a better approach towards water [3], [8]. Secondly, sewage or waste water treatment is another measure again water contamination. Since liquid water (wastewater) after washings, bathing, toilet flushing plus general cleaning goes down the sewer via the pipe, joins a larger sewer pipe under the road and in turn joins a major pipe that leads to the treatment center always screened as the first stage of the wastewater treatment practice. During screening large objects such as face wipes, diapers, bottle tops, sanitary stuffs, cotton buds, nappies, broken bottles, plastics and rags that can block
or mutilate the equipment are removed. Distinctive equipment is then used to eliminate grit that gets eroded into the sewer. After, primary treatment stage which embroils the separation of humanoid waste from the wastewater done through placing the wastewater into big settlement cisterns for the solids to descend to the bottommost of the cistern and the settled solids ones are named sludge. At the circular tanks bottom, huge scrappers constantly scrape the tank floor, push the sludge to the epicenter where it is impelled away for advance treatment while the residual water enthused to the Secondary treatment. Next stage which is secondary treatment embroils placing into large quadrangular tanks which are termed aeration lanes. Then air is propelled into the water to vitalize microbes so as to breakdown the miniscule bits of sludge that escapee the sludge scuffling process and lastly to the last treatment which passed through a settlement cistern. In the last treatment more sludge is produced at the end of the tank from the microbial action settling. The sludge is scraped again and gathered for treatment, but the water at this phase is virtually free from hurtful constituents and chemicals. The water is permitted to drift over a wall where it is sieved through a sand bed to eliminate any extra particles [4], [11].

Thirdly, Individual measures such as purchasing of super energy convertible washing machines with an energy star permitted washing equipment which may possibly save energy up to sixty liters of water should be bought so as to lessen the quantity of wastewater that requires treatment; De-clog drainage system naturally because a typical drain cleansers contain several deleterious chemicals like sodium hydroxide, as a substitute use natural techniques such as pouring equivalent portions of baking soda, white vinegar and boiling water, then allows it to stay in the drain for thirty minutes before washing; constantly opt for recyclable and green choices which avoid the excessive water usage so as to conserve water besides lessening the amount of waste water formed during production and handling. This must also embrace re-using dishware and linens like towels and bed sheets; frisk usage of plastics since plastic leftovers for examples used plastic bags, plastic water bottles and not reusable plastic plates often end up in the rivers, oceans, streams or lakes and sullying natural habitats as well as destroying marine life; dispose antifreeze, motor oil or batteries at specifically assigned gathering points to forfend
unnecessary ecosystems contagion which can end up infesting ground and surface waters; practice organic agriculture by growing so as to lessen herbicides and pesticides quantity used in agribusiness [3], [7], [11]. This is also ways of promoting organic fertilizer usage which stimulates natural growth and eradicates the use of noxious chemicals found in man-made fertilizers, which can infiltrate into the ground as well as infest water supplies; set up high rating water-efficient household appliances used for cleaning and hygienic purposes like dishwashers, shower heads and washing machines in the home, for water efficient then save millions of liters of water which could have been adulterated besides during the installation the rate of water efficiency should be checked; participate actively in water contamination prevention either by making monetary donations to water conservation organizations or sensitization of peers and community groups; avoid direct discarding into water structures by all means possible by desisting from discarding rubbish or any other waste produces into water physiques [1], [10].

![Figure 3: Example of waste discarded inside the water physiques.](image_url)

5. Conclusion
This study examined water contamination facing world community as polluted issues are global matter. The water quality in most region of the world has besmirched, though the situation in more severe in Sub-Saharan Africa. About 783 million populaces cannot access hygienic and safe water worldwide, 319 million populaces in Sub-Saharan Africa have no access to better-quality reliable clean water sources with half of the world's hospice beds occupied with populaces suffering from a water-related illness. Scientific philosophers believe that people thought depends on the kind of diet and water fed with, then when humans ingest unhygienic food and water the common physiology is stressed. Since, human body comprises of approximately ten thousands hormones and enzymes which are very specific in their requisite and kinetics, entering of any undesired material into the body affects the hormone mechanism. Substantial amount of xenobiotics such as aldrin, numerous other pesticides and variety of heavy metals are ingest along with our diet and water unaware, though they are cause of deaths now-a-days however its definite cycle is unmapped. Due to this, it becomes our obligation to examine as well as have adequate knowledge about environment of water and food ingested so as to detect
the greater amassing dose of any multifarious in the ecology, then adverse the impacts of water contamination.

6. Recommendation
Discreetly in tap using especially during washing and bathing by not keeping tap running when not in use thereby significantly thwart water unavailability besides lessen the quantity of dirty water that requires treatment. Buy more ecologically safe cleaning liquors which are less hazardous for uses at home and other unrestricted places. Chemicals and pesticides must be used moderately for parks and farms so as to avoid overdo besides reduce chemical runoffs into proximate water sources or make use of composting and organic manure as a substitute. Also people staying nearby to water body should plant a lots of flowers and trees round their homes as a preventing measure again chemicals easy drain into the water when it rains.

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