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Assessment of Sanitation Facilities, Hygiene Practices and Challenges in Urban and Rural Public Primary Schools in Oshimili South Local Government Area, Delta State

Kehinde B[1]*, Bashir SA[1], Iwebelua RN[1], Ndie EC[2] and Ojule IN[3]

[1]Department of Public Health, National Open University, Abuja, Nigeria

[2]Department of Nursing Science, National Open University, Abuja, Nigeria

[3]Department of Community Medicine, University of Port Harcourt, Nigeria

ABSTRACT

This study assessed sanitation facilities, hygiene practices and challenges in urban and rural public primary schools in Oshimili South local government area, Delta State. Three research questions guided the study and were correspondingly hypothesized. The design of the study was cross-sectional survey research design. A multistage sampling technique was employed to select, 234 pupils and 145 staff from the 2024/2025 academic year, resulting in a total sample of 379 participants drawn from a population of 6,204 across urban and rural schools. The instruments for data collection were 31-item structured questionnaires on 4-point modified Likert scale designed for staff and pupils by the researcher. Cronbach's Alpha method was used to ascertain the internal consistency of items and correlation indices of 0.83 and 0.80 were obtained for staff and pupils' questionnaires respectively. Data collected were analysed using frequency count and percentage statistics while independent sample t-test statistic was used to test the formulated hypotheses at $\alpha = 0.05$. Results showed among others, that the current conditions of sanitation facilities in urban public primary schools (57.2%) are more favourable compared to rural (43.9%) schools with inadequate facilities; a statistically significant difference in the quality of sanitation facilities between rural and urban public primary schools, with urban schools being favoured ($t = 2.325$, $p < 0.021$). The study recommended among others that, Delta State and Oshimili Local Governments, and school management should prioritize the provision and upgrading of sanitation facilities (toilets, water supply, waste management systems) particularly in rural public primary schools.

***Corresponding author**

Kehinde B, Department of Public Health, National Open University, Abuja, Nigeria.

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Introduction

In primary schools, where children are particularly vulnerable to infections due to their developing immune systems and close physical interactions, ensuring cleanliness is paramount to safeguarding their health and supporting their academic success. Prüss-Ustün et al. The absence of these basic provisions of WASH infrastructure can exacerbate health disparities, particularly in low-resource settings, where the burden of preventable diseases remains high [1]. According to UNICEF, a significant proportion of schools in sub-Saharan Africa, including Nigeria, do not meet the minimum standards for WASH, leaving students and staff vulnerable to waterborne and hygiene-related diseases [2].

Umeh and Okoro link irregular maintenance and poor toilet conditions to diarrheal disease outbreaks in Nigerian. Pulimeno emphasized fostering a culture of hygiene, schools contribute to breaking the cycle of disease transmission and improving community health outcomes [3,4]. Using HBM theory, the study will identify key perceptual and contextual factors influencing hygiene behaviors, informing targeted interventions to improve WASH outcomes in Oshimili South's schools with multifaceted nature of the sanitation crisis [5]. This study aims to assessed sanitation facilities, hygiene practices and challenges in maintaining proper sanitation in urban and rural public primary schools in Oshimili South local government area, Delta State and contribute to the development of sustainable WASH programs that improve health outcomes.

This study answered the following research questions: What is the current state of sanitation facilities, hygienic procedures and obstacles that exist in upholding appropriate sanitary standards in rural and urban public primary schools in Oshimili South Local Government Area of Delta State? The study's objective was to assess the sanitary infrastructure, hygiene standards, and difficulties in public elementary schools in Oshimili South Local Government Area, Delta State, both in urban and rural areas.

The following null hypotheses were tested at 0.05 level of significance

H_{01}: There is no significant difference in the current state of sanitation facilities in rural and urban public primary schools in Oshimili South Local Government Area of Delta State.

H_{02}: There is no significant difference in the hygiene practices adopted by pupils and staff in public primary schools in Oshimili South Local Government Area of Delta State.

H_{03}: There is no significant difference in challenges faced in maintaining proper sanitation in rural and urban public primary schools in Oshimili South Local Government Area of Delta State.

The findings of this study will serve as a powerful tool to improved sanitation infrastructure and the integration of hygiene education into their teaching practices and foster a sense of personal responsibility and self-esteem among pupils, as they learn to take pride in maintaining their cleanliness and contributing to a hygienic school environment. This study will provide a compelling case for integrating WASH programs into broader health strategies, encouraging collaboration between education, health, and community development sectors to achieve sustainable improvements in public health.

Methodology

This research employed a cross-sectional, descriptive survey design and utilized a multistage sampling technique for participant selection. The study was conducted in Oshimili South Local Government Area (LGA), which comprises a mix of urban and semi-urban settlements and includes both public and private primary schools serving a diverse population with varying socioeconomic backgrounds and environmental conditions. The Research Advisors' (2006) sample size table, with a confidence level of 95% and a margin of error of ±5.0%, was used to determine an appropriate sample size. Accordingly, 234 pupils and 145 staff were selected, resulting in a total sample of 379 participants drawn from a population of 6,204 across urban and rural schools.

Data were collected using a self-structured questionnaire based on a 4-point modified Likert scale. The research instrument, titled "Assessment of Sanitation Facilities, Practices and Challenges Questionnaire (ASFPCQ)," comprised 31 items designed to gather responses from both pupils and staff (including teachers and school administrators). The questionnaire was validated and pilot tested in two schools one rural and one urban with 40 participants (20 staff and 20 pupils) to assess its reliability. Reliability was determined using Cronbach's Alpha, yielding correlation indices of 0.83 for the staff questionnaire and 0.80 for the pupils' questionnaire. These values, exceeding the acceptable threshold of 0.70, indicate that the instrument had good internal consistency and was reliable for the study.

Data related to demographic information and research questions were analyzed using frequency counts and percentage statistics. Ethical clearance for the study was obtained from the researcher's institutional review board and the Oshimili South Local Education Authority. The study participants included both male and female pupils in upper primary classes who were capable of reading and responding to the questionnaire with minimal assistance and staff (including teachers and school administrators).

Results

Analysis of Demographic Data

Table 1 illustrated the distribution of respondents by age group in rural and urban public primary schools within the Oshimili South Local Government Area of Delta State. In both settings, the largest portion of staff falls within the 35-44 age bracket (rural: 45.6%, urban: 44.5%). The staff demographic mainly consists of experienced individuals, which could positively impact school management and the quality of instruction. The majority of pupils are in the 11-13 age range in both rural (52.5%) and urban (52.0%) schools, aligning with the expected age distribution for primary school students. This indicates that the pupils' age range is consistent with typical primary school enrolment, making the study sample representative of the intended age group.

Table 1: Distribution of Respondents by Age Bracket Across Rural and Urban Public Primary School Settings

Respondents	Age Bracket	Rural		Urban	
		Frequency	Percent	Frequency	Percent
Staff	Below 25	7	10.3	12	9.4
	25-34	5	7.4	9	7.0
	35-44	31	45.6	57	44.5
	45 & above	26	36.8	49	39.1
	Total	**68**	**100**	**128**	**100**
Pupils	8-10	27	45.8	81	46.3
	11-13	31	52.5	91	52.0
	14 & above	1	1.7	03	1.7
	Total	**59**	**100**	**175**	**100**

Table 2 presented the distribution of staff in rural and urban public primary schools within the Oshimili South Local Government Area of Delta State. The majority of the staff are teachers, accounting for 86.8% in rural schools and 87.3% in urban schools. A smaller percentage consists of assistant teachers, with 11.8% in rural areas and 10.9% in urban settings, while government officials represent a very small fraction, at 1.5% in rural schools and 1.6% in urban ones. This data indicates that teaching is the main role in these schools.

Table 2: Category of Staff Across Rural and Urban Public Primary Schools

Category of Staff	Rural		Urban	
	Frequency	Percent	Frequency	Percent
Teacher	59	86.8	112	87.3
Assistant Teacher	8	11.8	14	10.9
Government Official	1	1.5	2	1.6
Total	**68**	**100**	**128**	**100**

Table 3 illustrated the distribution of students by class in rural and urban public primary schools within the Oshimili South Local Government Area of Delta State. Primary 5 made up approximately 47-48%, while Primary 6 comprised about 52%. This balanced distribution indicates that the study sample accurately reflects the upper primary classes. The equal representation in class levels facilitates comparisons or data aggregation between these two groups without the risk of biased representation.

Table 3: Distribution of Pupils by Class Across Rural and Urban Public Primary Schools

Number of Years	Rural		Urban	
	Frequency	Percent	Frequency	Percent
Primary 5	28	47.5	84	48.0
Primary 6	31	52.5	91	52.0
Total	59	100	175	100

Table 4, which compares sanitation facilities in public primary schools in rural and urban areas. It highlights significant disparities, with urban schools generally having better infrastructure. Only 30.7% of rural respondents said their schools had adequate toilets, compared to 70.6% in urban areas. While maintenance remains an issue for both, only about a third of respondents in each setting believed the facilities were in good condition. Urban schools also had a better functional water supply (60.7%) than rural ones (43.3%). Overall, 57.2% of urban respondents felt their sanitation facilities were adequate and well-maintained, compared to just 43.9% of rural respondents. This indicates that urban schools, though better equipped, still face maintenance issues, while rural schools struggle with basic infrastructure and resource access.

Table 4: Frequency Count and Percentage Response Ratings on Current State of Sanitation Facilities between Rural and Urban Public Primary Schools in Oshimili South Local Government Area of Delta State

S/N	STATEMENT	Resp.	Agree		Disagree	
			(f)	*(%)*	*(f)*	*(%)*
1	The school has adequate number of toilets facilities for both staff and pupils	Rural	39	30.7	88	69.3
		Urban	214	70.6	89	29.7
2	There are separate toilet facilities for male and female staff	Rural	90	70.9	37	29.1
		Urban	239	78.9	64	21.1
3	The available toilet facilities in my school are in good condition for use	Rural	42	33.1	85	66.9
		Urban	115	37.9	188	62.1
4	My school has a functional water supply system for drinking and other uses	Rural	55	43.3	72	56.7
		Urban	184	60.7	119	39.3
5	The school management ensures regular provision of disinfectants and soap for handwashing and cleaning purposes	Rural	50	39.4	77	60.6
		Urban	144	47.5	159	52.5
6	There is a functional waste management system in the school	Rural	91	71.7	36	28.4
		Urban	201	66.3	102	33.7
7	Toilets and other sanitation facilities are accessible to all pupils and staff	Rural	51	40.2	76	59.8
		Urban	118	38.9	185	61.1
8	The school authority prioritizes the maintenance and upgrading of sanitation facilities	Rural	36	28.4	91	71.7
		Urban	108	35.6	195	64.4
9	Regular health and hygiene education is provided to staff and pupils on proper sanitation practices	Rural	72	56.7	55	43.3
		Urban	187	61.7	116	38.3
10	The school employed the services of cleaners and gardeners for prompt sanitation	Rural	32	25.2	95	74.8
		Urban	180	59.4	123	40.6
Grand percentage scores		**Rural**	**558**	**43.9**	**712**	**56.1**
		Urban	**1790**	**57.2**	**1340**	**42.8**

Table 5 assessed hygiene practices are followed by pupils and staff in public primary schools in Oshimili South Local Government Area of Delta State? A total of ten items (11-20) assessed hygiene practices and personal sanitation behaviors, which included adherence to rules and reminders, routine cleanliness, handwashing habits, and the reporting of sanitation issues. Overall percentage scores indicated that both staff (76.1%) and pupils (70.8%) exhibited a generally positive adherence to good sanitation practices; Furthermore, the lower percentage of disagreement among staff (23.9%) compared to pupils (29.2%) suggests that staff possess greater confidence or satisfaction regarding these practices.

Table 5: Frequency Count and Percentage Response Ratings on Sanitation Practices Adopted by Pupils and Staff in Public Primary Schools in Oshimili South Local Government Area of Delta State

S/N	Statement	Resp.	Agree		Disagree	
			(f)	(%)	(f)	(%)
11	My school has specified rules and regulations guiding teachers and pupils on sanitation practices	Pupils	147	62.8	87	37.2
		Staff	135	68.9	61	31.1
12	My school has a sanitation taskforce or committee that oversees sanitation practices	Pupils	130	55.6	104	44.4
		Staff	52	26.5	144	73.5
13	I routinely remind pupils about proper handwashing techniques and address any observed unsanitary practices promptly	Pupils	146	62.4	88	37.6
		Staff	148	75.5	48	24.5
14	I consistently practice proper handwashing hygiene, especially before and after interacting with pupils	Pupils	126	53.8	108	46.2
		Staff	171	87.2	25	12.8
15	I regularly monitor and maintain my classroom's cleanliness	Pupils	182	77.8	52	22.2
		Staff	169	86.2	27	13.8
16	I participate in and support initiatives aimed at improving hygiene and sanitation practices in the school	Pupils	171	73.1	63	26.9
		Staff	165	84.2	31	15.8
17	I properly dispose of any waste in wastebins or containers	Pupils	212	90.6	22	9.4
		Staff	183	93.4	13	6.6
18	I promptly report any malfunctioning sanitation facilities to the school management	Pupils	184	78.6	50	21.4
		Staff	179	91.3	17	8.7
19	Pupils who break sanitation rules and regulations are usually punished	Pupils	175	74.8	59	25.2
		Staff	160	81.6	36	18.4
20	I actively seek opportunities to improve my knowledge and practice of proper sanitation and hygiene measures	Pupils	183	78.2	51	21.8
		Staff	129	65.8	67	34.2
Grand Percentage Scores		Pupils	1656	70.8	684	29.2
		Staff	1491	76.1	469	23.9

Table 6 analysed challenges faced in maintaining proper sanitation practices in rural and urban public primary schools in Oshimili South Local Government Area of Delta State? Eleven items (21-31) were analyzed to identify obstacles to effective sanitation, including issues such as inadequate funding, supply shortages, irregular availability of cleaning materials, insufficient training, inadequate staffing, delays in repairs, and other systemic challenges. The overall percentage scores indicate that both rural (69.6%) and urban (70.0%) public primary schools largely acknowledge the existence of these challenges, with both groups showing similar levels of agreement (approximately 70%).

Table 6: Frequency Count and Percentage Response Ratings on Challenges Faced in Maintaining Proper Sanitation Practices in Rural and Urban Public Primary Schools in Oshimili South Local Government Area of Delta State

S/N	Statement	Resp.	Agree		Disagree	
			(f)	(%)	(f)	(%)
21	Insufficient funding and resources hinder maintenance, repair or upgrade of school's sanitation facilities effectively	Rural	102	80.3	25	19.7
		Urban	237	78.2	66	21.8
22	There are shortages of sanitation facilities (toilets, wastebins, and drinking water supply) to meet the needs of all pupils and staff	Rural	111	87.4	16	12.6
		Urban	238	78.5	65	21.5
23	Irregular provision of cleaning materials and hygiene supplies such as water, soap, sanitizers, disinfectants and washbasins hinder effective cleaning and maintenance of sanitation facilities	Rural	110	86.6	17	13.4
		Urban	248	81.8	55	18.2
24	Lack of training and awareness among staff affects enforcement of hygiene rules, infrequent cleaning schedules and the overall maintenance of sanitation standards.	Rural	27	21.3	100	78.7
		Urban	47	15.5	256	84.5
25	Lack of employed cleaners and gardeners complicates the task of teachers as they teach and also participate in sanitation tasks	Rural	102	80.3	25	19.7
		Urban	229	75.6	74	24.4
26	Delays in repairing and maintaining sanitation facilities pose a challenge for staff to enforce proper sanitation practices among pupils	Rural	105	82.7	22	17.3
		Urban	234	77.2	69	22.8

27	The poor condition of the sanitation facilities negatively affects the health and well-being of both staff and pupils	Rural	100	78.7	27	21.3
		Urban	223	73.6	80	26.4
28	Poor implementation of sanitation rules and regulations makes teachers and pupils to exhibit a carefree attitude towards sanitation practices thereby complicating the situation	Rural	29	22.8	98	77.2
		Urban	119	39.3	184	60.7
29	The ongoing challenges in maintaining sanitation facilities make it harder to create a healthy and conducive learning environment	Rural	94	74.0	33	26.0
		Urban	142	46.9	161	53.1
30	Poor government attention to primary schools' sanitation needs affects the environmental condition of my school negatively	Rural	95	74.8	32	25.2
		Urban	247	81.5	56	18.5
31	Locking up available sanitation facilities such as toilets by school authorities hinders proper sanitation practices of teachers and pupils	Rural	97	76.4	30	23.6
		Urban	226	74.6	77	25.4
	Grand Percentage Scores	Rural	972	69.6	425	30.4
		Urban	2190	70.0	940	30.0

Hypothesis Testing

Table 7 analysis compared rural schools (N = 127) to urban schools (N = 303) and found a t-calculated value of 2.325 with a p-value of 0.021 (df = 428) at an alpha level of 0.05. Because the p-value (p = 0.021) is less than the alpha level, the tested null hypothesis (H01) was rejected and conclude that there is a statistically significant difference in sanitation facilities, favouring urban schools. In other words, urban schools have significantly better sanitation facilities compared to their rural counterparts (t = 2.325, p <0.021).

H_{01}: Table 7: Independent t-test Sample on the Current State of Sanitation Facilities between Rural and Urban Public Primary Schools in Oshimili South Local Government Area of Delta State

Group	N	Mean	Std. Dev.	t-cal.	df	p-value	Alpha Level	Decision
Rural Schools	127	23.95	10.57	2.325	428	0.021	0.05	Sig.
Urban Schools	303	26.59	10.78					

Table 8, When comparing the sanitation practices of pupils (N = 234) and staff (N = 196), the t-test yielded a t-calculated value of 1.645 and a p-value of 0.101. Since the p-value (p = 0.101 > 0.05) exceeds the alpha level threshold, the null hypothesis (H02) was not rejected. Therefore, there is no statistically significant difference in hygiene practices between pupils and staff, (t = 1.645, p > 101).

H_{02}: Table 8: Independent t-test Sample on Hygiene Practices of Pupils and Staff of Public Primary Schools in Oshimili South Local Government Area of Delta State

Group	N	Mean	Std. Dev.	t-cal.	df	p-value	Alpha Level	Decision
Pupils	234	29.92	9.60	1.645	428	0.101	0.05	Not Sig.
Staff	196	31.38	8.54					

Table 9. The t-test, which compared the challenges faced by rural (N = 127) and urban (N = 303) schools, yielded a t-calculated value of 0.809 and a p-value of 0.419. Since the p-value (p = 0.419) is greater than the alpha level of 0.05, hence, the tested null hypothesis (H03) is retained. This suggests that there is no statistically significant difference in the challenges encountered by rural and urban schools, even though some differences at the item level were noted in Table 10 (t = 0.809, p > 0.419).

H_{03}: Table 9: Independent t-test Sample on Challenge Faced in Maintaining Proper Sanitation Practices between Rural and Urban Public Primary Schools in Oshimili South Local Government Area of Delta State

Group	N	Mean	Std. Dev.	t-cal.	df	p-value	Alpha Level	Decision
Rural Schools	127	32.72	9.76	0.809	428	0.419	0.05	Not Sig.
Urban Schools	303	31.87	10.01					

Discussion of Finding

The Demographic

The demographic profile of respondents in public primary schools within Oshimili South Local Government Area highlights key patterns in, age, staff roles, and pupil distribution. Staff are largely within the 35–44 age range (45.6% rural, 44.5% urban), with many aged 45 and above, reflecting an experienced workforce. Pupils are mainly aged 8–13 (98.3%), aligning with typical primary school age norms. The majority of staff are teachers (86.8% rural, 87.3% urban), with minimal representation from assistant teachers or officials—similar to findings by Kebati et al. in Kenya, where teachers made up 85% of school staff. Pupils are fairly split between Primary 5 and Primary 6, supporting a representative sample of upper primary learners. Overall, the schools feature a predominantly female, experienced teaching workforce and a well-distributed pupil population, forming a solid foundation for analyzing sanitation-related issues [6].

Research Questions

The study investigates sanitation and hygiene conditions in public primary schools in Oshimili South, revealing a stark rural-urban disparity in facility quality and hygiene practices. Urban schools are generally better equipped, with 57.2% of respondents reporting favorable sanitation conditions compared to 43.9% in rural areas. Adequate toilet facilities are more prevalent in urban schools (70.6%) than in rural ones (30.7%), and functional water supply is more common in urban (60.7%) than rural settings (43.3%). However, maintenance is a concern in both areas, with only about a third of respondents in either context indicating that facilities are in good condition.

Hygiene practices among pupils and staff also show uneven adherence; staff demonstrate higher compliance (76.1%) than pupils (70.8%), especially in handwashing (87.2% vs. 53.8%) and waste disposal (93.4% vs. 90.6%). Despite general awareness, systemic barriers—such as insufficient hygiene education and lack of regular cleaning routines—impede consistent hygiene behavior. The study further identifies pervasive challenges in maintaining sanitation practices, including inadequate funding (80.3% rural, 78.2% urban), shortages of sanitation facilities and cleaning materials, delays in maintenance (particularly in rural schools), and lax enforcement of rules (more common in urban schools). Both rural and urban schools also report poor government support as a key issue. These findings are consistent with previous studies across Nigeria and Kenya, which highlight systemic neglect, particularly in rural schools [7-10]. Ultimately, the study underscores an urgent need for policy-level reforms, targeted infrastructure investment, and consistent resource allocation to ensure equitable sanitation and hygiene standards across public primary schools in Oshimili South.

Hypotheses

The hypothesis testing results provide statistical clarity on the differences and similarities in sanitation dynamics across Oshimili South's schools. Hypothesis 1 (Table 7) reveals a significant difference in sanitation facilities between rural and urban schools ($t = 2.325$, $p = 0.021$), with urban schools having better facilities (mean = 26.59) than rural ones (mean = 23.95). This aligns with Njeri and Ndani, who found in Kenyan schools that urban areas had a mean facility score of 28.1 compared to 22.4 in rural areas ($p < 0.05$), driven by better funding access [10]. Wada et al. reported similar disparities in Lagos, with urban schools scoring 27.5 on facility adequacy versus 21.8 in rural areas ($p = 0.03$) [11]. Hypothesis 2 (Table 8) shows no significant difference in hygiene practices between pupils and staff ($t = 1.645$, $p = 0.101$), with means of 29.92 and 31.38, respectively. This is consistent with Ebizie, who found no significant difference in Anambra State ($t = 1.52$, $p = 0.13$), with means of 30.1 for pupils and 32.0 for staff, suggesting shared environmental influences [12]. Hypothesis 3 (Table 9) indicates no significant difference in challenges faced by rural and urban schools ($t = 0.809$, $p = 0.419$), with means of 32.72 and 31.87, respectively. This aligns with Wada et al., who reported in Lagos that challenges like funding shortages had similar impacts across settings ($t = 0.75$, $p = 0.45$), and Kebati et al., who found no difference in Kenyan schools ($t = 0.82$, $p = 0.41$) [6,9]. These findings highlight that while facility disparities exist, the challenges and hygiene practices are broadly systemic, requiring comprehensive interventions that address both rural and urban contexts in Oshimili South.

Conclusions

The study found a significant difference in the quality of sanitation facilities between rural and urban schools, with urban schools outperforming rural counterparts. However, no significant differences were found in sanitation practices between students and staff, suggesting that both groups are similarly influenced by environmental and institutional factors. The study emphasizes the urgent need for comprehensive, context-sensitive interventions to address these deficits and governance gaps. Such efforts are essential for achieving Sustainable Development Goals, particularly SDG 6 (Clean Water and Sanitation) and SDG 4 (Quality Education) [13,14].

Recommendations

The following recommendations are derived from the findings and conclusions of the study.

- Delta State and Oshimili Local Governments, along with school management, should prioritize the enhancement and provision of sanitation facilities (including toilets, water supply, and waste management systems), especially in rural public primary schools.
- The management of public primary schools should launch collaborative hygiene promotion campaigns that would be embraced by students and staff
- The Local Education Authority (LEA) should ensure the regular allocation of financial resources and materials for the timely repair and upgrading of sanitation facilities, Moreso, they should implement routine maintenance schedules for sanitation facilities to avoid delays in repairs

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