

Assessment of Water Quality of Some Private Borehole in Port Harcourt, Rivers State Case Study, Diobu Community.

Odunze Wisdom C.N., Nwachukwu Chinonso

Abstract— This study investigated the assessment of water quality of some private borehole in Port Harcourt metropolis case study Diobu Community. Four research questions and four hypotheses guided the study.

The related literature review was done under the theoretical/conceptual, empirical studies and summary which identified the assessment of water quality of some private borehole in Port Harcourt metropolis. Descriptive survey research design was adopted for the study.

A 40- item structured questionnaire development by the research was used. Questionnaire was used for data collection, Descriptive statistic of mean and standard deviation were used to answer the research question while chi-square was used to test the hypotheses at 005 level of significance. The finding indicated that there is no significant mean difference in the causes of water contamination of private borehole in port Harcourt metropolises. The study revealed that the ground water pollution causes contamination of water in private borehole. Some private borehole owner in Diobu community do not test the quality of their boreholes. It is re-commended that standard measures should be taken by the appropriate authorities to ensure proper treatment of the water to safeguard the health of the innocent consumers.

Index Terms— Borehole, Water Quality, Contamination, Port Harcourt.

I. INTRODUCTION

Groundwater which is also the source of private borehole water supply is one of the most important resources available to humanity; therefore it is more than necessary to provide a tool that can assess its quality over space and time. Groundwater exists below the surface of the ground in the spaces between particles of rock or soil, or in the crevices and cracks in rocks, usually within 100 meters of the surface of the Earth. Groundwater plays a substantial role in water supply, in ecosystem functioning and human well-being. Worldwide, 2.5 billion people depend solely on groundwater resources to satisfy their basic daily water needs, and hundreds of millions of farmers rely on groundwater to sustain their livelihoods and contribute to the food security of so many others.

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Groundwater supplies are diminishing, with an estimated 200/o of the world's aquifers being over-exploited, leading to serious consequences such as land subsidence and saltwater intrusion in coastal areas. The major sources of pollution in streams, rivers and underground water arise from anthropogenic activities largely caused by the poor and uncultured living habit of people as well as the unhealthy practices of factories, industries and corporate bodies; resulting in the discharge of untreated effluents and waste. Rivers state is a wetland in the Niger delta with likely serious problems of drinking water. Groundwater studies in some areas in Rivers State have shown increased levels in Total Dissolved Solids (TDS) (up to 2900mg/L), high hydrocarbon content oil and grease (71 mg/L in 2006 compared to 1.8 mg/L recorded seventeen years earlier) are reported to be some of the groundwater problems according to Ayotamuno and Kogbara (2010 and 2011) had reported iron and chloride elevation as groundwater issues and this was corroborated by Ophori et al (2012). Similar problems as reflected in Bayelsa, Delta and Rivers States were also reported by Arnangabara and Ejenma (2013), Edet(2014), and Amadi ci al.(2015).The principal goal of groundwater monitoring and management in developing countries is to assess and manage the water resources that are available. Groundwater is an important source of drinking water for more than half of Nigeria's population and nearly all its rural population; it is generally a very good source of drinking water because of the self-purifying properties of the soil, therefore there is the need for regular monitoring and assessment of these drinking water sources. This is because monitoring provides data on groundwater quantity and quality and it is an integral aspect of groundwater management (2016)-(2017). However, the quality assessment of private boreholes in some selected community in Port Harcourt Metropolis has not been reported, hence, this study is aimed at assessing the groundwater quality samples from Diobu Community to provide baseline data which will be used as a guide for future monitoring and to determine the extent of contamination by comparing results with local and international standardized limits.

Groundwater sources are being increasingly used as drinking water yet, testing to see whether the water is of good quality is almost non-existent. Although, it is true that soils generally function to reduce the effect of microorganisms by a simple filtration mechanism, especially larger bacterial and protozoa, pollution of groundwater by micro-organisms, especially the located near septic tanks or landfills

significantly do occur

STATEMENT OF THE PROBLEM

Groundwater sources are being increasingly used as drinking water yet, testing to see whether the water is of good quality is almost non-existent. Although, it is true that soils generally function to reduce the effect of microorganisms by a simple filtration mechanism, especially larger bacterial and protozoa, pollution of groundwater by microorganisms, especially the located near septic tanks or landfills significantly do occur

Objective of the Study

The aim of this study is to assess the water quality of some private borehole in Port Harcourt metropolis using questionnaire method this was achieve to:

1. Access the water quality in Port Harcourt metropolis.
2. Examine the causes of contamination of private borehole water.
3. To examine the effect of private borehole contamination
4. To determine the possible contamination control measure of private borehole water in Diobu Community

Research Questions

- 1) What is water quality in Port Harcourt metropolis?
- 2) What are the causes of contamination of private borehole water?
- 3) What is the effect of private borehole contamination?
- 4) What are the possible contamination control measures of private borehole water in Diobu Community?

Hypotheses

The follow hypotheses were formulated and tested at 001 level of significance.

Ho₁, there is no significant mean difference in the water quality rating among respondent based on the demographic variables.

Ho₂: there is no significant mean difference in the casus of water contamination of private borehole based on demographic variables.

Ho₃: there is no significant mean difference in the effect of private borehole contamination based on demographic variable.

Ho₄: there is no significant mean different in the control contamination private borehole water based on demographic variable.

Table 1: Summary of mean rating of the water quality in Diobu Port Harcourt metropolis

S/N	WATER QUALITY	SA	A	D	SD	Mean	STD
1	Most of the private borehole in Diobu have taste	86	62	28	19	3.10	0.98
2	The private borehole owners in Diobu Community do test water in the laboratory to determine the	71	50	55	19	2.89	1.01
3	The boreholes water in Diobu community contains black particles?	21	149	16	9	2.93	0.61
4	The sites in Diobu Community are Checked	90	87	12	6	3.34	0.73

Methods:

The study adopted a descriptive research survey design to enhance generalization of findings, the study is confined to Diobu which consists of three main extension namely; mile1, mile2, and mile3, it is boarded by new GRA to the North, D-line to the north east, Rivers state University to the northeast old GRA to the east, kidney island to the south east, eagle island to the South West, the coordinates of Diobu are 4° 47'24N 6° 59 ' 3 '6 " E .(Latitude 4.772152: Longitude 6.9945147).



Figure 1.1 Port Harcourt Map showing Diobu Area in Rivers State

A sample of 200 questionnaires was used for the study.

40 item structured questionnaire developed by the research was used “ WATER QUALITY” causes of contamination of private borehole , effect of private borehole contamination and control of contamination of private borehole water in Diobu community in Port Harcourt metropolis. The data collected was analyzed using simple descriptive statistics of means and standard deviation to answer research question.

A mean cut off point of 3.37 was used for decision making the hypotheses were tested using chi-square test by TAMANI formula to arrive at the sample population of the study.

RESULT AND FINDING

This section present and discuss the result of the study

Research question 1: What is water quality in Port Harcourt metropolis?

	often by government and non-government standard organization						
5	Most of the Private borehole in Diobu Community uses granular magnesium dioxide (Salt) for water treatment	72	61	57	5	3.03	0.88
6	Setting and filtration is a physical process used in treating water quality	70	58	48	19	2.92	1.00
7	Private boreholes are used in Port Harcourt Metropolis, mostly in Diobu Community	92	84	9	10	3.32	0.79
8	Colour in water is primarily a concern of water quality for aesthetic reason	143	45	3	4	3.68	0.61
9	Water purification is a measure taken to ensure water quality treatments	102	61	19	13	3.29	0.90
10	Taste and odour are human perceptions of water quality, Human perceptions of taste includes Sour (hydrochloric acid), salty sodium chloride), sweet (sucrose) and bitter (caffeine)	117	48	13	17	3.36	0.94

Overall Mean Scores 3.18 0.45

- SA - Means strongly Agreed
- A - Means Agreed
- D - Means disagreed
- SD - Means strongly disagreed
- STD - Means Standard Deviation

The result from Table 1 shows the summary of mean rating of water quality in Diobu Port Harcourt metropolis. It shows that the grand mean rating of water quality in Diobu Port Harcourt metropolis was 3.18, STD=0.45. Specifically, the result also shows that the mean rating of colour in water is primarily a concern of water quality for aesthetic reason. Coloured water give the appearance of being unfit to drink was 3.68, STD=0.61 whereas Taste and odours are human perceptions of water quality. Human perception of taste includes sour (hydrochloric acid), salty (sodium chloride), sweet (sucrose) and bitter(caffeine)? Was 3.36, STD=0.94. and that of The sites in Diobu Community are checked often

by government and non government standard organization was 3.34, STD=0.73, while Setting and filtration is a physical process used in treating water quality is a measure of the light-transmitting properties of water and is comprised of suspended and colloidal material was rated with mean score of 3.29, STD= 0.90, and Most of the Private borehole in Diobu Community uses Granular Magnesium dioxide (salt) for water treatment had mean rating of 3.17. STD=0.90.

Research Question: 2 What are the Causes of Contamination of Private Borehole Water.

Table 2: Summary of mean rating of Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis.

S/ N	Causes of contamination of private borehole water	SA	A	D	ST D	Mean	STD
1	When hazardous waste is disposed or dumped in a site, it leads to contamination ground water after some time	135	50	6	4	3.62	0.65
2	Any borehole located close to a landfill site will produce contaminated water	111	84	0	0	3.57	0.50
3	Atmospheric pollutant is one of the agent of water pollution	118	77	0	0	3.61	0.49
4	Oil spillage in an area can directly or indirectly contaminate the ground water	161	29	5	0	3.80	0.46

5	Chemicals like road salts, solvents used in the area are part are source ground water contamination	140	49	6	0	3.69	0.53
6	Pesticide is prone to washing into the soil after heavy rainfalls which will also lead to contamination ground water	111	77	7	0	3.53	0.57
7	Animal waste in the area will cause contamination of water	89	75	31	0	3.30	0.73
8	Arsenic is a chemical in rock, ground water flows from the rock when these chemical contaminate the ground water, it capable of poisoning both human and animals	95	75	25	0	3.36	0.70
9	Radon gas is a natural pollutant that can cause serious problem to human or animals that consumes water contaminated with it	73	105	15	2	3.28	0.65
10	Contamination of ground water is the major source contaminated boreholes	94	99	2	0	3.47	0.52

Grand Mean 3.52 0.33

The Result from Table 2

Shows the summary of mean rating Control of Contamination of Private Borehole Water in Diobu Community, It shows that the grand mean rating of water quality in Diobu Port Harcourt metropolis was 3.52, STD=0.33. Specifically, the result also shows that the mean rating of Oil spillage in an area can directly or indirectly. Contaminate the ground water.3.80, STD=0.46 where as that of Chemicals like road salts, solvents used in the area are part of the area are part of the source of ground water

contamination. 3.69, STD=0.53 it also shows that when hazardous waste is dispose or dumped in a site, it leads to contamination of groundwater after some time 3.62, STD=0.65, and also the mean rating of Atmospheric pollutant is one of the agent of water pollution 3.61, STD=0.49 and also the least Any borehole located close to a landfill site will produce a contaminated water was 3.57, STD =0.50

Research Question 3: What is the Effect of Private Borehole Contamination?

Table 3: Summary of Mean Scores Rating of the Effect of Private Borehole Contamination Dibou Community in Port Harcourt Metropolis.

S/ N	Effect of contamination of private borehole water	SA	A	D	ST D	Mean	STD
1	Most of the disease that affects children in Diobu Community is traceable to contaminated water which they drink	119	76	0	0	3.61	0.49
2	Groundwater infected with hepatitis is the major cause of Hepatitis in human	150	45	0	0	3.77	0.42
3	Most children in our rural area are suffering from dysentery because of the intake of contaminated water	108	86	1	0	3.55	0.51
4	Any borehole that is not properly dug, or that is exposed to chemical flow can become poisonous to human consumption	133	62	0	0	3.68	0.47
5	When an area has a contaminated groundwater the land value will be depreciated	95	76	24	0	3.36	0.69
6	Contamination of groundwater reduces the nutrient of the land	73	60	62	0	3.06	0.83
7	An area with contaminated ground water cannot be used as an industrial area	74	59	62	0	3.06	0.83
8	Vegetations are affected when the groundwater is contaminated	25	148	18	4	2.99	0.55
9	The degree of Private borehole contamination is high in Diobu Community	83	106	6	0	3.39	0.55
10	Some private borehole water owner in Diobu community does not take care or wash their storage up to 10 years	102	92	1	0	3.52	0.51

11	Private borehole owner in Diobu community test their water always	72	61	62	0	3.05	0.83
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Grand Mean 3.37 0.37

The result from Table 3 shows the summary of mean rating of Effect of Private Borehole Contamination in Diobu Community, It shows that the grand mean rating of Effect of Private Borehole Contamination in Diobu Port Harcourt metropolis was 3.37, STD=0.37 Specifically, the result also shows that the mean rating of ground water infected with hepatitis is the major cause of Hepatitis in human. 3.77, STD=0.42 where as any borehole that is not properly dug, or that is exposed to chemical flow can become poisonous to human consumption.3.68, STD=0.47, it also shows that Most of the disease that affects children in Diobu Community is

traceable to contaminated. 3.61, STD=0.49, and also the mean rating Most children in our rural area are suffering from dysentery because of the intake of contaminated water. 3.55, STD=0.51 and also the some private borehole water owner in Diobu Community does not take care or wash their storage tank for up to 10 years 3.52 STD=0.51

Research Question 4: What are the possible Contamination control measures of Private Borehole Water in Diobu Community

Table 4: Summary Of Mean Scores Rating of Control Contamination of Private Borehole Water in Diobu Community in Port Harcourt Metropolis

S/ N	Control of contamination of private borehole water	SA	A	D	ST D	Mean	STD
1	Government should always send their law enforcement agents, to make sure people abide with the law and regulation guiding quality of water	98	93	4	0	3.48	0.54
2	Private borehole owner should ensure the cleanness of their storage tank always	139	55	1	0	3.71	0.47
3	Dump sites should not be located close to resident area where it will affect water flowing to the borehole	120	75	0	0	3.62	0.49
4	Due examination of water should be done periodically by the private borehole owners to detect when the water becomes contaminated	140	55	0	0	3.72	0.45
5	Joint effort should put in place for cleaning of contamination in the environment	115	67	9	4	3.50	0.68
6	Series of test should be done on groundwater of an area before that site can be chosen as borehole site	107	88	0	0	3.55	0.50
7	Discharge of petroleum product in any community of Diobu or its environs should be reported to the appropriate quarters to avoid contamination of ground water	117	78	0	0	3.60	0.49
8	Rearing of some animal like pig, cow etc should not be located near drinking borehole to avoid contamination of water through animal waste	61	111	21	2	3.18	0.66
9	Hazardous chemicals should not be disposed inappropriately	81	80	34	0	3.24	0.73
10	Old boreholes which was a conversion from dug well to borehole should be closed down because of health implication of contaminated water	88	76	31	0	3.29	0.73

Grand Mean 3.49 0.34

The result from Table 4 shows the summary of mean rating of Control of Contamination of Private Borehole Water in Diobu Community, It shows that, the grand mean rating of Control of Contamination of Private Borehole Water in Diobu Community, was 3.49, STD=0.34 Specifically, the result also shows' that the mean rating Due examination of water should be done periodically by the private borehole owner to detect when the water become contaminated. 3.72, STD=0.45 where as Private borehole owner should ensure the cleanness of their storage tank always.3.71, STD=0.47, it also shows that Dump sites should not be located close to resident area where it will affect water flowing to the borehole 3.62,

STD=0.49, and also the mean rating of Discharge of petroleum product in any community of Diobu or its environ should be reported to the appropriate quarters to avoid contamination of ground water .3.60, STD=0.49 and also the least and not the last was Series of test should be done on groundwater of an area before that site can be chosen as borehole site. 3.55 STD=0.50

HYPOTHESIS TESTING

H0₁: There is no significant mean difference in the water quality rating among respondent based on the demographic variables.

Table 1: Summary of the factorial Analysis of Variance on the mean difference in the water quality rating among respondent based on the demographic variables

Source	Type III Sum of square	Df	Mean Square	F	Sig
Corrected	6.004a	11	.546	3.019	.001
Model Intercept	299.823	1	299.823	1658.731	.000
GENDER	.010	1	.010	.055	.814
AGE	.208	4	.052	.288	.886
MARITAL STATUS	5.155	3	1.718	9.507	.000
EDU QUALIFICATION	.047	3	.016	.087	.967
Error	33.078	183	.181		

Total 2016.149 195

Corrected Total 39.082 194

a. R Squared = .154 (Adjusted R Squared .103)

The result from Table 1 shows the summary of the factorial Analysis of Variance on the mean difference in the water quality rating among respondent based on the demographic variables. It shows that only marital status(F1, 1839.507, p<.05) as significant over mean difference in the water quality rating among respondent, whereas Age(F4, 183=.288,

p>. 05), gender(F1, 183=.055) and Educational qualification (F3, 188=.087, p>.05) were not significant over mean difference in the water quality rating among respondent.

H0₂: There is no significant mean difference in the cause of water contamination of private borehole based on demographic variables.

Table 2: Summary of the factorial Analysis of Variance on the mean difference in the cause of water contamination of private borehole rating among respondent based on the demographic variables

Source	Type III Sum of square	Df	Mean Square	F	Sig
Corrected	.712a	11	.065	.578	.846
Model Intercept	380.960	1	380.960	3397.004	.000
GENDER	.140	1	.140	1.245	.266
AGE	.370	4	.093	.826	.510
MARITAL STATUS	.124	3	.041	.368	.776
QUALIFICATION	.043	3	.014	.128	.943
Error	20.523	183	.112		

Total 2440.180 195

Corrected Total 21.235 194 -

a. R Squared .034 (Adjusted R Squared = -.025)

The result from Table 2 shows the summary of the factorial Analysis of Variance on the mean difference in the cause of water contamination of private borehole respondent based on the demographic variables. It shows that there were no significant mean difference in the cause of water contamination of private borehole based on marital status

(F3, 183=.368, p>.0S), Age(F4, 183=.826, p>. 05), gender(F1, 1831.245, p>.05) and Educational qualification (F3, 188.128, p>.05) respectively

H0₃: There is no significant mean difference in the effect of private borehole contamination based on demographic variables.

Table 3: Summary of the factorial Analysis of Variance on the mean difference in the Effect Of Private Borehole rating among respondent based on the demographic variables

Source	Type III Sum of square	Df	Mean Square	F	Sig
Corrected Model	2.007a	11	.182	1.359	.196
Intercept	365.125	1	365.125	2719.434	.000
GENDER	.093	1	.093	.691	.407
AGE	1.059	4	.265	1.972	.101
MARITAL STATUS	.348	3	.116	.864	.461
QUALIFICATION	.446	3	.149	1.108	.347
Error	24.570	183	.134		

Total 2239.152 195

Corrected Total 26.578 194

a. R Squared =.076 (Adjusted R Squared = .020)

The result from Table 3 shows the summary of the factorial Analysis of Variance on the mean difference in the effect of private borehole respondent based on the demographic variables. It shows that there were no significant mean

difference in the effect of private borehole respondent based on marital status(F3, 183=864, p>.05), age (F4, 183=1.972, p>. 05), gender(F1, 183=691, p>.05) and Educational qualification (F3, 183=1.108, p>.05) respectively.

H04: There is no significant mean difference in the control of variable. contamination private borehole water based on demographic

Table 4: Summary of the factorial Analysis of Variance on the mean difference in the Control of Contamination rating among respondent based on the demographic variables

Source	Type III Sum of square	Df	Mean Square	F	Sig
Corrected	1.080a	11	.098	.847	.594
Model Intercept	386.078	1	386.078	3328.416	.000
GENDER	.040	1	.040	.348	.556
AGE	.673	4	.168	1.450	.219
MARITAL STATUS	.048	3	.016	.139	.936
QUALIFICATION	.272	3	.091	.781	.506
Error	21.227	183	.116		

Total 2396.380 195

Corrected Total 22.3 07 194

a. R Squared = .048 (Adjusted R Squared = -.009)

The result from Table 4 shows the summary of the factorial Analysis of Variance on the mean difference in the Control of Contamination respondent based on the demographic variables. It shows that there is no significant mean difference in the control of contamination private borehole water based on marital status (F3, 183=.139, p>.05) whereas Ae (F4, 183=.1.450, p>. 05), gender (F1, 183=.348, p>.05) and Educational qualification (F3, 183.781, p>.0S) respectively.

SUMMARY OF FINDINGS

The key knowledge among water quality in Diobu Port Harcourt metropolis was that Most private borehole water in Diobu Community is full of little particles and greenish substance (M=3.68, STD=0.61) While the least was that considering the private borehole owner in the Diobu community do water testing in the lab to determine the level of hazardous particles in water. The key knowledge of Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis. is Chemicals like road salts, solvents used in the area are part of the source of ground water contamination. (M=3.69, STD=0.53) While the least was Radon gas is a natural pollutant that can cause serious problem to human or animals that consumes water contaminated with it. The key knowledge of Effect of Private Borehole Contamination Dibou Community in Port Harcourt Metropolis Groundwater infected with hepatitis is the major cause of Hepatitis in human. (M=3.77, STD=0.42) and the least was Vegetations are affected when the groundwater is contaminated. The key major knowledge of Control Contamination of Private Borehole Water in Diobu Community in Port Harcourt Metropolis, Due examination of water should be done periodically by the private borehole owners to detect when the water become contaminated is (M=3.72, STD=0.45). and the least is Rearing of some animal like pig, cow etc should not be located near drinking borehole to avoid contamination of water through animal waste. Gender has no significant influence on the knowledge of water quality in Diobu Port Harcourt metropolis. Gender has no significant influence on the of Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis. Gender has no significant influence on the Effect of Private Borehole Contamination Dibou Community in Port Harcourt Metropolis.

Gender has no significant influence on Control Contamination of Private Borehole Water in Diobu Community in Port Harcourt Metropolis.

Age has no significant influence on the knowledge of water quality in Diobu Port Harcourt metropolis. Age has no significant influence on the Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis. Age has no significant influence on the Effect of Private Borehole Contamination Dibou Community in Port Harcourt Metropolis.

Age has no significant influence on Control Contamination of Private Borehole Water in Diobu Community in Port Harcourt Metropolis.

Marital Status has no significant influence on the knowledge of water quality in Diobu Port Harcourt metropolis. Marital Status has no significant influence on the of Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis. Marital Status has no significant influence on the Effect of Private Borehole Contamination Dibou Community in Port Harcourt Metropolis.

Marital Status has no significant influence on Control Contamination of Private Borehole Water in Diobu Community in Port Harcourt Metropolis.

Educational Qualification has no significant influence on the knowledge of water quality in Diobu Port Harcourt metropolis. Educational Qualification has no significant influence on the Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis. Educational Qualification has no significant influence on the Effect of Private Borehole Contamination Dibou Community in Port Harcourt Metropolis.

Educational Qualification has no significant influence on Control Contamination of Private Borehole Water in Diobu Community in Port Harcourt Metropolis.

DISCUSSION OF FINDINGS

Table:1 Water Quality In Diobu Port Harcourt Metropolis

The result from Table 1 shows that water quality in Diobu Port Harcourt metropolis is that colour in water is a primary concern of water quality for aesthetic reason (M=3.68, STD=0.61) While the least was that considering the private borehole owner in Diobu community do water testing in the

lab to determine the level of hazardous particles in water. The result from Table 1 shows that gender has no significant influence in water quality in Diobu Port Harcourt metropolis (F1, 183=0.55, p>.05). The null hypothesis was retained at 0.05 alpha level. Age has no significant influence in water quality in Diobu Port Harcourt metropolis (F1, 183=0.288, p>.05). The null hypothesis was retained at 0.05 alpha level. Marital Status has no significant influence water quality in Diobu Port Harcourt metropolis (F1, 183=0.9.51, p>.05). The null hypothesis was retained at 0.05 alpha level, Educational Qualification has no significant influence water quality in Diobu Port Harcourt metropolis (F1, 183=087, p>.05). The null hypothesis was retained at 0.05 alpha level.

Table 2: Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis.

The result from Table 2 shows that Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis is Chemicals like road salts, solvents used in the area are part of the source of ground water contamination. (M=3.69, STD=0.53) While the least was Radon gas is a natural pollutant that can cause serious problem to human or animals that consumes water contaminated with it. The result from Table 2 shows that gender has no significant influence that Causes of contamination of private borehole water in Diobu (F1, 183=1245, p>.05). Age has no significant influence in the Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis (F4, 183=826, p>.05). The null hypothesis was retained at 0.05 alpha level. Marital status has no significant influence in the Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis.(F3, 183=.368, p>.05). The null hypothesis was retained at 0.05 alpha level, Educational Qualification has no significant influence in the Causes of contamination of private borehole water in Diobu Port Harcourt Metropolis (F3, 183=128, p>.05). The null hypothesis was retained at 0.05 alpha level.

CONCLUSION

The result showed that some of the parameter used was within normal range for the water samples in the study area were within the acceptable limits by W.H.O and FME standards for drinking water except the P^H value which was comparatively low in private borehole water samples.

RECOMMENDATION

It is therefore recommended that standard measures be taken by the appropriate authorities to ensure proper treatment of the waters to safeguard the health of the innocent consumers, total coliforms, and lead in the affected sites.

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