

# Water Borne Disease in Dudhnoi, Goalpara, Assam: A Review

Dr. Pradip Das, Associate Professor, Department of Chemistry, Dudhnoi College, Dudhnoi, Assam, India.

## Abstract:

Water is one of the most important requirements for human health and life. It is also the most effective carrier of pathogens causing a number of infectious diseases in developing countries particularly in rural areas. The aim of the study was to review the prevalence and causes of waterborne diseases in Dudhnoi, Goalpara. Diarrhoea was found to be the most prevalent waterborne diseases among gastroenteritis, skin infection, typhoid, cholera, and dysentery. It was also found that these diseases are more prevalent in rainy season than dry season. Majority of the community had no knowledge of water-borne diseases except some had little knowledge of diarrhoea and typhoid. It was therefore recommended improvement in sanitation, hygiene and access as well as awareness to safe drinking water in the study area.

**Key Words: Water-borne Disease, Environment, Pollution, Drinking Water, Rural health**

## Introduction

The Protocol on Water and Health defines water-related disease as, “any significant adverse effects on human health, such as death, disability, illness or disorders, caused directly or indirectly by the condition, or changes in the quantity or quality, of any waters”.

Worldwide, 1.1 billion people lack access to improved water supplies, and 2.4 billion do not have access to sanitation services. Hundreds of millions more rely on improved water supplies that are not safe because of microbial or chemical contamination. Diarrheal diseases, which are frequently transmitted by contaminated water, continue to be a leading cause of morbidity and mortality, especially among children.

There are four primary routes of transmission of water-related diseases, and each route has a set of proven disease prevention measures. The first route is water-borne transmission, in which water contaminated with pathogens is ingested and causes disease. Transmission of water-borne diseases can be prevented by assuring access to a sufficient quantity of disinfected water, proper disposal of human waste, and improved hygiene. A second route is water-washed transmission in which poor personal or domestic hygiene results in exposure to pathogens through a person-to-person or fecal-oral mechanism. Water-washed diseases can be prevented by increasing the quantity of water available to populations and effectively promoting improved hygiene. A third route is water-based transmission through skin contact with water infested with pathogens that spend part of their life cycle in an animal that lives in water. Water-based disease transmission can be prevented by eliminating contact with infested water, controlling the populations of the intermediate hosts in water, and reducing fecal contamination of surface waters by human waste. The fourth route is water-related transmission through insect vectors that breed in water or bite near water. Prevention strategies include elimination of insect breeding sites, use of insecticide treated bednets, and reduction of insect populations.

## Objectives:

- a. To review the prevalence of waterborne disease in Dudhnoi, Goalpara
- b. To assess the causes of waterborne diseases in Dudhnoi, Goalpara

## Materials and methods

This research is carried out by reviewing literatures on previously done work and presenting the findings in form of discussion and tabular representation

### Place of study:

Goalpara district, of Assam is situated between 25°33' and 26°12' North latitude and 90°07' and 91° 15' East longitude. The district occupies an area of 1,832 Sq.km. It is surrounded by West and East Garo Hill districts of Meghalaya on the South and Kamrup district on the East, Dhubri district on the West and river Brahmaputra along the North.

The district has five Revenue Circles. These are (1) Lakhipur Revenue Circle (2) Balijana Revenue Circle (3) Ronjuli Revenue Circle (4) Dudhnoi Revenue Circle and (5) Matia Revenue Circle. There are 81 (eighty one) Gaon Panchayats, 8 (eight) Anchalik Panchayats and 834 Revenue villages in the district.

Dudhnoi, a taluk in Goalpara district of Assam, India is located at 25°59'0"N 90°44'0"E at an elevation of 44 m above MSL.

### Waterborne Diseases

Water borne diseases, such as Diarrhoea, Dysentery, Cholera, Gastroenteritis etc. are most common in rural areas due to the contaminated drinking water associated with aerobic & anaerobic microbes. Similarly vector borne diseases are also comparatively higher in rural areas. Mortality is also high in rural areas due to the insufficient medical facilities where infant & child mortality rate is much higher than in the urban areas. Most of the children are suffering from water borne diseases associated with malnutrition.

Poor habitat and improper sanitation are other major problems in Dudhnoi. Untreated drinking water from open sources like ponds, wells, rivers etc. are the major causes of various water borne diseases like Cholera, Diarrhoea, Dysentery etc. Contamination of drinking water sources here may be due to the use of pesticides & chemical fertilizers & animal dung in the agricultural field and improper sanitation.

In Dudhnoi most of the village people are deprived of proper health care services as the dispensaries and health care centers are not at easy reach. Distribution of free medicine including the life saving medicines & saline are not adequately provided to the poor rural people, many of whom are suffering from indoor air pollution due to the use of biomass fuel. It is common for village people to use wood & bamboo and sometimes-dried animal dung & plants as fuel for cooking.

Contaminated drinking water and improper sanitation is the primary cause for various water borne diseases. Diarrhoea, Dysentery, Cholera and Gastroenteritis are the major water borne diseases of Assam. Diarrhoea, Dysentery, Cholera, Typhoid, Hepatitis and E. coli are dominant during the monsoon season when protozoan and bacteria are rampant and overflow from sewage. Ground water contamination especially fluoride toxicity in certain localities as reported is also an alarm to the concern departments and the agencies. Environmental factors are also responsible for the various communicable diseases, which have not yet been analysed in a systematic way. However, a few studies have been carried out in this regard.

Water-borne pathogens, which are largely transmitted through a fecal-oral route, are important causative agents of disease outbreaks in the developing as well as developed world. In addition, water-borne pathogens contribute to background rates of disease not detected as outbreaks and therefore not reported to public health authorities. Table 1 contains examples of water-borne diseases. The focus of the table is microbiologic agents of disease. Inorganic compounds such as arsenic and lead are also important causes of water-borne disease but will not be considered here.

Disease	Pathogen(s)	Transmission	Symptoms
<b>Bacterial</b>			
Cholera	<i>Vibrio cholerae</i>	Fecal-oral	Acute, profuse watery diarrhea, dehydration
Gastroenteritis	<i>Escherichia coli</i> , <i>Campylobacter</i> spp., <i>Salmonella</i> spp.	Fecal-oral, person→ person, or animal→ person	Watery or loose stools, stomach cramps
Typhoid	<i>Salmonella typhi</i>	Fecal-oral	Fever, headache, nausea, loss of appetite, constipation or diarrhea
<b>Parasitic</b>			
Amoebic dysentery	<i>Entamoeba histolytica</i>	Fecal-oral, person→ person	Stomach pain, bloody diarrhea, fever
Cryptosporidiosis	<i>Cryptosporidium parvum</i>	Fecal-oral, person→ person, or animal→ person	Watery diarrhea, stomach cramps
Dracunculiasis (Guinea worm)	<i>Dracunculus medinensis</i>	Person→ copepod→ person	Emergence of worm through skin causes an ulcer, severe local pain, and swelling
Giardiasis	<i>Giardia lamblia</i>	Fecal-oral, person→ person	Watery diarrhea, stomach cramps, upset stomach
<b>Viral</b>			
Hepatitis	Hepatitis A	Fecal-oral, person→ person	Jaundice, fatigue, abdominal pain, loss of appetite, nausea, diarrhea, fever
Viral Gastroenteritis	Norwalk virus	Fecal-oral, person→ person	Watery diarrhea, vomiting

## Transmission

Water-borne transmission refers to the acquisition of disease by exposure to pathogens through the ingestion of water contaminated with feces or inorganic substances. Water can become contaminated at the source, during transport to the home, in storage containers, or through improper handling.

Unprotected surface water (such as rivers, lakes, or springs) or ground water (such as shallow wells) can become contaminated by human or animal feces or agricultural effluent. Piped water sources can also become contaminated from a variety of factors. If source water is contaminated and is not chlorinated or otherwise treated, or if the amount of disinfectant applied is inadequate, the water delivered to the tap will likely be contaminated. Insufficiently maintained pipes may contain sediment that consumes chlorine residuals, rendering disinfection practices ineffective. Cracked pipes or crossed connections with sewer pipes can permit entry of contaminants into a water system, creating an efficient vehicle for transmission of pathogens. When power outages occur in water systems, or when power to systems is periodically interrupted in order to reduce costs or conserve water, the resultant negative pressure in the system can

pull contaminants into the water system from outside. Clandestine connections (holes made in existing water pipes by persons without access to a tap) create apertures in water pipes that also allow contaminants to enter into the water system.

Source water can become contaminated during transport in fecally-contaminated containers, or if fecally-contaminated hands touch the water, for example when the mouth of a bucket is grasped to stabilize it for transport on a person's head.

Stored water can become contaminated if the storage container is fecally-contaminated, if the implement introduced into a storage vessel to remove water, such as a cup, is contaminated, if no cover is kept on the container to keep contaminants out, or if fecally-contaminated hands touch the water.

Water can be contaminated by improper handling, which can include touching water with unwashed hands, or using dirty implements to obtain water for food preparation or drinking.

## Discussions

Major efforts to improve access to drinking water across India have not been matched by proportionate declines in deaths and illnesses from waterborne diseases, which remain grossly underestimated, a new government report has said. Today 85% of India's population is covered by water infrastructure, said the report, from India's planning commission, a top policy making body. Between 400 000 and 500 000 children aged under five years die each year from diarrhoea, the report said, citing a failure to improve personal and home hygiene as a factor. The report also cautioned that failure in epidemiological surveillance is leading public health authorities to record only a small fraction of cases of waterborne diseases.

Reported data indicate that the incidence of viral hepatitis is 12 cases per 100 000 people. But at least two studies in urban communities studies have shown that the incidence might be around 100 per 100 000. The report also said that only a small proportion of diarrhoeal diseases are picked up through surveillance. The report, which was sponsored by the World Health Organization and UNICEF, said that improvements in hygiene behaviour are not likely unless sanitation coverage improves dramatically. Without an adequate water supply children cannot wash often enough and so contract eye infections and skin conditions such as scabies.

The report said that poor water quality and the lack of adequate disposal of human, animal, and household wastes are contributing to waterborne diseases. Just 30% of waste water from India's cities is treated before disposal. The rest flows into rivers, lakes, and groundwater, it said.

Public health experts also say that the actual quality of water varies widely. "Quality assurance checks are lacking in cities and rural areas. What's passed off as drinking water often leaves much to be desired," said Dr Chandrakant Pandav, a specialist in community medicine at the All India Institute of Medical Sciences.

Figures from India's Central Bureau of Health Intelligence show that the incidence of diarrhoea, enteric fever, viral hepatitis, and cholera has stayed at the same level over the past decade.

Fluoride contamination of fresh water also affects large parts of rural India, the report said. More than 25 million people across 17 states have to drink water with fluoride concentrations higher than the maximum permissible limit of 1.5 parts per million, it said. Excess fluoride can cause a condition called skeletal fluorosis.

Health is directly related to the environment. Environmental degradation is responsible for most of the diseases. The rural people usually suffer from health problems on account of:

- a. Contaminated drinking water.
- b. Improper sanitation
- c. Poor habitat
- d. Insufficient Medical facilities
- e. Exposure to indoor air pollution due to the use of biomass fuel.
- f. Water pollution due to the use of pesticides & chemical fertilizer, animal dung etc.

## Conclusion

Under the Health Department of Assam a sincere attempt is made to cover all the Health Care activities including various National Programmes & other Programmes run by the Directorate of Health & Directorate of Family Welfare. A good number of rural hospitals have come up in the last few years. But these hospitals often face certain problems making health care still a major handicap for the rural people of Dudhnoi.

The problems in brief are-

- a. Lack of resident doctors and hospital staff. Usually most of the doctors and hospital staff do not stay in rural hospitals.
- b. Lack of required basic equipments for the hospitals.
- c. Irregular supply of medicines and other essential items in hospitals.
- d. Improper maintenance of the hospital etc.

## References

1. World Health Organization. Vector-borne diseases, Factsheet # 387, March 2014. <http://www.who.int/mediacentre/factsheets/fs387/en>
2. Ortega L. World Health Day 2014: an opportunity to promote research on vectors & vector-borne diseases. *Indian J. Med. Res.* 2014;139:481–483.
3. Bhatia R, Ortega L, Dash AP, Mohamed AJ. Vector-borne diseases in South-East Asia: burdens and key challenges to be addressed. *WHO South-East. Asia J. Public Health* 2014;3:2–4.
4. Gupta I, Chowdhury S. Economic burden of malaria in India: the need for effective spending. *WHO South-East. Asia J. Public Health* 2014;3:95–102.
5. Statistical Handbook of Assam, Directorate of Economics and Statistics, Government of Assam, Guwahati, 2008; p. 281.
6. Jacob JT, Dandona L, Sharma VP, Kakkar M. Continuing challenge of infectious diseases in India. *Lancet.* 2011;377: 252–269.
7. Abbas G, Khan SH, Hassan M, Mahmood S, Naz S, Surriya S. Incidence of poultry diseases in different seasons in Khushab district, Pakistan, *J. Adv. Vet. Anim. Res.*, 2015; 2(2):141-145.
8. Andrews SC, Robinson AK, Rodriguez-Quinones F. Bacterial iron homeostasis. *FEMS Microbiol Rev* 2003; 27:215-237.
9. Arne P, Thierry S, Wang D, Deville M, Le Loc'h G, Desoutter A et al. *Aspergillus fumigatus* in poultry. *International Journal of Microbiology*, Article ID 746356, 2011.
10. Chakrabaty S, Sarma HP. Fluoride, iron and nitrate contaminated drinking water in Kamrup district, Assam, India, *Archives of Applied Science Research*, 2011; 3(4):186-192