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Determinants of Water Treatment Utilization among Residents of Port Harcourt City Local Government Area of Rivers State

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ABSTRACT
This study focused on the determinant of water treatment utilization among residents of Port Harcourt City Local Government Area of Rivers State. The research design employed for this study was a descriptive survey design. The sample for this study was 1229 residents of Port Harcourt City Local Government Area of Rivers State. The instrument for data collection was a self-structured questionnaire titled Determinants of Water Treatment Utilization Questionnaire (DWTUQ). The reliability index of 0.78 was determined using Cronbach Alpha. Data collected were analyzed using Statistical Product for Service Solution (SPSS) version 25.0. The result illustrated that the 193(49.5%) utilized water treatment and 197(50.5%) did not utilize water treatment. The result revealed that there was a significant association between knowledge of water treatment ($p<0.05$), level of education ($p<0.05$), household size ($p<0.05$) income size ($p<0.05$) and water treatment utilization in Port Harcourt City Local Government Area of Rivers State. It was concluded that water treatment practice among residents of Port Harcourt city was fair. The water treatment practices were determined by knowledge of water treatment, household size, educational level, income status and water sources. It was recommended that the state and local government authority should embark on the mass campaign on the importance and methods of household water purification in rural communities.
Keywords: Water Treatment, Utilization, Residents, Port Harcourt city.

INTRODUCTION
Water is a natural resource that helps to maintain health when it is available in sufficient quantity and appropriate quality. Even though 91% of the world's population now has access to improved drinking water, and 6.6 billion people have improved water sources at their disposal (OMS/UNICEF 2015), a large portion of the population especially those living in rural areas continues to drink water with low microbiological quality. 102 million people in sub-Saharan Africa still use surface water and 319 million lack accesses to an upgraded water source (OMS/UNICEF 2015). The people of the Niger Delta are still quite concerned about water issues, especially those who reside in rural areas where only 72% of people have access to potable water. The world's poorest nations are still beset by the issue of access to clean water and sanitary facilities. An estimated 2.6 billion people, or almost 40% of the world's population, lack proper access to clean water and sanitary conditions, according to the World Health Organization (WHO, 2010). Of them, almost 2 billion live in rural parts of sub-Saharan Africa, Eastern Asia, and South Asia (WHO, 2010). The majority of those impacted live in informal settlements, periurban areas, and rural areas of developing nations. Here, people continue to use unsafe water,

defecate in the open, and lack access to basic sanitation services due to a lack of knowledge and attitudes that prevent them from practicing basic hygiene. Hygiene education is necessary in addition to the provision of safe community water supplies and sanitation services. This is crucial because it will guarantee that the services are used correctly and appropriately long after the technical experts have departed.

According to Boschi-Pinto et al. (2008), the consequences of inadequate access to water, sanitation, and hygiene (WASH) impact all facets of health and development, impede social and economic advancement, and provide a significant obstacle to the reduction of poverty. By enhancing WASH habits, many communicable diseases can be effectively controlled. By putting the three main WASH principles into practice, the prevalence of waterborne diseases can be decreased. Waterborne disease prevalence can be decreased by 30% and 40%, respectively, by properly disposing of waste and washing hands with soap during sensitive periods. In a similar vein, proper drinking water treatment and storage can lower the incidence of waterborne illnesses by 30–50% (UNICEF, 2016). 892 million people worldwide performed open defecation, 844 million lacked access to clean drinking water, and 2.5 million did not have access to better sanitation (WHO, 2017). 2.3 billion people worldwide lack basic sanitation. WASH is one of the most significant perceived requirements in public health in underdeveloped nations in the twenty-first century. However, 58% of all diarrheal deaths occur as a result of poor WASH, accounting for around 842,000 deaths annually (WHO, 2017). WASH is still one of the biggest public health issues in sub-Saharan Africa, with relatively little coverage (Bain et al., 2014). Only 15% of people have access to facilities for hand washing with soap and water, 58% of people in sub-Saharan Africa lack adequate drinking water, and over half of the population (319 million) does not utilize WASH facilities (WHO, 2017). According to Manetu and Karanja's (2021) assessment, families or residents with inadequate hygiene and water treatment practices had a notably higher prevalence of water-borne infections. According to Tunje (2019), 65% of the population conducts excellent water treatment, such as washing their hands after using the restroom, and the degree of water treatment and utilization is good. Tamene et al.'s (2022) research demonstrated the high prevalence (36.07%) of water treatment procedures and consumption.

It is plausible that most may have received information on the benefit of water treatment and the effects of drinking impure water on the health status. Sisay et al. (2022) revealed that the level of water treatment utilization was 29.9% and was determined by various factors which may vary from place to place. However, there is a lack of reliable and up-to-date data on water treatment patterns and practices, making it difficult for water treatment organizations and policymakers to make informed decisions. Poised to this background, the researcher sought to unravel the determinants of water treatment utilization among residents of Port Harcourt City Local Government Area of Rivers State.

METHODOLOGY

Research Design: The research design employed for this study was a descriptive survey design

Area of the Study: The area of this study was Port Harcourt City Local Government Area of Rivers State, Nigeria

Population of the Study: The population of this study comprised residents of Port Harcourt City Local Government Area of Rivers State.

Sample and Sampling Technique: The sample size of 390 was determined using the descriptive formula method. A simple random sampling technique was adopted to select the sample for the study in the 20 political wards of Port Harcourt city Local Government Area for the study.

Instrument for Data Collection: The instrument for data collection was a self-structured questionnaire titled Determinants of Water Treatment Utilization Questionnaire (DWTUQ). This instrument was designed in three sections A, B and C.

Reliability of the Instrument: Split-half method was used to determine the degree of internal consistency of the instrument. A reliability index of 0.78 was determined using Cronbach Alpha indicating that the reliability of the instrument was reliable and applicable for the study.

Method for Data Analysis: Data collected were analyzed using Statistical Product for Service Solution (SPSS) version 25.0.

RESULTS

Table 1: Chi-square test showing significant association between knowledge of water treatment and water treatment utilization in Port Harcourt city Local Government Area of Rivers State

Variables	Water treatment utilization		Total Freq %	χ^2 P-value Df	Decision
	Yes Freq %	No Freq %			
knowledge of water treatment					
Good	44(38.9)	69(61.1)	113(100)	9.083	Rejected
Poor	149(53.8)	128(46.2)	277(100)	0.004	
Total	193(49.5)	197(50.5)	390(100)	1	

***Significant, p<0.05**

The result in table 1 above revealed that there was a significant association between knowledge of water treatment and water treatment utilization in Port Harcourt city Local Government Area of Rivers State (X^2 value = 9.083; df =1; p<0.05). Therefore, the null hypothesis which stated that there is no significant association between knowledge of water treatment and water treatment utilization in Port Harcourt city Local Government Area of Rivers State was rejected.

Table 2: Chi-square test showing significant association between level of education and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State

Variables	Water treatment utilization		Total Freq %	χ^2 P-value Df	Decision
	Yes Freq %	No Freq %			
Education					
No formal	32(50.0)	32(50.0)	64(100)	116.998	Rejected
Primary	46(48.9)	48(51.1)	94(100)	0.000	
Secondary	32(22.1)	113(77.9)	145(100)	3	
Tertiary	83(95.4)	4(4.6)	87(100)		
Total	193(49.5)	197(50.5)	390(100)		

***Significant, p<0.05**

The result in table 2 above revealed that there was a significant association between level of education and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State (X^2 value = 116.998; df =3; p<0.05). Therefore, the null hypothesis which stated that there is no significant association between level of education and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State was rejected.

Table 3: Chi-square test showing significant association between household size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State

Variables	water treatment utilization		Total Freq %	χ^2 P-value Df	Decision
	Yes Freq %	No Freq %			
Household					
1-3	91(32.6)	188(67.4)	279(100)	111.614	Rejected
4-6	102(91.9)	9(8.1)	111(100)	0.000	
Total	193(49.5)	197(50.5)	390(100)	1	

***Significant, p<0.05**

The result in table 3 above revealed that there was a significant association between household size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State (X^2 value = 111.614; df =1; p<0.05). Therefore, the null hypothesis which stated that there is no significant association between household size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State was rejected.

Table 4: Chi-square test showing significant association between income size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State

Variables	Water treatment utilization		Total Freq %	χ^2 P-value Df	Decision
	Yes Freq %	No Freq %			
Income					
<50,000	157(55.5)	126(44.5)	283(100)	14.805	Rejected
>50,000	36(33.6)	71(66.4)	107(100)	0.000	
Total	193(49.5)	197(50.5)	390(100)	1	

***Significant, p<0.05**

The result in table 4 above revealed that there was a significant association between income size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State (X^2 value = 14.805; df =1; p<0.05). Therefore, the null hypothesis which stated that there is no significant association between income size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State was rejected.

DISCUSSION

The result showed that 193(49.5%) utilized water treatment and 197(50.5%) did not utilize water treatment. The result of this study is expected because residents are not aware and do not see it as their responsibility to ensure a safe drinking water. The result of this study in consonance with the report of World Health Organization (2017) which estimated that 844 million people lack basic safe drinking water and 2.5 million people lack improved sanitation of which 58% occur in sub-Saharan Africa. The result of this study is in keeping with the findings of Desye et al. (2023) which illustrated that a fewer proportion of residents (21%) practiced household water treatment and this was due to unimproved water source. Studies of Manetu and Karanja (2021) reported that the prevalence of water borne diseases was significantly high among families or residents with poor hygiene and water treatment practice. Tunje (2019) indicated that the level of water treatment practices and utilization was good of which 65% of the population exercised good water treatment practices such as hand washing after toilet. Tamene et al. (2022) illustrated that the prevalence of water treatment practices and utilization was high (36.07%). It is plausible that most may have received information on the benefit of water treatment and the effects of drinking unclean water on the health status. Sisay et al. (2022) revealed the level of water treatment utilization to be 29.9% and was predicted by household level. It is also plausible because residents who do not have access to improved water source may not practice household water treatment. As at the time of this study, prior studies indicated that household water treatment is uncommon and poor. Hence, there are poor practices of water treatment among residents in Port Harcourt city.

The result in table above revealed that there was a significant association between knowledge of water treatment and water treatment utilization in Port Harcourt city Local Government Area of Rivers State (p<0.05). The result of this study is expected because it is only those who are aware and familiar with importance of household water treatment are likely to practice it. The result of this study is in keeping with findings of Momoh et al. (2022) which indicated that about 59.2% of respondents had good knowledge, 59.2% of them had positive attitude, and 53.1% of them had good practice. Bitew et al. (2017) indicated that a good percentage of residents exercised good knowledge of household water treatment and practice. Hence, those who have good knowledge are about 3 times more likely to practice water treatment. In Nigeria, studies of Amoukpo et al. (2018) reported that more than 65% of the district's population knew some methods of water treatment at home and they lacked the knowledge to apply the different water treatment methods and only 6.1% of the population used at least a method of water treatment at home, even if it was not always adapted. Sibiya, and Gumbo (2013) revealed that

the level of knowledge about waterborne diseases was relatively high (76.7%), but knowledge on transmission routes was inadequate whereas the majority of the respondents had no knowledge when it comes to water-based diseases and their prevention (78.4%) due to knowledge of water treatment practices. It is plausible because increasing knowledge of water treatment may directly or indirectly determine good practice.

The result revealed that there was a significant association between level of education and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State ($p<0.05$). The result of this study is required because households who are educated are likely to have good knowledge and are aware of different methods of water treatment for safe consumption. The result of this study is in keeping with the findings of Asefa et al. (2023) which gave an illustration that educational status of residents was found to be the major factors affecting household water treatment methods and level of utilization. Tamene et al. (2022) added that households who are well trained were 2 times more likely to predict water treatment practices and the prevalence of water treatment was high among them. Apparently, studies of Gebremichael et al. (2021) affirmed that educational status were 19 times to significantly determine water treatment pattern and utilization. Tafesse et al. (2021) buttressed that residents who have received formal education were 2 times more likely to be significantly associated with household water treatment practice. Abubakar (2019) depicted that educational status of resident was a significant predictor of the utilization of water treatment and access to safe drinking water. It is pertinent that educated resident may have requisite knowledge and familiarities with the use of safe drinking water thereby practice water treatment for household use.

The result illustrated that there was a significant association between household size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State ($p<0.05$). The result of this study is necessary because household of family size could affect the extent of water treatment practices and utilization among residents. The result of this study is in line with findings of Asefa et al. (2023) which revealed that large household size were 2.4 times more likely to predict poor practices of water treatment and storage among residents. Gebremichael et al. (2021) added that family size was found to be a significant factor in determining water treatment practices and level of utilization. Sisay et al. (2022) affirmed that the predictors of household-level water treatment practices, respondents who had good knowledge were 5 times more likely to practice household-level water treatment. It could be pertinent that sanitation and hygiene practice are likely low in family with large size because they tend to generate more waste. As at the time of this study, there were no contrary findings against the outcome of this present study. Hence, household size constitutes a determinant of water treatment utilization.

The result revealed that there was a significant association between income size and water treatment utilization among residents in Port Harcourt city Local Government Area of Rivers State ($p<0.05$). The result of this study is expected because most household with medium to high wealth index or income status are likely to access resources needed for water treatment practices as compared with families with low wealth index. The result of this finding is in line with the study of Tamene et al. (2022) which revealed that household wealth index was 2 times more likely to be significantly associated with use of water treatment practices and level of utilization was high. Gebremichael et al. (2021) buttressed that monthly income of household were found 13 times more likely to determine water treatment practices. Admasie et al. (2022) also reported that monthly income was 2 times more likely a significant factor in the practice of household water treatment. Abubakar (2019) reported that 64% of households with access to pipe water in their dwellings are richer households, the middle-class, poorer and poorest households constitute 83.4% of surface water users and wealth index was significantly associated with water treatment practices and sources.

CONCLUSION

In regards to this study, it was concluded that water treatment practice among residents of Port Harcourt city was fair. The water treatment practices were determined by knowledge of water treatment, household size, educational level, and income status and water sources. There is need to educate the residents on the importance of water treatment so as to have safe drinking water and prevention of water based diseases.

RECOMMENDATIONS

In regards to the outcome of this study, the following recommendations were made:

1. State and local government authority should embark on mass campaign and awareness on the importance and methods of household water purification in rural communities.
2. Government through the ministry of water resources should ensure that clean and safe water be the fundamental requirement for maintaining public health and ensure that residents have access to high-quality drinking water.
3. Environmental health/public health experts should develop water treatment systems and contribute to environmental conservation by preventing the discharge of untreated wastewater into natural water bodies. Since, proper treatment reduces the contamination of rivers, lakes, and oceans, protecting aquatic ecosystems and biodiversity.
4. Individual/residents should ensure that bore hole facilities are washed quarterly and ensure that treatment/filtration of water are carried out for safe improved drinking water.

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