

Study of Water Borne Diseases of Sikanderpur Lake at Muzaffarpur

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Abstract – Despite numerous efforts by government at various levels and other agencies interested in water and its safety, waterborne diseases are still a major public health and environmental concern. The huge investments in water research have not yielded the highly anticipated result, although they are worth the expenditure. There are undoubtedly major causes of the increasing prevalence of waterborne diseases in Sikanderpur Lake in Muzaffarpur, since pipe-borne water and rural people are not accessible on the surface water, which is also polluted with faecal materials. The scarcity of water and poor sanitation practise among these rural residents also play a crucial role in the proliferation of water-washed diseases on Sikanderpur Lake at Muzaffarpur. Less environmental practise that promotes intra-residential breeding of insects and other vectors leads to the increased prevalence of waterborne diseases at Muzaffarpur Lake. This study concentrates on the classification of waterborne diseases and the different approaches used in the bacteriological analysis of water.

Key Words – Water; Waterborne Disease; Bacteriological; Conventional; Molecular.

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INTRODUCTION

Waterborne diseases are those diseases that are transmitted through the direct drinking of water contaminated with pathogenic microorganisms. The origins of diseases that are carried by food, by ingestion of the same microorganisms, can be polluted water when used in food preparation. Many waterborne diseases include diarrhoea, which requires excessive stooling and sometimes contributes to dehydration and death. Diarrheal disorder is estimated to account for 4.1% of overall global everyday pressures, and accounts for the death of an estimated 1,8 million people worldwide, according to the World Health Organisation. In addition, it is estimated that 88% of this burden is due to clean water sources, hygiene and sanitation and is primarily focused on children in developing countries. Most waterborne illnesses are typically transmitted via the faecal oral route when human faecal matter is ingested through potable polluted water or food which is polluted mainly by inadequate wastewater management and insufficient sanitation. Faecal drinking-water emissions can be intermittent and may be low or extremely fluctuating in faecal contamination. In communities with low levels of pollution, livelihood threats cannot exist and the people may have been using the same source over time. However, where there are high levels of contamination, there could be an enormous risk of infection for consumers (especially tourists, young people, the elderly and those suffering from an

immunodeficiency disease). Runoffs from nearby forests and brooks act as defecating sites for rural people cause faecal pollution of the water in rural Indian regions. Protozoa, viruses, bacteria and intestinal parasites may cause waterborne disease. A remarkable group of species is cholera, dysentery in the ammonium, bacillary dysentery, cryptosporidiosis, typhoids, giardiasis, paratyphoids, balancetrisis, salmonellose, enteritis of campylobacter, diarrhoea of rotavi, E., for their role in the outbreak of waterborne diseases. Diarrhea, hepatitis A, poliomyelitis, and leptospirosis.

The world's greatest public health concern are waterborne pathogens and associated diseases not only because of the morbidity and mortality caused by them, but also because of their high cost of care and prevention. These diseases are directly connected to pollution and environmental degradation. Despite ongoing efforts to ensure water protection, worldwide outbreaks of waterborne disease are still reported. Proper evaluation of water pathogens and water monitoring quality are critical considerations in deciding on water delivery systems, selecting the right water treatment and avoiding waterborne outbreaks. Water delivery systems' facilities A tool is developed to track the pathogenic water contamination and detect not only cultured pathogen, but also viable but non-cultivable microorganisms and the presence of pathogen on

biofilms, with strong, sensitive, and reproducible diagnostic devices. A valuable tool for assessing pathogen infection scenarios, including monitoring, detection methods, analysis, and decision-making, is Quantitative Microbial Risk Assessment (QMRA). This study is intended to provide a research perspective on waterborne outbreaks in recent years. This review also focuses in the main molecular techniques for detection of waterborne pathogens and the use of QMRA approach to protect public health.

WATER-BASED DISEASES IN SIKANDERPUR LAKE

Water-based diseases are infections caused by parasitic pathogens found in aquatic host organisms. Snail, fish or other water species belong to these host organisms. People get infected by contamination or penetration of the skin. For eg, the treatment of water-borne diseases involves Schistosomiasis (snail-free cercariae, penetrate of the skin), Dracunculiasis, paragonimiasis (crab-fished metacercariae), and Clonorchiasis (metacercariae). Examples of water-based diseases include: The use of protective clothing or barrier creams will prevent these diseases by preventing the contact with polluted water.

FOOD-BORNE AND WATER-BORNE DISEASES

The World Health Organization (WHO) estimates that, in 2012, 12.6 million deaths globally, representing 23% of all deaths, were attributable to the environment (WHO, 2016). The global environmental burden of disease was 22 percent for premature mortality and disability (CI, 95 percent, 13–32 percent) (WHO, 2016). (WHO, 2014) Up to 26% (95 % CI: 16-38%) of all deaths in children under the age of 5 could be avoided if environmental threats were eliminated. In more than 80% of major diseases and wounds worldwide, environmental factors may play a role and are among the biggest killers. Lower respiratory infections (32%), diarrhoeal (22%) and neonatal disorders (15%) and parasite and vector-borne illnesses (12%) are the diseases with the highest environmental contribution in children under the age of 5.

Food and water pollution are of particular importance in disease transmission among environmental factors. Several million children die each year from acute diarrhoea, most of which are due to food or water contamination. It is therefore critical that careful attention be paid to these two diseases in public health interventions. However, it is difficult to measure the real burden of feeding and waterborne diseases. The challenges in many parts of the world are how risk evidence can be produced in different contexts, especially in low and middle income (LMICs) countries, from environmental pollution caused by climate change.

The latest IPCC Special Reports on the effects of global warming of 1.5 ° C states that "The threats to the health, livelihoods, protection of food, availability of water, human security and economic growth associated with climate change are forecasted to rise by 1.5oC, while further growth is expected to rise by 2oC. The Intergovernmental Panel on Climate Change (IPCC, 2018). Any rise in global warming is likely to have negative effects on human health (high confidence). The risk of certain vector-borne illnesses including malaria and dengue fever, including possible changes in geographical range (high confidence), is expected to increase as warming rises from 1.5 ° C to 2 ° C. Different mechanisms, connected with various social, cultural, ecological and economic factors and pathways by which climate change and climatic variability affect human health play a major role in the spread, survival and development of pathogenics. (see Fig. 1).



Fig. 1 Pathways of climate change effects on health with particular highlights of human infectious diseases (water-, food- and vector-borne diseases).

In order to develop a variety of diseases, humans must be exposed to pathogens. In a number of optimal climatic conditions bacteria, vectors and hosts survive and replicate. In particular, temperature and precipitation play an important role in disease transmission. Precipitation can affect the transportation and distribution of infectious agents, in particular through water and hygiene systems, while temperature can affect pathogens and vectors' growth and survival.

There are three important categories of infectious diseases sensitive to climate change:

- (i) water-borne diseases;
- (ii) food-borne diseases; and
- (iii) vector-borne diseases.

An individual is exposed by contacts with polluted potable water, recreational water, or food to water-borne infections. The intakes of pathogens from polluted water, food or water-borne diseases, while vector-borne conditions, including mosquitoes, are associated with infection by arthropods.

Thus, the burden of climate-sensitive infection conditions, particularly water-borne and food-borne

diseases, will be affected by climate change and climate variability. There are concerns that climate change patterns are likely to worsen the health threats associated with water, sanitation, and hygiene shortages in many regions of the world. Climate change can affect food- and water-borne diseases through the following pathways:

- -direct impacts, in the case of extreme events like floods and sea-level rise, where water can be contaminated due to presence in the environment of fecal-oral pathogens; and
- -indirect impacts, through climatic factors (like temperature and humidity) that influence processes of pathogens multiplication and survival, and other issues (e.g. agriculture, water resource management, conflicts, displacements, etc.).

The health consequences associated with climate change are also enormously inequitable, as the risk is related to social and environmental structures. It is generally known, though less research is conducted in many of the most affected areas, that LMIC's are affected especially by the effects of climate change.

WATER-WASHED DISEASES IN SIKANDERPUR LAKE

Water washed or water scarce diseases are those diseases which thrive in conditions with freshwater scarcity and poor sanitation in Sikanderpur Lake at Muzaffarpur. Water-white disease control is more dependent than consistency on the quantity of water. Examples include: scabies, typhoid, yaw, fever relapsing, impetigo, trachoma, conjunctivitis and skin ulcers. There are four kinds of water bathed diseases: helminthes, acute respiratory (ARI), skin and eye diseases and flea, lyceum, mites or tick diseases. All of these are critical for preventing disease transmission, washing and improved personal hygiene.

WATER-BORNE DISEASES IN INDIA

Travelling from north to south in India, you can easily experience the huge contrast in water availability and scarcity. There are areas with plenty of water and where water is the big problem and where women's day-to-day work includes providing their household with water. Suitable places of water struggle to maintain their use on a sustainable basis while other places are grappling with the reality of insufficient safe drinking water. The problem of waterborne diseases is the basis of this disparity in the supply of water.



Townsend cities with plenty of water have trouble handling the water effectively, leading sometimes to water collection in and around the potholes and areas, which are unused. This can have significant implications as a result of poor management of water supply and disposal, water-borne diseases such as cholera, malaria and diarrhoea can spread. Looking at the numbers, more than 500 million Indians receive water in the Ganges, and pollution of only one water source could have an effect on millions of lives. The poor and incompetent management of resources and waste inflows into the source are also causing water pollution.

CONCLUSION

The importance of water to man cannot be over emphasized, however its role as vehicle in the transmission of pathogenic organisms has become a source of concern and fear to man as he cautiously scrutinizes every drop of water before consumption. Unfortunately, the cost for safe water is that which only a very few can afford while majority still rely on the available water sources irrespective of their physical, chemical and biological state. Occurrence of pathogenic microorganisms in fresh water bodies demands routine assessment as a means of forestalling future outbreaks. However, the detection of water borne diseases and their vectors has become an evolving art which requires some sought of professionalism. Conventional methods such as Membrane filtration and the MPN requires prolonged timing and are in most cases not exact in their conclusions. Molecular techniques on the other hand though efficient and reliable requires sophisticated instrumentation and expertise which are missing in Sikanderpur Lake at Muzaffarpur where waterborne diseases still constitute a problem. Hence the scourge of waterborne disease remains unabated in Sikanderpur Lake at Muzaffarpur. There is therefore a need to build on available methods especially fast and reliable methods which will sufficiently address the crisis within the in Sikanderpur Lake at Muzaffarpur, not necessarily discarding the existing methods but strengthening them to be able to tackle the need of the time. It is also pertinent that enlightenment campaigns aimed at educating the people of the need for proper handling of water be embarked

upon as a means to addressing the existing water crisis in Sikanderpur Lake at Muzaffarpur.

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