

Research Article

A Study on Water Pollution and Health Hazard

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A B S T R A C T

Water pollution and health hazard is a matter of concern all over the world. Rapid and unplanned urbanization has given way to big urban centers which produces huge quantity of solid and liquid waste daily which is simply being dumped in open space or water bodies contaminating rivers and other water bodies. The present study explores the current status of water pollution and its impact on health of the people of Patna, the capital of Bihar. There is potential hazard of contamination of ground water through the leaching of solid waste through the sub-soil into the ground water. The underground water is also being polluted due to seepage through underground drains in urban areas. Human littering in rivers and other water bodies and enormous use of synthetic organic substances in household is the major source of water pollution in Patna. The present paper intends to identify the cause and extent of water pollution in Patna. It further explores the nature and dimensions of water pollution induced health hazard and focus on the ways and means to control the same. It is an empirical study based on primary and secondary data.

Keywords: Pollution, Hazard, Contamination, Disease, Pathogens

Introduction

The water cycle is responsible for the continual water of this non-exhaustible resource. However, as a result of unchecked anthropogenic activity, water has been subjected to excessive usage, as well as other forms of abuse, which has rendered it unsuitable for consumption. The direct discharge of untreated or partially treated sewage water loaded with chemicals, agricultural discharge having dissolved chemicals obtained from fertilisers and pesticides, untreated industrial effluents in water bodies are the major agents of water contamination. Direct discharge of untreated or partially treated sewage water loaded with chemicals also contributes to water contamination. The majority of the chemicals that are released into the water bodies are not biodegradable, these chemicals eventually make their way up the food chain by way of marine life, posing a health risk.

Rapid and uncontrolled urbanisation results in the production of a large number of solid and liquid waste,

which is then deposited openly in open space or water bodies, poisoning rivers and subterranean water. The solid waste that is thrown in open space eventually makes its way into the ground water by way of the subsoil. This causes the ground water to become contaminated. The most major contributor to water pollution in Patna is the human amount of trash that is dumped by humans in rivers and other bodies of water, as well as the extensive usage of synthetic organic chemicals in homes. Because to the discharge of non-biodegradable solid waste and untreated chemical effluent into the Ganges River, it is now ranked as the sixth most polluted river in the world (TOI: 2020).

Aims and Objective

The present research paper intends to:

- Find out what's causing the water to be so polluted in Patna and how bad it is
- It investigates deeper the nature and the extent of the health threat that is induced by water pollution, it also

- Concentrate on the ways and means to manage the same thing

Study Area

Patna, capital of Bihar is the study area having latitudinal and longitudinal extent of 25°21'45.83"N, 85°42'19.54"E and 25°28' 22.78"N 83°51'51.40"E respectively. The present study examined a potential hazard to human health induced by water. About 17 million people called the city ground in 2011, the majority of them get their river water from streams and aquifers rather than municipal water systems. Over the last three decades, Patna has been subjected to several transformations in terms of its ecology, morphology, population, all of which have witnessed to the city's ongoing battle with difficulties pertaining to water. The effects of a health hazard induced by water pollution have become more severe as a result of unplanned urbanisation and faster anthropogenic activity.

Research Design

It is an empirical study that was based on personal observation, primary and secondary data, as well as a comprehensive review of the relevant literature. The primary data were collected by conducting a random sampling of one hundred respondents and then questioning them according to a predetermined timetable. It has been taken into consideration to include respondents from all different economic brackets and social classes. The secondary data came from a wide variety of reliable sources, including papers, journals, organisations inside the government and outside of it.

Discussion and Result

Cause and Extent of Water Pollution in Patna

Water is a resource that can be found almost everywhere; nevertheless, over use of it has led to its degradation and pollution. Water pollution is the presence of excessive concentrations of a hazard (pollutants) in water in such a way that it is no longer appropriate for drinking, bathing, cooking, or other purposes (Olaniran: (1995). There are many different contributors to the problem of water pollution.

Every day, Patna produces around 290 MLD of sewage water, but only 50 MLD of that sewage water gets treated (in terms of PMC) before it is released into the river. In addition to this, very hazardous waste from hospitals, such as human bodies and diseased body parts, is dumped into the river in an unfiltered state. This results in a high level of bacteriological pollution in the river, which ranges from 500 to 3500 MPN (most Probable Number) count per 100ml of water, when the safe level is merely 1/100th of a millilitre of water (PCB).

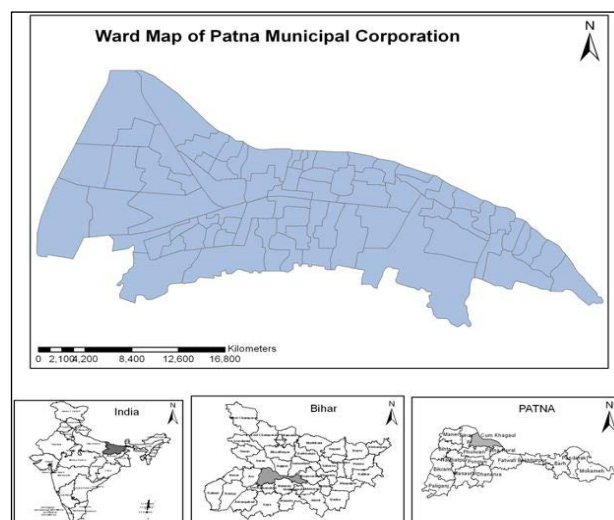


Figure 1

Because organic matter stimulates decomposers, particularly bacteria, which break down suspended solids in the sewage and the use dissolved oxygen (O_2) for respiration, this causes a substantial drop in the amount of dissolved oxygen in the water, the Biological Oxygen Demand (BOD) decreases as a result (Owa: 2014). It has an impact on marine life, leading to a reduction of both flora and fauna as a result of suffocation-related deaths.

For its drinking river needs, Patna draws from both rivers and groundwater. The leaching of solid waste and the percolation of drain water via the subsoil into the ground water both present the potential hazard of ground water contamination. The danger of contamination is increased in many communities by the fact that water supply pipes and sewage pipelines cross paths with one another. The sewage systems in a number of different locations of Patna have gotten clogged and broken, which has led to leakages and water logging, which in turn has caused an unpleasant stench and created a breeding ground for mosquitoes. Aside from this, there are open drains, which are an additional contributor to the problem. Patna has grown beyond the borders of the Patna Municipal Corporation, the newly built-up regions lack sufficient drainage and give way to chronic water logging, which raises a number of health concerns. Patna has also extended beyond the limits of the Patna Municipal Corporation. Thermal water pollution is caused by the release of hot water from residential, commercial, industrial facilities, respectively. This causes the temperature of the water to rise and increases down the metabolic rate of the organisms (Owa: 2014). During the wet season, urban flooding may occur as a result of sudden flooding of roadways caused by high rain totals over a short period of time. The heavy rain that occurred in Patna in September'2019 caused the city to become inundated, which led to water stagnation and, as a result, water pollution. The rainfall totaled over 154 millimetres

in just under 24 hours, according to skymetweather.com, it was responsible for the deaths of 73 people (India News). Collectively, unplanned urbanisation, shifting patterns of land use, insufficient infrastructure, an inattentive attitude on the part of local officials have contributed to the disastrous pattern of water contamination.

Nature and Dimensions of Water Pollution Induced Health Hazard

Water is not only a global solvent, but also a major source of infection; in fact, water is the root cause of eighty per cent of all diseases that affect human beings (WHO). There are a number of nations in which the drinking water does not comply with WHO guidelines (Khan et al. 2013), it is estimated that 3.1% of fatalities worldwide are attributable to the uncleanness and poor quality of the water (Pawari, 2015).

According to Kamble (2014), home sewage is responsible for between 75 and 80 percent of the world's water pollution. This sewage, which includes human chemicals, solid waste, plastic litter, is drained into rivers, putting the health of humans at a caused risk. The microorganisms that are responsible for the water-borne diseases are caused to collectively as pathogens. This grouping comprises viruses, bacteria, protozoa, parasitic worms. These infectious pathogens disseminate via water sources and spread directly through individuals who come into contact with food and water. The majority of water-related diseases are brought on by untreated drinking water, faeces contamination, pathogens in the water.

There is a diverse range of diseases that are transmitted by water, including diarrhoea, encephalitis, jaundice, typhoid, malaria, dengue, chikungunya, cancer, reproductive, neurological, cardiovascular conditions (Ullah et.al., 2014). Infectious diseases of the skin and eyes, such as trachoma, which may lead to a permanent loss of vision if they are contracted via using unclean water for washing (www.narayanahealth.org). The consumption of contaminated water, the transmission of flies or grime, the presence of dirt all contribute to the spread of these diseases. The lack of poor sanitary facilities makes the issue even more challenging. According to the Patna Municipal Corporation, sewage network in Patna caters to just 10% of the city's population, while the remaining 90% of the city's excreta are released into the river Ganges via the open sewers without any kind of treatment.

The situation becomes even more difficult during the rainy season because clogged sewage canals and poor drainage give way to the accumulation of rain water in low-lying areas and pot holes. This creates a breeding ground for bacteria and viruses that spread diseases such as malaria, cholera, typhoid, fungal infection, gastro-intestinal diseases,

diarrhoea, nausea, dengue, etc. The rainy season also makes the situation more dangerous for travellers because of the increased risk of flash floods. The contamination of the underground water is another major source of the health hazard. In a number of areas, toxic waste products and sewage water mix with underground water. This water is then pumped up and utilised for drinking and other household purposes, which may spread diseases that are spread by water. The transmission of these pathogens may take place when tainted water is used for activities such as drinking, preparing meals, washing clothing, amongst other activities. Every year, diarrheal diseases alone are responsible for the deaths of 1.5 million people throughout the world (WHO 2012). Due to poor hygiene and a weakened immune system, the risk of infection is increased for babies, younger children, the elderly, people with chronic diseases. People who are part of groups with low incomes are more susceptible since they do not have access to clean water for drinking and maintain poor hygiene practises. There are at least 2 billion people around the source who get their drinking water from sources that are contaminated with excrement (www.news-medical.net), children under the age of five account for the great majority of the fatalities that result from this (WHO).

Ways and Means to Control water Borne Health Hazard

According to the World Health Organization (WHO), the quality and safety of water are essential to human advancement and wellbeing, preventing the spread of diseases that are transmitted via water demands enormous efforts from all parties involved. Access to clean water supplies, proper sanitation services, improved hygiene habits have the potential to avert a significant proportion of the world's disease burden. It necessitates the reorganisation of the infrastructure, as well as the involvement and knowledge of the community.

The government has to take the necessary steps to both reduce the amount of pollution in the water supply and improve the country's ageing infrastructure. It is very necessary to do routine inspections of sewage treatment plants as well as water supply pipelines in order to check and avoid any kind of failure. Because the majority of sewage treatment plants are outdated and have a relatively low peak loading capacity (PMC), there is a pressing need to develop innovative and efficient methods of treating sewage water in treatment to keep up with the present demand. Patna Municipal Corporation has a number of challenges, one of the most major being a shortage of available work. In order to guarantee the reliability of its water supply, the municipality must find ways to recruit work that is both skilled and effective. In addition to this, stringent rules need to be followed in order to check the

flow of untreated industrial effluents, as well as solid and infectious hospital waste, into the river Ganges (TOI). To prevent drainage channels from being clogged with water during the wet season, the municipal corporation has to increase the carrying capacity of drainage channels. Within the framework of this discussion, the routine cleaning of the drainage channel is of similar importance. The contamination of solid waste is another key step in preventing seepage that might contaminate underground water supplies. Additionally required to check the further spread of pathogens is the administration of disinfectant on a regular basis. The gathering and storage of water is an additional way for preserving both the quality and quantity of available water. In this regard, the adoption of forward-thinking practises such as the construction of a domestic water treatment plant and the safe storage of water (WHO) may go a long way. Regular testing of the water's quality is a mandatory requirement.

When it comes to addressing water-related health concerns, having community involvement in the form of public-private partnerships may be of great help. This is accomplished through advocating for rules that are based on health to be adopted by governments and working with partners to promote effective risk management techniques to water providers, communities, individual homes (WHO). In order to educate and raise people's knowledge about the required measures to take against water-borne infections, the government has to run health check-up and awareness camps that are specific to each location. People are required to sterilise their drinking water by bringing it to a boil, filtering it, keeping it covered at all times. Eliminating standing water is an effective way for reducing the likelihood that bacteria and viruses will be able to reproduce. Maintaining a high level of personal cleanliness substantially lowers one's risk of contracting diseases that are borne by water. Innovative actions, such as arranging street play, may help in mobilising people at risk to water-related risks. Mobilizing the population's children and women may also be of great help. In order to preserve the water chemical, the general public have to be incentivized to switch from using items that include hazardous people to those that are natural and biodegradable.

Field Study

According to the findings of the field study, the communities in the area seem to be afflicted by a wide range of health problems associated to water. People bathe in the Ganges River despite the dangers because of its religious risk, which contributes to the river's water. People who live in close proximity to the river have reportedly experienced unpleasant odours and, as a result, respiratory issues. People who live in slums and squatter settlements are subjected to persistent water logging, which results in

around 80 percent of these individuals suffering from digestive issues. Even in the most affluent neighbourhoods, clogged drains may lead to water logging, which in turn provides pathogens with an open way. In many locations, the water supply pipes run through places that have been clogged with water, which makes the supply water infectious.

The problem is becoming worse as the rainy season continues. The outdated, inadequate, clogged sewerage and drainage system is unable to keep up with the increased amount of monsoon runoff. This results in water logging, which in turn provides a breeding ground for bacteria and viruses that spread diseases such as malaria, dengue, cholera, jaundice, typhoid, fungal and gastro-intestinal infections, diarrhoea, nausea, chikengunia, amongst others. According to the results of the survey, almost 45 percent of the people who were studied go to the doctor at least once a month to get treatment for water-borne infections. During the course of the field research, it was discovered that 51% of the respondents do not have access to good drainage, that 28% of the respondents do not have access to a waste disposal facility.

Conclusion

In light of what has been discussed above, it is abundantly evident that the incorrect management of water resources is the origin of water-borne illnesses and that this problem needs to be attacked with all out war. Both the government and the general population have a responsibility to take appropriate safety measures in order to stop the spread of infectious diseases that are transmitted by water. The government must prevent quickly to take preventative measures against water pollution, water contamination, water logging. Drainage lines should correspond to the natural slope in order to prevent water from pooling. It is necessary to enact stringent rules and ensure that they are rigorously enforced. Strict punishments should also be applied in the event that any of these laws are broken. After all, it is the obligation of the government to guarantee that the public has access to clean drinking water.

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