Short communication

Contaminated Drinking Water, Source of Contamination and its Associated Risk

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Introduction

The primary water pollution problem in the world is lack of clean disease-free drinking water. The occurrence of disease may quickly and surprisingly occur (Keller, 2009). Drinking water must meet the highest quality standards. To meet these quality standards, municipal water supply systems include facilities for water purification. Integrated with municipal water supply systems are necessary installation for collection, treatment and disposal of waste fluids. As part of this process, water is often used as carrier of wastes (Polevoy, 2003).

Experience has shown that microbial hazards continue to be the primary concern in bothdeveloping and developed countries (WHO, 2004). The great majority of evident water-related health problems are the result of microbial (bacteriological, viral, protozoan or other biological) contamination (WHO, 2008). Some improved water systems may start with water that is microbiologically safe. However, once the water has flowed past cracked well heads and casings, through poorly maintained pipes laid adjacent to sewer pipes, and has been subject to low and sometimes negative water pressure and other flaws, it is not surprising that the water is often contaminated by the time it reaches the point of collection. As the water is carried home and stored, it can be further compromised by hands and utensils that are dipped into the bucket and by other intrusions. The end result is that the water may be heavily contaminated at the moment it is consumed, even if it started out as potable (Choffnes and Rapporteurs, 2009).

Unsafe drinking water, along with poor sanitation and hygiene, are the main contributors to an estimated 4 billion cases of diarrhoeal disease annually, causing more than 1.5 million deaths, mostly among children less than 5 years of age (WHO, 2005). Since diarrhoeal diseases inhibit normal ingestion of foods and adsorption of nutrients, continued high morbidity also contributes to malnutrition, a separate cause of significant mortality; it also leads to impaired physical growth and cognitive function, reduced resistance to infection, and potentially long-term

gastrointestinal disorders. Contaminated drinking water is also a major source of hepatitis, typhoid and opportunistic infections that attack the immuno-compromised, especially persons living with HIV/AIDS (UNICEF, 2008).

According to GWSH (2009), the four categories of water related diseases are water-borne, waterwashed, water-based and water-related insect vectors. Water-borne pathogen is acquired through consumption of contaminated water, as occurs in diarrheal diseases, dysenteries and typhoid fever and water-washed pathogen is spread from person to person due to lack of water for hygiene, as occurs in diarrheal diseases, scabies, and trachoma. Water-based pathogen is transmitted to humans through contact with infection, multiplication in, and excretion from aquatic intermediate hosts, as occurs in the diseases schistosomiasis and Guinea worm and water related insect vectors pathogen is carried and transmitted by insects that breed in or bite near water, as occurs in Dengue fever, Malaria, and Sleeping sickness. However, Diarrhoeal diseases, which are faecal-oral, are responsible for the greatest number of episodes of illness and deaths worldwide, compared to any other single classification of water and sanitation-related disease (Choffnes and Rapporteurs, 2009).

Effective catchment management has many benefits. By decreasing the contamination of the source water, the amount of treatment required is reduced. This may reduce the production of treatment by-products and minimize operational costs (WHO, 2008). Coagulation, flocculation, sedimentation (or flotation) and filtration remove particles, including microorganisms (bacteria, viruses and protozoa). It is important that processes are optimized and controlled to achieve consistent and reliable performance (Metcalfe and Eddy, 2003). The most common and widespread health risk associated with drinking-water is microbial contamination, the consequences of which mean that its control must always be of paramount importance. Priority needs to be given to improving and developing the drinking water supplies that represent the greatest public health risk (WHO, 2008).

Improved sanitation and hygiene have several benefits. Pit latrines, when used by adults themselves and for the disposal of infant's stools, can reduce diarrhea by 36% or more, cholera by 66%, and worm infestations by between 12 and 86%. Hand washing with soap (or a substitute) and water after contact with stools can reduce diarrheal disease by 35% or more. Eye and skin infections can be reduced with more frequent face and body washing. Improved water supply is generally associated with a 15% reduction in diarrhea. A combined safe water supply, sanitation and hygiene can reduce diarrhea by 65% (MOH, 2005).