



Research Article

Evaluation of Health, Safety, and Environment (HSE) Information Access in Schools: A Case Study of Udu Local Government Area in Delta State, Nigeria

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ABSTRACT

This study assesses Health, Safety and Environment (HSE) practices and hygiene information access in schools within the Udu Local Government Area, Delta State, Nigeria. Utilizing a mixed-method approach, including systematic random sampling and structured questionnaires, the study collected data from 381 respondents across 35 schools. The findings reveal that primary water sources were boreholes/jacking pumps (47.5%) and hand-dug wells (50.4%). Functional handwashing facilities were vital for disease prevention, yet significant gaps in HSE information access exist. This study underscores the need for enhanced hygiene infrastructure and targeted interventions to promote safer learning environments, providing valuable insights for policymakers and educators.

Keywords: Environment; Health; Hygiene; Information Access; Safety; Udu Local Government Area

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INTRODUCTION

Promoting a safe and healthy environment in schools is of utmost importance for the well-being of students and staff members. This study aimed to assess the level of awareness and availability of Health, Safety, and Environment (HSE) and hygiene information in schools located within the Udu Local Government Area of Delta State. Through examining the adequacy of awareness, provision of facilities, and accessibility of resources related to HSE and hygiene, this research hopes to provide valuable insights that can inform policy decisions, resource allocation, and targeted interventions. The ultimate objective is to establish learning environments that are both safer and healthier, thus promoting the well-being of students and staff members. Malingu (2022) emphasizes the crucial role that safe water, sanitation, and hygiene practices play in schools to prevent diseases, underscoring the need for awareness and implementation of these measures. Additionally, Behzadkolaee *et al.* (2015) emphasised the necessity

of improving HSE conditions in schools, emphasizing the importance of adhering to guidelines and enhancing infrastructures to receive better HSE ratings. Furthermore, findings from studies conducted by Klar *et al.* (2022) and Thaman *et al.* (2021) emphasize the relevance of assessing hygiene knowledge and practices among schoolchildren, shedding light on areas that require attention and improvement.

MATERIALS AND METHODS

Research design

The study utilized a thorough research design to evaluate how easily accessible Health, Safety, and Environment (HSE) and hygiene information are in schools within the Udu Local Government Area of Delta State, Nigeria. A combination of quantitative and qualitative methods was used to gain a complete understanding of the topic.

Research Instrument

A carefully designed structured questionnaire was used as the main tool to collect data for this study. The questionnaire aimed to gather quantitative data on various aspects of health, safety, and hygiene practices in schools. In addition to the questionnaire, in-depth interviews were conducted with key individuals to obtain qualitative insights and specific perspectives. Both the questionnaire and interview guides were thoroughly tested in advance to ensure clarity, relevance, and reliability, meeting the high standards of research quality.

Population under Study

The research focused on employees in 35 schools located in the Udu Local Government Area of Delta State cumulated to 381 respondents. These employees were categorized into teaching and non-teaching staff. Their perspectives were considered crucial in understanding how health, safety, and hygiene practices are implemented in school environments.

Sample Size Determination and Sampling Procedures

The sample size was determined using a method known as stratified random sampling. This method accounted for the different types of schools in the Udu LGA to ensure a diverse sample. Schools were categorized based on their ownership (public or private) and educational level (primary or secondary). Proportional allocation ensured that each category was adequately represented in the sample. Within each category, a systematic random sampling technique was employed to select the schools for inclusion in the study. The sample size was calculated using the formula developed by Krejcie and Morgan (1970) for finite populations (Equation 1), with necessary adjustments made to ensure accurate representation of the population.

$$n = \frac{PNX^2(1-P)}{(N-1)d^2+(1-P)PX^2} \quad \text{Equation 1}$$

where:

n is the required sample size,

N is the population size,

X² is the standard normal deviation (for a 95% confidence level, X²=3.841),

d is the margin of error (set at 5%).

P is Population proportion (assumed to be 0.5 for maximum sample size)

Procedures for Collecting Data

$$n = \frac{3.841 \times 47080 \times 0.5 \times 0.5}{0.05^2(47080-1)+3.841 \times 0.5 \times 0.5}$$

n ~381

The process of collecting data for this study involved distributing questionnaires to staff members and conducting thorough interviews with head teachers. In order to guarantee accuracy and dependability, data from school records and reports were incorporated. Prior to commencing the data collection, official permission from school authorities were obtained, emphasizing the significance of adhering to ethical research standards. This ensured compliance and cooperation throughout the study.

Data Analysis

The collected data was meticulously organized and cleansed using Microsoft Excel 2016 before undergoing analysis with IBM SPSS 25. This analytical process assisted in revealing crucial insights and patterns from the data, providing a comprehensive understanding of the health, safety, and hygiene conditions in schools.

RESULTS

Sanitation Facilities in Schools

The evaluation of sanitation facilities in schools reveals that the majority of schools are equipped with modern toilet systems. Specifically, 72.17% of schools use water closets, indicating a strong commitment to improved sanitation standards (Miiro *et al.*, 2018). Additionally, 17.06% of schools have Ventilated Improved Pit (VIP) latrines, while 10.76% still rely on ordinary pit latrines. Regarding the number of toilets available, 42.26% of schools reported having six toilets, while 24.67% had five or more. Furthermore, 79.26% of schools have designated male and female toilets, and 70.60% provide toilets specifically designated for students.

Water Facilities Availability

Findings indicate that boreholes/jacking pumps (47.50%) and hand-dug wells (50.39%) are the dominant sources of water in schools, while rainwater harvesting is minimally utilized (2.09%). In terms of storage, borehole/jacking pump systems account for 58.53%, followed by jerry cans (34.64%), and covered buckets (6.82%).

Hygiene Practices in Toilet Accommodations

The results show that 87.40% of respondents reported the use of disinfectants for cleaning toilets. School management is primarily responsible for providing disinfectants (94.23%), while cleaning frequency is highest for thrice-weekly cleaning (56.69%), followed by twice weekly (33.60%).

Handwashing Practices among Schools

The results indicate that 73.23% of respondents practice handwashing after toilet use or potentially contaminating activities. Additionally, 88.45% of

schools have handwashing facilities such as soap and sanitizers available.

Associations between Hygiene Practices and School Characteristics

The Chi-square analysis shows a statistically significant association between handwashing

practices and types of toilet facilities in Table 5 ($\chi^2 = 10.348$, $df = 2$, $p = 0.006$). Similarly, Table 6 shows a significant relationship exists between toilet facilities and educators' years of experience ($\chi^2 = 66.063$, $df = 10$, $p < 0.001$).

Table 1: Participants' Response to Toilet Facilities

Variables	Frequency	Percentage (%)	Mean	Standard Deviation (Sd)
Type of toilet facilities in the schools surveyed			1.81	0.65
Ordinary Pit Latrine	41	10.76		
Ventilated Improved Pit (VIP)	65	17.06		
Water Closets	275	72.17		
Total	381	100		
Number of toilets available in the schools surveyed			2.06	0.74
3	49	12.86		
4	77	20.21		
5 and above	94	24.67		
6	161	42.26		
Total	381	100		
Presence of designated Male and Female Toilets			2.35	0.88
Yes	302	79.26		
No	79	20.7		
Total	381	100		
Designated toilet facilities for students			2.07	0.79
Yes	269	70.60		
No	112	29.39		
Total	381	100		

Table 2: Participants' Response to Water Facilities in their School

Variables	Frequency	Percentage (%)	Mean	Standard Deviation (Sd)
Type of water source			2.3	0.81
Rainwater	8	2.09		
Borehole/Jacking pump	181	47.50		
Hand dug well	192	50.39		
Total	381	100		
Water storage medium			2.23	0.97
Covered Buckets	26	6.82		
Borehole/Jacking Pumps	223	58.53		
Jerry Cans	132	34.64		
Total	381	100		

Table 3: Participants’ Responses to Hygienic Practices in Toilet Use

Variables	Frequency	Percentage (%)	Mean	Standard Deviation (Sd)
Use of disinfectants			2.15	0.72
Yes	333	87.40		
No	48	12.59		
Total	381	100		
Responsibility for disinfectants			2.08	0.97
School Management	359	94.23		
Teachers	10	2.625		
Community	12	3.15		
Total	381	100		
Cleaning frequency			2.17	0.89
Once a week	35	9.19		
Twice a week	128	33.60		
Thrice a week	216	56.69		
Daily	2	0.52		
Total	381	100		

Table 4: Participants’ Response to Handwashing Practices

Variables	Frequency	Percentage (%)	Mean	Standard Deviation (Sd)
Handwashing practice			2.13	0.92
Yes	279	73.23		
No	102	26.77		
Total	381	100		
Availability of handwashing facilities			2.05	0.82
Yes	337	88.45		
No	44	11.55		
Total	381	100		

Table 5: Association Between Handwashing Practices and Toilet Facilities

Test	Value	df	p-value
Pearson Chi-Square	10.348	2	0.006
Likelihood Ratio	11.248	2	0.004
Linear-by-Linear Association	7.898	1	0.005

Table 6: Association Between Toilet Facilities and Educators’ Experience

Test	Value	df	p-value
Pearson Chi-Square	66.063	10	0.000
Likelihood Ratio	71.862	10	0.000
Linear-by-Linear Association	0.663	1	0.416

DISCUSSION

The findings of this study reveal a progressive improvement in sanitation infrastructure across schools, particularly with the predominance of water closets and the presence of VIP latrines, reflecting a growing commitment to hygienic learning environments (Miiri *et al.*, 2018). However, the continued use of traditional pit latrines in a proportion of schools signals persistent infrastructural disparities that may expose students to environmental and health risks. This concern is particularly critical when viewed through the lens of

gender and inclusivity, as inadequate sanitation facilities have been shown to negatively affect attendance, safety, and the overall well-being of students—especially girls managing menstruation in school settings (Sommer, 2009; Montgomery *et al.*, 2012; Mahon and Fernandes, 2010; Groce *et al.*, 2011). These realities underscore the urgent need to not only expand infrastructure but also ensure that facilities are safe, accessible, and responsive to the needs of all users.

Water availability patterns further highlight structural challenges, with schools relying heavily on boreholes and hand-dug wells while underutilising more

sustainable options such as rainwater harvesting. Although these sources provide a degree of reliability, the presence of less modern storage systems suggests gaps in water safety and management practices (McMicheal, 2019). Given that adequate WASH facilities are directly linked to improved educational outcomes, health status, and school attendance, strengthening water infrastructure remains a non-negotiable priority (Balogun-Adeleye *et al.*, 2021). Previous studies have also demonstrated that improved sanitation systems contribute significantly to reduced absenteeism, enhanced enrolment, and better health outcomes among students (Buxton *et al.*, 2019; Synder *et al.*, 2020; Freeman *et al.*, 2013). Encouragingly, hygiene practices within school toilet facilities appear relatively strong, with a high proportion of schools utilising disinfectants and maintaining structured cleaning schedules. This reflects institutional responsibility and a proactive approach to maintaining sanitary conditions (Alam *et al.*, 2017). Nevertheless, sustaining such standards requires continuous provision of resources and reinforcement of hygienic behaviours among both students and staff. Access to clean and hygienic facilities has been widely associated with improved dignity, comfort, and health outcomes (Peltzer and Pengpid, 2014; Pickering *et al.*, 2013; Salleh *et al.*, 2019), while comprehensive hygiene strategies—including education and behavioural interventions—are essential for long-term impact (Vally *et al.*, 2019; Wu *et al.*, 2019; Melaku, 2023).

Similarly, the findings on handwashing practices indicate a commendable level of compliance; however, gaps remain in both behavioural adherence and infrastructure provision. The absence of handwashing facilities in some schools presents a critical vulnerability, as inadequate hand hygiene significantly increases susceptibility to infectious diseases (Jasper *et al.*, 2012; Watson *et al.*, 2017; Jamaluddin *et al.*, 2020). Strengthening handwashing culture through structured interventions, including daily routines and educational campaigns, has been shown to improve hygiene behaviours and reduce disease transmission in school environments (Chard *et al.*, 2019; Melaku and Addis, 2023).

Importantly, the statistical associations observed between toilet facilities and handwashing practices, as well as between sanitation infrastructure and educators' years of experience, reinforce the interconnected nature of infrastructure and behaviour. The significant relationship between infrastructure availability and hygiene practices suggests that improving physical facilities can directly

influence behavioural outcomes (Trinies *et al.*, 2016; Chittleborough *et al.*, 2012; Freeman *et al.*, 2013; Wada *et al.*, 2022). Furthermore, the linkage between educators' experience and sanitation provision highlights the critical role of institutional knowledge and decision-making in shaping school environments (Jasper *et al.*, 2012; McMicheal, 2019).

The findings of this study carry profound implications for health, safety, and environmental sustainability within educational settings. They provide a strong evidence base for informing policy reforms and guiding practical interventions. Addressing disparities in sanitation and water infrastructure, improving hygiene education, and strengthening handwashing facilities are essential steps toward creating healthy and inclusive learning environments (Wolf *et al.*, 2014). The demonstrated relationship between educators' experience and sanitation infrastructure further emphasises the importance of institutional capacity and informed leadership in resource allocation (Jasper *et al.*, 2012), while the observed correlation between handwashing practices and toilet facilities reinforces the need for integrated WASH interventions (Kabir *et al.*, 2021).

Promoting improved hygiene and sanitation practices remains fundamental to preventing infections, controlling pathogen transmission, and safeguarding public health (Bolatova *et al.*, 2021). The availability of safe water and sanitation infrastructure is central to both individual and community well-being, reinforcing the need for sustained investment in WASH systems (Tseole *et al.*, 2022). Moreover, targeted hygiene education programmes have proven effective in reducing the prevalence of diseases such as diarrhoea, demonstrating the transformative power of knowledge-driven interventions (Yu *et al.*, 2019).

The study also highlights that the effectiveness of water and sanitation systems is shaped by both technical and social dynamics, necessitating a holistic and multidisciplinary approach to infrastructure development (Dietler *et al.*, 2021). Integrating hygiene education into school curricula and actively engaging students in hygiene promotion activities can significantly enhance the effectiveness of interventions and foster long-term behavioural change (Fuller *et al.*, 2014). At the same time, addressing inequalities in access to water and sanitation—particularly in marginalised communities—is critical for promoting equity and ensuring universal access to essential services (Mattos *et al.*, 2021; Dietler *et al.*, 2021).

In essence, sustainable progress in school health and hygiene demands a coordinated approach that combines infrastructure development, behavioural change strategies, policy support, and stakeholder collaboration. When these elements align, schools evolve beyond mere centres of learning into environments that actively protect, nurture, and empower the next generation.

CONCLUSION

The study assessing Health, Safety, and Environmental (HSE) and hygiene practices in schools within Udu Local Government Area of Delta State provides valuable insights into the status of Water, Sanitation, and Hygiene (WASH) in educational institutions. The findings reveal notable progress in promoting health, safety, and environmental consciousness, while also identifying critical gaps that require improvement. Addressing these challenges through coordinated efforts among school authorities, health agencies, and community stakeholders can foster safer and more conducive learning environments. The study further highlights the broader impact of WASH interventions on student health, academic performance, and community well-being. Ultimately, the adoption of evidence-based practices, alongside continuous monitoring and evaluation, is essential for enhancing hygiene standards, reducing disease transmission, and sustaining healthy school environments.

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CONFLICT OF INTEREST

There is a conflict of interest

Ethics Statement

Free and informed consent of the participants was obtained and the ethic committee of the Federal University of Petroleum Resources Effurun, Delta

State, Nigeria approved the study protocol for the Protection of Human Participants.

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