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Adverse Effect of Water Contamination or Pollution to Human Health and Safety in the Nigeria Delta – Nigeria: An Environmental Case Study

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Abstract
Water have been found to be a life-supporting liquid. Humans like other living being required water for purposes of its metabolism. Human uses water for other purposes including domestic and industrial activities. Nearly every human daily activities will be free of water use. This goes further to connote the important of water. Contamination of water sources relatively has great impact on human health, domestic and industrial development as well as the survival of aquatic lives which also serve as a source of food for humans. This paper seeks to analyze this environmental situation in relation to its related health issues. Empirical evidence was examined to establish concrete evidence that water contamination can lead to severe health problems. The paper focus its scope of analyzing water contamination situation in the Niger Delta, Southern Nigeria and its impact on the health of the residence. Recommendations were proposed on how water contamination can be mitigated to avoid advent of increased mortality in Niger Delta.
Keywords: Water contamination, Human Health and Safety, Water-borne disease

1. Water Pollution and Sources of Water Contamination in Niger Delta

Human activities produce direct or indirect discharge into the water sources – rivers, lakes, and streams as well as underground water bodies. This alien particle regarded as 'pollutants' accumulates to contaminate the sources of water rendering it unhealthy for use and consumption. Pollutants are particles either in the hydro or solid form that changes the quality of water (Owa, 2013; UN Report, 1972). When such pollutants are introduced into any water body, it leads to a situation regarded as water contamination or pollution (Owa, 2013).

UN Report (1972) defined water pollution as an emergence of constituents into water sources, either directly or indirectly causing an impediment in the quality of the water resulting in a harmful effect on lives of aquatic, humans and plants. In communities where water pollution exists, the quality of health depreciates based on consumption of poor quality of water (Olaniran, 1995). The quality of water sources and its effects in the Niger Delta have generated several concerns in the national discuss. Several international, national and local coalitions have engaged in drawing the relevant attention of concerned parties to the quality of health of occupants in the region attributed to the contamination of water sources.

Niger Delta is Nigeria's oil-producing region. The region constitutes of six states namely Akwa Ibom, Cross River, Bayelsa, Rivers, Delta and Edo known for vast deposit of crude oil. This natural resource has served as the major source of revenue to Nigeria, a drastic shift from agriculture. Oil exploration and extraction in the region has become a major attraction and activities. According to Aghalino (2002), huge quality crude oil is extracted daily from the region with severe cases of oil spills. Inhabitants in the area mainly farmers and fishermen/women battles to overcome underdevelopment which comes with limited access to basic care and amenities including safe drinking water, healthcare, and quality education. Oil extraction in the region adds to the problem of the region beginning with contamination of natural water sources (streams, rivers), aquatic habitat, destruction of farmland and mangroves (Olaniran, 1995). Afinotan and Ojakorotu (2009) reiterated that the region is faced with water-borne diseases spreading across communities with no health facilities or remedies available for the common and rural dwellers. This further affirms that uncontrolled environmental situation can become a public health outbreak. The attention of government, international communities, public health, and environmental health specialist in designing multi-sectoral interventions.

Niger Delta region has also faced several environment issues among which water contamination is predominant (Raji & Abejide, 2013). Several factors have been identified as causes of water contamination in the Niger Delta. UNEP Report (2011) have identified oil extraction and spill as major contributors to extensive pollution of water sources in the Niger Delta. Other activities like linkages of sewages and refuse disposal into water sources, channeling of industrial toxic waste into a water source and use of pesticides for farming are additional human-related activities that contaminate the quality of water in the Nigeria Delta (Gbamanija, 1998). Access to safe drinking water is gradually reduced based on the activities from oil exploration and spills (World Bank, 2008). Nwilo & Badejo (2015) posited that the effect of oil spill-related water pollution is felt in the number of cases of water-borne illness reported annually.

Sewage deposit into natural sources of water has also been a contributing factor to contamination of water sources in the Niger Delta. Predominant ways of deposing human fecal materials are through open toilet

systems. WHO (2013) asserted that dumping of discomposed materials or channeling of debris from domestic and industrial operation into the water bodies are also major contributors to the diminishing the quality of water needed for drinking, watering and cooking. These human activities occur in the Niger Delta due to poor orientation on personal hygiene and sanitation. According to Owa (2013), most of these sewage comes from defecation at river sides, using streams for bathing, dumping of refuse into streams and rivers as well as wash-off of fertilizer from farmlands. This further reveals that the state of water sources available in the Niger Delta in terms of quality should attract public health concerns to ensure that the region is free of water-borne diseases outbreaks.

2. Analyzing the Impact Water Contamination or Pollution to Human Health and Safety

Empirical evidence revealed that water contamination or pollution as an environmental health issue is synonymous with the quality of human health and safety. There are growing concerns about the rate of public health issues linked to environmental pollution. USGS (2016) argues that there is relatively any non-communicable public health outbreak without a link to environmental contamination, arising from daily human's interaction with the environment. It's therefore, important to correlate based on evidence environmental pollution and its relative public health impact.

According to Owa (2013), water contamination accounts for nearly 14,000 mortality cases reported daily in developing countries. These cases are attributed to exposure to poor quality water used for drinking and preparing food. Effect of water pollution is therefore seen as a repercussion arising from activities carried by humans in the environment either immediately or years ago. It has also been observed people involved in creating this environmental crisis might not necessarily be the ones affected.

WHO (2013) opined that diarrheal diseases arising from water contamination are one of the leading cause of deaths in children below five years. Diarrhea is obtained from consuming polluted food or contaminated drinking water and can to be contagious when proper hygiene is not practiced. Diarrhea is predominant in the Niger Delta as a result of the presence of poor quality of water contaminated by human and animal feces (Owa, 2013). WHO (2013) also asserted that diarrheal disease can lead to malnutrition and growth stunting. Most cases of deaths in the Niger Delta are related to diarrhea and mainly challenged with no access to quality treatment (Alens, 2014). Interestingly, most deaths in the Niger Delta might not be reported since limited functional facilities are available to provide up-to-date medical records.

Sewage disposal into water bodies has been identified as a health hazard. Sewage deposits are pollutants that create an ill in the condition of water and the aquatic lives. Major deposits from sewage are toxic and poisonous. Studies have also revealed that sewage contributes to significant cases of aquatic lives poisoning (Alens, 2014), gastroenteritis, hepatitis and infections in the eyes or nose during dermal exposure (EPA, 2015). These findings revealed that fishes and other aquatic lives consumed (by the inhabitants or visitors) may be poisoned and poses a serious health threat. Most exposure to sewage-infested water in the Niger Delta is during swimming, bathing and use of stream water for cooking and drinking. This attests that health hazard posed by sewage and could be properly managed.

Contamination in water can also be caused by the presence of algae and nitrates. These compounds have been found to a major contributor to health problems ranging from rashes to other complex cases like respiratory disorder and illness in the stomach or liver (EPA, 2015). Natural water sources in the Niger Delta are currently experiencing algal bloom, thereby diminishing the quality of water needed for drinking, recreation and other domestic activities (Alens, 2015). Children and households who don't understand the effect of algal bloom in water bodies insist on utilizing it for swimming, washing, bathing, cooking and sometimes drinking. This might be the only source of water with the absence of an alternative other than awaiting rainy seasons to do water harvesting. Carmichael et al, (2013) posited that consumption and dermal exposure to algal-infested water bodies have led to increased cases of hepatitis B and liver damage.

Nitrates is also another poisonous compound identified to pose a threat to human and aquatic health. Nitrates get into the water bodies through wash-off from farmland where fertilizers were applied, deposit from septic tanks and from animal or human waste. Research evidence revealed that this compound relates to cases of risk to cancer, birth defects, thyroid enlargement and health disorder in children (EPA, 1996). Nitrate consumption in drinking water is very common in rural communities like in the Niger Delta. Nitrate affects both underground water and surface water. Exposure to nitrate-infected water bodies can be in different forms including direct ingestion or use for other domestic activities including cooking.

Water contamination also weakens the health status and improvement of persons living with HIV and other chronic illnesses. CDC (2014) asserted that certain group of persons is more vulnerable when exposure to contaminated water – this include the aged, younger children, newly born and individuals who have done medical transplants. This further connotes that there is a need for necessary attention to be given to the quality of water consumed or ingested by persons classified as more vulnerable. Niger Delta region has a composite of all the vulnerable attributed to the factors of underdevelopment, poverty, environmental problems, and limited

access to basic health needs.

3. Prevention and Control Measures of Water-borne Diseases to reduce risks to Human Health and Safety

Strategic prevention and control measures are eminent in reducing the effect of water contamination on human health. Measures of controlling and preventing the impact of water contamination can be tackled from the point of contamination at the source and at the level of managing its effect. Interventions at the contamination source will focus on addressing human behavior and strengthening policies. Similarly, interventions targeted at managing the effect will emphasize rapid surveillance and treatment.

Behaviour change communication have been identified as an effective strategy needed to change perceptions of persons towards achieving expected health impact. This is achieved through persuasion, cohesion and motivating people to act. Tengland (2012) argued that behavior change approach can be so demanding and somehow does not allow for the autonomy of the target individuals. Behaviour change is effective as it empowers the individual in reviewing their actions. Agencies of government and civil society organizations can be involved in propagating education and campaign on proper hygiene and sanitation.

Wain et. al., (1997) asserted that an effective water treatment and conservation strategy can minimize the effect of water-borne illnesses. Water treatment and conservation strategy reduces the quantity of untreated water in circulation for consumption and use. An efficient strategy will drastically reduce water-borne disease outbreaks. In communities where water treatment is ineffective, vaccination can be applied simultaneously to maintain spread (WHO, 2003).

Disease surveillance systems and operations have been revealed in several case studies to be effective in control water-borne disease outbreaks. CDC (2012) argued that water-borne incidence can be slowed down through an efficient surveillance system. This validates the important of a surveillance system to be instituted and coordinated by agencies of government providing realistic data and information as when needed.

Enactment of an act to prohibit domestic and industrial pollution of water sources could also be a policy level intervention. Learning from Clean Water Act enacted in 1971 in the United States contributed to a drastic reduction in the quantity of pollutant discharged into the water sources (Lyon & Stein, 2009). In Nigeria, legislations have been enacted like the Water Resource Act, Harmful Waste Act but faced with issues of enforcement and compliance (Amokaye, 2012). This is an area that government will need to strengthen its commitment towards safe water for use, especially for the Niger Delta region.

4. Conclusion and Recommendations

Water pollution in the Niger Delta has been a menace leading to several health issues including socio-economic advancement of the region. This is far from the reality of a region that generates 75% of the country's revenue daily. Government and critical stakeholders should be involved in curbing the crisis of the Niger Delta region and provide safe water for drinking and other purposes.

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