International Journal of Social Sciences and Management Research Vol. 2 No.1 2016
ISSN: E-ISSN 2545-5303 P-ISSN 2695-2203 www.iiardjournals.org

Prospects and Challenges of Traditional Methods of Water Treatment in Rural Area; Case Study of Udi L A.G., Eastern Nigeria

Gladys Ogochukwu Chukwurah
University of Nigeria
DOI: 10.56201/ijssmr.vol.2no1.2016.pg.110.116

Abstract

Access to clean water supply has been a major challenge over the years. This study examines the traditional methods of water treatment in the rural areas using Udi local government area of Enugu. Based on qualitative analysis, secondary and primary sources of data were utilized such as internet search engine and interview and FGD discuss. Using systematic and simple random survey a sample size of 50 participants were used for the research. Findings revealed 3 common traditional methods of water treatment, which are boiling, Sedimentation, Local filtration. Some of the discovered advantages of the traditional method of water treatment in the rural areas include accessibility, cost-effectiveness, and sustainability. More so the traditional methods are without challenges which are Inadequate removal of particles, inconsistency, potential health risks, labor and time intensive, cultural and behavioral limitations, and some other environmental negative Impact. The study suggest that adequate clean water supply should be provided to the rural communities. Further study on the environmental impacts of traditional methods of water treatment should be considered.

Key words: Traditional water treatment, methods, advantages, challenges, rural areas

Introduction

Clean and adequate water supply to rural areas has been a problem for centuries and remains so till the present time. In advanced country such as U.S.A, public issues concerning clean water are known to have erupted sporadically at the local, state, and National level for about two centuries while the problem of wise allocation is still very serious. The situation of water supply is worse particularly in Nigeria and other (LDCs) Low Developing countries due to a number of factors. According to Ohwo (2012) such shortages can lead to serious economic disruptions and human suffering. Most rural areas have never enjoyed adequate water supply as supposed since its inception. The inhabitants of the Rural areas used the rivers and streams as a source of water. Due to the water quality and sources of the rural drinking water, most of the rural dweller resort to some traditional means of purifying the water for drinking purposes and may be other domestic uses particularly during the drying season.

Oboli (1985), noted lack of pipe borne water in Enugu. Global Health Security (2013) stressed on Water treatment is a critical process that ensures the safety, quality, and availability of water for various uses, particularly for human consumption. As water is a fundamental resource, its purity

and safety are paramount in preventing waterborne diseases and ensuring overall public health (Smith, 2013). The significance of water treatment lies in its ability to remove contaminants, such as pathogens, chemicals, and suspended solids, making water safe for drinking, cooking, and other domestic purposes and Oboli (1985), noted lack of pipe borne water in Enugu. Stimson Global Health Security (2013) stressed on many households resort to private wells, streams, or street vendors to meet drinking water needs which has exposed consumers to bacterial and heavy metal contamination exceeding local regulatory standards. WHO/UNICEF joint report (2007) on water and sanitation, reviewed that access to portable water supply lack behind in Nigerian cities, and the rural areas suffer worst situation as majority of the villages have no access to water expect streams.

The importance of water treatment extends beyond public health; it also plays a vital role in environmental protection by reducing the impact of wastewater on natural ecosystems (Williams, 2014**).** Moreover, treated water is essential for industrial processes, agriculture, and recreation, demonstrating the multifaceted benefits of effective water management (Brown et al., 2021). Water treatment methods can be broadly categorized into traditional and conventional approaches. Traditional water treatment methods have been employed for centuries, particularly in rural and indigenous communities, and are often based on natural processes and locally available materials. These methods include practices such as sedimentation, where water is allowed to stand undisturbed to settle out particulate matter, and the use of natural coagulants like moringa seeds or alum to facilitate the removal of suspended solids (Ngwu, 2013). Boiling and filtration through sand, gravel, or charcoal are also common traditional methods, providing a basic level of disinfection and clarity to water (Eze, 2016). On the other hand, conventional water treatment methods are typically more sophisticated and are implemented on a larger scale, often in urban and industrial settings (Anderson & Patel, 2016). These methods involve a series of processes such as coagulation, flocculation, sedimentation, filtration, and disinfection, usually employing chemical agents and advanced technologies (Clark, 2020). For instance, in conventional treatment plants, water undergoes rigorous filtration through activated carbon and sand, followed by chlorination or ionization to kill pathogens and ensure the water is safe for consumption (Williams et al., 2014). The combination of these processes ensures that water meets regulatory standards and is free from contaminants that could pose risks to human health and the environment (Johnson, 2011).

However, this study aims to explore and compare traditional and conventional water treatment methods. By examining both approaches, the report aims to highlight their respective advantages, limitations, and applicability in different contexts (Ngwu, 2013). Traditional methods, while often simple and cost-effective, may not always achieve the level of purification required for modern health standards (Smith, 2018). Conversely, conventional methods, although more effective in removing a wide range of contaminants, can be resource-intensive and may not be feasible in all settings (Clark, 2020). Additionally, this study seeks to examine the specific practices in Udi Local Government Area (L.G.A.), where water treatment practices reflect a blend of traditional knowledge and modern techniques .Understanding the water treatment methods in this region will provide insights into how local communities manage their water resources, the challenges they face, and the potential for integrating traditional methods with conventional technologies to

improve water quality and accessibility (Ngwu, 2013). This comparative analysis aims to contribute to the broader discourse on sustainable water management and the potential for innovative solutions that are both culturally appropriate and technically sound (Anderson & Patel, 2016).

Materials and methods

Study Area

The study area Enugu region specifically in Udi Local Government Area (L.G.A.). Enugu is located between 60 271N and 70 291 E. It covers an area of about 73 square kilometers. It silts about 223 meter above sea

level. Enugu is bound in the south by River Nyaba and in the North by AmaojiAgu-Knik further off towards the west it is bound by Obiagu. Enugu falls within the Equatorial belt, having temperature rainfall and seasons indicating a tropical rainforest.

Sampling design

The study adopted the survey design. The study was conducted in Enugu region particularly in Udi L.G.A., has a population of about 370,002 as of 2015 census. Using purposive sampling and multi-stage random sampling techniques 60 copies of questionnaires were distributed to the women in the three villages within Udi L.G.A. such as, Eke, Egede, Abor. The researchers had a FGD discussion with the women in the various community during the village women monthly. The choice of the respondents is because they are knowledgeable about the subject matter. These respondents were, to identify the traditional methods of water treatment, provide information on the advantages, and disadvantages. . A sample of 60 semi-structured questionnaires were administered to the respondents to obtain relevant information for detailed assessment of the phenomena being investigated into (Sarantakos 1998). since the size of the women is not known and the data required from this source is to corroborate the secondary data, also no advance statistics is requiring 60 respondents were used in the study.

Result and Discussions

Reports from the FGD

Traditional water treatment methods have been utilized for centuries, especially in rural and indigenous communities, where access to modern infrastructure may be limited. These methods rely on locally available materials and simple techniques to purify water, making them accessible and practical for many people.

One of the most common traditional practices is **boiling**. Boiling water is one of the oldest and simplest methods of disinfection. By heating water to its boiling point, harmful microorganisms such as bacteria, viruses, and parasites are killed, making the water safe for drinking and cooking

(Smith, 2016). Despite its effectiveness, boiling does not remove chemical contaminants or sediments, so it is often used in combination with other methods.

Sedimentation is another widely used traditional method. This process involves allowing water to stand undisturbed in a container so that heavier particles, such as silt and sand, can settle to the bottom (Ogbazi, and Nnaji 2016). After a period of time, the clear water at the top can be carefully poured off, leaving the sediment behind. Sedimentation is particularly useful in areas where water sources are prone to turbidity, but it may not effectively remove smaller particles or pathogens.

Filtration with local materials is also a common practice. In many communities, water is filtered through layers of sand, gravel, and charcoal, which act as natural filters to remove impurities (Ngwu, 2013). Charcoal, in particular, is valued for its ability to absorb certain chemicals and reduce unpleasant tastes and odors in the water (Eze, 2016). This method is often used in conjunction with other treatments, such as sedimentation, to improve the overall quality of the water.

Advantages of Traditional Methods

Traditional water treatment methods offer several advantages, particularly in low-income and rural communities. One of the primary benefits is **accessibility**. These methods do not require specialized equipment or significant technical knowledge, making them accessible to a wide range of people (Williams, 2014). Materials needed for traditional treatments, such as firewood for boiling or local sands for filtration, are often readily available within the community, reducing reliance on external resources.

Another significant advantage is **cost-effectiveness**. Traditional methods are generally low-cost, relying on simple, natural materials and processes that do not require significant financial investment. For example, the cost of boiling water is primarily associated with the fuel used, which can be gathered locally at little to no expense. Similarly, the materials used in sedimentation and filtration are inexpensive and often reusable.

Sustainability is also a key advantage of traditional water treatment methods. These methods are environmentally friendly, as they typically use natural materials that are biodegradable or have minimal environmental impact. Moreover, the simplicity of traditional methods means that they can be easily maintained and passed down through generations, ensuring long-term sustainability in water management practices.

Traditional water treatment methods are not only practical and effective in certain contexts but also offer significant advantages in terms of accessibility, cost-effectiveness, and sustainability. These attributes make them valuable tools for improving water quality, particularly in regions where modern water treatment infrastructure is lacking.

2.3 Challenges to Traditional Methods

Traditional water treatment methods, while accessible and cost-effective, have several disadvantages that can limit their effectiveness and safety. Some of the key disadvantages include:

1. Inadequate Removal of Particles

Traditional methods like boiling, sedimentation, and filtration using local materials are often only partially effective in removing contaminants from water. For instance:

- **Boiling** can kill most pathogens, such as bacteria and viruses, but it does not remove chemical contaminants, heavy metals, or physical impurities (Eze, 2016).
- **Sedimentation** is only effective for removing large particles and does not address dissolved substances or microscopic pathogens (Smith, 2013).
- **Filtration** using local materials like sand and gravel may reduce turbidity but often lacks the precision needed to remove fine particles, bacteria, or viruses (Johnson, 2011).

2. Inconsistency

The effectiveness of traditional methods can vary significantly depending on the user's knowledge, resources, and adherence to proper procedures:

- Boiling water for an insufficient amount of time or failing to use clean storage containers can result in the re-contamination of treated water (Ngwu, 2013).
- Sedimentation and filtration methods require regular maintenance and correct implementation to be effective, which can be challenging in resource-limited settings (Brown et al., 2021).

3. Potential Health Risks

Some traditional methods may inadvertently introduce health risks:

- **Boiling** can lead to the concentration of harmful substances in the water if contaminants like nitrates are present.
- Improper filtration techniques, such as using contaminated or low-quality materials, can introduce additional pollutants or pathogens into the water.

4. Labor and Time Intensive

Traditional methods can be time-consuming and labor-intensive:

- Boiling requires a significant amount of fuel and time, which can be a burden, especially in areas with limited access to firewood or other energy sources (Williams et al., 2014).
- Sedimentation and filtration processes may take hours or even days to produce a relatively small amount of treated water, making them impractical for large households or communities (Smith, 2016).

5. Lack of Chemical and Microbial Control

Traditional methods generally do not address chemical contaminants, such as pesticides, industrial pollutants, or heavy metals, which can pose serious health risks:

- Methods like boiling and sedimentation do not remove chemical contaminants, leaving the water unsafe for consumption in areas where these pollutants are present (Johnson, 2011).
- Traditional filters often lack the capacity to remove dissolved substances or harmful microbes that are smaller than the filter media.

6. Cultural and Behavioral Limitations

In some cases, the effectiveness of traditional methods is hindered by cultural beliefs or behaviors:

- There may be a reluctance to adopt safer water treatment practices if they conflict with long-standing cultural practices or beliefs (Eze, 2016).
- Misconceptions about the effectiveness of certain traditional methods can lead to over-reliance on inadequate practices, resulting in continued exposure to unsafe water (Ngwu, 2013).

7. **Environmental Impact:** Traditional methods can have an environmental impact, particularly in areas where they are widely used: The extensive use of firewood for boiling water can contribute to deforestation and air pollution, exacerbating environmental degradation.

Conclusion

These traditional methods, though simple, have been effective in providing basic levels of water purification for centuries. They continue to play a crucial role in communities where access to advanced water treatment facilities is limited. These methods are deeply rooted in the local culture and are often the first line of defense against waterborne diseases. The effectiveness of these methods varies depending on the specific techniques used and the conditions under which they are applied. However traditional methods of water treatment should be used in conjunction with other treatments, such as sedimentation, to improve the overall quality of the water. The governments should provide a adequate clean water for the rural area, since water is a basic need and the responsibility to provide the basic infrastructure need of her citizen.

References

Eze, F. (2016). *Traditional Water Treatment in Nigeria*. Heritage Publishers.

Gadgil, A. (1998). Drinking Water in Developing Countries. *Annual Review of Energy and the Environment*, 23, 253-286.

Johnson, M. (2011). *Water Quality and Public Health*. Health Press.

Ndoye, S., & Diop, S. (2014). Traditional Water Treatment Systems in Sub-Saharan Africa: Case Study of Senegal. *Journal of Water, Sanitation, and Hygiene for Development*, 10(1), 20-30.

Ngwu, O. (2013). *Indigenous Water Treatment Techniques in Nigeria*. African Journal of Environmental Studies, 14(2), 45-67.

Obeli, C.J. (1985); City Administration: A case of pipe borne water in Enugu. Unpublished Bsc thesis. Dept. of geography and

Ogbazi, J. U., & Nnaji, C. C. (2016). A Review of Water Treatment Practices and Approaches in Nigeria. *Journal of Environmental Science and Public Health*, 1(3), 230-245.

Ohwo.O. (2012) "Quality of Water Supply from the Hand –Dug Wells in Warri-Effurun Metropolis, Delta State,Nigeria, *"Nigeria* planning, University of Benin pp34.

Sarantakos S. (1998). Social research. London: McMillan

Smith, P. (2016). *Water Treatment and Public Health*. EcoScience Publishing.

Stimson Global Health Security, (2012) "Lagos: Growth without infrastructure," *The Stimson Centre*, 2012 [Online]. Available:

WHO/UNICEF (2007), Joint Monitoring Programme for Water Supply and Sanitation "*Nigeria Washwatch.*

Williams, R. (2014). *Sustainable Water Management Practices*. EcoPress.

World Health Organization. (2011). *Evaluating Household Water Treatment Options: Health-Based Targets and Microbiological Performance Specifications*.