

## Availability and Utilization of Wholesome Water: A Necessity for Health Promotion and Longevity

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### **Abstract**

*The importance of water to every living thing including man cannot be overemphasized as it plays very vital role in human activities. This paper focused on "Availability and utilization of wholesome water as a necessity for health promotion and longevity. Some importance of safe and pure drinking water to our health and society at large were discussed. It also highlighted major sources of water supply, methods of water treatment, qualities of wholesome water and wholesome water as a tool for health promotion. Conclusion was drawn and it was recommended among others that government should take it as an obligation to make wholesome water available and accessible to all irrespective of age, gender, ethnicity, socio-economic status and religion. Again, NAFDAC should ensure proper registration and documentation of companies and organizations producing packaged water in order to ensure strict compliance to standards. Community leaders, elders and youth leaders should ensure that water projects cited in their areas is made accessible by members of the public.*

**Key words.** Availability, disease prevention, health promotion, longevity, purification, utilization, wholesome water.

### **Introduction**

The usefulness of water to mankind and other living things cannot be overemphasized as no living organism can survive without water. One of the basic necessities of life is food in which water is classified. As every living thing needs food for survival, so also they needed water. Water is a prime natural resource, a basic need and a precious national asset. It is worthy of note that poor water quality continues to pose a major threat to human health. According to World Health Organization (2013), Diarrhoea disease alone amounts to an estimated 4.1% of the total Disability Adjusted Life Year (DALY) of the global burden of disease and is responsible for the deaths of 2 million people every year. Also, WHO (2013) estimated that 88% of that burden is attributable to unsafe water supply, sanitation, and hygiene and is mostly concentrated on children in developing countries.

Water is the only liquid that is so useful not only to mankind but also to the animal and plant world (Bamiji, Olumayokun, Samuel, 2014). Out of five basic human needs namely air, water, food, light, and heat; water is common factor to other four. It is therefore not an overstatement to say that water is life, because it forms an appreciable proportion of all living things including man. It constitutes a large proportion of animal cells. According to the Human Development Report, (2006), the human body by weight consists of about 70 per cent water and several body functions depend on water. This confirms the popular maxim that says "water does not have enemy" All human activities revolve around water and man in times of scarcity of water will be ready to go to any length in search for water. Water is required in almost all human activities both in treatment of some health conditions.

According to Willis and Wilby (2009), water is not just a first aid remedy in its own right, alleviating some trauma-induced conditions rather a front-line strategy in dealing with other common health problems. It is an essential factor in the economic, social and cultural development of a country. Infact, any developmental project in an area that did not incorporate water projects has failed in its context.

The universal access to safe drinking water is the right of every citizen (Bamiji, Olumayokun & Samuel 2014). Water intended for human use should not only be safe but also wholesome because of its physiological health effect on human body systems. Willis and Wilby (2009) explained that the healthy human body has a physiological stability throughout its systems which is perceived through a feedback mechanism called homeostasis. In the view of Venmathi (2014), a safe water is one that cannot harm the consumer even when ingested over a long period of time while a wholesome water is defined as water that is free from pathogenic agents; free from harmful chemical substances; pleasant to the taste and useable for domestic purposes. Majority of the ill health in the underdeveloped and developing countries including Nigeria is largely due to lack of wholesome and safe drinking water (Bamiji, et al, 2014). Positive community health and wellbeing cannot be feasible without adequate safe and wholesome water supply. Wholesome and safe water can eliminate water-borne diseases, promote rural development and improve the quality of life. Barry (2010) argued that the provision of safe and wholesome community water supply is one of the most effective and permanent health technologies for promoting the health and wellbeing of the people. There had been an increase in sewage contamination of drinking water in several parts of the world affected by flooding and many countries are affected by gross water shortage. It has been estimated that by 2025, 50 percent of the world's population will live in countries facing severe water shortage, by that time the poorest countries will be using all their available water resources (WHO, 2013). So, it is necessary to enlighten the public on the dangers involved in using or consuming unsafe water. Hence, availability and utilization of wholesome water is a necessity for health promotion and longevity of the people since health promotion indexes is the rightful tool to be used in improving the health standard of the society. This is discussed under the following sub-headings; Concept of wholesome water, Sources of water supply, Methods of Water purification, Qualities of wholesome water, Importance of wholesome water to human health and Wholesome water as a tool for health promotion

### **Concept of Wholesome Water**

Discussion on water is inexhaustible as water is the only liquid that is so useful not only to mankind but also to the animal and plant kingdoms. The good access to safe drinking water is the right of every citizen. Venmahti (2014) defined wholesome water as one that is free from pathogenic agents; free from harmful chemical substances; pleasant to the taste and useable for domestic purposes. Again, Nick (2010) in his own view defined Wholesome water as water fit to use for drinking, cooking, food preparation or washing without any potential danger to human health by meeting the requirements of regulations made under Section 67 (Standards of Wholesomeness) of the Water Act 1991. In relation to ph scale, there is no naturally existing water with ph of seven which is neutral (not acidic or alkaline) therefore, it was recommended that wholesome water should have a ph range of 6.5 and 7.5 (WHO, 1984)

However, it is most likely that humans have used the concept embodied in the term since the beginnings of the written record. There are numerous examples of the use of the term in religious tracts, literature, scientific writings and news items. It is also clear from the early references that people were defining pure and wholesome water based on their senses of

sight, taste, smell and touch (feeling). To establish this fact, it is imperative to consider some of notable early references in order to appreciate the origin of the term 'Wholesome water'.

A 17<sup>th</sup> century use of the term in a religious context was notable, "...as there, the nature of the most pure and generous wine is described, whereby men are allured to drink thereof; so here the right wine, the *pure and wholesome* doctrine out of the mouth of the Spouse, is declared by the company of Believers, to be pleasing and right (Michael, 2013). One hundred and fifty years before the germ theory of disease was espoused, it was documented and tried to explain how the cleanliness of air and water were related. The Ancients, among the admirable rules delivered by them for the choice of water, frequently inculcate its similitude to air; partly on account of the greater lightness and purity of the finest waters, and partly on account of the changes wrought in them both by their stagnation, and mixture with heterogeneous particles. And indeed, as there is nothing that contributes more to render the *air pure and wholesome*, than its agitation by winds and gentle breezes; so neither does anything preserve water from corrupting, and acquiring the most mischievous qualities, so well, as a brisk and rapid motion, which is so essentially necessary to this end, as to be constantly enumerated amongst the distinguishing characters of a *wholesome* water," (Michael, 2013).

In the early 19<sup>th</sup> century, a discussion of the Albany, New York, water supply made it clear that a good quality of water was needed to serve the City. "The importance of a constant and certain supply *of pure and wholesome* water, to the inhabitants of populous towns, can hardly be duly appreciated, and there is little danger that it should ever be overrated." (Michael, 2013). A few years later, an author related the quality of the water based on its passage through soil. "Nature also compels the motion of this invaluable fluid through the bowels of the earth, and by various efforts, of which those of gravity, however, are the chief; thus effecting a most perfect filtration, and converting water, such as had even been derived from the most putrid supplies, into a beverage the most delicious, the most refreshing, and found generally to be perfectly *wholesome*," (Michael, 2013).

### Sources of Water Supply

There are basically three main sources of water supply; namely rain water, ground water, and surface water.

**Rain water:** When the cloud is full, it must drop down to the earth. Ideally rain water should be the purest source of water supply, but it is contaminated by impurities in the atmosphere. It picks up some impurities like dust, sorts, smoke, gases, among others suspended in and around the vicinity of towns and villages and the purity of rain-water can also be affected by the method of collection. (Owhor, 2004).

**Ground water:** This can be described as water which is stored underground or below the earth surface. Ground water is not stationary but flows and could therefore be said to be a river or lake flowing underground. The formation of ground water results from seepage from rainfall and melting snows or ice. (Owhor, 2004).

**Surface water:** These are derived from rain which run off or remain on the surface of the ground. They include; streams, rivers, lakes and ponds. Some rivers and streams are fed by underground water. All surface water are prone to contamination and pollution and would therefore require adequate purification process before supply and use.

### Methods of water purification/treatment

According to Owhor (2004), water can be treated through the house hold (individual) water treatment (purification) and at the household level, water can be purified through the following methods; storage, boiling, filtration and disinfection.

**Storage;** It improves the quality (purity) of water by allowing particulate matters to settle down to the bottom of container. This water then becomes clearer at the upper level ready for use. However, if storage is prolonged, some disease causing agents can be naturally harboured for a long time in water. Although, this method does not include the microscopic aspect of water but, only the physical aspect.

**Boiling;** In households, boiling is more practiced and much easier and better method. Water should be allowed to boil for about five to 10 minutes to ensure the destruction of pathogenic micro-organisms and parasitic worms. Boiling of water has its own pitfall as dissolved elements in the water are destroyed in the process. After boiling, the water should be allowed to cool off and then be stored in a hygienic condition with a clean container having a cover.

**Filtration;** In this method, the water is passed through a filter and is collected. This process reduces the numbers of pathogenic bacteria and suspended matters in the water thereby making the water more attractive for consumption. In households, it can be achieved through "candle filters". The filter consists of a lower and upper chamber. The water to be filtered is poured into the upper chamber which is the candle-like filtering medium. As the water passes through the pores, it is filtered and is collected in the lower chamber through the tap. For effectiveness and efficiency, the filtering medium has to be removed from time to time to check for damage and washed with hot water and sharp brush after a period of operation and re-fixed.

**Disinfection;** This process involves the application of disinfectants in water. This method is not commonly practiced at households because it requires some professional knowhow. The disinfection of water aimed at destroying disease producing microorganisms that may have escaped other treatment processes as earlier discussed. To achieve this, chemicals such as chlorine, alum, among others can be used with caution and professional advice.

### **Qualities of a wholesome water**

World Health Organization (1995) explained that, water that is safe and acceptable for drinking is called wholesome water. Wholesome water is also called portable water which is safe for consumption at households and industries. It is worthy of note that consumption of wholesome water enhances health promotion and increases longevity. Such water must possess certain qualities which are grouped as physical, biological and chemicals qualities of wholesome water. However, in the context of this paper, only physical qualities were discussed.

### **Physical composition of wholesome water**

**Appearance:** Wholesome water must be clear and colourless in order to attract users. Water must be attractive and aesthetically appealing. Water that is attractive in appearance will mostly attract people for use.

**Odour:** Wholesome water must not have odour otherwise it will not attract users. Odour should be absent or very faint for water to be acceptable for use.

**Taste:** water should have an objectionable taste. Sincerely speaking the taste of water is the sensation that results from the interaction between saliva and substances dissolved in the water, as perceived by receptors in the taste buds.(Parks, 2009)

**Turbidity:** turbidity is usually due to the presence of suspended particles or colloid in water such as clay, silt, and other microscopic organism. It is measured by how interference is caused to the passage of light through the water. WHO (1984) recommended that turbidity must not be more than 25 units for untreated water and 5 units for treated tap water.

### **Importance of Wholesome Water to Human Health**

The usefulness of wholesome water to human health cannot be overemphasized as it is important to the mechanics of all the systems in human body. The body cannot work without water just as a car cannot move without petrol and oil. In fact, all the cells, tissues and organs that functions to make up our entire anatomy and physiology depend on water for their functioning. Wholesome water serves as a lubricant, forms the base for saliva and the fluids that surround the joints, regulates metabolism and the body temperature as the cooling and heating is distributed through perspiration (Willis & Wilby, 2009).

It hydrates the body and helps it to retain optimum levels of moisture in structures such as blood, bones, and the brain. Hossein (2013) explained that adequate intake of wholesome water enables the human body systems to excrete waste through perspiration, urination, and defecation and the kidneys and liver use it to help flush out waste, as do the intestines. Wholesome water can also prevent constipation as it aids digestion. Water is also necessary to digest soluble fibre. Infact, the chemist calls water the 'universal solvent' because it dissolves a wide range of substances and with the help of water, fibre dissolves easily and enhances the bowel health by making well-formed, soft stools that can easily be passed out (Malone, 2016;;

Another very important role of wholesome water is prevention of dehydration due to loss of body fluid. The body loses fluids when an individual is engaged in vigorous exercise, sweat in high heat, or come down with a fever or contract an illness that causes vomiting or diarrhea (Willis & Wilby, 2009). Dehydration negatively affects cognitive performance, physical performance, kidney functions, gastrointestinal functions, heart functions and hemodynamic response and skin health. The function of every cell in our body is controlled by electrical signals sent through our nervous system from the brain. As explained by Hossein (2013), our nerves, in reality, are an elaborate system of tiny waterways of which if the fluid inside our nerves thickens due to dehydration, or is contaminated with synthetic chemicals or toxic heavy metals like lead, the vital signals can get distorted. Many experts and researchers have now discovered that the distortion of these signals may be the root cause of many degenerative diseases and neurological illnesses like Attention Deficit Disorder, Chronic Fatigue Syndrome, anxiety, depression and even Alzheimer's disease ( Hossein, 2013). Considering the major role that water plays in the function of our brain and nervous system, its purity is possibly the most basic and essential key to healthy life and longevity. Proper digestion and nutrient absorption depend on a healthy intake of water. In order for our body to get the nutritional value from our foods and supplements, we must consume plenty of wholesome water. Since sugars and carbohydrates are absorbed more rapidly, even a slight degree of hydration can cause us to get the caloric intake without the nutrition from the foods we eat (Malone, 2016).

### **Disease prevention**

God at creation made provision for natural mechanism for disease prevention in which wholesome water has a vital role to play. In addition to the daily maintenance of our body systems, wholesome water also plays a key role in the prevention of many diseases. On this note, Hossein (2013) reported that drinking eight glasses of wholesome water daily can decrease the risk of colon cancer by 45 per cent bladder cancer by 50 per cent and it can potentially even reduce the risk of breast cancer.

### **Infectious Diseases**

Consuming water that contains pathogenic microorganisms causes water borne diseases. This is very common especially in the rural areas where there is no good access to wholesome

water. Malone (2016) reported that Water borne diseases are cause of the deaths of millions of people every year. In most developing countries, water borne diseases are the main cause of childhood death, especially from vomiting and diarrhea. Flood waters carry human and animal feces, silt, toxic chemical wastes, oil, and other suspended particles with it. The occurrence of infectious diseases associated with drinking water like diarrhea and dysentery is quite common. Thus, it is necessary to focus on the prevention of waterborne diseases by making wholesome water readily available for the people and encouraging its utilization. The task of conditioning the water and making it fit for human consumption is the role of the government, well-meaning individuals and organizations. According to Malone (2016), water borne diseases are contagious and its prevention requires high standards of hygiene and sanitary conditions, and are extremely harmful and can lead to severe illness which may even be fatal. They lower the body's resistance and intake of nourishment, resulting in further infections and diseases hence, prevention of waterborne diseases through the provision of wholesome water is very essential (Malone, 2016).

### **Headaches**

The head and the skull carry the central nervous system which is the brain that controls all the activities in the body systems. Our brain is over 75 per cent water and when it detects a shortage of available fluids it implements a water rationing process by producing histamines, causing pain and fatigue (Hossein, 2013). This natural process is meant to slow us down and conserve water for defence uses. Histamines are released as a warning signal that something is wrong. When we take antihistamines or analgesic medicines, we mainly turn off the signal and do little or nothing about the problem but a big glass of wholesome water and a 20 minute decompression break will overcome most common stress related headaches (Hossein, 2013).

### **Hypertension**

The blood exerts some pressure on the walls of the blood vessels which if not controlled can result to hypertension. Hypertension is very often a result of the body adjusting to blood volume loss. The most common cause of lower blood volume is dehydration. Hossein (2013) explained that since our blood is more than 83 per cent water, its total volume is heavily affected by our level of intake of water into our body therefore when the body detects a loss of blood volume, it closes off less active capillary beds in order to maintain proper blood flow to the more active areas. This closing of vessels cause a rise in tension inside the muscle mass which we have come to know as "hypertension." More water allows proper blood volumes and a lower level of muscle tension (Michael, 2013).

### **Arthritis pain and stiffness**

The fluid within the joints helps to lubricate the joints to enhance movement. So, when this fluid is dried up due to aging or dehydration, it will result to pain at the joint area which is now known as arthritis. Arthritis pain and stiffness is now understood to be initially a result of increased friction and swelling in the bone joints. Water is what our body uses to lubricate these joints and hydrate the -pliable joint cartilage. According to Hossein (2013), when our water level is reduced, there is increased friction between the cartilage surfaces resulting in swelling, stiffness and pain then, the movement of the joints causes a suction that pulls water from the bone marrow to the joint cavity if there is proper hydration. Michael (2013) was of the view that increased intake of water enhances gentle rhythmic movements of the joints, and in many cases, overcome minor arthritic pain and swelling. Wholesome water therefore have become of necessity for health promotion.

## **Wholesome Water; a necessity for Health Promotion**

Human health is dynamic and not static. It is therefore necessary to engage in processes that can promote and maintain health. Health promotion is the process of enabling people to increase control over, and to improve, their health status. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions (WHO, 2015). One way of promoting the health of individuals and communities is to provide an easy access to supply of wholesome water which would be used for drinking, bathing, cooking, laundry and other domestic, industrial and agricultural activities. Therefore, when health of people is promoted and maintained, it will increase their years of living (longevity) and the resultant reduction in death rate. WHO (2013) reported that a significant proportion of disease could be prevented especially in developing countries through better access to safe water supply and that nearly 4 per cent of the global disease burden could be prevented by improving water supply, sanitation and hygiene.

It is worthy of note that poor water quality continues to pose a major threat to human health. Diarrhea disease alone amounts to an estimated 4.1 per cent of the total Disability Adjusted Life Year (DALY) of the global burden of disease and is responsible for the deaths of 2 million people every year (WHO, 2013). Furthermore, WHO (2013) estimated that 88 per cent of that burden is attributable to unsafe water supply, sanitation, and hygiene and is mostly concentrated on children in developing countries. It is no doubt therefore that bringing not just water but wholesome water to the door steps of both the urban and rural populace is necessary and essential as this would not only promote the health of the citizenry but also prevent the numerous water related diseases that are endemic in our society. Wholesome water should also be provided in churches, schools, among others as children spend more of their day in school. Again, wholesome water should be provided in public places, especially where more people are found and are actively engaged in activities such as parks, playgrounds, recreation centres, and markets among others.

## **Conclusion**

Wholesome water has a directly proportional relationship with health and longevity. Access to wholesome water to a large extent determines individual's position on the health illness continuum. A healthy nation is a productive nation. With the numerous diseases that can be prevented through access and utilization of wholesome water, any individual, community or nation that strives for health and productivity must consider the provision of wholesome water because it ensures disease prevention, health promotion, health maintenance and long life.

## **Recommendations**

Based on the foregoing, the following recommendations were put forward;

- 1 Government especially at the local government level and well-meaning individuals should see it as an obligation to make wholesome water readily available and accessible to the majority of the masses irrespective of age, gender, ethnicity, socio-economic status and religion.
- 2 Civil society Groups should assist the government by citing modern water projects in the rural areas in order to make wholesome water available to the people
- 3 Health educators should through enlightenment campaigns, media talk shows, outreach programmes, seminars and conferences enlighten the general public at both urban and rural areas on the role of wholesome water in health promotion, maintenance, disease prevention and long life.
- 4 Community leaders, elders and youth leaders should ensure that water projects cited

- in their areas is made accessible by members of the public.
- 5 Educationists should teach students and other people the processes of domestic water purification so as to make their water wholesome and safe for consumption.
  - 6 NAFDAC should ensure proper registration and documentation of companies and organizations producing packaged water in order to ensure strict compliance to standards.

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