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Water Pollution and Its Impact on Human Health in India

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Abstract:

Freshwater is indispensable for all form of life and is needed in large quantities, in almost all human activities. The main source of freshwater pollution can be ascribed to the discharge of untreated waste, run-off from agricultural fields and dumping of industrial waste water. Industrial growth and rapid urbanization is promoting the use of synthetic substances that have a serious impact on our freshwater bodies. Polluted water supplies cause serious human health problems in addition to threats to the ecosystem sustainability. The main cause of water pollution in urban areas are directly discharge both industrial and domestic waste water into natural water bodies. These water bodies are highly polluted by humans and in result come right back to hurt us. India's remarkable economic growth, industrialization, and urbanization, coupled with inadequate investment in basic water supply and treatment infrastructure, have resulted in widespread water pollution. Polluted water is the main cause of number of diseases in human being. This pollution not only affects the life of present generation but also effect the life of next generation because its effect remains for long. This paper deals with the water pollution causes and its impact on human health in India.

Key words: Freshwater, Pollution, Industrialization, Urbanization, Waste.

Introduction:

Water is the most essential material for human survival, after air. Without water, life as we know it would not be possible (Ahuja, 1980, 1986). Water pollution occurs when unwanted materials enter in to water, changes the quality of water (Alrumman SA, El-kott AF, Kehsk MA. 2016). Water pollution categories into three major sources, natural Sources: include thermal and acid effluents from volcanic effect areas and this type of natural sources are rarely found on some places of the earth, domestic sources that are primarily sewage water and laundry wastes and discharge from the houses, apartments, and other dwellings, Industrial wastes vary from industry to industry depends on the chemical compounds use in the industry and location also determine the quantity and quality of water pollution. The major source of fresh water pollution can be caused by to discharge of untreated

waste, run-off from agriculture field and unscientific dumping of industrial waste and polluted by agriculture or households cause damage to human health or the environment (European Public Health Alliance, 2009). Urbanization and industrial growth change the trend use of synthetic organic substance have serious and adverse impact on the freshwater bodies. In this regard the generally accepted fact that the developed countries experience from problem of chemical discharge into the water source mainly groundwater, while third world countries facing problem of agriculture run-off in water sources. Chemicals dissolve in the freshwater caused water pollution and create the health problem and lead to water born diseases. According to the World Health Organization (WTO) survey 80% of all diseases in developing countries are water born (Tebbutt 1983).

Water is so important for all living beings that it should always remain pure but unfortunately it gets polluted through various sources. The recommended standard for potable water or drinking water is that it must be free from pathogenic microorganisms and chemicals that are harmful to human health. All over the world water pollution is posing a threat to human life both in rural and urban areas. In the urban areas water gets contaminated in many different ways, some of the most common reasons being leaky water pipe joints in areas where the water pipe and sewage line pass close together. Sometimes the water gets polluted at source due to various reasons and mainly due to inflow of sewage into the source.

Water pollution is the cause of many diseases and consequently of atmospheric pollution. Most inhabitants are served by surface waters i.e. rivers, streams and lakes. The raw water from these sources is frequently polluted with human waste or sewage and industrial waste. Nearly 80 % of the world's diseases, particularly in developing world, can be linked with contaminated water. About 90% pollution load in river system is due to human waste. The degradation of both surface and ground water resources has had adverse impact on the quality of drinking water for human use, as well as harmful effects on aquatic life.

Major sources of water pollution:

- Domestic sewage
- Urbanization
- Haphazard Population growth
- Rapid Industrialization
- Modernization and Intensification in Agriculture
- Municipal and Medical Waste
- Unscientific disposal of waste

Domestic Sewage:

Domestic water waste system is the most important source of water pollution. Domestic wastewater comes from 'residential sources including toilets, sinks, bathing, and laundry (Stapleton

et al 2004: 298). Globally, 80 percent of municipal waste water is discharged into water bodies without any treatment (WWAP, 2017). The domestic waste generation as a result of household activities such as cleaning, cooking, maintaining empty containers, packaging, huge use of plastic bags etc. most of the domestic drainage system directly dumped into the river, ponds, and wells, which are the basic sources of drinking water in our country. In India the river passing through the cities or cities which situated on the bank of the rivers the excreta and domestic waste directly dumped into the rivers. The problem of excreta disposal in the holly river or water bodies is clearly as old as mankind. The religious festival and activities also affect the water bodies such as immerse of clay idols, sacrament, flowers and number of religious books including Hindu, Islamic and Christian texts etc. In Mumbai alone, around 150,000 statues are immersed annually, itself and the need for careful disposal is highlighted in a number of religious books including Hindu, Islamic and Christian texts. Population and domestic waste has a positive relationship, domestic waste increases with increasing population and vice-versa.

Urbanization:

The release of domestic sewage in water resources is a practical feature of the urbanization process and this action cause changes that may impair the environmental balance and the water quality of the many region in India. Polluted water resources are not only a problem in the urban areas but in the big cities and its fringe areas. The consequences of burgeoning population in urban centers are more noticeable in developing countries as compared to the developed countries. Indian cities have limited facilities or infrastructure to treat sewage and drinking water, which generally comes from the underground, large rivers and lakes. Mostly cities and industrial regions simply discharge their untreated industrial waste water and sewage water into surrounding surface water. The population of urban India was 377 million (Census of India, 2011a), which accounts for 31% of the total population. Global case histories reveal that when a country's urban population extends beyond 25% of the overall population (as in the present case), the pace of urbanization accelerates (Kumar & Gaikwad, 2004). The population residing in urban regions increased from 18 to 31.2% from 1961 to 2011 respectively (Census of India, 2011b).

Table: Per capita generation rate

Population size	Waste generation (kg/capita/day)	Waste generation (kg/capita/day)
>2000000	0.43	0.55
1000000–2000000	0.39	0.46
500000–1000000	0.38	0.48
100000–500000	0.39	0.46
<100000	0.36	-

Source: CPCB report (2000b) and calculated from R.K. Annepu (2012)

Haphazard Population Growth:

Water pollution has a various determinants and population is the major source one of them. There are various determinants of water pollution. One of the major causes is population. For example, Kemp (2004: 126, 135) and Chu and Yu (2002: 129) suggest that population growth brings environment deterioration through development, such as large scale farming, urbanization and industrialization. Kempt also states (2004: 277) that population growth and the change of life style and technology bring worse sewage, because the nature cannot keep up with the treatment of the pollution. Population growth has had a negative impact on the quality of the water resources. In India, where population size is the second biggest size in the world and environmental deterioration is proceeding due to the rapid economic growth and urbanization, there is serious water pollution problem.

Rapid Industrialization:

Water pollution is not only cause by the sewage, but industrial waste also a significant pollutant. Industrial waste is plays a major role in the water pollution. It's increasing the level of contamination with heavy metals in the water. A recent research conducted by the Community Development Organization has concluded that the chemicals discharged by the factories are more harmful than the sewerage that flows into the river and bodies of water. These untreated water disposals display the negative long-term effects on local natural resources. Industrialization is the parameter of development of intellectuals and financial trade that changes a predominantly rustic culture into a modern one. Many industries discharge their waste water without any proper scientific treatment in the natural water bodies. Waste water with the heavy contamination is the causes of negative impact on surrounding natural environment. Chemicals, waste oil and heavy metals are regularly transported into their water. Human and other living organism can accumulate heavy toxic metals from untreated industrial discharge in their bodies.

Modernization and Intensification in Agriculture:

Drinking water quality and inadequate water treatment infrastructure is not the only problem plaguing urban water resources. In the modern era the new tools and techniques uses in the agricultural practices and the so-called vegetable basket (urban and fringe areas) are also affect the quantity and quality of drinking water. The newly developed or fringe areas of the city where the intensifying the vegetables agriculture are usually irrigated their farmland by the untreated sewage water while uses the high quantity of fertilizers, pesticides and insecticides to raise productivity. Indian agriculture has undergone a rapid transformation after green revolution. This produce incentive to increase agricultural productivity with the adaptation HYV's of seeds and it's requires a maximum use of fertilizers, insecticide and pesticides. Agriculture, which accounts for 70 percent of water abstractions worldwide, plays a major role in water pollution. Farms discharge large quantities

of agrochemicals, organic matter, drug residues, sediments and saline drainage into water bodies. The resultant water pollution poses demonstrated risks to aquatic ecosystems, human health and productive activities (UNEP, 2016). Phosphates and nitrates are the major components of chemical fertilizers and main reason behind water pollution. Pesticides and insecticides are other causes of water pollution. It is improved the crop productivity and yield but these pesticides are harmful when they use improper and unscientific. It's added the unsuitable substances in water, which change the quality of water properties. This can occur when pesticides are used on land areas that are used to grow crop and are flushed away by wind and rainfall into water bodies. As a consequence, they change the state of such water quality by changing to its physical, chemical or biological conditions, as a result of that making it toxic, contaminated and unhygienic for use.

Municipal and Medical Waste:

Water is an essential component of life, socio-economic development, poverty reduction and ecosystem conservation (The United Nations Educational Scientific and Cultural Organization (UNESCO), 2003). Solid waste are defined as non-air and sewage emissions created within and disposed by a municipality, including household garbage, commercial refuse, construction and demolition debris, dead animals and abandoned vehicles. The process of solid waste management consists of generation, collection transfer, treatment and final disposal. An integrated solid waste management gives a permanent and logical alternative for solving the water contamination problem by reducing, reusing, and recycling the solid waste. Overall in the solid waste composition plastic element is one of the major components which play an important role in the water pollution in the modern time. Plastic pollution is the accumulation of the plastic objects and particles (e.g. plastic bottles, bags and microbeads) in the earth's environment that adversely affects humans, wildlife and their habitats. Plastic and polythene bags are difficult as well as very costly to recycle and most end up on landfill sites especially in the fringe areas of the city, where they take a period of around 300 years to photodegrade. They break down into tiny toxic particles and that particles contaminate with the soil and water bodies thereafter enter the food chain when animals accidentally ingest them.

During the 60th and 70th plastic and polythene bags were rarely found and their usage has increased at an alarming rate since they become popular during the 80th century. Plastic and polythene bags are frequently using for the every purposes. These can be seen everywhere as hanging from the branches of trees, flying in the air on windy days, settled amongst bushes and floating on rivers. These plastic bags choke gutters and drains causing water and sewage to accumulate and overflow and become the breeding grounds of germs and bacteria that causes different type of diseases.

COVID-19 saw an increase in plastic finding its ways to the ocean, especially from medical waste and masks. Several news reports point to a plastic industry trying to take advantage of the

health concerns and desire for disposable masks and packaging to increase production of single use plastic.

Unscientific Disposal of Waste:

Most of cities in India are witness the lack of proper waste-water treatment facility. The sewage and industrial waste water directly dumping into the natural water bodies. Contamination of groundwater from municipal solid waste hazardous landfills sites, accidental spills and abandoned production facilities is a major cause of water pollution. Many of the official solid waste contamination sites are under control and the large majority of them are expected to release chemicals into the open environment. The drinkable water pollution is strongly correlated with the solid waste generated in high quantity in the urban areas. The main concern is focused on the pollution potential due to leaching generated from the landfill sites into the groundwater. Many studies revealed that pollution existing in drinkable water is generated from solid waste in India (Saba, Chattopadhyay and Naidu, 2003; Sabahi et al., 2009) and United Kingdom (Giusti, 2009). Landfills have been identified as one of the major threats to groundwater resources (Fatta et al., 1999; USEPA, 2008). Landfill sites or open dump are subjected to either groundwater underflow or infiltration from precipitation.

Impact of Water Pollution on Human Health:

Chemicals contaminations in water can be both naturally occurring or introduced by human interference and can have different serious problems. Heavy metals such as lead, mercury, fluoride, arsenic, cadmium, chlorinated solvents petrochemicals, pesticides and nitrates are the major chemicals are presence in the water and affecting the human health in a different way.

Water-borne Diseases	Causes	Disease
Typhoid Cholera Diarrhea Paratyphoid Fever Bacillary Dysentery	Bacterial Infections	Water-borne diseases are infectious diseases spread primarily through contaminated water. Though these diseases are spread either directly or through flies or filth. Water is the important source of spread of these diseases and hence they are termed as water-borne diseases.
Infectious Hepatitis (Jaundice) Poliomyelitis	Viral Infections	Most intestinal (enteric) diseases are infectious and are transmitted through faecal waste.
Amoebic Dysentery Cryptosporidiosis	Protozoal Infections	Pathogens- which include virus, bacteria, protozoa and parasitic worms are disease producing agents found in the faeces of infected persons. These diseases are more prevalent in areas with poor sanitary conditions. These pathogens travel through water sources and interfuses directly through persons handling food and water.

Conclusion:

Water pollution is a global issue and world community is facing worst results of polluted water. Major sources of water pollution are discharge of domestic, industrial waste and excessive use of pesticides and pesticides in agricultural activities. Unhygienic living condition and polluted water are the major causes of bacterial, viral and parasitic disease in the human being. It is strongly recommended that there should be treated before discharging into the river. Educational and awareness programs related to safe drinking water should be organized in a large scale in the rural as well as in the urban areas.

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