RISK OF WATERBORNE DISEASES

Introduction

The cholera and typhoid epidemic experienced in South Africa in the recent past have highlighted the need to address the causes of infectious decease transmission. While the provision of clean, disinfected drinking water plays a key role in lessening the incidents of infection, together with regular hand washing before handling food, for example, there are other factors not related to the water which are as important as and more often more important than the water route infection.

Two major and overriding factors facilitating the conditions promoting infectious disease transmission are poverty, with its associated overcrowding, and human behavior, especially those behavior patterns resulting in many close human contacts (as people live in closely crowded conditions, often clustering around water).

The need for this awareness on water related microbial diseases arose as a result of the typhoid epidemic in Delmas, with the public asking such question as: "How can we protect ourselves from Typhoid and other infectious diseases"? The presentation will describe the diseases where water may play a role in transmission. From this it must not be concluded that the water is the only route of infection.

The Purpose of Water Related Disease Awareness

The purpose of creating awareness is to introduce and describe the basic facts of some important water-related diseases, in terms of:

- How they can be recognized.
- How are they transmitted?
- The role of water in the transmission routes.
- How they can be prevented.
- What management option may be exercised in reducing their occurrence and risk of transmission?

This information will educate the upcoming generation in the need for:

- Disinfected drinking water.
- Safe waste disposal.
- Good personal and kitchen hygiene.
- Protection of water resources from faecal pollution.

How Microorganisms Enter the Body

The most common routes for microorganism to enter the human body are through the:

- Air we breathe
- Water we drink
- Food we eat

There are of course other important routes for the spreading of the microbes. We live in the environment that is teaming with microorganisms, these bacteria can find a host not only in humans, but also in animals and plants and soil. Normal soil also consists of microscopic life. The bacterial composition of soil varies tremendously depending on the history of the soil, particularly with respect to contamination with animal or plant waste product, or even industrial waste.

Most Common Symptoms of Microbial Water Related Disease

- A runny tummy i.e., the frequent passage of loose, usually watery stools. Diarrhea is commonly observed but not in all of water related diseases.
- Dysentery occurs if blood and mucous are also present in the liquid stools
- Vomiting and fever, and general feeling of malaise and weakness.
- If the diarrhea becomes severe, and especially vomiting is such that fluids are lost more rapidly than they can be replaced, the individual may go through a stage of **circulatory shock** and in untreated and sever cases death may occur

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How Water Related Microbial Diseases are transmitted

Chemicals and radioactive substances in the water can cause water related diseases. This awareness however, focuses on the diseases that are caused by pathogenic microorganisms in the water, such as bacteria, viruses and protozoa.

Microorganisms thrive when the conditions are favourable for their growth and condition. Water is often a favourable environment to sustain and transmit harmful microorganisms that are responsible for millions of human deaths worldwide.

Water-related microbial disease is classified into four types relating to the path of transmission:

(a) Water washed (water scarce) disease

These are the diseases where the interruption of the transmission (and thus management) is achieved through a proper attention to effective sanitation, washing and personal hygiene. Regular washing of hands, especially after going to the toilet, is the single most effective measure in preventing many infections, as is proper washing and hygiene during food preparation, together with proper sanitation, waste disposal and fly control. #May also be waterborne. Example of water washed diseases are:

- Poliomyelitis (polio)
- Amoebic dysentery
- Trachoma

(b) **Waterborne diseases**

These are the diseases that are transmitted through drinking water, and interruption of transmission is achieved by proper treatment of drinking water. Typical required treatment is filtration and disinfection (on a large or small scale) or boiling of water (on a small scale). Water transmission of these diseases can be prevented through the provision of clean and disinfected drinking water. Examples of waterborne diseases include:

- Cholera
- Campylobacteriosis
- Gastroenteritis
- Cryptosporidiosis
- Giardiasis
- Viral Hepatitis
- Shigella dysentery
- Typhoid fever

(c) Water-based diseases

These are the diseases that are transmitted by contact with the water, e.g. recreational swimming, where the causative microorganisms live in water bodies, typically in secondary hosts such as snail. These diseases are prevented through avoidance where possible of water contact, or use of protective clothing or barrier creams. Examples of water-based diseases are:

- Bilhizaria.
- Swimmer's itch = non human bilhizaria.
- Leptospirosis (Weil's disease).

(d) Water vector diseases

These are the diseases that are transmitted by an arthropod vector, such as a mosquito, which needs water or moisture in order to breed. Prevention of transmission is through vector control, protection from being bitten by the vector or vaccination (e.g. in the case of yellow fever). An example of water-vector disease is Malaria.

There are large numbers of water-related diseases, where water may play a role in transmission, but only Gastroenteritis is addressed.

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Gastroenteritis

Gastroenteritis is the disease where there is sudden onset of vomiting and watery diarrhea often accompanied by moderate fever and sometimes stomach cramps. The disease is referred to as "stomach bug". Gastroenteritis can be caused by a wide variety of microorganisms, both bacterial and viral. Examples of bacterial causes of Gastroenteritis are Salmonella enteritis and E. *coli* 0157.

Otherwise healthy adults usually recover within few days, but the disease can be life threatening in the case of infants, the elderly and the individuals in the advanced stages of HIV infection.

(a) How Gastroenteritis is Transmitted

Transmission of the disease can occur by a variety of routes, such as eating contaminated food or drinking contaminated water. Very rapid spread within families or groups of people sharing the same utensils, or living together is common, especially with the viral forms of the disease. Microorganism that causes gastroenteritis can survive freezing.

(b) How should the patient be treated

Urgent and immediate replacement of water and salts that are lost, especially in infants and the elderly, is of critical importance.

(c) Transmission route

Gastroenteritis is predominantly a water- washed disease, but may also be waterborne.

(d) Management options

Clean drinking water and effective sanitation and good hygiene.

(e) Interesting Facts on Gastroenteritis

- Vaccination is not possible in practice, as there are so many different microorganisms that can cause Gastroenteritis, and each epidemic is generally due to different organism.
- Gastroenteritis can be life threatening in case of an individual with advanced HIV infection.

Preventative measures for Typhoid, Cholera and Gastroenteritis

- Don't drink untreated water.
- Add I teaspoon of domestic bleach to 20 litters of water and allow to stand for 1 hour before drinking or, if no bleach is available, the water can be boiled vigorously for at least 3 minutes. If the water is cloudy (turbid) add 2 to 3 extra teaspoons of bleach.
- Proper personal hygiene and sanitation infrastructure should be installed and maintained.
- Wash fruit and vegetables before eating.
- Adequate sanitation, treatment of wastes and fly control is an essential adjunct to drinking water disinfection and lowering the incidence of epidemic outbreaks of these disease.
- Wash your hands after going to the toilet and before preparing food.

Foodborne diseases

There are two major foodborne diseases caused by microorganisms: food poisoning and foodborne infections. Food poisoning occurs when a microorganism produces a toxin in a food, when people consume the food, the ingested toxin causes damage to the body. Foodborne infections occur when the pathogen is ingested and grows within the body. Salmonellas infect humans almost exclusively through the consumption of contaminated food. The foods most commonly involved are:

- Cream containing Pastries.
- Ground meats Sausages.
- Poultry.
- Eggs.

Humans can spread salmonella to other humans. Persons may excrete organisms in their faeces, and the salmonella may contaminate their hands. If persons with contaminated hands are involved with food preparation they may inoculate Salmonella into the food. If food is stored at

warm temperatures for several hours, the bacteria can multiply to high numbers, high enough to cause disease in those who eat the food.

(a) Control of food borne infections awareness

The factors that contribute to foodborne infections are:

- Inadequate cooked food.
- Improper holding time and temperatures of the food (between preparation and ingestion). The use of refrigeration for perishable food is a must.
- Work cleanly when preparing and cutting meat especially chicken, and knifes and cutting boards must be washed with very hot water immediately after use.
- There is also a need to be aware of the importance of clean water for food preparation by street vendors of fast foods, especially those that operate from the roadside. Dust blown up from the road can easily enter their drinking water container, if it is an open container.
- Kitchen hygiene is very important in controlling disease transmission.
- Wash hands after changing baby's nappy.
- Wash containers used for carrying water.

Rand water's role in minimising of these water related microbial disease. Rand water will always ensure the safety of drinking water is achieved at all times. Rand Water purifies the water by means of a conventional purification process, resulting in water that is safe to drink, and meets the SANS 0241 water quality specifications.

Visit **www.reservior.co.za** for further information on water quality in your area.

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