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Hospital Waste Management In OAUTHC Ile-Ife: Influencing Factors

AFOLABI, Adeniyi Samson
Department Of Urban And Regional Planning,
Obafemi Awolowo University Ile-Ife Nigeria

Abstract
Background*: Solid waste management in tertiary hospitals is perilous to public health and environment, most especially in resource-limited settings. A complex mixture of general, infectious, toxic, and pharmaceutical waste is produced by healthcare facilities. This poses significant risks if not properly managed. The insufficient resources for the practices pose significant risks. This study aimed to examine the factors influencing Hospital solid waste management practices at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) in Ile-Ife, Nigeria.*
Materials and Methods*: Utilizing Principal Component Analysis on 25 variables, the study found six important factors influencing solid waste management practices. These accounted for 84.61% of the total variance explained. The availability of storage and collection facilities was the most important factor, accounting for 30.94% of the variance. The number of patients (17.86%), transportation (15.39%), human and material resources (8.33%), and disposal (7.36%) were additional significant considerations.*
Results*: These results highlight the significance of strong infrastructure, sufficient resources, effective logistics, and appropriate handling procedures. It also emphasized the need for staff responsibility in source sorting and waste handling.*
Conclusion: *The study provides crucial evidence to guide internal quality improvement initiatives and inform policy reviews. It also provides the broader discourse on achieving sustainable and safe healthcare waste management in resource-limited settings like OAUTHC Ile-Ife.*
Keywords: *Healthcare Waste, Solid Waste, Tertiary Hospital, OAUTHC, factor influence*

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I. Introduction

Background

Solid waste generation is an inevitable consequence of healthcare delivery (Gashaw et al., 2025). It poses significant challenges to public health and environmental sustainability (Basavaraju et al., 2025). In tertiary hospitals, which are referral centers with high patient volume, special diagnostic laboratories, and specialized treatment wards, the quantity and complexity of the waste produced are significantly increased (World Health Organization [WHO], 2018). Healthcare facilities produce a wide variety of waste, such as infectious, pathological, sharps, pharmaceutical, and chemical waste (Adam et al., 2025). If this waste is not managed properly, it can result in the spread of diseases, environmental pollution, and pose risks to healthcare workers, waste handlers, and the general public (Afolabi et al., 2018). The World Health Organization (WHO) emphasizes the critical importance of having effective Healthcare solid waste management (HSWM) systems, particularly in areas where resources and infrastructure are often limited (Quttainah & Singh, 2024).

The safe and effective handling of waste is not merely a logistical concern but a fundamental component of infection prevention and control, occupational health, and environmental stewardship (Ali et al., 2021). Nigeria, like many other developing nations, face significant challenges in managing hospital solid waste (Udofia et al., 2022). These challenges are often exacerbated by factors such as inadequate funding, lack of appropriate infrastructure, insufficient training of personnel, and weak enforcement of existing regulations, Inadequate practices, such as improper segregation and the use of dysfunctional incinerators. These factors expose healthcare workers, patients, waste handlers, and the surrounding community to needlestick injuries, toxic emissions, and the spread of pathogens (Babatunde, 2020).

In Nigeria, National policy on HCWM does exist in the country, but in practice, implementation across the nation has been inconsistent. A large gap between policy recommendations and actual practice has been reported in many healthcare setups (Awodele et al., 2016; Nwachukwu et al., 2020). These gaps have an influence on a complex interplay of factors. These include insufficient financial investment, a lack of appropriate technology and infrastructure, inadequate knowledge and training among staff, and weak organizational oversight (Caniço, 2022; Olaifa et al., 2018).

The Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) in Ile-Ife stands out as a leading tertiary institution in South-Western Nigeria It generates a substantial amount of healthcare waste. How this hospital handles its waste, affects the health of its staff and patients as well as the environment of its host community. Researchers have documented the general challenges of healthcare waste management (HCWM) in Nigeria. However, there is a lack of in-depth, hospital-specific studies that examine the unique factors shaping daily waste management operations at a major teaching hospital like OAUTHC.

Aim and Objectives

This research aims to examine the factors influencing hospital solid waste management practices at OAUTHC, Ile-Ife. It aims to assess the knowledge and attitudes of healthcare workers, evaluate the adequacy of available resources and infrastructure, and review the existing management and policy frameworks. The findings will provide crucial evidence to guide internal quality improvement initiatives and inform policy reviews. It will also contribute to the broader discourse on achieving sustainable and safe healthcare waste management in resource-limited settings.

Study Area

The research was conducted at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife. This hospital is a prominent tertiary healthcare institution located in Southwestern Nigeria. This setting was chosen due to its significant role in healthcare delivery. OAUTHC is a major tertiary healthcare institution offering a wide range of medical services. The hospital generates significant volumes of diverse solid waste streams due to the high level of patronage. This makes it a representative case for studying HSWM practices in a Nigerian teaching hospital.

Literature Review

A substantial body of literature establishes that effective Healthcare Solid Waste Management (HSWM) is essential for public health, environmental safety, and occupational hygiene (WHO, 2018; Ali et al., 2021; Tolera et al., 2023). In particular, studies from developing countries like Nigeria reveal a host of systemic challenges. These challenges include insufficient funding, a lack of proper infrastructure, inadequate training for staff, and weak enforcement of existing regulations (Babatunde, 2020; Udofia et al., 2022; Afework 2025). Research conducted by Awodele et al. (2016) and Nwachukwu et al. (2020) highlights a significant gap exists between national policy recommendations on HCWM and the actual practices observed in many healthcare facilities across Nigeria. This gap is often linked to a complicated mix of factors, such as limited financial investment, a shortage of technology, and a lack of knowledge among personnel (Caniço, 2022; Olaifa et al., 2018).

There is a shortage of comprehensive, hospital-centered studies examining the unique factors affecting the routine solid waste management activities at a tertiary teaching hospital such as OAUTHC. This is the major gap that the present research seeks to fill. This study shift focusses from national-level generalizations to a detailed, factor-based analysis of a specific, major teaching hospital (OAUTHC). It also employing a robust multivariate statistical method (PCA) to objectively determine and rank the factors by their relative importance, offering a clear hierarchy of challenges.

In conclusion, this this research fills a significant gap in the literature by moving from a broad description of HSWM problems to a precise, empirical identification. Weighting of the key influencing factors within a specific, resource-limited tertiary hospital, thereby enabling more effective and targeted quality improvement initiatives.

II. Materials And Methods

Data were collected using a structured questionnaire designed to capture respondents' perceptions on factors influencing solid waste management practices. The study utilized a set of 25 variables identified as potential determinants of HSWM practices at OAUTHC. The level of agreement on the influence of these variables was measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Principal Component Analysis (PCA) was the primary statistical technique employed to analyze the collected data. It was used to identify the underlying factors influencing solid waste management practices. PCA is a mathematical procedure that transforms a set of correlated variables into a smaller number of uncorrelated variables, known as principal components, which capture most of the variability in the original data. The first principal component accounts for as much of the variability in the data as possible, and each succeeding component accounts for as much of the remaining variability as possible. Principal components analysis is similar to another multivariate procedure called Factor Analysis.

Factor model explores a reduced correlation matrix. That is, communalities (r^2) are inserted on the diagonal of the correlation matrix, and the extracted factors are based only on the common variance, with specific and error variances excluded**.** Explores underlying "latent" structure of data. Model assumes variability partitionable into common and unique components.

However, communality is the total amount of variance an original variable shares with all other variables included in the analysis. Eigenvalue is the column sum of squared loadings for a factor, i.e., the latent root. It conceptually represents that amount of variance accounted for by a factor.

III. Results And Discussion

Factors influencing solid waste management practices were examined using a number of variables as factors that determine solid waste management practice in OAUTHC. These factors comprises of Provision of protective materials, Staff training on waste handling, Provision of equipment for waste collection, Number of patients in the hospital, Number of bed spaces available in the hospital, Area of specialization in the hospital, Segregation of waste, Use of colour code system in segregation, Availability colour code system in segregation, Availability of material resource, Placement of storage facilities, Labeling of waste storage facilities, Period of emptying storage facilities, Maintenance of storage facilities, Packaging of waste to prevent littering, Materials use of waste collection, Availability of vehicle for waste transportation, Status of the vehicles, Disinfection of the truck, Duration of transportation from collection to dump site, Disposal method adopted

Treatment of waste, Site protection, Location dumps site and Waste component generated in the hospital. The level of agreement on the influence of these variables were measured on five points Likert scale rating in the order of *1- strongly disagree, 2- disagree, 3- just agree, 4- agree, and 5- strongly agree*

Correlation and Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of Sphericity was carried out to test the suitability of data set for factor analysis. The result indicated the sufficiency of the 25 variables loaded for factor analysis, as presented in Table 3.1. The KMO value of 0.856 which is greater than minimum 0.5, Bartlett's test of shericity chi-square value of 4078.290 and significant value of 0.000 ($p \leq 0.05$) agree with Field (2005). Therefore, factors analysis is considered relevant and possible for this study.

Table 3.1 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.856
Bartlett's Test of Sphericity	Approx. Chi-Square	4078.290
	Df	300
	Sig.	.000

Table 3.2 shows the correlation matrix of factors influencing solid waste management practices of OAUTHC. The Table contains Pearson correlation coefficient between all pairs of variables. It is important to eliminate multicollinerity (Variables that are highly correlated with other variables) and singularity (variables without correlation other variables) in the data set. Therefore, all variables in this data set correlated fairly well and only few among the correlation coefficient are relatively large and those cannot create multicolliniarity and singularity in the data. Also, the determinant which is a good measure of determining the level of multicolliniarity and singularity is 0.0023 as presented in Table 3.2, which is far greater than the value of 0.00001 suggested by Field (2005).

Furthermore, Table 3.3 presents the initial communalities of the factors before extraction through principal component analysis with an initial assumption that all variables are common with 1.000 each. After extraction, it was observed that each variable reflects common variance in the data set, which is evident in the proportion of the variance explained by the underlying factors. For instance, variable such as *Number of Bed space Available in the Hospital, Duration of Transportation, Segregation of Waste, and Availability of Material resources* have associated variation of 0.945(94.5%), 0.937(93.7%), 0.933(93.3%), and 0.927(92.7%) respectively. Other variable with lower associated variation are *Treatment of waste, Provision of Protective Materials, Period of emptying storage facilities, and Maintenance of storage facilities with 0.517(51.7%), 0.645(64.5%), 0.759(75.9%) and 0.762(76.2%).* It is expected that the communalities after extraction must be high for a reasonable representation. The average communality as computed from Table 3.1 is 0.846 (84.6%)

Table 3.2: Correlation Matrix of the Loaded Factors

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Correlation	A	1																								
	B	.047	1																							
	C	.511**	-.124	1																						

D	-.120	-.076	.198*	1																					
E	-.214**	.060	-.563**	-.805**	1																				
F	-.429**	-.257**	-.382**	-.182*	.516**	1																			
G	.221**	.285**	.477**	.385**	-.700**	-.865**	1																		
H	-.327**	.631**	-.130	.448**	-.263**	-.127	.329**	1																	
I	-.518**	.107	-.778**	-.321**	.724**	.590**	-.685**	.167*	1																
J	.317**	-.132	.631**	.627**	-.892**	-.536**	.687**	.111	-.811**	1															
K	-.301**	.120	-.619**	-.655**	.909**	.532**	-.688**	-.135	.796**	-.982**	1														
L	.481**	-.095	.741**	.361**	-.626**	-.427**	.524**	-.144	-.865**	.702**	-.689**	1													
M	.496**	.029	.652**	.080	-.546**	-.633**	.672**	-.126	-.755**	.613**	-.601**	.613**	1												
N	.313**	.081	.693**	.440**	-.731**	-.558**	.702**	.234**	-.711**	.770**	-.763**	.575**	.627**	1											
O	.529**	.030	.695**	.040	-.582**	-.675**	.716**	-.134	-.804**	.653**	-.641**	.547**	.812**	.668**	1										
P	.384**	-.178*	.678**	.520**	-.830**	-.552**	.683**	.016	-.872**	.931**	-.914**	.754**	.658**	.756**	.701**	1									
Q	.343**	.149	.282**	.026	-.378**	-.837**	.768**	-.087	-.522**	.424**	-.416**	.355**	.609**	.413**	.649**	.455**	1								
R	.274**	.221**	.092	.021	-.302**	-.668**	.612**	-.069	-.417**	.338**	-.332**	.283**	.486**	.262**	.518**	.363**	.798**	1							
S	.519**	-.007	.731**	.191*	-.572**	-.518**	.584**	-.132	-.790**	.641**	-.629**	.737**	.682**	.587**	.727**	.689**	.472**	.376**	1						
T	-.152*	-.066	.151	.970**	-.803**	-.206*	.405**	.470**	-.290**	.615**	-.645**	.272**	.078	.446**	.083	.501**	.054	.043	.081	1					
U	.514**	-.068	.778**	.319**	-.613**	-.418**	.513**	-.141	-.847**	.687**	-.675**	.940**	.601**	.564**	.588**	.739**	.348**	.278**	.766**	.231**	1				
V	-.041	-.303**	.066	-.114	.112	.267**	-.324**	-.362**	.015	-.070	.088	.098	-.132	-.276**	-.098	-.088	-.235**	-.097	.080	-.161*	.113	1			
W	-.123	-.122	.062	-.014	.041	.113	-.032	-.062	.041	-.129	.137	.029	-.029	-.090	-.079	-.099	.000	-.148	.149	-.072	.065	.115	1		
X	-.027	-.004	.046	-.010	.059	.075	-.028	-.014	.041	-.013	.026	.063	.080	-.025	-.090	-.028	.000	-.085	.006	-.043	.061	-.021	.181*	1	
Y	.029	-.093	.075	-.135	.144	.191*	-.200*	-.194*	.060	-.075	.092	.027	.013	-.107	-.064	-.075	-.115	-.174*	.000	-.162*	.062	.114	.268**	.796**	1

Determinant= 0.0023

PLEASE NOTE

A= Provision of protective materials
B= Staff training on waste handling
C= Provision of equipment for waste collection
D= Number of patients in the hospital

E= Number of bed spaces available in the hospital
F= Area of specialization in the hospital
G= Segregation of waste
H= Use of colour code system in segregation
I= Availability colour code system in segregation
J= Availability of material resource
K= Placement of storage facilities
L= Labeling of waste storage facilities
M= Period of emptying storage facilities
N= Maintenance of storage facilities
O= Packaging of waste to prevent littering
P= Materials use of waste collection
Q= Availability of vehicle for waste transportation
R= Status of the vehicles
S= Disinfection of the truck
T= Duration of transportation from collection to dump site
U= Disposal method adopted
V= Treatment of waste
W= Site protection
X= Location dump site
Y= Waste component generated in the hospital

Table 3.3: Communalities before and after Extraction Process

	Initial	Extraction
Provision of protective materials	1.000	.645
Staff training on waste handling	1.000	.825
Provision of equipment for waste collection	1.000	.842
Number of patients in the hospital	1.000	.923
Number of bed spaces available in the hospital	1.000	.945
Area of specialization in the hospital	1.000	.844
Segregation of waste	1.000	.933
Use of colour code system in segregation	1.000	.914
Availability colour code system in segregation	1.000	.919
Availability of material resource	1.000	.927
Placement of storage facilities	1.000	.931
Labeling of waste storage facilities	1.000	.807
Period of emptying storage facilities	1.000	.759
Maintenance of storage facilities	1.000	.762
Packaging of waste to prevent littering	1.000	.816
Materials use of waste collection	1.000	.900
Availability of vehicle for waste transportation	1.000	.920
Status of the vehicles	1.000	.797
Disinfection of the truck	1.000	.821
Duration of transportation from collection to dump site	1.000	.937
Disposal method adopted	1.000	.837
Treatment of waste	1.000	.517
Site protection	1.000	.829
Location dump site	1.000	.906
Waste component generated in the hospital	1.000	.895
Extraction Method: Principal Component Analysis.		

According to Kaiser's criterion, factors are to be extracted (Gorsuch, 1983). However, it is important to note that this criterion is accurate when there are less than 30 variables and the average communalities after extraction is greater than 0.7 (Field, 2005). This study satisfies the condition where 25 variables are loaded for analysis with average communality value of 0.846 after extraction.

Findings as presented in Table 3.4 revealed that six factors with the initial eigenvalues of between 1.033 and 11.152 were extracted with 84.61% as total variance explained. Factor 1 accounted for 44.61% of the total variance explained in the original set of data; factor 2 accounted for 12.98%, while factor 3 accounted for 10.92%, factor 4 accounted for 7.19%, factors 5 and 6 accounted for 4.79% and 4.13% respectively.

Table 6.4: Total Variance Explained on the factors influencing SWM Practice

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.152	44.609	44.609	11.152	44.609	44.609
2	3.244	12.975	57.585	3.244	12.975	57.585
3	2.729	10.915	68.500	2.729	10.915	68.500
4	1.797	7.187	75.687	1.797	7.187	75.687
5	1.197	4.788	80.475	1.197	4.788	80.475
6	1.033	4.133	84.608	1.033	4.133	84.608
7	.845	3.381	87.989			
8	.619	2.474	90.463			
9	.452	1.810	92.273			
10	.320	1.279	93.552			
11	.269	1.077	94.629			
12	.234	.934	95.564			
13	.217	.866	96.430			
14	.199	.796	97.227			
15	.143	.572	97.798			
16	.123	.492	98.290			
17	.112	.446	98.737			
18	.075	.302	99.038			
19	.071	.284	99.322			
20	.052	.208	99.530			
21	.037	.149	99.679			
22	.033	.133	99.812			
23	.025	.100	99.912			
24	.016	.063	99.975			
25	.006	.025	100.000			

Findings as presented in Table 3.5 the rotated component matrix revealed the types of variable loading highly on each factor. Factor 1 accounted for 30.94% variance, factor 2 accounted for 17.86% variance while factor 3 accounted for 15.39% variance, four accounted for 8.33%, factor 5 and 6 accounted for 7.36% and 4.72% variance respectively. This study agrees with Adeyinka (2007) who adopted 0.55 and above, therefore any variable loading with value that is greater than 0.55 will be interpreted in line with Adeyinka (2007). Accordingly, component 1 has nine (9) variables loading highly on it, these are *Availability colour code system in segregation(-0.850), Availability of material resource(0.645), Placement of storage facilities(-0.627), Labeling of waste storage facilities(0.841), Period of emptying storage facilities(0.703), Maintenance of storage facilities(0.663), Packaging of waste to prevent littering(0.725), Materials use of waste collection(0.712), and Treatment of waste(0.888).* By the nature of these variables loading on factor 1, it is named **Availability of Storage & Collection Facilities.**

Component 2 have five (5) variable loading, they are: *Number of patients in the hospital (0.947), Number of bed spaces available in the hospital (-0.775), Area of specialization in the hospital (-0.773), Segregation of waste (0.676), and Use of colour code system in segregation (0.818).* This variable is referred to as **Number of Patients**

Component 3 has 4(four) variables loading which are: *Availability of vehicle for waste transportation (0.918), Status of the vehicles (0.875), Disinfection of the truck (0.829), and Duration of transportation from collection to dump site (0.960).* These variables fall within **Transportation Factors**

Component 4 has 3 (three) variables loading. Which are: *Provision of protective materials (0.677), Staff training on waste handling (0.875), and Provision of equipment for waste collection (0.908).* These variables fall within **Human and Material Resources Factors**

Component 5 has 3(Three) variables loading which are: *Disposal Method Adopted (0.872), Location of dump site (0.948) and Waste component generated in the hospital (0.916).* These variables fall within **Disposal Factors**

The last Component is disregarded, according to field, 2005, any component that has less than two variables can be disregarded

ROTATED COMPONENT MATRIX	**COMPONENT**					
	1	**2**	**3**	**4**	**5**	**6**
Provision of protective materials	.034	-.294	.165	**.677**	.003	-.267
Staff training on waste handling	-.023	-.185	.139	**.875**	-.061	.031
Provision of equipment for waste collection	.423	.113	.002	**.908**	.048	.042
Number of patients in the hospital	.119	**.947**	-.050	.081	-.037	.053
Number of bed spaces available in the hospital	-.529	**-.775**	-.241	-.046	.061	.007
Area of specialization in the hospital	-.397	**-.773**	-.143	-.237	.081	.071
Segregation of waste	.456	**.676**	.379	.343	-.058	.048
Use of colour code system in segregation	-.175	**.818**	-.085	.441	-.085	.074
Availability colour code system in segregation	**-.850**	-.270	-.327	.115	.038	.034
Availability of material resource	**.645**	.547	.267	-.060	.000	-.133
Placement of storage facilities	**-.627**	-.471	-.261	.042	.013	.135
Labeling of waste storage facilities	**.841**	.252	.115	-.114	.029	.096
Period of emptying storage facilities	**.703**	.045	.496	.031	.098	-.080
Maintenance of storage facilities	**.663**	.431	.222	.259	-.012	-.137
Packaging of waste to prevent littering	**.725**	.037	.524	.013	-.051	-.109
Materials use of waste collection	**.712**	.532	.290	-.103	-.010	-.123
Availability of vehicle for waste transportation	.273	.024	**.918**	.048	.005	.017
Status of the vehicles	.141	.011	**.875**	-.005	-.099	-.046
Disinfection of the truck	.075	.281	**.829**	-.027	-.027	.216
Duration of transportation from collection to dump site	.047	.007	**.960**	.095	-.051	-.031
Disposal method adopted	.036	.203	.099	-.090	**.872**	.131
Treatment of waste	**.888**	-.119	-.227	.344	-.099	**-.564**
Site protection	.015	-.043	-.021	-.051	.075	.188
Location dump site	.002	.010	-.010	.043	**.948**	.064
Waste component generated in the hospital	.051	-.119	-.126	-.102	**.916**	.117
Eigenvalue	**7.735**	**4.464**	**3.849**	**2.083**	**1.841**	**1.181**
% variance explained	**30.939**	**17.857**	**15.394**	**8.332**	**7.363**	**4.723**
Cumulative % variance explained	**30.939**	**48.795**	**64.190**	**72.522**	**79.885**	**84.608**
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						

Table 35: Rotated Component matrix

The summary of the variance explained by the extracted components after rotation is presented in Table 3.6 and Fig. 3.1, findings revealed that Available storage and collection facilities played significant role in influencing SWM practices in the study area as they accounted for 30.94% among the rest of the factors extracted. The next component in the order of loading variability among the 25 variables as factors influencing SWM practice is Number of patients factors with 17.86% of the extracted components. This plays emphasis on the importance of the responsibility of the staff of OAUTHC to embark on source sorting practice and proper handling of waste prior to collection and disposal. The next components are Transportation factor, Human and Material resource factors, and Disposal with a share of 15.39%, 8.33% and 7.36% respectively of the extracted components. This is an indication that Available storage & Collection facilities, Number of patients, Transportation Factors, Human and material resource factors and Disposal factors influences Solid waste management practice of Obafemi Awolowo University teaching Hospital, Ile-Ife Nigeria.

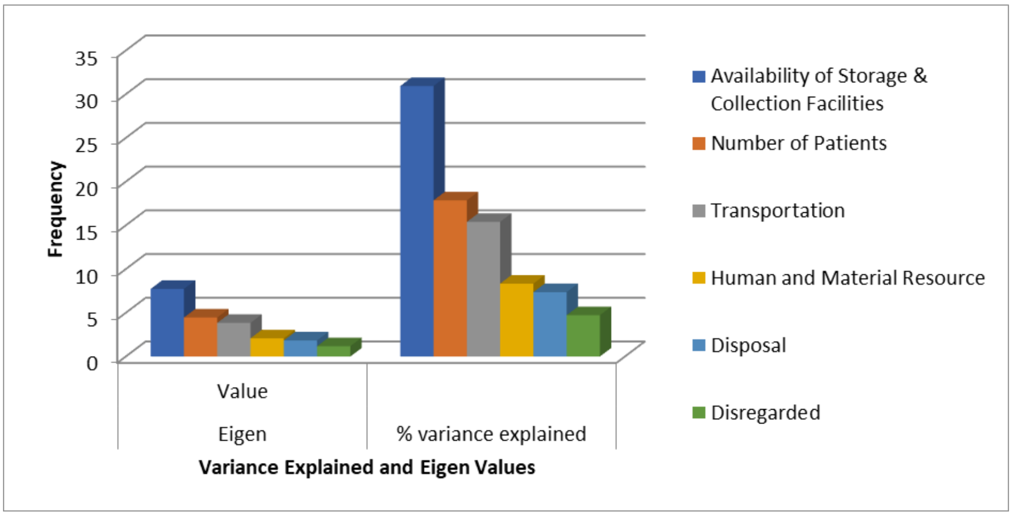

Figure 3.1: Factors Influencing Solid waste management practices in OAUTHC

Table 3.6: Summary of Factors Influencing Solid Waste Management Practices in OAUTHC

Factors	Eigen Value	% variance explained	Cumulative % variance explained
1 (Availability of Storage & Collection facilities)	**7.735**	**30.939**	**30.939**
2 (Number of Patients)	**4.464**	**17.857**	**48.795**
3 (Transportation)	**3.849**	**15.394**	**64.190**
4 (Human and Material Resource)	**2.083**	**8.332**	**72.522**
5 (Disposal)	**1.841**	**7.363**	**79.885**
6 (Disregarded)	**1.181**	**4.723**	**84.608**

IV. Conclusion And Recommendations

The study successfully identified and analyzed the multifaceted factors influencing hospital solid waste management (HSWM) practices within the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) in Ile-Ife, Nigeria. Through a rigorous Principal Component Analysis on a comprehensive set of 25 variables, the research successfully identified six pivotal factors. These factors are collectively account for 84.61% of the total variance in solid waste management practices. The findings reveal that effective solid waste management is not influenced by a single factor at OAUTHC. It is done by a complex interplay of multiple institutional, logistical, and operational elements.

The most significant determinant identified was the Availability of Storage & Collection Facilities, which alone accounted for 30.94% of the variance. This underscores the fundamental importance of having adequate, well-labeled, and properly maintained storage infrastructure. Others are efficient waste segregation systems (including color-coding), and appropriate materials for waste collection. The high loadings on variables such as the availability of material resources, labeling, and maintenance of storage facilities. This highlight that infrastructural adequacy is a primary determinant of effective waste handling.

The second major factor was the Number of Patients (17.86% of variance). This emphasized that the volume of patient is directly impacts waste generation and management complexity. This factor stresses the need for dynamic waste management strategies. This can be scaled with patient intake and the specific specializations of hospital units, which generate different types of solid waste. Transportation Factors (15.39% of variance) emerged as the third critical component. This highlights the important of reliable vehicles, their condition, disinfection protocols. The efficiency of transporting waste from collection points to disposal sites. This indicates that logistical efficiency is paramount in preventing secondary contamination and ensuring timely waste disposal. Additionally, Human and Material Resource Factors (8.33%) were identified as essential. This reinforces that even with advanced infrastructure, the human element remains a pillar of effective waste management. Disposal Factors (7.36%), such as the methods adopted, location of dump sites, and the type of waste generated, play a significant role in determining the overall sustainability and safety of waste management practices.

In essence, the findings of this study provide empirical evidence that effective HSWM at OAUTHC Ile-Ife is predominantly influenced by infrastructural adequacy, operational logistics, resource availability, and the final disposal mechanisms. The study implicitly emphasizes the critical role of staff responsibility in source sorting and proper waste handling, as these human elements are intrinsically linked to the successful implementation of infrastructural and procedural frameworks. These insights are invaluable for guiding internal quality improvement initiatives, informing policy reviews, and fostering a more sustainable and safer healthcare environment within OAUTHC and similar tertiary institutions in Nigeria.

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