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Integration of Sustainable Development Goals (SDGs) with Water, Sanitation, and Hygiene (WASH) Practices in Public Primary Schools in Ibadan, Nigeria

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Abstract

This study investigates the incorporation and implementation of the Sustainable Development Goals (SDGs) in water, sanitation, and hygiene (WASH) practices in public primary schools in Ibadan, Oyo State, Nigeria, to determine their effectiveness in achieving their goals. The study used a combination of qualitative and quantitative methods to investigate the current state of wash infrastructure, policies, and instructional programmes in public primary schools. The cross-sectional study employed a multi-stage sampling approach to choose 300 pupils from various public and private schools in 11 local government areas in the Ibadan metropolitan area. Data was obtained using semi-structured questionnaires and observation methods. The inferential statistics were calculated with a confidence interval of 95%.Findings reveal that schools lack quality drinking water and inadequate sanitation infrastructure, thereby making it difficult to achieve the Sustainable Development Goals target. It also emphasize the difficulties, recommended approaches, and potential for improving water, sanitation, and hygiene (WASH) programmes in line with wider sustainable development goals at the local level. The study documented a significant degree of pupil engagement in WASH practices, surpassing 90%. This finding highlights the effectiveness of WASH practices as a strong tool for advancing the attainment of the SDGs. The study established an all-encompassing school water, sanitation, and hygiene strategy, along with practical implementation procedures, as necessary measures to implement in order to achieve significant progress towards achieving the Sustainable Development Goals target.

Keyword: *Sustainable Development Goals, Water, Sanitation, and Hygiene Practices, Public Awareness, Primary Schools, Strategy, Semi-structured*

Introduction

Recently, there has been a growing acknowledgement among the international community of the crucial importance of education and public health in attaining sustainable development. The United Nations Sustainable Development Goals (SDGs) offer a comprehensive framework to tackle a range of social, economic, and environmental concerns, including those pertaining to water sanitation and hygiene (WASH). Within the Sustainable Development Goals (SDGs), goal 4 prioritises the provision of high-quality education, whereas goal 6 specifically targets the improvement of access to clean water and sanitation. Nevertheless, the successful incorporation of these objectives continues to be a notable obstacle, especially in limited-resource environments like public elementary schools in Ibadan, Nigeria. Water, sanitation, and hygiene are the three interconnected foundations of proactive healthcare. Nigeria has a high prevalence of inadequate sanitation and hygiene practices, as evidenced by its recent designation as the global leader in open defecation (Idowu, 2019). Given that a significant proportion of Nigeria's population falls within the age range for education, it is crucial to prioritise interventions in schools to impart essential knowledge, attitudes, and practices related to sanitation and hygiene to the next generation (UNICEF, 2012). Children dedicate a substantial amount of their childhood and adolescent years to the school setting. On average, individuals spend more than 6 hours per day in the school neighbourhood, which amounts to about 1100 hours per year (Micaiah, 2014). This suggests that the condition of the school environment greatly influences the children' overall health, behaviours, and perspectives. The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation, and Hygiene emphasized the importance of school WASH for children's welfare and advised the provision of basic WASH amenities. When we break down the terms, basic drinking water service means having access to a working water source that is free from contamination. Basic sanitation service means having improved, usable, separate-sex toilet facilities that prevent human contact with faeces. Basic hygiene service means having functional hand washing facilities with soap and running water available (WHO/UNICEF, 2018). Research has shown that there is a widespread lack of basic school-WASH services in Nigeria, which significantly contributes to the poor sanitation and hygiene habits of young people (Egbinola & Amanambu, 2015; Wada et al., 2020; Wada & Oloruntoba,

2021). Furthermore, the Nigerian WASH industry's pervasive social disparities exacerbate the problem. According to the World Bank's 2017 estimate, over 90% of rural Nigerians practice open defecation, and it was found that 51% of rural communities lack access to better water sources (World Bank Group, 2017). The gaps between rural and urban areas primarily stem from variations in wealth quantiles. Urban areas typically have a greater concentration of affluent households and possess more robust economic influence.

Therefore, there is a somewhat lower level of determination among politicians to provide fundamental water, sanitation, and hygiene (WASH) services and social infrastructure in rural areas (Ojima et al., 2020; Sinharoy et al., 2019). A recent study examining the advancement of water, sanitation, and hygiene (WASH) in sub-Saharan Africa found that rural families living in poverty were much less likely to have access to better water sources and sanitation facilities compared to their urban counterparts. Specifically, the study revealed that rural poor households were 29 times less likely to get improved water and 25 times less likely to have improved sanitation facilities when compared to the urban poor (Armah et al., 2018). In addition, affluent households in these rural regions have superior water, sanitation, and hygiene (WASH) services in comparison to other households (Chasekwa et al., 2018). Furthermore, studies have found that Nigerian teenagers and adolescents who engage in unhealthy sanitation and hygiene practices possess insufficient information and a negative attitude towards positive hygiene and sanitation (Azuogu et al., 2016; UNICEF, 2015). While conducting school-WASH surveys, it is critical to go beyond simply evaluating the presence of sufficient WASH facilities. It is critical to consider the students' related knowledge and attitudes as significant factors. The disparities in WASH (Water, Sanitation, and Hygiene) between different socio-economic groups pose a significant challenge to achieving Sustainable Development Goal targets 6.1 and 6.2 by 2030. These targets aim to ensure universal and fair access to safe and affordable drinking water, as well as adequate and equitable sanitation and hygiene, while also addressing the specific needs of women, girls, and vulnerable populations. However, the WHO/UNICEF report from 2018 indicates a high likelihood of not meeting these goals. Currently, there is a lack of comprehensive data on disparities in access to water, sanitation, and hygiene (WASH) facilities in schools in Nigeria. This scarcity of information hinders the ability to accurately determine the magnitude of the

problem. Therefore, this study aims to evaluate the water, sanitation, and hygiene (WASH) facilities available in schools within a low-income community in Nigeria, as well as investigate the knowledge, attitudes, and practices (KAP) of children regarding sanitation and hygiene. The study also highlights the disparities in access to water, sanitation, and hygiene (WASH) facilities across public and private schools, as well as among pupils from different socio-economic backgrounds. Given the lack of local data on disparities in school water, sanitation, and hygiene (WASH), the results of this survey offer valuable insights for developing a plan to address the widespread problem of unsanitary practices and poor hygiene in Nigeria. This, in turn, can help to alleviate the health and economic consequences of such conditions. There is a general agreement that the poor world lacks the ability to meet the Sustainable Development Goals (SDGs), including SDG 6 which focuses on guaranteeing the availability and sustainable management of water and sanitation for everyone (Nanseu-njiki et al. 2019). Access to uncontaminated and secure drinking water is an essential requirement and entitlement for all individuals. Nevertheless, the use of polluted water is on the rise, especially in emerging nations (Akram 2020). Ensuring that learners have access to clean drinking water at school is vital, hence, evaluating the quality of drinking water is crucial during WASH assessments in schools. The goal of this study is to assess the safety and hygiene of water for drinking and other purposes (Scheili et al., 2015; Wen et al., 2020; Morgan et al., 2021). The objective of the study is to evaluate the degree to which water, sanitation, and hygiene (WASH) practices in public primary schools in Ibadan are consistent with the overall goals of the Sustainable Development Goals (SDGs). More precisely, it analyses the present condition of WASH facilities, policies, and educational programs. It also identifies obstacles and successful strategies, and investigates possibilities for improving WASH initiatives to support sustainable development.

Methodology

The study used a mixed-method approach that integrates qualitative and quantitative methodologies to collect extensive data on water, sanitation, and hygiene (WASH) practices in both public and private elementary schools in Ibadan. Qualitative approaches encompass the use of interviews and focus group discussions with school administrators, teachers, students, and

community stakeholders to investigate perspectives, experiences, and difficulties pertaining to WASH. Quantitative data was gathered by conducting surveys and observations to assess the accessibility and effectiveness of WASH facilities.

The study population consisted of public primary schools in Ibadan Metropolis LGA. Senior classes comprising primary students were selected because the students would have spent at least 3 years in their respective schools and would also be expected to have formed their WASH-related attitudes and practices. Primary schools were also selected because these students are the bridge between teenagers and adults. With poor WASH practices prevalent among public primary schools in Ibadan, having an insight into their WASH-related KAP in adolescence would provide information on how to break unhealthy habits. The sample size of 300 students was estimated using the Leslie Kish formula, based on a 35.4% prevalence of poor sanitation practice as reported in a recent study (Wada et al., 2020), at a 95% level of confidence and 5% precision. To account for non-response and increase the statistical power, the sample size was increased to 320 students. Eventually, a 99.5% response rate was achieved.

A multi-stage sampling technique was used to select the students. First, five local governments were randomly selected from the 11 local governments in the LGA via balloting. Second, in each ward, one public and one private primary school were selected via simple random sampling. A total of 10 schools were selected. Third, via stratified sampling, students were proportionally selected from each school based on the school's population size. For confidentiality, the private schools were renamed PS 1, PS 2, PS 3, PS 4, and PS 5, while the government schools were renamed GS 1, GS 2, GS 3, GS 4, and GS 5.

To determine an appropriate sample size for the study, Slovin's formula was applied. The population under consideration consisted of 195 schools within the region. With a desired confidence level of 90% and a margin of error, or sampling error, of 0.1 (10%), the formula was employed as follows:

$n = N / (1 + Ne^2)$

Substituting the given values into the formula:

n = *195 / (1 + 195(0.1^2)) n =*

195 / (1 + 1.95) n =

195 / 2.95 n ≈ 66.10

The calculated sample size was approximately 66.10. To ensure a more practical and feasible sample, the number was rounded up to the nearest 10, resulting in a sample size of 70. However, it was anticipated that there might be non-responses, declines, or inaccessible schools during data collection. This ensured that the final sample size adequately represented the population of 195 schools within the region.

For data collection, a questionnaire was employed, comprising a combination of closed-ended and open-ended questions. The questionnaire was administered to the head teachers of the selected schools to gather information relevant to the study. Closed-ended questions provided respondents with predefined response options, allowing for easy quantification and statistical analysis of the collected data. On the other hand, open-ended questions provided an opportunity for the head teachers to express their thoughts and opinions in more detail. The collected data were analysed using version 20 of the SPSS software. This statistical software facilitated data organisation, manipulation, and analysis. The results were interpreted and presented using tables. These graphical representations helped to illustrate patterns, trends, and relationships within the data, enabling a clearer understanding of the findings. The qualitative data obtained from the review of the strategic plan and the education policy was analysed using two main approaches. First, direct quotations from the documents were used to support specific claims or provide evidence for certain aspects of the study. Second, a thematic analysis was conducted on the content of the documents. This involved identifying recurring themes, patterns, or key ideas present in the text. The thematic analysis provided a comprehensive understanding of the policy's content, objectives, and guidelines related to WASH implementation in schools.

RESULTS

The students had an average age of 15.65±1.67 years, ranging from 11 to 21 years. More students attended the government schools because they are very affordable to the common man; however, these schools are mostly underfunded. Considering the private school students, a majority of their parents had attained tertiary education and were working as professionals in the formal sector (health, banking, and education), while a majority of the public school students' parents had attained a below-tertiary level of education and worked informal jobs (trading, farming, and auto mechanics). Over 60% of the respondents also revealed that at least one under-5 child was present in their households (1.80+2.13 children per household).

Table 1: Analysis of Responses

S/N	LGA	Private Primary School		Public Primary School	
		Sample Size	Response Rate (%)	Sample Size	Response Rate (%)
1	Ibadan North	27	26 (96.3)	12	12(100.0)
2	Ibadan North-East	27	27(100.0)	12	12(100.0)
3	Ibadan North-West	26	25(96.2)	7	7(100.0)
4	Ibadan South	21	21(100.0)	13	13(100.0)
5	Ibadan South-East	17	15(88.24)	10	10(100.0)
6	Ibadan South-West	26	25(96.2)	14	13(92.9)
7	Oluyole	22	21(95.45)	18	16(88.9)
8	Ido	34	33(97.7)	12	12(100.0)
9	Ona-Ara	24	22(91.7)	16	14(87.5)
10	Akinyele	29	26(89.7)	19	19(100.0)
11	Lagelu	11	9(81.9)	13	13(100.0)
	Total	264	250(93.7)	146	141(96.9)

Source: *Author's Field Survey, 2024*

In Table 1, the study recorded a high level of participation (above 90%) during the survey. This high rate reflects the importance of the issues addressed in the study related to WASH practices at the basic educational level, as well as the interests of the stakeholders. The higher rate, on the other hand, shows that the students who took the survey had a more varied view. Their individual opinions make the study's estimates and results valid and reliable by giving useful information about WASH practices, pointing out major problems, and providing real-time practical solutions for policy direction.

The Role of WASH Education in Public Schools

Schools as learning environments have the potential to be places where pupils learn safe WASH practices (Morgan et al., 2021). WASH services alone are often not sufficient, they need to be combined with educational programs (Mushota et al., 2021). Although often taken for granted, handwashing education is the most simple, effective, and inexpensive measure for interrupting the transmission of microorganisms and slowing the spread of diseases (Ngwenya et al. 2018). Hence, most school-based WASH programs aim to increase student knowledge and practice of behaviours such as washing hands with soap (Winter et al., 2021). However, evidence of good WASH-related practices and knowledge at schools is scarce (Kouamé et al., 2021). This discrepancy of knowledge and practice might arise due to the lack of handwashing facilities or the unavailability of clean water. A study by Kouamé et al. (2021) in the south-central part of Côte d'Ivoire revealed that, although learners had knowledge about WASH, they did not practice hygiene. Therefore, effective hygiene education should be incorporated into the school curriculum, as this will help promote long-term positive behavioural changes among pupils (Mogaji et al. 2018). According to a study conducted by Egbinola & Amanambu (2015) and Thakadu et al. (2018), despite the fact that hygiene education was incorporated into the curriculum, learners did not practice hygiene.

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Table 2: Effect of the Influencing Factor on WASH Practice in Private Basic Schools in Ibadan

Influencing Factor	Standardized Coefficients			ANOVA		Adj. R^2
	Beta	t-Stats	p-value	F-Stats	p-value	
Socio-economic (PCF1)	0.133	2.174	0.042			
Demographic/locational (PCF2)	0.144	1.188	0.087			
Behavioural/infrastructure (PCF3)	0.178	3.018	0.012			
Institutional/regulatory (PCF4)	0.076	1.145	0.167			
Financial/management (PCF5)	0.205	2.112	0.006			
Community engagement (PCF6)	0.141	1.029	0.211	6.512	0.001	.641

Dependent Variable: WASH Practice; Level of Significant at 5% ($p<0.05$); Significant p-value @ 5%

Source: Author's Filed Survey, 2024.

Table 2; presents the results for the public schools, and it reveals that except for the financial/management factor that has a negative influence, other factors influence WASH practice positively in the study area, but to varying degrees. However, some of the factors (beta coefficient; p-value) that exhibit a positive and statistically significant ($p < 0.05$) influence on WASH practice are the demographic/locational factor (DLF: 0.017; 0.036), and community engagement (CEF: 0.173; 0.017). Also, the positive influence of some factors, namely socioeconomic (SEF: 0.239; 0.091), behavioural and infrastructure (BIF: 0.153; 0.099), and institutional/regulatory (IRF: 0.067; 0.121), was noticed but with statistically non-significant effects ($p < 0.05$). Meanwhile, a negative but statistically non-significant influence of the financial/management factor (FMF: -0.194; 0.274) was documented. The model summary, on the other hand, shows that it has a statistically significant effect (F-stats Sig: $p < 0.05$), predicting a 54.2% difference in how well WASH is practiced in public basic schools in the study area.

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Table 3: Accessibility to WASH Facilities in Ibadan's Basic Schools

Facilities	Private			Public		
	MS	**St. Dev.**	**M Rank**	**MS**	**St. Dev.**	**M Rank**
Sanitation Facilities						
Clean water	3.84	1.11	1st	3.84	1.08	1st
Toilet	3.73	1.07	2nd	3.45	1.07	2nd
Disinfectants	3.40	1.19	3rd	2.99	1.17	7th
Hand towels	3.05	1.32	8th	2.86	1.22	9th
Tippy taps and bowls	3.15	1.25	6th	3.09	1.28	6th
Sewage	3.22	1.16	5th	3.15	1.21	5th
Latrines	2.48	1.45	10th	2.87	1.31	8th
Sanitary pads/tissue	2.79	1.30	9th	2.69	1.37	10th
Waste disposal units	3.21	1.19	4th	3.18	1.19	4th
Drainage	3.29	1.19	7th	3.21	1.22	3rd
Average Mean Score	*3.21*			*3.13*		
Hygiene Facilities						
Washing Stations	3.25	1.25	3rd	3.11	1.36	2nd
Soaps	3.46	1.28	2nd	3.32	1.10	1st
Ash	2.49	1.50	6th	2.79	1.39	5th
Hand Sanitizers	3.02	1.21	4th	3.07	1.24	3rd
Water dispensers	2.94	1.29	5th	2.79	1.33	5th
Hygiene materials/education	3.47	1.23	1st	3.02	1.31	4th
Average Mean Score	*3.11*			*3.02*		

Note: MS (mean score), St. Dev. (standard deviation), M Rank (mean rank)

Source: *Author's Field Survey, 2024*

In private basic schools, the study also observed higher access to sanitation facilities such as toilets (3.73), disinfectants (3.40), waste disposal units (3.29), and sewage (3.22), ranking 2nd to 5th, respectively. Other sanitary facilities with their corresponding mean scores, such as tippy taps and bowls (3.15) ranked 6th, drainage (3.14) ranked 7th, and hand towels (3.05) ranked 8th. While the least ranked sanitary facilities were sanitary pads/tissues (2.79) and latrines (2.48), occupying 9th and 10th positions. For public basic schools, accessibility to toilets (3.45) and drainage (3.29) were ranked 2nd and 3rd, respectively. Next are the waste disposal unit (3.21), sewage (3.15), and tippy tap and bowls (3.09), occupying the 4th, 5th, and 6th positions, respectively. Disinfectants (2.99) and latrines (2.81) were ranked 7th and 8th, respectively, while the least accessible sanitary facilities in public basic schools were hand towels (2.86) and sanitary pads/tissues (2.69), ranked 9th and 10th, respectively.

The result implies that pupils do not have timely access to toilet accessories, including disinfectants, hand/paper towels, and sanitary pads and tissues, in basic schools. This unhealthy situation makes students uncomfortable while learning, especially the girl child who has begun her menstruation.

A similar analysis was conducted for hygiene facilities, and the results were presented together with sanitation facilities. Hygiene materials/education scored a mean of 3.41, topping the list of hygiene facilities the pupils have access to in private basic schools. The next hygiene facilities with their corresponding mean values, in order of ease of access, were soaps (3.46), washing stations (3.25), and hand sanitizer (3.02). The least accessible hygiene facilities were water dispensers (2.94) and ash (2.49), occupying the 5th and 6th positions, respectively. The result of private schools' pupils having access to hygiene education and materials is expected because the management of private schools invests in facilities to ensure a convenient and comfortable learning environment for their pupils. Some high-paying private schools have some of their learning facilities equipped with a private toilet/bathroom and its supplies, including soaps, water, sanitary pads for ladies, and hand sanitizer, to provide a safe, healthy, and conducive environment for learning activities to take place.

Conclusions

The study reveals that schools lack quality drinking water and inadequate sanitation infrastructure, making it difficult to achieve SDG target 6.2 by 2030. To improve the situation, incorporating WASH (Wastewater, Sanitation, and Hygiene) into rural primary schools in Ibadan could lead to improved hygiene practices and raise awareness about the importance of functional WASH infrastructure. Future research should include focus group discussions and qualitative research to deepen understanding of cultural and social issues related to WASH. This combination of approaches could lead to comprehensive and inclusive WASH assessments. The inclusion of WASH topics in relevant subjects within the curriculum, such as home economics, integrated studies, and science, is a positive step. However, the lack of comprehensive articulation, learning objectives, and indicators to measure performance hinders the effective implementation of WASH education. We must review and enhance the curriculum framework to adequately cover WASH topics and enhance students' knowledge, skills, and competencies. Key education policy documents fail to mention or discuss a school's WASH policy.

Recommendation

The Ministry of Basic and Secondary Education should formulate a comprehensive school WASH policy to uphold water, sanitation, and hygiene standards in schools. This policy should align with international commitments and outline clear goals. The Ministry should review curriculum frameworks, provide guidelines, and incorporate WASH-related guidance into school management tools. We also recommend investing in capacity-building programmes and awareness campaigns for teachers, administrators, and cluster monitors.

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