



ENGAGED ENVIRONMENTAL HEALTH OFFICERS ASSESSMENT IN THE MANAGEMENT OF HEALTH CARE WASTE AT PRIMARY HEALTH CARE CENTRES IN BRASS LGA BAYELSA STATE, NIGERIA

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ABSTRACT

Aim/Objectives: This study investigates healthcare waste management in Primary Health Care centers across Brass Local Government Area, Bayelsa State, with a focus on the role of Environmental Health Officers (EHOs). **Methods:** Descriptive research design was employed to select the respondents for this study. **Results:** The age range among the respondents was more 26-35yrs (46.2%) compare to the least age with (9.6%) and those with master's degree of 7.7%. Respondents with professional certificate in environmental health were 90.4% having years of experience of 1-5years (42.3%) respectively. Findings from this study indicate insufficient EHO staffing, limited retraining, and significant challenges in waste segregation and handling, with 81% of respondents acknowledging systemic barriers. **Conclusion:** While EHOs demonstrate commitment; their effectiveness is hampered by resource constraints, irregular training, and weak policy enforcement. Recommendations include enhanced funding, continuous EHO training, stricter policy enforcement, community sensitization, and investment in eco-friendly disposal infrastructure to improve HCW management and mitigate public health and environmental risks in Brass LGA.

Keywords:

Community, Healthcare, Health officers, Management, Segregation, Waste.

INTRODUCTION

Healthcare wastes are waste generated during healthcare activities, including diagnosis, treatment, immunization, and research (WHO, 2014; 2021). The WHO classifies HCW into infectious waste (materials contaminated with pathogens), hazardous waste (sharps, chemicals, pharmaceuticals), and general waste (non-hazardous materials like paper and food scraps). About 15-20% of HCW is considered hazardous, resulting in significant risks if mismanaged (WHO, 2018; IAEA, 2018). Studies in Nigeria conducted by Awodele *et al.* (2016) indicate that majority of HCW from PHCs falls into general category, yet the lack of segregation often renders all waste potentially hazardous. Proper classification is critical for appropriate handling, treatment, and disposal (Prüss *et al.*, 2014). EHOs in Brass LGA face multifaceted challenges,

including inadequate training, limited funding, and poor infrastructure (Raimi *et al.*, 2020; Aluko, 2020). Tobin *et al.* (2013) observe in Edo State that EHOs lacked access to personal protective equipment (PPE) and modern disposal facilities, a situation likely mirrored in Brass LGA. Also, the rural setting and difficult terrain hinder timely waste collection, while low awareness among healthcare workers complicates EHOs' efforts to enforce standards (Abah & Ohimain, 2010; Chatier *et al.*, 2014).

In many cases, most of the hospitals and clinics in both public and private sectors have either a non-existent or an outdated HCWM system. Waste produced from the HCE's in the city are not treated or smashed properly. Instead, they are thrown into dustbins, consequently causing health hazards. This waste product mingles with general solid waste from different household, contaminated the air and water as well as the wider environment. Moreover, bacteria such as pseudomonas, staphylococcus, streptococcus, and so on are produced from these products. (Sohrab *et al.*, 2013; Gama, 2019). Health care wastes are considered the second most hazardous waste globally after radiation waste. Healthcare waste encompasses various forms of waste such as sharps, human body parts, blood, chemicals waste, pharmaceutical waste and medical devices (Rodriguez-morales 2013; Ogunyinka and Obafemi 2019; Okeke & Eze 2020). In developing countries, HCW possess a serious threat due to its potentials for causing environmental and public health hazard; lack of awareness among health professional's as well as general population regarding improper handling of HCW, the absence of an effective regulatory framework, and national policy and financial strains are the major impediments of adequate HCWM, and all increase the potential risk of environment and public health hazards (WHO, 2018).

In Brass LGA, a rural coastal region in Bayelsa State, PHCs serve a dispersed population with limited resources, leading to a mix of waste types. Yelebe *et al.* (2014) note that PHCs in Bayelsa State produce sharps, infectious dressings, and pharmaceutical waste, often in small but significant quantities due to high patient turnover and immunization campaigns. The absence of specialized waste management infrastructure exacerbates the challenge of handling these diverse waste streams effectively.

The Bayelsa State Environmental Sanitation Authority oversees general waste, but its capacity to address HCW from PHCs is limited (Abah & Ohimain, 2010; Olukanii *et al.*, 2018; Olalipekun & Ojo, 2020). The Basel Convention regulates the trans-boundary movement of hazardous waste, including HCW, emphasizing the responsibility of nations to manage waste domestically (United Nations Environment Programme [UNEP], 1989). In Nigeria, the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act of 2007 and the National Guidelines on Healthcare Waste Management (Federal Ministry of Environment, 2006) outline standards for HCW handling, though enforcement remains weak (Oyekale & Oyekale, 2017). These policies mandate segregation, treatment (e.g., incineration), and disposal, yet compliance in rural PHCs is inconsistent. Bayelsa State lacks a specific HCW management policy, relying on national frameworks that are often misaligned with local realities (Raimi *et al.*, 2020; Papa & Daula, 2021). EHOs play a pivotal role in implementing waste segregation at the point of generation, a practice deemed essential by WHO (2018). Studies in Nigeria, such as Afolabi *et al.* (2018), highlight that EHOs often train staff to use color-coded bins, though adherence is low due to resource shortages. In terms of collection and treatment, EHOs in Bayelsa State PHCs are tasked with ensuring waste is transported to designated sites, often relying on rudimentary methods like open burning or burial due to the absence of incinerators (Yelebe *et al.*, 2014; Smith & Koko, 2022).

RESEARCH METHODOLOGY

Research Design

Descriptive research design was employed for this study.

Study Setting

The population of the study comprised of all EHO's working in all the PHCC's (19 PHCC's) in Brass LGA of Bayelsa state. Thus; Buoama PHC (0), Egweama PHC (0), Ibidi PHC (0), Odioama PHS (0), Imbikiri PHC (0), Sangana PHC (5 EHO's), Opu-Okumbiri PHC (5 EHO'S), Minibie PHC (4 EHO'S), Bekekiri PHC (7 EHO's), Oginibiri PHC(5 EHO's),. Iseleama PHC (4 EHO's), Diema PHC (6 EHO's), Ewoama PHC (5 EHO's), Twon PHC (11 EHO's). Total of 52 EHO's (Primary Healthcare Board, 2026).

Sample Size/Sampling Technique

A census sampling technique was adopted to include all the primary healthcare centers and their environmental health officers totaling 52 persons in this study.

Instrument Design

The major instrument for data collection was self-structured questionnaire. The questionnaire contained two sections (A/B). Section A comprised of the demographic data of the respondent, while section B was use to sought information's relevant to the study.

Method of Validating Instrument

Copies of the questionnaires were presented to other expert by the researchers for assessment and verification while a correction was made where necessary.

Methods of Data Collection

Data were collected and documented by means of a self-structured standardized questionnaire that was administered personally by the researcher.

Ethical Consideration

Ethical approval was obtained from the office of research and man-power development in Bayelsa State College of Health Technology, Otuogidi, before the onset of this research study.

Methods of Data Analysis

The data obtained were analyze using SPSS version25.0 and are presented in frequency tables and percentages.

Limitations of the Study

Due to the distance from the place of study to the study area (Brass local Govt. areas) financial challenges was one of the major limitations for the collection of data.

RESULTS

Demographic Data Presentation

Table 1 presents the responses regarding the demographic characteristics of the respondents: gender, age range, religion, marital status, educational qualification, professional certification in environmental health, and years of experience as an Environmental Health Officers (EHO), PHC assigned to, and number of EHO's in PHC centre.

Table 1: Demographic Data of Respondents

S/N	Variables	Options	Frequency (n=52)	Percentage (%=100.0)
1	Gender	Male	32	61.5
		Female	20	38.5
2	Age Range	18 - 25	8	15.4
		26 - 35	24	46.2
		36 - 45	15	28.8
		46 & above	5	9.6
3	Religion	Christian	45	86.5
		Muslim	4	7.7
		Tradition	3	5.8
4	Marital Status	Single	18	34.6
		Married	30	57.7
		Divorced	4	7.7
5	Educational Qualification	Diploma	10	19.2
		Bachelor's	38	73.1
		Degree		
		Master's Degree	4	7.7
6	Professional Certification in Environmental Health	Yes	47	90.4
		No	5	9.6
7	Years of Experience	Less than one year	5	9.6
		1 - 5 years	22	42.3
		6 - 10 years	15	28.8
		Above 10 years	10	19.2

Source: Field Data (2026)

2. Presentations of Research Questions

Table 2: Distribution of Response on Number of Engaged EHOs Responsible for Health Care Waste Management

S/N	Variables	Options	Frequency (n=52)	Percentage (%=100)
1	Are there environmental health officers responsible for health care waste management in your facility?	Yes	52	100
		No	0	0.0
2	How many Environmental Health Officers are currently engaged in managing health care waste at this PHC?	None	0	0.0
		1 – 2	10	19.2
		3 – 5	42	80.8
3	Are these EHOs employed on a full time or part time basis?	Fulltime	30	57.7
		Part time	12	23.1
		Both	10	19.2
4		Yes	38	73.1

Is the current number of EHOs sufficient to manage health care waste effectively at this PHC?	No	14	26.9
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Source: Field Data (2026)

3 Categories of Engaged Environmental Health Officers

Table 3: Response on Categories of EHOs Engaged in Health Care Waste Management

S/N	Variables	n	SA	A	D	SD	$\bar{X}$	St.D	$\bar{X}\%$	CM	Decision
1.	The EHOs engaged in health care waste management at this PHC center are primarily Registered Environmental Health Officers (REHOs)	52	5	10	25	12	2.15	0.92	53.5		Disagree
2.	The EHOs managing health care waste at this PHC center typically hold a Bachelor's Degree Environmental Health as their highest qualification, aligning with the principles of (EVT) which emphasizes the relevance of qualifications to practical field competence	52	8	12	20	12	2.31	0.97	57.8		Disagree
3.	The Environmental Health Assistants (EHA) at this PHC center have specialized training specifically for health care waste management	52	20	15	10	7	2.92	1.03	73%		S.Agree
	Grand mean/mean%						2.64	0.97	66		Disagree

Source: Field Data (2026)

Hints: Strongly Agree = SA, Agree = A, Disagree = D, and Strongly Disagree = SD

4. Retraining Exercises for Environmental Health Officers

Table 4: Response on Effectiveness of EHOs retraining

S/N	Variables	n	SA	A	D	SD	$\bar{X}$	St.D	$\bar{X}\%$	CM	Decision
1.	The EHOs at this PHC center have undergone retraining exercises related to health care waste management in the past 5 years	52	4	8	25	15	2.02	0.89	50.5		Disagree
2.	The retraining exercises for EHOs at this PHC center related to health care waste management are conducted on a regular and frequent basis	52	3	7	22	20	1.87	0.85	46.8		Disagree
3.	The retraining exercises have been effective in improving the EHOs' skills in health care waste management at	52	20	15	10	7	2.92	1.03	73.0		S.Agree

	this PHC center										
4.	The most recent retraining exercise for EHOs at this PHC center focused on infection control and safety protocols	52	5	10	20	17	2.06	0.92	51.5		Disagree
	Grand mean/mean%						2.22	0.92	55.5		Disagree

Source: Field Data (2026)

Hints: Strongly Agree = SA, Agree = A, Disagree = D, and Strongly Disagree = SD

5. What challenges are encountered by the engaged Environmental Health Officers in the segregation and handling of healthcare waste at all primary health care centers in Brass Local Government Area of Bayelsa State?

Table 5: Response on Challenges Faced by EHOs

S/N	Variables	n	SA	A	D	SD	$\bar{X}$	St.D	$\bar{X}\%$	CM	Decision
1.	There are a sufficient number of Environmental Health Officers (EHOs) currently engaged in managing health care waste at this PHC center	52	30	15	5	2	3.40	0.78	85		S.Agree
2.	The EHOs engaged in managing health care waste at this PHC center are primarily employed on a full-time basis	52	25	15	8	4	3.17	0.94	79.3		S.Agree
3.	The EHOs at this PHC center face significant challenges in ensuring proper segregation and handling of health care waste	52	20	20	8	4	3.08	0.89	77		Agree
4.	The current number of EHOs is sufficient to effectively manage health care waste at this PHC center		28	15	6	3	3.31	0.85	82.8		S.Agree
	Grand mean/mean%						3.24	0.87	81%		S.Agree

Source: Field Data (2026)

Hints: Strongly Agree = SA, Agree = A, Disagree = D, and Strongly Disagree = SD

DISCUSSION

Understanding the demographic characteristics of the respondents is essential in contextualizing their responses and assessing their suitability and experience in managing healthcare waste. The data in Table 1 presents a comprehensive distribution of 52 Environmental Health Officers (EHOs) across various socio-demographic and professional categories within the Primary Health Care (PHC) facilities in Brass Local Government Area of Bayelsa State.

The gender distribution reveals a male-dominated workforce, with 61.5% (n=32) of the respondents being male and 38.5% (n=20) female. This suggests that while both genders are represented in the environmental health workforce, men constitute a significantly larger proportion. This may reflect broader national trends

in health-related technical fields, particularly in roles requiring field-based and manual work such as waste management.

The majority of respondents (46.2%) fall within the 26–35 age range, followed by those aged 36–45 (28.8%). The presence of younger professionals (15.4% aged 18–25) and a smaller proportion of older individuals (9.6% aged 46 and above) indicates a relatively youthful workforce. This age profile may be advantageous in roles requiring physical activity, adaptability to new waste management protocols, and participation in training programs.

Most respondents identify as Christians (86.5%), with smaller representations of Muslims (7.7%) and practitioners of Traditional religion (5.8%). This reflects the prevailing religious demographics in Bayelsa State and suggests minimal religious diversity among the respondents.

Majority of the respondents are married (57.7%), followed by singles (34.6%), and a minority who are divorced (7.7%). Marital status may influence availability for fieldwork, shifts, or participation in extended training exercises, though further research would be needed to establish direct correlations.

The data indicates a relatively high level of academic attainment among EHOs in the LGA. 73.1% hold Bachelor's degrees, while 19.2% have diplomas, and 7.7% possess Master's degrees. This high level of education implies that most EHOs have received formal academic training in environmental or public health-related disciplines, which is essential for competent healthcare waste management.

A significant proportion of respondents (90.4%) have professional certification in Environmental Health, highlighting a well-qualified workforce. The presence of 9.6% without certification suggests a potential area for professional development, especially if these individuals are involved in technical waste management duties.

Experience levels vary, with 42.3% of EHOs having 1–5 years of experience, 28.8% with 6–10 years, and 19.2% with over 10 years of professional practice. Only 9.6% have less than one year of experience. This mix of new and seasoned professionals offers a blend of fresh perspectives and institutional knowledge, which can be leveraged for peer learning and mentoring in healthcare waste management practices.

This data suggests variability in EHO staffing across PHC centers. With only 10 EHOs reportedly engaged in managing healthcare waste compared to the total respondent pool of 52, it appears that not all facilities have dedicated EHOs for waste management. This uneven distribution may contribute to inefficiencies or gaps in waste handling practices.

CONCLUSION

This study critically examined the role of engaged Environmental Health Officers (EHOs) in the management of healthcare waste across all Primary Health Care (PHC) centres in Brass Local Government Area, Bayelsa State. Findings reveal that while EHOs demonstrate a commendable level of commitment and technical knowledge, the effectiveness of healthcare waste management is significantly hindered by systemic challenges. These include limited funding, inadequate supply of protective and disposal equipment, lack of continuous training, poor community awareness, and weak policy enforcement. The research underscores that although the presence of EHOs has positively impacted certain aspects of healthcare waste handling—such as segregation and temporary storage—gaps remain in areas like proper transportation, final disposal, and comprehensive record-keeping. These lapses not only undermine public health safety but also pose serious environmental threats, especially in riverine communities like Brass, where access to safe waste disposal sites is limited.

REFERENCES

- Abah, S. O., & Ohimain, E. I. (2010). Healthcare waste management in Nigeria: A case study of Yenagoa. *Journal of Public Health and Epidemiology*, 3(3), 99-110.
- Afolabi, O. T., Aluko, O. O., Kehinde, A. B., & Funmito, F. (2018). Healthcare waste management practices and risk perception of healthcare workers in private healthcare facilities in an urban community in Nigeria. *African Journal of Environmental Science and Technology*, 12(9), 305-311.
- Aluko, O., & Akinmoladun, F. (2020). Environmental health officers and the management of healthcare waste: Role and challenges in Nigeria. *Journal of Environmental Health Research*, 25(3), 45-52.
- Awodele, O., Adewoye, A. A., & Oparah, A. C. (2016). Assessment of medical waste management in seven hospitals in Lagos, Nigeria. *BMC Public Health*, 16, 269.
- Chartier, Y., Emmanuel, J., Pieper, U., *et al.* (2014). Safe management of wastes from health-care activities (2nd ed.). *World Health Organization*.
- Environmental Health Officers Registration Council of Nigeria (EHORCON 2015). *Guidelines for Environmental Health Practice in Nigeria*. EHORCON.
- Federal Ministry of Environment, Nigeria. (2011). *National policy on healthcare waste management in Nigeria*. Federal Ministry of Environment.
- Federal Ministry of Environment. (2006). *National guidelines on healthcare waste management*. Federal Government of Nigeria.
- Gama, R. M., & Rodrigues, A. F. (2019). Healthcare waste management: A review of practices and challenges in developing countries. *Environmental Science and Pollution Research*, 26(7), 6397–6412.
- International Atomic Energy Agency (IAEA) (2018). *Management of Waste from the Use of Radioactive Material in Medicine, Industry, Agriculture, Research and Education*.
- National Environmental Standards and Regulations Enforcement Agency (NESREA). (2007). *Establishment Act*. Abuja, Nigeria: NESREA.
- National Primary Health Care Development Agency [NPHCDA] (2019). (Bayelsa State Ministry of Health, 2021)
- Ogunyinka, A., & Obafemi, A. (2019). Community-based approaches to healthcare waste management: The role of Environmental Health Officers. *Environmental Health Perspectives*, 37(1), 72-78.
- Okeke, I. O., & Eze, C. F. (2020). Role of environmental health officers in healthcare waste management in developing countries. *Journal of Environmental Health Science and Engineering*, 18(2), 203-212.
- Olanipekun, O. A., & Ojo, O. A. (2020). Challenges of healthcare waste management in Nigeria: Issues and policy implications. *Journal of Environmental Health Science and Engineering*, 18(2), 103-115.
- Olukanni, D. O., Pius-Imue, F. B., & Joseph, S. O. (2018). Public perception of solid waste management practices in Nigeria: Ogun State experience. *Recycling*, 5(2), 8.
- Oyekale, A. S., & Oyekale, T. O. (2017). Healthcare waste management practices and safety indicators in Nigeria. *BMC Public Health*, 17(1), 740.
- Pappa, V., & Doula, M. (2021). Risks from improper disposal of healthcare waste: A review on public health and environmental impacts. *Waste Management & Research*, 39(4), 413-429.
- Raimi, M. O., Olalekan, R. M., & Odipe, O. E. (2020). Environmental health and waste management in Bayelsa State, Nigeria: Challenges and prospects. *Journal of Environmental Science and Public Health*, 4(2), 96-111.
- Smith, J., & Koko, A. (2022). Improving healthcare waste management in developing countries: The role of EHOs in education and compliance. *Global Environmental Health Journal*, 29(4), 101-110.
- Sustainable Development Goals and Environmental Health. (2018). *Environmental Health Perspectives*. *Journal of Environmental Science and Technology*, 126(4), 047001.
- Tobin, E. A., Edigbonya, T., Asogun, D., & Aj, O. (2013). Assessment of healthcare waste management

- practices in primary health care facilities in a Lassa fever endemic local government area of Edo State, Nigeria. *Journal of Public Health and Epidemiology*, 5(10), 431-439.
- United Nations Environment Programme (UNEP). (1989). *Basel Convention on the control of transboundary movements of hazardous wastes and their disposal*. UNEP.
- World Health Organization (WHO). (2014). *Safe management of wastes from health-care activities*. WHO Press.
- World Health Organization (WHO). (2018). *Health-care waste*. WHO Fact Sheet.
- World Health Organization (WHO). (2021). *Health-care waste management: A guide for healthcare workers and EHOs*. www.who.int
- Yelebe, Z. R., Samuel, R. J., & Yelebe, B. Z. (2014). Biomedical waste treatment: A case study of some selected hospitals in Bayelsa State, South-South, Nigeria. *Journal of Environmental Science and Technology*, 7(5), 245-253.