



## **Potable Water and Sanitation Practices among Pupils in Some Selected Primary Schools in Yenagoa, Bayelsa State, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author HOS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors CJU, VCO, EO, EGO and TEO managed the analyses of the study. Authors CJU, VCO, EO, EGO and TEO managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Nearly half of all children in developing countries have infections or disease associated with inadequate water supply and sanitation. This study aimed at assessing sanitation practices and available sources of water supply in selected primary schools in Yenagoa, Bayelsa State, Nigeria. A descriptive cross sectional survey was used in this study. The primary schools and pupils were selected by random sampling. Results revealed that sanitation facilities in the schools were grossly insufficient. Where available, the facilities were overused and poorly maintained. The study also showed that potable water supply in the schools was inadequate. Sachet water was the main source of water supply in the study area. Sanitation facilities in the study area were inadequate and impacted on the sanitation practices of the pupils. The level of awareness towards sanitation education among the pupils was quite high and encouraging. The sanitation practices and potable water supply were generally not satisfactory, putting the pupils at risk of infectious diseases associated with inadequate water supply and sanitation.

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## 1. INTRODUCTION

Water is one of the most important resources required for survival in human society. Its uses range from domestic applications such as drinking and washing to several industrial and manufacturing processes. Potable water can be described as any water that is good for drinking without fear of poisoning or disease [1].

Poor waste management may contaminate water bodies especially if waste disposal is close to the source of water used for domestic or industrial use. Unsafe water, inadequate sanitation and insufficient hygiene account for an estimated 9.1% of the global burden of disease and 6.3% of death according to the World Health Organization [2]. Nearly half of all children in developing countries have infections or diseases associated with inadequate water supply and sanitation [2]. In Nigeria, the inadequacy of potable water supply and sanitation services is manifested in the prevalence of water and sanitation related diseases. Diarrhoea which results from poor sanitation/hygiene habits and consumption of poor quality water is the second main cause of infant mortality after malaria and the third main cause of mortality generally [3,4]. Similarly, there has been an increasing number of cholera infant mortality over the years as a result of contaminated water supply, inadequate sanitation and personal hygiene. Poor water supply and sanitation also account for almost 50% of the child being underweight since it has a direct link to diarrhoea [1].

The global disease burden can be reduced if rapid success is attained in facilitating access to water, sanitation, and hygiene facilities [5]. The provision of safe water and sanitation facilities in primary schools is the first step towards a healthy physical learning environment benefiting both learning and health, though the mere provision of facilities does not make them sustainable or produce the desired impact [6].

In most developing countries satisfactory environmental sanitation has not been strictly adhered to. Potable water and sanitation greatly determine the frequency of communicable diseases especially waterborne, foodborne and

vector-borne diseases in developing countries all over the world, with much effect on children of primary school age [7]. A large number of

primary schools in urban and rural areas in most developing countries lack access to adequate sanitary facilities like latrines and means for hand washing [8]. The common water sources used in primary schools in Nigeria are borehole, rain and river water [9,10]. This study aimed at assessing the available sources of water supply, its adequacy and the level of sanitation practices among pupils in selected primary schools in Yenagoa, Bayelsa State, Nigeria.

## 2. METHODOLOGY

### 2.1 Study Area/Location/Setting

The study area is Yenagoa, Bayelsa State, Nigeria, which is both the headquarters of Yenagoa Local Government Area and the capital city of Bayelsa State. The area is situated on 4°55'29"N 6°15'51"E. It has an area of 706 km<sup>2</sup> and a population of 352,285 at the 2006 census. The Ijaws form the majority of the state. English is the official language, but Epie-Atissa language is one of the local languages spoken in Yenagoa.

The local government is politically divided into 15 wards. According to the records of Bayelsa State Ministry of Education, there are 68 public primary schools and 18 approved private schools in Yenagoa LGA, with a combined estimated population of 35802 pupils. Records from the Yenagoa LGA Basic Education Authority (LGBEA) showed that the area is divided into 3 education zones namely: Gbarain/Ekpetiama, Biseni/Okordia, Epie/Atissa.

### 2.2 Study Design and Population

A cross-sectional descriptive survey was adopted for this study. The study population consisted of all the pupils in primary V and VI in the selected primary schools in Yenagoa L.G.A, Bayelsa State, Nigeria.

#### 2.2.1 Inclusion criteria

- Children in primary V and VI in the selected primary schools.
- Public primary schools funded and administered by the Bayelsa State Ministry of Education.
- Mixed (both boys and girls), or single sex (only girls or only boys) in composition
- Pupils that have been at the school for five years.

### 2.2.2 Exclusion criteria

1. Pupils in special schools like school for the blind
2. Pupils from class 1-4 were also excluded,
3. The staff of the selected schools were also excluded.
4. Pupils who have not spent five years in the school

interviewer administered questionnaire, which is made up of close ended questions.

The questionnaires had 3 sections namely

- Section 1: Bio-data of pupils and schools.  
 Section 2: Potable water and sanitation.  
 Section 3: Level of awareness on potable water and sanitation among the pupil.

### 2.3 Sample Size Determination

A minimal sample size was calculated using the formula below for cross sectional descriptive study: Sample size  $n = z^2pq/d^2$ .

### 2.4 Sample Technique

Multi-stage random sampling technique was used, this involved 3 stages: Five wards were selected by simple random sampling from the 15 political wards in Yenagoa Local Government Area; at least one primary school was selected from each ward and an additional one from the city centre making it a total of 6 primary schools, and the pupils for the actual study in all primary school were selected by picking a "yes" and "NO" option.

### 2.5 Data Collection

Data from the project were collected from the pupils in primary V and VI with the help of an

## 3. RESULTS

Table 1 shows the distribution of respondents based on sex, age group, class and schools. From the table, more females (55.6%) participated in the study. Majority of the pupils fell within the age range of 11-15 years (77.1%) and the mean age was 11 years. More of the pupils were in primary 5. Okordia primary school had less number of pupils than other schools with a population of 11 pupils (5.1%).

Table 2 shows the distribution of respondent by the source of water supply, the distance of water source from school, and means of getting water from the source. From the table, sachet water accounted for 45.8% on the sources of water supply to the pupils in the study area and borehole water 30.8%. The distance of the source of water from the schools was close for 49.1% of the pupils while the means of getting the water for 50.5% of the pupils was by buying.

**Table 1. Distribution of respondents based on sex, age group, class and schools**

Characteristics	Number of respondents	Percentages (%)
<b>Sex</b>		
Male	95	44.4
Female	119	55.6
Total	214	100
<b>Age group</b>		
6-10	49	22.9
11-15	165	77.1
<b>Class</b>		
Primary 5	125	58.4
Primary 6	89	41.6
Total	214	100
<b>Schools</b>		
Obunagha primary school	38	17.8
Biseni primary school	43	20.1
Okordia primary school	11	5.1
Kpansia primary school	43	20.1
Ogbogoro primary school	43	20.1
Ogorama primary school	36	16.8
Total	214	100

**Table 2. Distribution of respondent by source of water supply, distance of water source from school, and means of getting water from the source**

<b>Characteristics</b>	<b>Number of respondent</b>	<b>Percentage (%)</b>
<b>Sources of water supply</b>		
Borehole water	66	30.8
Well water	3	1.4
Rain water	11	5.1
River water	9	4.2
Sachet water	98	45.8
Bottle water	17	7.9
Total	214	100
<b>Distance of water supply from the school</b>		
Close	105	49.1
Very close	49	22.9
Far	35	16.4
Very far	10	4.7
Not too close nor far	10	4.7
No response	5	2.3
Total	214	100
<b>Means of getting water from the source</b>		
Fetching with container	91	42.5
Buying	108	50.5
Pumping	7	3.3
No response	8	3.8
Total	214	100

Table 3 shows that 102 (47.7%) pupils had access to toilet facilities out of which only 55 (53.9%) of the 102 (47.7%) pupils had access to a functional toilet. Only 15(14.7%) pupils had access to toilets with available water while 77 (75.5%) pupils had cleaning materials in their toilets. A total of 100 (46.7%) of the pupils that had nonfunctional toilet ease themselves in the bush close to the school.

Table 4 shows that 31.3% of the pupils indicated that their school environment was always clean, 61.7% indicated they clean their schools daily. In addition, 60.7% indicated that there was presence of grasses around the school environment, 50% indicated garbage disposal was outside the school environment, 79.4% wash hands with soap and water after using the toilet and 47.7% indicated that the classrooms were good and clean.

Table 5 shows that 49.1% of the pupil had no knowledge of potable water, 86.9% had knowledge of sanitation, 93.9% had knowledge of the effect of drinking dirty water and 90.2% had knowledge of the effect of dirty environment.

#### 4. DISCUSSION

This study looked at sanitation practices, available sources of water supply and its

adequacy among pupils in selected primary schools in Yenagoa, Bayelsa State Nigeria. Sanitation is a serious issue that is affecting most part of the world especially developing countries like Nigeria. On a global scale, children of school age are the most affected by inadequate water supply and poor sanitation [1].

In the present study, only 85% of the respondents had access to potable water (Borehole, sachet and bottled water). The result of this study did not agree with the findings of a study carried out by Lawani et al. [10] in Owerri, Imo State, Nigeria which reported that only 25% of their respondents had access to potable water (pipe borne and borehole water). This observation may be due to the improved water supply presently available when compared to the period when this same research was carried out in their study.

Results on the accessibility of potable water showed that 49.1% of the respondents obtained their water from a source close to the school compound while 22.9% of the respondents obtained their water from a source far from the school compound. The results of this study is not in line with findings of a study carried out in the Niger Delta by Kotingo et al. [11] which reported that 87% of the pupils walk a distance of fewer

than 5 minutes (close) from the school to the source of water supply while 13% had to walk more than 5 minutes to the source (far). This observation may be due to lack of potable water supply facilities in most of the schools sampled.

Regarding sanitation facilities a reasonable proportion of the respondents 47.7% had toilet facilities in their school while 49.5% of the respondents do not have toilet facilities. As a result, about 46.7% of those without toilet facility use open environment such as field and bush for defecation. This finding is in congruence with a study carried out in Ghana by Gyabaah et al. [12] which reported that 53% of the respondents had no toilet facilities. The Federal Ministry of

Education reported that 27.7% of schools in the Local Government Areas of Nigeria had no toilet facilities [13]. Furthermore, of the 47.7% of the pupils that had toilet facilities, it was observed that 16.7% used pit latrines, 6.9% used bucket toilet and 74.5% used water closet. This observation is not in agreement with the findings of Aremu [14] which reported that 33% of schools in Ilorin, Kwara State, Nigeria had pit latrines while 40% had a water closet. In the current study, the use of the modern facility (water closet) which was 74.5% showed an improvement in the disposal of excreta which may have been achieved by awareness education in environmental sanitation within the study area.

**Table 3. Distribution of respondents by sanitation facilities, their adequacy and use in the study area**

<b>Characteristics</b>	<b>Number of respondent</b>	<b>Percentage (%)</b>
<b>Availability of toilets</b>		
Toilets are available	102	47.7
No toilets available	106	49.5
Total	214	100
Pit Latrine	17	16.7
Bucket Toilet	7	6.9
Water Closet	76	74.5
No response	2	2.0
Total	214	100
<b>Functionality of toilets</b>		
Toilets are functional	55	53.9
Toilets not functional	27	26.5
No response	20	19.6
Total	214	100
<b>Availability of water in the toilets</b>		
Water is available in toilet	15	14.7
No water available in the toilets	82	80.4
No response	5	4.9
Total	214	100
<b>Alternatives in the absence of toilet</b>		
In the bush close to the school	100	46.7
Go back home to ease myself	8	3.7
Suppress it until I get home	9	4.2
A friends place close to the school	5	2.3
No response	92	30
Total	214	100
<b>Availability of cleaning materials in toilets</b>		
Cleaning materials available in toilets	77	75.5
No cleaning materials available in toilets	22	21.6
No response	3	2.9
Total	214	100

**Table 4. Distribution of respondents based on the level of hygiene practices in the study area**

<b>Characteristics</b>	<b>Number of respondent</b>	<b>Percentage (%)</b>
<b>Cleanliness of the school yard</b>		
Clean	63	29.4
Dirty	18	8.4
Always dirty	13	6.1
Always clean	67	31.3
Sometimes clean	28	13.1
Sometimes dirty	13	6.1
No response	12	5.6
Total	214	100
<b>How often they clean the school environment</b>		
Daily	132	61.7
Weekly	28	13.1
Twice weekly	38	17.8
Monthly	3	1.4
No response	13	6.1
Total	214	100
<b>Presence of grasses around the school surrounding</b>		
There is presence of grass	130	60.7
No presence of grass	78	36.4
No response	6	2.8
Total	214	100
<b>Method of disposal of garbage</b>		
Disposed outside school	107	50
Burning	77	36
Buried within the school environment	14	6.5
No response	16	7.5
Total	214	100
<b>Hand washing with soap and water after using the toilet</b>		
Yes	170	79.4
No	44	20.6
Total	214	100
<b>Condition of the interior of the classrooms</b>		
Good and clean	102	47.7
Good and dirty	42	19.6
Bad and clean	14	6.5
Bad and dirty	29	13.6
No response	27	17.1
Total	214	100

On the school environment, 73.8% of the respondents affirmed that their school environment was clean, 20.6% of the respondents affirmed that their school environment was dirty while 5.6% did not respond to the question. From Table 4, 60.7% of the respondents agreed that there is the presence of grass in the school surrounding which does not suggest a clean environment. More so, 61.7% of the respondents affirmed that they clean the school environment on a daily bases. The study also revealed that 50% of the respondents dispose of the refuse generated in

the school environment at a dump site outside the school environment while 36% dispose of their refuse by burning, 6.5% by burying within the school environment and 7.5% respondents gave no response. This is not in agreement with the findings of Lawani et al. [10] carried-out in Imo State which reported that 72.3% of the respondents practice daily burning of refuse.

The pupil's knowledge of potable water supply (46.3%) was inadequate when compared to their knowledge of sanitation (86.9%). A good number of the respondents 93.9% and 90.2% were

**Table 5. Distribution of the respondents based on knowledge of potable water and sanitation**

Characteristics	Number of respondents	Percentage (%)
<b>Knowledge of potable water</b>		
Have knowledge of potable water	99	46.3
No knowledge of potable water	105	49.1
No response	10	9.2
Total	214	100
<b>Knowledge about sanitation</b>		
Have knowledge about sanitation	186	86.9
No knowledge about sanitation	12	5.6
No response	16	7.5
Total	214	100
<b>Knowledge on the effect of drinking dirty water</b>		
Yes	201	93.9
No	2	0.9
No response	11	5.2
Total	214	100
<b>Knowledge on the effect of dirty environment</b>		
Yes	193	90.2
No	9	4.2
No response	12	5.7
Total	214	100

aware that drinking dirty water and staying in a dirty environment can cause illness respectively. This finding is in congruence with the finding of Lawani et al. [10] which reported that primary school pupils in Imo State have a high awareness that dirty environment could lead to illness. The result that 79.4% wash their hands after using the toilet with soap and water while 20.6% of the respondents did not wash their hands after using the toilet due to lack of hand washing facilities agrees with that of Lawani et al. [10] where 70% of the respondents wash their hands after using the toilet with soap and water.

## 5. CONCLUSION

The major source of potable water supply to the pupils in this study was sachet water which was readily available, accessible and affordable in this area. Majority of the pupils' were knowledgeable about the effect of dirty environment on illness and hands washing after using the toilet. Sanitation facilities were not adequate in most of the schools surveyed. In a few schools that had some sanitation facilities, these were grossly insufficient and were overused and not maintained. The knowledge of potable water and sanitation practices in the study area was generally not satisfactory but the level of awareness towards sanitation education was quite high and encouraging.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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