

Water Education: An Antidote to Water Borne Diseases for Sustainable Development

Ifesinachi B. Onyekaozuru

*Department of Physical and Health Education
Alvan Ikoku Federal College of Education, Owerri-Imo State, Nigeria.*

Doi:10.5901/jesr.v2n10p171

Abstract

This paper is designed to address the significance of water education. This is aimed at increasing public awareness on the importance of taking clean and safe water and keeping our bodies clean in order not to be contaminated with water borne-diseases. This paper therefore focuses on concept of water, water education, reasons for water education, water-borne diseases, transmission of water borne diseases, effects of water borne-diseases and the prevention of water borne diseases. When people's behaviour is changed towards water issues as a result of proper information on water, it will go a long way to reduce the wide spread of water-borne diseases which kill over two billions of people annually. It was therefore recommended that comprehensive legislative programs should be enacted to protect and improve water quality and protect communities from water pollution thereby preventing water-borne diseases.

Introduction

The essentiality of water cannot be over emphasized. It is required in every sphere of human, plant and animal life. It is one of the most abundant liquid in the body and forms over 60% of our body fluids. It aids in metabolic activities which helps in sustaining our body system, an individual can survive without food for some weeks but cannot survive without water for one week. Water is of paramount importance as we use it in our home for drinking, washing, bathing, cooking, extinguishing fire and so on. It is also used for recreational activities, transportation and also acts as a solvent which helps in dissolving some polar molecules

Water benefits are enormous that we need to acquire so that we can value taking safe and clean water and keep our water-bodies clean thereby preventing water-borne diseases which can be contacted by drinking water contaminated by human or animal faeces which contain pathogenic micro-organisms such as protozoa, bacteria, virus and so on, and it can be transmitted due to flood water, water runoffs from landfills, septic fields and sewer pipes through the faecal-oral routes of disease transmission. These diseases have tremendous effects on our health as well as the economy, locally and internationally people infected with water-borne diseases and faced with a huge financial burden in order to receive proper treatment. This can be prevented if we acquire a positive attitude towards water as a result of water education which will help us drink clean water devoid of pathogenic micro-organisms and keep our water bodies clean.

Concept of water

Deltawerken (2004) states that water is a colourless, tasteless and odourless substance that is essential to all forms of life that we know of.

Also the Merriam-Webster Unabridged Dictionary (2011) says that, water is the liquid that descends from the clouds as rain, forms streams, lakes and seas, and it is a major constituent of all living matter and that when pure is an odourless, tasteless, very slightly compressible liquid oxide of hydrogen H_2O which appears bluish in thick layers, freezes at $0^{\circ}C$ and boils at $100^{\circ}C$ has a maximum density of $4^{\circ}C$ a high specific heat, is freely ionized to hydrogen and hydroxyl ions and is a poor conductor of electricity and a good solvent.

Water is also a chemical substance that has the chemical formula H_2O , a water molecule contains one oxygen and two hydrogen atoms connected by covalent bonds, Dihydrogen monoxide is the scientific name of water. Though it is almost never used (Wikipedia free encyclopedia 2012).

The Relationship Between Water and Education

The World Water Council (2010) says that, the intimate relationship between water and education is based on the need for information. We need to be educated about water in order to know how to deal with all kinds of water-related problems or diseases. In developing countries, communities also need to know how best to manage their water sources and eradicate all pathogenic organisms that are likely to contaminate our water.

Therefore, water education is the process of acquiring adequate knowledge of where water comes from, its uses and the proper way of managing water so that it will be safe for human consumption. It is aimed at helping people to understand that water is essential to life, in food, energy, transportation, nature, leisure, culture, social norms and virtually all products used on daily basis.

Reasons for water education

The Alliance for Water Education (2012) stipulated the following reasons for water education:

- ❖ Billions of people live without clean water and their children are dying.
- ❖ We buy food grown in different places, wear cloths grown in different countries and use computers and cell phones made in China, foods and products flown around the world like never before and with them goes the water that went into making them.
- ❖ To have energy systems, you must have water system; water and energy are three basic building blocks of modern civilization and both are challenged in the 21st century. Energy supplies depend on abundant fresh water and electricity from dams.
- ❖ To teach our children water literacy so as to be able to control the emerging water crisis.
- ❖ Also to create water awareness among individuals.
- ❖ To encourage improvement in water purification.
- ❖ To encourage citizens to be better informed about their drinking water supplies in order to prevent water-borne diseases.
- ❖ To educate people on the effect of polluted water.

Water-Borne Diseases

According to Lenntech (2011), water-borne diseases are any illness caused by drinking water contaminated by human or animal faeces which contain pathogenic micro-organisms.

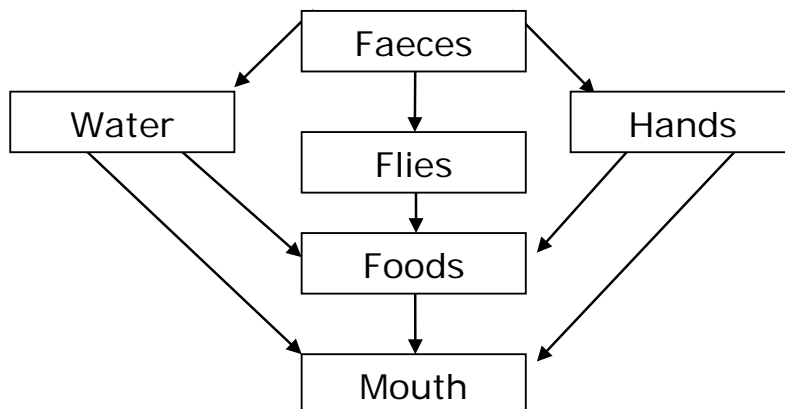
Also, Webmaster (2009) states that water-borne diseases are caused by pathogenic micro-organisms that are most commonly transmitted in contaminated fresh water. Infections commonly result during bathing, washing, drinking, preparation of food or the consumption of food thus infected. Various forms of water-borne diseases affect mainly children in developing countries according to World Health Organization (W.H.O) such diseases accounts for an estimated 4.1% of the total daly global burden diseases and cause about 1.8 million human deaths annually. The World Health estimated that 88% of the burden is attributed to unsafe water supply, sanitation and hygiene.

Lenntech (2011) opines that the full picture of water-associated diseases is complex for a number of reasons. Over the past decades, the picture of water-related human health issues have become increasingly comprehensive with the emergence of new water-related infectious diseases and the re-emergence of ones already known, such as salmonellosis, cholera, shigellosis, schistosomiasis or the most modern infections such as legionellosis or SARS, the analysis remain to be done. The water related diseases according to the Lenntech (2011) includes; Anaemia, Arsenicosis, Ascariasis, Bolulism, Campylobacteriosis, Cholera, Crptosporiodiosis, Cynabacterial toxins, Dengue, Diarrhoea, Hookworm infection, Japanese encephalitis, lead poisoning, Legionellosis, Laptospirosis, Lymphatic filariasis, methaemoglobinemia, Onchocerciasis, Ringworm or Tinea, Scabies, Schistosomiasis, Trachoma, Trichuriasis, Typhoid and so on.

Transmission of Water-Borne Diseases

Lenntech (2011), says that, water-borne diseases spread by contamination of drinking water system with the urine and faeces of infected animal or people. This is likely to occur where public and private drinking water systems get their water from surface water (rain, creeks, rivers, lakes, and so on) which can be contaminated by infected animal or people. Runoffs from landfills, septic fields, and sewer pipes, residential or industrial development can also sometimes contaminate surface water. This has been the cause of many dramatic outbreaks of faecal-oral diseases such as typhoid and cholera. However, there are many other ways in which faecal materials can reach the mouth; for instance, on the hands or on contaminated food. In general, contaminated food and water are the single most common way in which people become infected. These germs in the faeces can cause the diseases by even slight contact and transfer. This contamination may occur due to flood waters, water runoffs from landfills, septic fields and sewer pipes.

The United Nations World Water Development Report (2012) shows the following diagram as the faecal-oral routes of disease transmission



Effects of water-borne diseases

The IWA water wiki (2012) states that, in developing countries, four fifth of all the illnesses are caused by water borne diseases with diarrhea being the leading cause of childhood death.

The global picture of water and health has a strong local dimension with some 1.1 billion people still lacking access to improved drinking water sources and some 2.4 billion to adequate sanitation and education on water issues. Today, we have strong evidence that water sanitation and hygiene related diseases account for some 2,213,000 death annually and an annual loss of 82,196,000 disability adjusted life years (Dalys, BOS, Dec. 2004).

The World Health Organization (2000) stipulated that water borne diseases can have a significant impact on the economy, locally as well as internationally. People who are infected by water-borne diseases are usually confronted with related costs and not with a huge financial burden.

This is especially the case in less developed countries. The financial losses are mostly caused by example, costs for medical treatment and medication, costs for transport, special food and by the lost of manpower. On average, a family spends about 10% of the monthly household's income per person infected.

The World Health Organization (W.H.O) (2012) estimates indicates that the world wide over 2 billion people are infected with schistosomes and soil transmitted helminthes and 300 million of these suffer serious illness as a result. Also an estimated 246.7 million people worldwide are infected by schistosomiasis and these 20 million suffer severe consequences of the infection, while 120 million suffer milder symptoms. Also, estimated 80% of transmission takes place in Africa South of the Sahara (World Health Organization, 2012)

Diarrhea occurs worldwide and causes 4% of all deaths and 5% of the health loss to disability. Also after the Tsunami attack in Asia on Sunday 26th of December 2004, people faced the threat of water-borne diseases link to flooding like shigellosis, cholera, hepatitis A, leptospirosis, typhoid fever and dengue fever (W.H.O. 2012).

Prevention of water-borne diseases

The United Nations World Water Development Report (2012) states that, the only way to break the continued transmission of water-borne diseases is to improve the people's hygiene behaviour

through education. And to provide them with certain basic needs such as drinking water, washing and bathing facilities and sanitation.

However, Lenntech (2011) opines that blackflies, bilharzian snails and other vectors that can cause water-borne diseases can be controlled with efficient drainage because they all depend on water to complete their life cycle.

More so, clean water is a pre-requisite for reducing the spread of water-borne diseases. It is well recognized that the prevalence of water-borne diseases can be greatly reduced by providing clean drinking water and safe disposal of faeces, (World Health Organization, 2012).

Water is disinfected to kill any pathogens that may be present in the water supply and to prevent them from growing again in the distribution system. Disinfectants are then used to prevent the growth of pathogenic organisms and to protect public health. The choice of disinfectant depends on the individual water quality and water supply system which can be improved by having adequate knowledge of water.

We should use water purifiers like kent for making the water clean so that we can keep the water-borne diseases away. It is also our responsibility to keep the water sources clean (Medindia 2012).

More so, drugs for water borne diseases include Albendazole, Ampicilin, Chloramphenicol, Ciproflaxacin, Doxycycline, Erythromycin, Furazolidone, Metronidazole, Nitazoxanide, Ornidazole, Tetracycline, Tinidazole and so on but all these drugs should be taken only according to Doctors' prescription (Medindia 2012).

Also, the two common methods to kill micro-organisms in the water supply are oxidation with chemicals such as chlorine dioxide or Ozone and irradiation with Ultra-violet (UV) radiation (Lenntech 2011).

Recommendation

More water supplies, water quality, environmental restoration, climate change, flood management and a long list of other water-related issues should be explored.

Water education should be inculcated in the curriculum of different schools so that students at different levels should learn it from tender stage.

Water education should be encouraged so that people will learn how to keep their water safe for drinking.

Policies that prevent people from throwing dirt's and waste products in our streams and rivers should be implemented.

National Agency for Food and Drug Administration and Control (NAFDAC) and other Organization that ensures that quality water are consumed and sold should be encouraged. Also there is need to invest in the water plan's strategies and actions according to Guivetch.

Comprehensive Legislative Programs should be enacted to protect and improve water quality, protect fish and wild life and protect communities from water pollution.

There should be creation of water finance plan for integrated water management on a state wide and regional basis.

Conclusion

Water is one of the basic necessities of life that enhances metabolic activities of the body. It is vital in every sphere of human life and for the sustenance; it gives to our environment the economic

health, social, cultural and recreational benefits we get from it.

The acquisition of knowledge that will enable people to have positive attitude towards water is necessary so as to enable people value keeping their water bodies clean and drink clean and safe water devoid of pathogenic organisms such as bacteria, protozoa, virus and parasitic infections thereby reducing and preventing the wide spread of water-borne diseases.

References

- Deltawerken (2004) Water Education. www.deltawerken.com/34.html
<http://www.watereducation.org/userfile/2009.AnnualReport.pdf>*
- lenntech B.V (1998-2011) www.Lenntech.com>home>library.*
- Merriam- Webster Unabridged Dictionary, version 1.2.1 Retrieved 13-06-2012*
- The United Nations World Water Development Report "Water for People Water for Life" (2012)*
- Water-Borne Diseases (Medindia 2012) www.medindia.net>medindia>consumerhealth>healthinformation*
- Water Borne Disease- Wikipedia, the free encyclopedia en.wikipedia.org/wiki/Waterbornediseases*
- World Water Council (2012) Relationship between Education and Water*
- World Health Organization (W.H.O) (2012) Burden of Diseases and Cost Effectiveness Estimates*