

# Assessment of Health Care Waste Management Practices among Healthcare Workers in Doma LGC, Nassarawa State, Nigeria

Zumbes, H. J.<sup>1</sup>, \*Kwapnoe, A. P.<sup>1</sup>, Oloruntoa, O. T.<sup>2</sup>, Ogbole, M. A.<sup>3</sup>

<sup>1</sup>Department of Microbiology, Faculty of Natural Sciences, University of Jos, Jos, Plateau State, Nigeria

<sup>2</sup>Department of Environmental Resource Management, Faculty of Environmental Science, Nassarawa State University, Keffi, Nassarawa State

<sup>3</sup>Department of Community Health Management, ESPAM Formation University, Benin.

\*Corresponding Author

DOI: <https://doi.org/10.51244/IJRSI.2026.1305000254>

Received: 24 May 2026; Accepted: 30 May 2026; Published: 12 June 2026

## ABSTRACT

This study assessed healthcare waste management practices among healthcare workers in Doma Local Government Area, Nassarawa State, Nigeria, examining the methods, challenges, and impacts of waste handling in healthcare facilities. Employing a cross-sectional design, the study surveyed healthcare workers using a semi-structured questionnaire to capture data on demographic characteristics, waste generation types, disposal methods, training, and formal waste management policies. Findings reveal that most respondents are well educated, with 89.36% holding tertiary qualifications, and most have substantial work experience, predominantly between five and seven years. Infectious waste emerged as the most commonly generated category (50.7%), followed by non-infectious (25.77%) and hazardous waste (14.57%). Although segregation and disposal (51.82%) are the primary methods, many facilities still rely on burning and burying (27.73%) practices that raise environmental concerns. Concern worthy, while 90.76% of healthcare workers reported receiving training on proper waste management, only 10.92% confirmed the existence of formal policies or guidelines, with 60.78% indicating their absence. This policy gap, coupled with limited government support, inadequate infrastructure, and insufficient resources, compromises effective waste management and increases public health risks. Negative impacts include environmental degradation, heightened risk of disease outbreaks, and injuries among healthcare workers. The study concludes that despite high levels of individual training and experience, systemic shortcomings, particularly the lack of standardised policies and infrastructural support, hamper optimal waste management. It recommends that policymakers prioritise developing and enforcing comprehensive waste management policies, improving resource allocation, and investing in modern disposal technologies to safeguard public health and the environment.

**Keywords:** Healthcare, Waste, Management, Assessment

## INTRODUCTION

Health care waste management (HCWM) has emerged as a significant global problem, especially in developing settings where access to suitable waste disposal items is limited (WHO, 2018). According to the WHO (2020), healthcare waste is a range of materials produced for diagnosing, treating, preventing, or controlling human and animal diseases, conducting medical research, producing biological products, or training healthcare professionals. Moreover, hazardous healthcare waste constitutes about 15% of total healthcare waste, which, if not disposed of correctly, may have negative effects on people's health and the environment (WHO, 2018).

The SDGs concerning health and well-being, clean water, and sanitation are Goals 3 and 6, respectively; these categorically state that proper waste management is vital to health. To achieve these goals, proper healthcare

waste management has to be prioritised, especially in LMICs, where the waste issue is worse (WHO, 2020). Rizan et al. (2021) examined international trends in managing and disposing of healthcare waste, with developed countries having more efficient systems than developing ones. Outlining advanced technologies, infection control measures, and proper disposal means like incineration, autoclaving, microwave treatment, etc., to save the health facility wastes of developed countries like the United States and Germany. However, developing countries experience issues like poor funding, absence of structures, and inefficient implementation of laws on proper waste disposal (Oduro-Kwarteng et al., 2021). Thus, making healthcare waste management efforts inadequate in LMICs.

HCWM in Nigeria is a critical issue due to the increasing volume of healthcare waste (HCW) generated by the country's expanding healthcare sector and rapid population growth. These challenges are compounded by inadequate infrastructure, weak regulatory frameworks, limited public awareness, and funding constraints, according to Abah and Ohimain (2019). Additionally, Afolabi et al. (2020) report that Nigeria generates an estimated 290,000 tons of healthcare waste annually, a substantial portion of which is hazardous waste such as sharps, infectious, chemical, and pathological waste. The rapid growth of the healthcare system, population growth, and increased medical interventions have led to a rise in waste generation.

Healthcare waste management in Nigeria falls under the National Environmental (Sanitation and Wastes Control) Regulations, 2009, and the National Healthcare Waste Management Plan, 2013. Nonetheless, the frameworks highlighted have been leveraged in synchronising excellent waste management, although they are not standard nationwide (Aniefiok et al., 2020). Additionally, Nigeria has several regulations governing HCWM, including the National Healthcare Waste Management Policy (2007), which provides guidelines for HCWM practices; the Harmful Waste (Special Criminal Provisions) Act (1988), which criminalises the improper disposal of hazardous waste; and the Environmental Health Officers' Registration Council of Nigeria (EHORECON) guidelines for waste management in healthcare settings. Despite these policies, enforcement is weak due to a lack of political will, funding, and workforce. Healthcare facilities often operate without fully complying with existing regulations, and monitoring by regulatory agencies is sporadic and ineffective (Afolabi et al., 2020). However, segregation and management of the waste at the point of generation are poorly practised in many healthcare facilities, resulting in hazardous waste being mixed with general waste.

Segregation of HCW in Nigeria is inconsistent and often limited to tertiary healthcare facilities, with primary and secondary facilities lagging. This is largely due to insufficient knowledge and appropriate tools, such as colour-coded bins and puncture-proof containers (Olowookere et al., 2020). The collection and transportation of healthcare waste are frequently carried out without adherence to established safety standards. In many rural and semi-urban areas, HCW is transported using open vehicles, exposing waste handlers and the public to hazardous materials (Adegboye et al., 2021). Common methods of HCW treatment in Nigeria include incineration, open burning, and burial. However, incineration facilities are often outdated and poorly maintained, leading to incomplete combustion and the release of toxic substances into the environment (Aborode et al., 2022). Open dumping and burning are widespread practices, particularly in rural areas, where access to modern treatment facilities is limited. These practices contribute to environmental degradation and pose severe health risks to nearby communities. Recycling of HCW is limited in Nigeria due to the lack of formalised systems. Informal waste pickers often scavenge for reusable materials from dumpsites, exposing themselves to infectious and hazardous waste (Oketokun et al., 2021).

Abah and Ohimain (2019) reveal that healthcare facilities in Nigeria, especially rural and semi-urban areas, lack basic HCWM infrastructure, such as incinerators, autoclaves, and colour-coded bins. These are exacerbated by limited financial resources, which hinder the acquisition of HCWM technologies and the training of healthcare workers. Funding allocated to waste management is often insufficient to cover the costs of proper disposal and treatment (Olowookere et al., 2020). Even though many healthcare workers and waste handlers are unaware of the risks associated with improper HCWM and lack training in safe waste management practices, as reported by Adegboye et al. (2021). Whereas, Aborode et al. (2022) highlight that regulatory agencies are underfunded and cannot enforce compliance with HCWM standards. This has led to widespread noncompliance by healthcare facilities. Cultural attitudes and behavioural practices also influence HCWM in Nigeria. Moreso, in some communities, waste is disposed of in environmentally harmful ways, reflecting a lack of awareness about its health implications (Afolabi et al., 2020).

The problem of HCWM in Nigeria, especially in rural areas, is still rampant, and there is scanty literature on the practices of HCWM in rural Nigerian communities. Knowledge on the types and use of HCWM technologies, the factors that determine these practices, and the effect on the community are important in developing targeted interventions. To fill these gaps, this paper aimed to evaluate the HCWM practices among healthcare workers in Doma LGC, Nassarawa State, Nigeria.

## **METHODOLOGY**

### **Study Area and Design**

The study was designed and conducted at Doma LGC, Nassarawa State, using a cross-sectional approach.

### **Population**

The study's key population are healthcare workers who work in the healthcare facilities in Doma LGC.

### **Sample size determination and sampling procedures**

#### **Sample size determination**

Due to the large size of the population, the Taro Yamane formula was used to determine the sample size. The formula is:

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

Where: n = Sample size

N = Estimated Number of Healthcare worker population in Doma LGC, which is 834

e = Level of significance or limit of tolerable error, which is 0.05

1 = Unit or a constant

n = 270.34 approximately, n = 270

Hence, the minimum required population for the study to meet the requirements for statistical significance is 270.

#### **Sampling procedure**

Randomised ballot sampling technique was used to decide and select the health facilities that will be included in the study. Additionally, a randomised ballot sampling technique was also used to select the study participants. The randomised balloting sampling technique eliminates researcher selection bias and gives every member of the study location and population an equal and independent chance of being selected.

#### **Data collection tools and procedures**

The data were collected by face-to-face interviews using a semi-structured questionnaire. The questionnaire was adapted from previous literature (Oyekale & Oyekale, 2017). It consists of socio-demographic variables, waste management techniques and technologies, factors affecting waste management, and the impact of healthcare waste on the environment.

#### **Data processing and analysis**

Upon completion of data collection, each questionnaire was coded and entered into an Excel sheet. Then, it was exported to SPSS Version 20, Windows-compatible software for cleaning and analysis. Using simple frequency tables and cross-tabulation, data were checked for completeness. A descriptive statistical method, such as

frequency tables, was used to present different characteristics of study participants. Logistic regression was used to test the association of predictors.

### Ethical Consideration/Informed Consent

A verbal consensus was made with the facility management and study participants after explaining the purpose of the study and the part they took in the research by data collectors to ensure their right to refuse or participate in the study. Participants were made aware that the data obtained will be kept confidential and that they had the right to withdraw from the study at any time during the interview. However, the responses provided cannot be withdrawn after data analysis and final synthesis and discussion of findings.

## RESULTS

### Descriptive analysis of the findings of the study

Table 1 shows that the study on healthcare waste management practices provides valuable insights into the current state of waste handling in healthcare facilities. A total of 357 respondents provided responses to the study questionnaire. Comprising of 53.5% females and 46.5% males, have varying educational backgrounds, with the majority (89.36%) having tertiary education, while a small percentage (1.12%) have no formal education.

Table 1. Study Participants' Demographic Information

Variable	Response	N	%
Gender	Female	191	53.50
	Male	166	46.50
Academic Qualification	No formal education	4	1.12
	Primary education	13	3.64
	Secondary education	20	5.60
	Tertiary education	319	89.36
How long have you been working in the healthcare facility?	2 years	9	2.52
	3 years	15	4.20
	4 years	34	9.52
	5 years	78	21.85
	6 years	120	33.61
	7 years	62	17.37
	8 years	25	7.00
	9 years	10	2.80
	10 years	4	1.12
	What is your role in the healthcare facility? (Select one)	CHEW	69
CHO		18	5.04
Community Leader		10	2.80
Dentist		12	3.36
Doctor		6	1.68
EHA		12	3.36
EHO		15	4.20
EHT		30	8.40
Health Attendant		36	10.08
HIMT		27	7.56
JCHEW		44	12.32
Midwife		6	1.68
MLA		9	2.52
MLLT		3	0.84
MLS	3	0.84	
MLT	36	10.08	

	Nurse	9	2.52
	Nutritionist	6	1.68
	Pharmacist	6	1.68

The data indicate that most healthcare workers have been employed in their facilities for an extended period. A significant proportion (33.61%) have worked for six years, while 21.85% have five years of experience. A smaller percentage (1.12%) have spent ten years in the healthcare sector, suggesting that the workforce is relatively experienced. The distribution of healthcare professionals and community members involved in healthcare waste management highlights the critical roles played by various stakeholders. Community Health Extension Workers (CHEWs) form the largest group, making up 19.33% of the total respondents. Their significant representation suggests their pivotal role in managing healthcare waste at the community level. Following closely, doctors (12.32%) and dentists (10.08%) are also key participants, indicating the involvement of clinical professionals in waste management practices. Similarly, community leaders (10.08%) play an essential role, possibly in advocacy and oversight of waste disposal processes.

Nurses (8.40%) and Medical Laboratory Technicians (MLTs) (7.56%) also contribute notably, reflecting the importance of clinical and laboratory personnel in ensuring proper waste disposal and infection control. Other groups, such as Environmental Health Officers (EHO) (5.04%), Community Health Officers (CHO) (4.20%), and midwives (3.36%), play smaller but significant roles in maintaining safe healthcare environments. Less represented categories include Environmental Health Technicians (EHT) (1.68%), Health Information Management Technicians (HIMT) (1.68%), and pharmacists (0.84%), suggesting limited direct involvement in waste management activities. Despite their smaller numbers, their contributions remain essential in ensuring comprehensive healthcare waste management.

### Types of Waste and Waste Management Practices

Table 2 presents the type of healthcare waste; infectious waste is the most commonly generated (50.7%), followed by non-infectious waste (25.77%) and hazardous waste (14.57%). Managing this waste is crucial for maintaining hygiene and preventing disease outbreaks. The most frequently used waste disposal method is segregation and disposal (51.82%), highlighting a preference for systematic waste separation. However, burning and burying (27.73%) remain a common practice, which raises concerns about environmental pollution. Other methods, such as incineration (15.13%), recycling (8.96%), and autoclaving (5.32%), are also in use but to a lesser extent.

Table 2: Attitude Towards HCWM

Variable	Response	N	%
What types of waste are generated in the healthcare facility?	Hazardous waste	52	14.57
	Infectious waste	181	50.70
	Non-infectious waste	92	25.77
Healthcare waste management practice	Recyclable waste	32	8.96
	Autoclaving	19	5.32
	Burn and Buring	99	27.73
	Incinerator	54	15.13
	Segregation and disposal	185	51.82
Healthcare workers are training on proper waste management practices	No	32	8.96
	Yes	324	90.76
Are there any policies or guidelines in place for healthcare waste management in the facility?	No	217	60.78
	Unsure	97	27.17
	Yes	43	12.04
What are the major challenges facing healthcare waste management in the facility?	Inadequate Infrastructure	77	21.57

	Inadequate-skilled personnel	42	11.76
	Lack of Government support	108	30.25
	Lack of resource	51	14.29
	Limited Awareness	79	22.13

### Attitudes to Waste Management

Training in proper waste management practices was highly reported, with 90.76% of respondents confirming that they have received training. However, despite this training, 60.78% reported that their facilities lack official policies or guidelines on healthcare waste management. An additional 27.17% were unsure about the existence of such policies, leaving only 12.04% of respondents confident that formal guidelines are in place. This gap suggests a need for institutionalised waste management policies to standardise best practices.

A significant majority of the participants (60.78%) reported that no policies or guidelines are in place for healthcare waste management in their facilities. This indicates a major gap in regulatory enforcement and structured waste management practices. 27.17% of respondents were unsure about the existence of such policies, suggesting a lack of awareness, even if policies do exist. Only 10.92% confirmed the presence of waste management policies, highlighting a critical need for improved policy implementation and awareness.

CHEWs (19.33%), JCHEWs (12.32%), and Health Attendants (10.08%) had the highest response rates, reflecting their frontline roles in handling healthcare waste. Doctors (1.68%), Dentists (3.36%), and Pharmacists (1.68%) had lower representation, possibly indicating less direct involvement in waste management. EHTs (8.40%) and EHOs (4.20%), who play a regulatory role, also reported a lack of policies, which raises concerns about enforcement gaps.

Table 2 shows that a vast majority (91.01%) of healthcare workers reported receiving training on proper waste management practices, demonstrating a high level of awareness and capacity in this critical area. Only 8.99% of respondents indicated they had not received training, suggesting that gaps still exist, though they are relatively small.

Community Health Extension Workers (CHEWs) (19.38%), Junior CHEWs (JCHEWs) (12.36%), Health Attendants (10.11%), and Medical Laboratory Technicians (MLTs) (10.11%) represent the largest proportion of respondents, indicating that frontline healthcare providers are the primary recipients of training. Environmental Health Technicians (EHTs) (8.43%) and Health Information Management Technicians (HIMTs) (7.58%) also show significant participation in training programs. Doctors (1.69%), Dentists (3.37%), and Pharmacists (1.69%) have lower representation in the dataset, possibly indicating their roles in waste management are less direct compared to frontline workers.

The data suggests a strong implementation of waste management training across healthcare roles, particularly among community health workers and technical support staff. However, the 8.99% without training presents an area for improvement, ensuring that all healthcare workers are adequately equipped to handle waste management safely and effectively.

### Knowledge of the Consequences of Waste Mismanagement

A critical finding of the study is that 100% of respondents acknowledged the negative impacts of poor healthcare waste management on the community. The most commonly cited consequences included health risks to workers (17.37%), environmental degradation (13.73%), disease outbreaks (9.8%), and sharp injuries (7.56%). Other issues, such as airborne pollution (7.56%), water contamination (6.44%), and rodent infestations (13.73%) were also reported. These findings highlight the urgent need for effective waste management strategies to mitigate health and environmental risks, as shown in Table 3.

Table 3: HCWM Approaches

Variable	Response	N	%
How do you think healthcare waste management practices can be improved in the facility?	Allocation of more resources in waste management	72	20.17
	Creation of more awareness among healthcare workers	72	20.17
	Employment of a sanitary officer	73	20.45
	Provision of a waste segregation protocol across all units	69	19.33
	Provision of a modern waste disposal facility	71	19.89
Have you observed any negative impacts of healthcare waste management practices on the community?	Yes	357	100.00
	no	0	0.00
Do you think the community is aware of the importance of proper healthcare waste management?	Yes	357	100.00
	No	0	0.00
If yes, please describe the negative impacts observed. (Open-ended question)	Affect the aesthetic nature of the environment	49	13.73
	Affects the health of the workers	62	17.37
	Cause a disease outbreak	35	9.80
	Cause water pollution	23	6.44
	Causes air-borne pollution	27	7.56
	Causes a fire outbreak	35	9.80
	Causes sharp injuries	27	7.56
	Contaminate Soil	28	7.84
	Give room for rodent infestation	49	13.73
	Increase the healthcare cost	22	6.16
Additional information you would like to share regarding healthcare waste management practices in the facility?	The government should support the management of healthcare waste	79	22.13
	Health care should not be allowed to expose	1	0.28
	Health care waste should be properly managed to prevent diseases	69	19.33
	Health care waste should not be allowed to be exposed to the community	29	8.12

There is widespread awareness of the importance of proper healthcare waste management. All respondents (100%) agreed that the community understands the significance of managing waste effectively. To reinforce this awareness, respondents suggested stronger government intervention (22.13%), stricter enforcement of waste management practices (19.33%), and enhanced measures to prevent exposure of healthcare waste to the public (8.12%).

### Challenges Hindering Efficient Waste Management

Several challenges hinder effective healthcare waste management. The most frequently reported issue is lack of government support (30.25%), followed by limited awareness (22.13%), inadequate infrastructure (21.57%), lack of resources (14.29%), and insufficient skilled personnel (11.76%). These challenges suggest that a combination of financial investment, awareness campaigns, and workforce training could improve waste management outcomes.

## Suggested Solutions to Enhance Waste Management in Healthcare

Respondents proposed various solutions, 20.17% emphasized the need for increased resource allocation, along with more awareness programs for healthcare workers (20.17%). Other recommendations included the employment of sanitary officers (20.45%), provision of waste segregation protocols (19.33%), and the establishment of modern waste disposal facilities (19.89%). These suggestions highlight the importance of both infrastructural and human resource improvements in tackling waste management inefficiencies.

### Logistic Regression Analysis

The logistic regression analysis sought to examine the factors influencing healthcare waste management practices in the facility, as shown in Table 4. The independent variables of age, academic qualification, job role, work experience, types of waste generated, current waste management methods, and training on proper waste management practices were assessed. However, the results indicate that none of these factors significantly predict the outcome.

Table 4: Logistic Regression Analysis to Establish the Association of HCWM

Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
age	.001	.011	.014	1	.905	1.001	Lower	Upper
academic qualification	-.155	.192	.647	1	.421	.857	.587	1.249
Role in the facility	-.004	.019	.050	1	.824	.996	.959	1.034
Years of working experience	.005	.071	.005	1	.942	1.005	.874	1.156
Types of waste generated in the healthcare facility	-.112	.132	.728	1	.394	.894	.690	1.157
Waste management approaches in the facility.	-.077	.109	.492	1	.483	.926	.748	1.147
Are healthcare workers trained on proper waste management practices?	-.054	.187	.084	1	.772	.947	.657	1.366
Availability of policies or guidelines in place for healthcare waste management in the facility	-.063	.113	.315	1	.575	.939	.753	1.171
Major challenges facing healthcare waste management in the facility?	.064	.077	.676	1	.411	1.066	.916	1.240
How do you think healthcare waste management practices can be improved in the facility?	.058	.077	.561	1	.454	1.060	.911	1.233
Have you observed any negative impacts of healthcare waste management practices on the community?	1.282	1.441	.791	1	.374	3.603	.214	60.733
If yes, please describe the negative impacts observed.	-.017	.036	.224	1	.636	.983	.917	1.054
Additional information you would like to share regarding healthcare waste management practices in the facility	-.036	.067	.293	1	.589	.964	.846	1.100

Age was not significantly associated with the outcome ( $B = 0.001$ ,  $p = 0.905$ ,  $OR = 1.001$ ). Similarly, academic qualification showed no statistically significant relationship with the outcome ( $OR = 0.857$ ,  $p = 0.421$ ). Although respondents with higher academic qualifications may have slightly lower odds of effective waste management, having a confidence interval of 1 (0.587–1.249). Additionally, the study participants' roles in the facility and years of working experience also failed to significantly predict efficient waste management ( $p = 0.824$  and  $p =$

0.942, respectively). This finding implies that professional designation and years of experience alone do not necessarily influence healthcare waste management outcomes, further supporting the minimal practical effect observed.

Institutional and operational factors such as types of waste generated, waste management approaches, training on proper waste management practices, and availability of policies or guidelines also showed non-significant associations with waste management practices. Healthcare worker training had an odds ratio of 0.947 ( $p = 0.772$ ), suggesting that trained workers were marginally less likely to not effectively handle waste generated, although the effect was not statistically significant. Likewise, the presence of waste management policies yielded an odds ratio of 0.939 ( $p = 0.575$ ), indicating no substantial predictive contribution towards waste management practices. Assessing major challenges facing healthcare waste management showed a positive but non-significant association with waste management practices (OR = 1.066,  $p = 0.411$ ). This suggests that increasing challenges may slightly increase the odds of poor waste management among healthcare workers, although the evidence was insufficient to establish a meaningful relationship. Similarly, respondents' suggestions for improving healthcare waste management practices were not significant predictors (OR = 1.060,  $p = 0.454$ ). Notably, assessing respondents observed negative impacts of healthcare waste management practices in the health facilities produced a relatively high odds ratio (OR = 3.603), indicating that increased odds of improved waste management among respondents who reported negative community impacts of healthcare waste. However, the association between community impacts and waste management remained statistically non-significant ( $p = 0.374$ ), and the very wide confidence interval (0.214–60.733) suggests instability in the estimate, likely due to variability in observations.

The findings imply that although several variables demonstrated weak positive or negative associations with the outcome variable, none emerged as statistically significant predictors in the regression model. This may indicate that healthcare waste management outcomes are influenced by other contextual, institutional, financial, infrastructural, or behavioural factors not captured in the present analysis. The absence of statistically significant predictors may also reflect issues such as limited sample size, insufficient variability among respondents, measurement limitations, or potential multicollinearity among explanatory variables. These findings do not necessarily imply the absence of effect. Rather, highlights the complexity of healthcare waste management systems and the broader multidimensional environmental, policy, funding, and organisational determinants influence on healthcare waste management outcomes than individual demographic characteristics alone.

## DISCUSSION

The study on healthcare waste management practices yields several findings that both align with and diverge from previous research in the field. For instance, the high educational attainment among healthcare workers, with 89.36% holding tertiary education, echoes similar findings in studies conducted in urban healthcare settings in Ghana by Afesi-Dei et al. (2023), where a well-educated workforce was seen as a critical factor in maintaining high standards of clinical care. However, despite this level of formal education, the persistence of improper waste management practices, particularly the reliance on suboptimal disposal methods like burning and burying, suggests that education alone does not translate into effective waste management. This observation contrasts with the work of Gautam et al. (2016), who reported a direct correlation between higher education levels and improved adherence to waste management protocols in hospitals.

Work experience in the current study also presents an interesting perspective. With a significant proportion of respondents having between five and seven years of experience, the workforce appears to be relatively seasoned. This finding is consistent with previous research by Sharma et al. (2018), which emphasised that experienced personnel are better equipped to manage healthcare waste. Yet, the logistic regression analysis in the present study indicates that years of experience did not significantly predict effective waste management outcomes. This contrasts with the study by Mendoza et al. (2017), which found that more experienced healthcare workers tended to implement waste management practices more rigorously, suggesting that other organisational or systemic factors might be at play.

In terms of waste generation, the predominance of infectious waste (50.7%) aligns with global trends documented by the World Health Organisation (WHO, 2014), where the high volume of infectious waste is a

known challenge in healthcare settings, especially in resource-limited environments. Although the widespread use of segregation and disposal (51.82%) is encouraging, since segregation is widely advocated as a best practice, the notable use of burning and burying (27.73%) raises environmental concerns that have been similarly noted in studies by Kumar et al. (2015) and Amoah et al. (2013). These studies have warned that such practices can lead to environmental pollution and adverse health outcomes in surrounding communities.

A particularly concerning finding of this study is the disconnect between the high rate of training on proper waste management practices (91.01%) and the low prevalence of formal policies or guidelines; only 10.92% of respondents confirmed their existence, while 60.78% reported an absence of such policies. This gap is a recurring theme in the literature; for example, Okafor et al. (2019) also found that although many healthcare workers receive training, the lack of institutionalised policies and clear guidelines often undermines the effectiveness of these training programs. Similarly, studies by Martins et al. (2018) highlight that without strong regulatory frameworks, even well-trained personnel can struggle to implement best practices consistently.

The challenges identified in the study, such as lack of government support, limited awareness, inadequate infrastructure, and insufficient resources, are not new. They have been documented in several studies from low- and middle-income countries (Adeyemi et al., 2019; Singh and Sharma, 2018), highlighting the continued institutional failure to uphold and implement stringent healthcare waste management practices among healthcare workers. Which call for comprehensive strategies that combine policy reforms, increased funding, and enhanced training programs. The respondents' recommendations for improved resource allocation, more robust awareness campaigns, and the employment of dedicated sanitary officers align with these calls for a more systemic approach to waste management.

The logistic regression analysis revealed that individual factors such as age, academic qualification, role, work experience, and even training did not significantly predict effective waste management practices. This finding suggests that the issue might be less about individual competencies and more about systemic shortcomings, such as the absence of enforceable policies and the lack of institutional support. This result contrasts with the study by Mendoza et al. (2017), which identified individual factors as significant predictors, and underscores the complexity of healthcare waste management, a complexity that likely requires multifaceted solutions beyond improving individual capabilities.

## CONCLUSION

The study underscores the complexity of healthcare waste management, where high levels of training and experience are undermined by systemic shortcomings. To achieve sustainable improvements, there is a pressing need for comprehensive policy reforms, better resource allocation, and stronger institutional support mechanisms. Future research should explore additional factors, such as institutional culture and financial constraints, to further elucidate the drivers of effective waste management and to inform targeted interventions that can bridge the gap between individual competencies and systemic capacities in waste management.

## RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed:

1. It is recommended that healthcare facilities, in collaboration with governmental bodies, develop and implement comprehensive waste management policies. These should clearly outline procedures, responsibilities, and protocols to ensure standardised practices across all levels of the facility. Regular policy reviews and updates will also help in adapting to new challenges and technological advancements.
2. Healthcare institutions should prioritise the allocation of funds to modernise waste disposal systems, such as improved incineration, autoclaving, and recycling facilities, to reduce environmental impact. Additionally, enhancing resource availability will help support the necessary training and maintenance of these systems, ensuring a safer environment for both healthcare workers and the community.
3. Establishing a system for regular monitoring and evaluation of waste management practices is essential. This could involve periodic audits, performance assessments, and feedback mechanisms to identify gaps and areas for improvement. Furthermore, engaging the community and other stakeholders in these processes will help

raise awareness, encourage accountability, and foster a collaborative approach to overcoming waste management challenges.

## REFERENCE

1. Abah, S. O., & Ohimain, E. I. (2019). Healthcare waste management in Nigeria: A case study. *Waste Management & Research*, 37(8), 754-764. <https://doi.org/10.1177/0734242X19861254>
2. Aborode, A. T., Bolarinwa, O. A., & Egbuabor, I. G. (2022). Healthcare waste management & occupational health risks in Nigeria: A systematic review. *Journal of Environmental Health*, 84(6), 14-23.
3. Adegboye, M. A., Adejumo, A. O., & Afolabi, A. O. (2021). Needle-stick injuries & sharps waste management practices among healthcare workers in Nigeria. *African Journal of Public Health*, 15(2), 100-108.
4. Adeyemi, S. A., Balogun, O. A., & Adebayo, T. O. (2019). Healthcare waste management challenges in low- & middle-income countries: A systematic review. *Journal of Environmental Health*, 81(3), 45-52.
5. Afesi-Dei, C., Appiah-Brempong, M., & Awuah, E. (2023). Health-care waste management practices: The case of Ho Teaching Hospital in Ghana. *Heliyon*, 9(4), e15514. <https://doi.org/10.1016/j.heliyon.2023.e15514>
6. Afolabi, A. A., Abimbola, O. P., & Oyebadejo, S. A. (2020). Challenges & prospects of healthcare waste management in Nigeria. *Journal of Environmental Health Science*, 42(3), 124-135.
7. Amoah, P. A., Boateng, R., & Mensah, K. (2013). Environmental impacts of healthcare waste disposal: A case study in urban hospitals. *International Journal of Waste Management*, 9(2), 100-110.
8. Aniefiok, U., Etim, E., & Idorenyin, A. (2020). Challenges & prospects of healthcare waste management in Nigeria. *International Journal of Environmental Science & Technology*, 17(4), 2001-2012. <https://doi.org/10.1007/s13762-019-02445-7>
9. Gautam, R. K., Shrestha, B., & Singh, R. (2016). Education & waste management practices in hospitals: Correlating knowledge with behaviour. *Journal of Hospital Administration*, 5(1), 12-18.
10. Kumar, V., Singh, A., & Patel, M. (2015). Healthcare waste disposal practices: Issues, challenges, & opportunities for improvement. *Journal of Health Management*, 17(4), 600-607.
11. Martins, L. O., da Silva, R. M., & Pereira, J. A. (2018). Institutional policies & their role in effective healthcare waste management. *Journal of Public Health Policy*, 39(2), 223-230.
12. Mendoza, A. G., Torres, M. C., & Reyes, J. P. (2017). The influence of work experience on healthcare waste management: Evidence from hospital settings. *Waste Management & Research*, 35(8), 761-768.
13. Oduro-Kwarteng, S., Addai, R., & Ess&oh, H. M. (2021). Healthcare waste characteristics & management in Kumasi, Ghana. *Scientific African*, 12, e00784. <https://doi.org/10.1016/j.sciaf.2021.e00784>
14. Okafor, E. N., Uche, C. G., & Nwankwo, U. J. (2019). The impact of policy on healthcare waste management: A Nigerian perspective. *African Journal of Environmental Science*, 15(3), 200-209.
15. Oketokun, F. O., Adeyemo, O. A., & Bamidele, F. S. (2021). Barriers to effective healthcare waste management in Nigeria. *African Journal of Health Sciences*, 30(1), 45-60.
16. Oladele, A. O., Adekunle, A. S., & Olatunde, F. O. (2017). Educational levels & waste management practices among healthcare workers in urban hospitals. *Journal of Medical Education*, 12(1), 45-52.
17. Olowookere, S. A., Adeleke, O. A., & Awotidebe, A. (2020). Challenges in managing sharps waste in Nigerian healthcare facilities. *Public Health Research & Practice*, 30(4), 441-452.
18. Oyekale, A. S., & Oyekale, T. O. (2017). Healthcare waste management practices & safety indicators in Nigeria. *BMC Public Health*, 17(1), 740. <https://doi.org/10.1186/s12889-017-4794-6>
19. Rizan, C., Bhutta, M. F., Reed, M., & Lillywhite, R. (2021). The carbon footprint of waste streams in a UK hospital. *Journal of Cleaner Production*, 286, 125446. <https://doi.org/10.1016/j.jclepro.2020.125446>
20. Sharma, P., Gupta, S., & Reddy, K. (2018). Assessing the influence of professional experience on healthcare waste management practices. *Journal of Healthcare Administration*, 4(2), 34-40.
21. Singh, R., & Sharma, P. (2018). Barriers to effective healthcare waste management in resource-limited settings. *Waste Management Journal*, 30(5), 450-457.
22. WHO (2014). *Safe management of wastes from health-care activities* (2nd ed.). World Health Organisation.

23. WHO (2018). Safe management of wastes from health-care activities: A summary. WHO Press.
24. WHO (2020). Health-Care Waste. World Health Organisation. <https://www.who.int/news-room/factsheets/detail/health-care-waste>