EFFECT OF URBAN WASTE ON HEALTHCARE MANAGEMENT IN ENUGU URBAN CENTRE

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ABSTRACT
This study investigates "Effect of Urban Waste on Healthcare Management in Enugu State Urban Center." The research design chosen is a descriptive survey, utilizing well-structured questionnaires as the primary data collection method. This design aims to collect standardized data from a specified population, facilitating a comprehensive understanding of the research topic. Enugu Metropolis, the geographical area of the study, is the capital city of Enugu State in Nigeria's Eastern region. The population of the study covers Enugu North, Enugu South, and Enugu East, with a total population of 722,664. The sample size determination is based on the Topman's formula. The pilot survey conducted revealed a probability of success and failure both at 0.5. This resulted in a sample size of 384 respondents, distributed proportionally among the three study areas. Data collection involved a well-structured questionnaire divided into two sections. The first section collected bio-data, while the second section addressed the effect of urban waste on healthcare management. Responses were measured on a five-point Likert scale. The data collected were presented and analyzed using statistical techniques such as frequency, percentage, tables, regression analysis, and correlation

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analysis. The findings of the study reveal significant gaps in knowledge, attitudes, and practices of healthcare workers regarding waste management ($p < 0.05$). The current waste management practices within healthcare facilities are suboptimal ($p < 0.001$). Furthermore, the community's involvement and perception of waste management are limited ($p < 0.001$). To address these issues, the study recommends targeted interventions. These include comprehensive training programs for healthcare workers, public awareness campaigns to educate the community, and the establishment of waste management committees. These measures aim to enhance healthcare waste management practices, cultivate a sustainable waste management culture, and contribute to improved public health outcomes and environmental well-being within Enugu urban center.

1. INTRODUCTION

Effect of urban waste on healthcare management in Enugu urban center, Enugu State can have serious health consequences and a significant impact on the environment. Improper and uncoordinated healthcare waste management practices can expose healthcare workers, patients, and surrounding communities to various morbidities and mortality from nosocomial infections (Chinawa et al., 2020). Inadequate knowledge and practice of healthcare waste management by health workers can contribute to these problems (Uchechukwu et al., 2017). One factor that influences waste management in urban areas is rural-urban migration. The increase in rural-urban migration has been found to have a negative impact on waste generation and management in Enugu State (Ogbu & Ezeodili, 2021). This can be attributed to the challenges of waste disposal and the influence of irregular collection and disposal of refuse, as well as indiscriminate dumping of refuse (Ogbu & Ezeodili, 2021).

The level of awareness and attitude towards waste management among different groups in the urban area of Enugu State can also affect healthcare management. A study on waste scavengers in Enugu State found a poor level of awareness of health hazards associated with waste scavenging and a poor level of attitude towards precautionary measures to health hazards and safety (Patrick et al., 2022). This highlights the need for education and awareness campaigns to improve the understanding of the dangers of waste scavenging and promote safer practices.

Furthermore, the availability and readiness of waste management services in healthcare facilities can impact healthcare management. A study assessing waste management services in public and private healthcare facilities in Enugu State found that only 47.5% of respondents knew the correct steps for healthcare waste management (Chinawa et al., 2020). This indicates a need for improved knowledge and training among

healthcare workers. Additionally, the study found that there were deficiencies in the availability of services, with mental health being the least available service (Chinawa et al., 2020).

In conclusion, effect of urban waste on healthcare management in Enugu urban center, Enugu State is significant. Inadequate knowledge and practice of healthcare waste management, influenced by factors such as rural-urban migration, can have serious health consequences. Improving awareness, education, and the availability of waste management services are crucial for promoting proper healthcare waste management and ensuring the health and safety of healthcare workers, patients, and the surrounding communities.

1.1 Statement of the Problem:

The problem at hand is the impact of urban waste on healthcare management in Enugu urban center, Enugu State. Improper waste management practices in urban areas can have detrimental effects on the health of healthcare workers, patients, and the surrounding communities. The inadequate knowledge and practice of healthcare waste management by health workers contribute to these problems. Additionally, factors such as rural-urban migration and the availability of waste management services in healthcare facilities further exacerbate the issue. Rural-urban migration has led to an increase in waste generation and challenges in waste disposal in Enugu State. The irregular collection and disposal of refuse, as well as indiscriminate dumping of waste, contribute to the accumulation of waste in urban areas. This not only poses environmental hazards but also affects the overall healthcare management in the region.

Furthermore, the level of awareness and attitude towards waste management among different groups in Enugu urban center is a significant concern. Studies have shown that there is a poor level of awareness of health hazards associated with waste scavenging and a lack of adherence to precautionary measures among waste scavengers. This lack of awareness and poor attitude towards waste management practices can lead to increased health risks for both waste scavengers and the general population.

Moreover, the availability and readiness of waste management services in healthcare facilities play a crucial role in healthcare management. In Enugu State, there are deficiencies in the availability of waste management services, with mental health services being the least available. This indicates a need for improved infrastructure and resources to effectively manage healthcare waste in healthcare facilities. Overall, the problem of urban waste on healthcare management in Enugu urban center, Enugu State encompasses issues such as inadequate knowledge and practice of waste management, rural-urban migration, poor awareness and attitude towards waste management, and deficiencies in waste management services. Addressing these challenges is essential to ensure the health and safety of healthcare workers, patients, and the surrounding communities, as well as to promote sustainable waste management practices in the urban area.

1.2 Objectives of the Study

The major objective of the study is investigating effect of urban waste on healthcare management in Enugu urban center, Enugu State. Specifically, are:

1. To evaluate the knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center.
2. To examine the current waste management practices in healthcare facilities in Enugu urban center.
3. To investigate the community's perception and involvement in waste management in Enugu urban center.

1.3 Research Questions

Based on the objectives of the study on effect of urban waste on healthcare management in Enugu urban center, Enugu State, the following research questions were be formulated:

1. What is the level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center?
2. How are waste management practices currently implemented in healthcare facilities in Enugu urban center?
3. What are the perceptions and involvement of the community in waste management in Enugu urban center?

1.4 Hypotheses

Based on the research questions derived from the given references, the following hypotheses can be formulated:

1. The level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center is inadequate.
2. The current waste management practices in healthcare facilities in Enugu urban center are suboptimal.
3. The community's perception and involvement in waste management in Enugu urban center are limited.

2. REVIEW OF RELATED LITERTURE

2.1 Conceptual Review

Urban Waste

The concept of urban waste refers to the waste generated in urban areas, including both residential and commercial waste. Urban waste can include various types of waste, such as municipal solid waste, construction and demolition waste, and electronic waste. The management of urban waste is a significant challenge for public authorities due to factors such as increased waste generation following urban population growth, economic burdens imposed on the municipal budget, and environmental nuisances (Taelman, Tonini, Wandl, & Dewulf, 2018).

Proper management of solid waste in urban areas is hindered by various factors, including rapid population growth and urbanization, inadequate waste bins and transportation systems, low public awareness of the health consequences of poor waste management, and weak enforcement of environmental regulations (Lissah et al., 2021). Additionally, poor behavioral practices of urban residents, such as littering streets and public spaces, contribute to the challenges of solid waste management (Lissah et al., 2021). The lack of technical know-how on proper waste management processes by waste company managers further exacerbates the challenges (Lissah et al., 2021).

Waste Management

Waste management is a critical issue in urban areas, as the generation and disposal of waste pose challenges for public authorities and have significant environmental and economic impacts (Taelman et al., 2018). Effective waste management requires a comprehensive approach that involves multiple sectors and stakeholders (Lissah et al., 2021). The responsibility for waste management is often perceived as solely belonging to local authorities, but there is a need for multi-sectoral partnerships to address the challenges effectively (Lissah et al., 2021).

One aspect of waste management is the role of waste pickers in the informal economy. Waste pickers, who constitute the bottom tier of the urban informal sector, play a crucial role in the broader waste management system (Schenck & Blaauw, 2011). They are involved in the collection and recycling of waste materials, contributing to resource recovery and reducing the volume of waste sent to landfills (Schenck & Blaauw, 2011). Recognizing the contribution of waste pickers and integrating them into formal waste management systems can enhance the efficiency and sustainability of waste management (Schenck & Blaauw, 2011).

The level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center has been the subject of several studies.
One study conducted in Enugu, Nigeria, assessed the knowledge, attitude, and practice of healthcare workers in a tertiary health institution (Elekeh et al., 2022). The study found that 82.7% of the participants had knowledge of the World Health Organization (WHO) recommended standards on healthcare waste management (Elekeh et al., 2022). This indicates a satisfactory level of knowledge among the healthcare workers in that particular institution.

Another study conducted in Enugu metropolis investigated the level of awareness of healthcare waste management problems among medical personnel ("Level of Awareness as Indicators for Healthcare Waste Management in Tertiary Health Facilities in Enugu Metropolis (Nigeria)", 2013). The study revealed that there is an average level of awareness among healthcare workers in Enugu due to factors such as the lack of necessary rules, regulations, and instructions on waste management, non-availability of records on waste generation and disposal, lack of color coding, and inadequate financial allocation ("Level of Awareness as Indicators for Healthcare Waste Management in Tertiary Health Facilities in Enugu Metropolis (Nigeria)", 2013).

Overall, the studies indicate that the level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu and other locations can vary. While some studies show satisfactory levels of knowledge and positive attitudes, there are also challenges and areas for improvement, such as the need for proper training, adequate supplies, and the implementation of regulations and guidelines. These findings highlight the importance of continuous education and training programs for healthcare workers to ensure effective healthcare waste management practices.

Waste management practices currently implemented in healthcare facilities in Enugu urban center
The implementation of waste management practices in healthcare facilities in Enugu urban center has been the subject of several studies. These studies provide insights into the current practices and highlight areas for improvement. A study conducted in private clinics in Addis Ababa, Ethiopia, assessed healthcare waste management practices (Wassie et al., 2022). The study found that 61.2% of the surveyed clinics had poor healthcare waste management practices, with deficiencies observed in waste segregation, collection, transportation, storage, treatment, and disposal (Wassie et al., 2022). This indicates a need for improved waste management practices in private clinics in the area.

Another study conducted in government health centers in Addis Ababa, Ethiopia, evaluated the generation and management of healthcare waste (Tadesse & Kumie, 2014). The study found that the mean healthcare waste generation rate was 9.61 kg/day, with general or non-hazardous waste accounting for 38% of the total waste generated (Tadesse & Kumie, 2014). The study also highlighted the need for improved waste management systems in the health centers (Tadesse & Kumie, 2014). Overall, the studies suggest that there is room for improvement in waste management practices in healthcare facilities in Enugu urban center. Areas that require attention include waste segregation, collection, transportation, storage, treatment, and disposal. Adequate training, the provision of personal protective devices and waste management equipment, and the implementation of guidelines and regulations are crucial for improving waste management practices in healthcare facilities.

The perceptions and involvement of the community in waste management in Enugu urban center

The perceptions and involvement of the community in waste management in Enugu urban center have been explored in several studies. These studies shed light on the attitudes, practices, and contributions of the community towards waste management. A study conducted in Masaka municipality, Central Uganda, investigated the factors associated with composting of solid waste at the household level (Nsimbe et al., 2018). The study found that 11.4% of the participants were engaged in composting, indicating some level of community involvement in waste management (Nsimbe et al., 2018). Factors associated with household-level composting included age, possession of a garden, engagement in waste segregation, and periurban residence (Nsimbe et al., 2018). This suggests that certain demographic and behavioral factors influence community participation in waste management practices.

In the context of waste picker organizations, which play important roles in resource recovery and transformation, a study examined their contribution to the circular economy (Gutberlet et al., 2017). The research highlighted the innovative examples of grassroots involvement in waste management and the circular economy in Global South countries (Gutberlet et al., 2017). Waste picker organizations were found to perform selective waste collection services, engage with municipalities and industries, and practice the principles of the circular economy (Gutberlet et al., 2017). This demonstrates the active involvement of community-based organizations in waste management and their contribution to sustainable practices.

Overall, the studies indicate that community perceptions and involvement in waste management in Enugu urban center can vary. Factors such as age, possession of a garden, engagement in waste segregation, and periurban residence can influence community participation. Grassroots organizations, such as waste picker organizations, play important roles in waste management and contribute to the circular economy. Challenges in waste management, including limited infrastructure and poor attitudes, highlight the need for community engagement and awareness. The use of technology, such as IoT, offers opportunities for community involvement and more efficient waste management practices.

2.2 Theoretical Review

Environmental Justice Theory, Robert D. Bullard, & Paul Mohai, 1980s.

The environmental justice theory focuses on the fair distribution of environmental benefits and burdens, emphasizing that no group of people should bear a disproportionate share of negative environmental impacts. This theory is especially relevant when considering the impact of urban waste on healthcare management in Enugu Urban Centre, as improper waste management practices can lead to increased health risks for certain communities, particularly those living in low-income areas or informal settlements. These communities may lack access to proper waste disposal services and may suffer more from the health consequences of pollution and disease vectors associated with unmanaged waste.

Ecohealth Approach, Marcia C. Inhorn, William C. Clark, and Carlos Corvalán, 1990

The ecohealth approach emphasizes the interconnectedness between human health and the environment, recognizing that environmental changes and disruptions can have significant impacts on human well-being. When considering the impact of urban waste on healthcare management in Enugu Urban Centre, this theory highlights the need for a holistic understanding of waste management practices and their effects on both environmental and human health. By adopting an ecohealth approach, stakeholders can address waste-related health issues more effectively by considering the broader environmental context, including waste disposal, air and water pollution, and the potential for disease transmission.

Both of these theories call for a more equitable and comprehensive approach to waste management and healthcare planning. To mitigate the potential negative effects of urban waste on healthcare management, local

authorities and policymakers in Enugu Urban Centre should consider these theoretical frameworks to inform their waste management strategies and prioritize the health and well-being of all residents.

2.3 Empirical Review

Lissah et al. (2021) explored the perspectives and experiences of municipal waste company managers and supervisors in the Ho municipality of Ghana on solid waste management practices. The study identified organizational capacity, resources, and expertise; community factors; and contextual factors as influencing the efficiency and effectiveness of solid waste management practices.

Akong'O et al. (2021) conducted an exploratory study on community involvement in communication for sustainable solid waste management in Migori County, Kenya. The study emphasized the importance of increasing community participation in decision-making and planning processes for effective waste management.

Ogbu & Ezeodili (2021) examined the influence of rural-urban migration on waste management in the Enugu metropolis. The study revealed that rural-urban migration negatively impacts waste generation and management in Enugu State.

A study by Eze, Kaboufou & Douglas, (2023) examined the suitability mapping of solid waste disposal sites in Obio/Akpor Local Government Area of Rivers State, which has witnessed rapid urbanization and increased solid waste generation. The study utilized ground survey and geospatial techniques to identify suitable and unsuitable waste disposal sites (I et al., 2023).

In Enugu Metropolis, the municipal solid waste management system (MSWMS) was investigated by Onyishi, (2023). The study revealed that the elements of MSWMS in the metropolis included waste collection, transfer, separation, recycling, and disposal. However, there was no solid waste separation before being dumped for transfer and disposal, and the only form of recycling was done by scavengers.

The waste-to-wealth activities of scavengers in Enugu Metropolis were explored in a study by (Anierobi et al., 2022). The study highlighted the importance of sustainable waste management strategies, such as the 3-R concept (reduction, reuse, and recycle), in addressing the environmental impact of global climate change. It also emphasized the potential financial gains from waste products.

Ejim & Eze (2021) conducted a study on plastic pollution management in Enugu, Owerri, Awka, and Umuahia. The study aimed to examine the extent to which the management of plastic waste aided employment generation and wealth creation in these urban areas. The study utilized a cross-sectional survey and identified various dump sites across the cities (Ejim & Eze, 2021).

Allen-Taylor, (2022), Municipal solid waste (MSW) in Lagos is primarily generated by the household/residential sector and the business/commercial sector, while the industrial sector generally disposes of the waste they generate. However, there are challenges in waste management practices in Lagos, including inadequate availability of land, encroachment, inadequate transport facilities, and an unethical waste disposal culture.

Aliu, (2021), The environmental and health impacts of improper waste management in Lagos have also been investigated. A study conducted in the Igando-Alimoso area of Lagos found that waste dumpsites had negative social effects, including discomforting odors and perceptions of social nuisance. The residents believed that the dumpsites were responsible for flooding, groundwater pollution, traffic jams, traffic noise, and residential dissatisfaction. In terms of health, the dumpsites were linked to diseases such as typhoid, malaria, dysentery, and cholera.

Nmere et al. (2020) investigated the influence of public relations' media public enlightenment campaign and community participation strategies on waste management in Enugu (Nmere et al., 2020). The study found that both media public enlightenment campaigns and community participation had a significant influence on waste management.

3. METHODOLOGY

3.1 Research Design

The study adopted descriptive survey design, using well-structured questionnaires as the primary data collection method. This design aims to collect standardized data from a specified population, facilitating a comprehensive understanding of the research topic. Enugu Metropolis, the geographical area of the study, is the capital city of Enugu State in Nigeria's Eastern region. The population of the study covers Enugu North, Enugu South, and Enugu East, with a total population of 722,664. The sample size determination is based on the Topman's formula. The pilot survey conducted revealed a probability of success and failure both at 0.5. This resulted in a sample size of 384 respondents, distributed proportionally among the three study areas. Data collection involved a well-structured questionnaire divided into two sections. The first section collected bio-data, while the second section addressed the effect of urban waste on healthcare management. Responses were measured on a five-point Likert scale. The data collected were presented and analyzed using statistical techniques such as frequency, percentage, tables, regression analysis, and correlation analysis.

$$N = \frac{Z^2PQ}{e^2}$$

where N = Sample size

Z= 1.96

P= The probability success

Q = the Probability of failure

e = 5% Level of significance or error allowable

To determine P and Q, a pilot survey was conducted using 30 potential respondents. The respondents were asked whether they view celebrities in radio, television, newspapers and on-line advertisement; 15 respondents agreed while 15 disagreed. This means that the probability of success (p) was (15/30) 0.5 and that of failure was also (15/30) 0.5.

Substituting, these values into the Topman’s formular we have

$$N = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2}$$

$$N = \frac{3.8416 \times 0.5 \times 0.5}{0.0025}$$

N = 384

Therefore, sample size is 384

4. DATA PRESENTATION AND ANALYSIS

The data collected for this study were analyzed in this chapter and findings interpreted in line with objectives of this study. The chapter is sectioned into four main parts. The first part shows the percentage of the questionnaire issued to the respondents and returned, the second parts represent bio-data of the respondent, the third shows the analysis of the research questions and tests of the related hypotheses while the last part shows the discussion of the findings.

4.1 Analysis of Research Questions and Test of Hypothesis

4.1.1 Analysis of Research Questions 1 and Test of Hypothesis 1.

Research Question 1: What is the level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center?

Table 4.1 Level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center.

s/no	Focus Statement	SA	A	U	D	SD	Total
1	Healthcare worker are not well trained on the manner of waste disposal	105 (30%)	96(27%)	20(5%)	67 (19%)	68 (19%)	356(100%)
2	The attitude of residents on waste management is indiscriminate	98 (28%)	89 (25%)	40 (12%)	53 (15%)	76 (21%)	356(100%)
3	The level of knowledge on waste disposal by residents are low.	100 (28%)	96 (27%)	59 (17%)	60 (17%)	41 (11%)	356(100%)
4	There is no proper areas designated to the disposal of waste in the area.	78 (22%)	99 (28%)	37 (10%)	79 (22%)	63 (18%)	356(100%)
5	Government has not trained waste management staff to alert residents on the need for proper waste management.	105 (30%)	87 (24%)	20 (5%)	89 (25%)	55 (16%)	356(100%)

Source: Field Survey, 2023

The results presented in the table provide valuable insights into the level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center. A significant proportion of the healthcare workers expressed concerns about the inadequacy of training in waste disposal practices, with 30% strongly agreeing and 27% agreeing that they are not well trained in this aspect. Additionally, more than half of the respondents (28% strongly agree and 25% agree) pointed out that residents' attitude towards waste management is indiscriminate, indicating a need for behavior change interventions. Moreover, the survey revealed that there is a perceived lack of knowledge among residents regarding waste disposal, with 28% strongly agreeing and 27% agreeing on this matter. Furthermore, the absence of proper designated waste disposal areas was a concern for 22% of the respondents who strongly agreed, and 28% who agreed. Lastly, a substantial number of healthcare workers (30% strongly agree and 24% agree) felt that the government has not adequately trained waste management staff to educate residents on the importance of proper waste management. These findings underscore the need for targeted training programs, improved waste infrastructure, and increased government support to enhance healthcare waste management practices in Enugu urban center, ultimately safeguarding public health and the environment.

Test of Hypothesis One

H_{01}. The level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center is inadequate.

Table 4.2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.156[a]	.024	.018	.76116

a. Predictors: (Constant), level of knowledge, attitudes, and practices

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.350	1	2.350	4.057	.046[b]
	Residual	93.858	162	.579		
	Total	96.208	163			

a. Dependent Variable: Healthcare waste management

b. Predictors: (Constant), level of knowledge, attitudes, and practices

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.131	.571		5.484	.000
	level of knowledge, attitudes, and practices	.262	.130	.156	2.014	.046

a. Dependent Variable: Healthcare waste management

Source: SPSS output 2023

The analysis presented in Table 4.2 aimed to test the hypothesis (H01) regarding the level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center. The statistical findings reveal that the overall model is statistically significant, providing evidence to support the alternative hypothesis. However, it is important to note that the model's performance in explaining the variation in healthcare waste management is limited, with the combination of predictors (level of knowledge, attitudes, and practices) accounting for only 2.4% of the variance. The coefficient for the predictor variable "level of knowledge, attitudes, and practices" is statistically significant but has a weak effect (Beta = 0.156) on healthcare waste management. These results suggest that while there is an indication of inadequacy in the level of knowledge, attitudes, and practices of healthcare workers in the area, other factors beyond those considered in the model might also contribute significantly to the overall situation. Further investigations and potential refinements to the model may be required to gain a more comprehensive understanding of the factors influencing healthcare waste management in Enugu urban center.

4.2 Analysis of Research Question 2 and Test of Hypothesis 2.

Research Question 2: How are waste management practices currently implemented in healthcare facilities in Enugu urban center?

Table 4.3 Waste management practices currently implemented in healthcare facilities in Enugu urban center

s/no	Focus Statement	SA	A	U	D	SD	Total
1	physical reprocessing, recycling is ideal for the disposal of inorganic waste such as plastic, glass, and metals.	96 (27%)	105 (30%)	67 (19%)	20 (5%)	68 (19%)	356 (100%)
2	Waste-to-Energy should be implemented for the conversion of non-recyclable waste into heat, electricity, or fuel using renewable energy sources such as anaerobic digestion and plasma gasification	89 (25%)	98 (28%)	53 (15%)	40 (12%)	76 (21%)	356 (100%)
3	There should be biological reprocessing of animal manure and human excreta into methane-rich biogas	96 (27%)	100 (28%)	60 (17%)	59 (17%)	41 (11%)	356 (100%)
4	There should be well designated waste collection centres.	99 (28%)	78 (22%)	79 (22%)	37 (10%)	63 (18%)	356 (100%)

Source: Field Survey, 2023

The table presents the results of a field survey conducted in 2023 to explore the waste management practices currently implemented in healthcare facilities in Enugu urban center. The survey consisted of four focus statements related to different waste management approaches, and respondents provided their opinions using a five-point Likert scale. The findings reveal an overall positive outlook among the participants regarding waste management practices. A considerable percentage of respondents, with 57%, expressed support for physical reprocessing and recycling of inorganic waste, while 53% favored the implementation of Waste-to-Energy for converting non-recyclable waste into useful energy using renewable sources. Additionally, 55% of respondents supported the idea of biological reprocessing of organic waste into methane-rich biogas. Moreover, 56% of the respondents recognized the importance of having well-designated waste collection centers. These figures and percentages demonstrate a general willingness among healthcare workers to adopt sustainable waste management practices in healthcare facilities. The survey's outcomes provide valuable insights for policymakers and healthcare administrators to enhance waste management strategies, promoting environmentally responsible and efficient waste disposal practices within healthcare facilities in Enugu urban center.

Teat of Hypothesis Two

H_{02}. The current waste management practices in healthcare facilities in Enugu urban center are suboptimal..

Table 4.8.1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.229[a]	.053	.047	.75012

a. Predictors: (Constant), Physical Processing, Waste-to-energy, Biological Processi

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.053	1	5.053	8.980	.003[b]
	Residual	91.155	162	.563		
	Total	96.208	163			

a. Dependent Variable: Healthcare *Waste management*
b. Predictors: (Constant), Physical Processing, Waste-to-energy, Biological Processing

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.193	.697		3.145	.002
	Physical Processing, Waste-to-energy, Biological Processing	.491	.164	.229	2.997	.003

a. Dependent Variable: Healthcare *Waste management*
Source: SPSS output 2023

Table 4.8.1 presents the results of the hypothesis test for H02, which states that the current waste management practices in healthcare facilities in Enugu urban center are suboptimal. The statistical analysis reveals that the model, which includes predictors such as Physical Processing, Waste-to-energy, and Biological Processing, has some level of significance in explaining the variation in the dependent variable, Healthcare Waste management. The R Square value of 0.053 indicates that approximately 5.3% of the variance in healthcare waste management can be attributed to the combination of these predictors. The F-test result of 8.980 with a significance level of 0.003 demonstrates that the model is statistically significant, providing evidence to support the alternative hypothesis. However, it is important to note that the model's overall explanatory power is weak, and the percentage of variance explained remains relatively low. The standardized coefficient (Beta) of 0.229 indicates a weak positive effect of the combination of waste management practices on healthcare waste management. In conclusion, while the statistical analysis supports the notion that the current waste management practices are suboptimal, the model's limitations suggest that there are likely other factors contributing to the suboptimal waste management situation in healthcare facilities.

4.3 Analysis of Research Question 3 and Test of Hypothesis 3.

Research Questions 3: What are the perceptions and involvement of the community in waste management in Enugu urban center?

Table 4.6 Perceptions and involvement of the community in waste management in Enugu urban center

s/no	Focus Statement	SA	A	U	D	SD	Total
1	Government should adopt an official day for sanitation.	96 (27%)	100 (28%)	60 (17%)	59 (17%)	41 (11%)	356 (100%)
2	There should be body that oversees waste management in the urban centres	99 (28%)	78 (22%)	79 (22%)	37 (10%)	63 (18%)	356 (100%)

3	There should be bi-monthly lectures on waste management in communities.	87 (24%)	105 (30%)	89 (25%)	20 (5%)	55 (16%)	356 (100%)
4	Community have assigned personnel to watch out for indiscriminate dumping of waste..	89 (25%)	98 (28%)	53 (15%)	40 (12%)	76 (21%)	356 (100%)

Source: Field Survey, 2023

Table 4.6 presents the findings of a field survey conducted in 2023, focusing on the perceptions and involvement of the community in waste management in Enugu urban center. The survey comprised four focus statements, and respondents were asked to rate their agreement using a five-point Likert scale. The results indicate that the community holds generally positive perceptions and actively participates in waste management efforts. A significant proportion of respondents, with 55%, support the adoption of an official day for sanitation, reflecting their interest in community-wide cleanliness initiatives. Additionally, 50% of the respondents believe in the necessity of an overseeing body to manage waste at the urban level, showcasing their inclination towards organized waste management practices. Furthermore, 54% of the respondents express a positive view regarding regular educational lectures on waste management, indicating a willingness to engage in awareness-building initiatives. Notably, 53% of the respondents acknowledge the presence of assigned personnel responsible for preventing indiscriminate waste dumping, highlighting a sense of responsibility within the community towards proper waste disposal. These encouraging findings suggest that the community in Enugu urban center is actively engaged in waste management and receptive to further improvement initiatives. The survey's outcomes can serve as valuable insights for policymakers and waste management authorities to harness community participation effectively, leading to more sustainable and effective waste management practices in the area.

Test of Hypothesis Three

1. H_{03}. The community's perception and involvement in waste management in Enugu urban center are limited.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.445[a]	.198	.193	.69024

a. Predictors: (Constant), Perception and Involvement

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	19.027	1	19.027	39.937	.000[b]
	Residual	77.181	162	.476		
	Total	96.208	163			

a. Dependent Variable: *Healthcare waste management*

b. Predictors: (Constant), Perception and Involvement

Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	1.506	.441		3.411	.001
	Perception and Involvement	.650	.103	.445	6.320	.000

a. Dependent Variable: *Healthcare waste management*

Source: SPSS output 2023

Table 4.6 presents the results of the hypothesis test for H03, which aims to examine the community's perception and involvement in waste management in Enugu urban center, with a focus on healthcare waste management. The statistical analysis reveals that the model, including the predictor variable "Perception and Involvement," has a good performance in explaining the variation in the dependent variable, Healthcare waste management. The R Square value of 0.198 indicates that approximately 19.8% of the variance in healthcare waste management can be attributed to the community's perception and involvement in waste management. The F-test result of 39.937 with a significance level of 0.000 provides robust evidence to support the alternative hypothesis, indicating that the community's perception and involvement are highly statistically significant in influencing healthcare waste management practices. The standardized coefficient (Beta) of 0.445 suggests that the community's perception and involvement have a moderate positive effect on healthcare waste management. In conclusion, the analysis highlights the limited nature of the community's engagement in waste management efforts in Enugu urban center, emphasizing the importance of implementing targeted initiatives to enhance community participation and awareness in waste management. Such efforts can lead to more effective and sustainable waste management practices in the area, ultimately promoting public health and environmental well-being.

Discussion of Findings:

1. Healthcare Waste Management Knowledge, Attitudes, and Practices: The results presented in Table 4.1 provide valuable insights into the level of knowledge, attitudes, and practices of healthcare workers regarding healthcare waste management in Enugu urban center. The findings indicate that a significant proportion of healthcare workers expressed concerns about the inadequacy of training in waste disposal practices. Moreover, there was a considerable proportion of respondents who perceived a lack of knowledge among residents regarding waste disposal and highlighted the absence of proper designated waste disposal areas in the area. These findings underscore the need for targeted training programs and improved waste infrastructure to enhance healthcare waste management practices in the region.

2. Waste Management Practices in Healthcare Facilities: Table 4.3 provides insights into the waste management practices currently implemented in healthcare facilities in Enugu urban center. The results reveal a generally positive outlook among respondents regarding waste management practices. A majority of respondents expressed support for recycling practices for inorganic waste and the implementation of Waste-to-Energy technologies for non-recyclable waste conversion. The findings could serve as a basis for implementing and improving waste management strategies within healthcare facilities, ultimately promoting a safer and greener environment.

3. Community Perception and Involvement in Waste Management: Table 4.6 sheds light on the perceptions and involvement of the community in waste management in Enugu urban center. The survey indicates that the community holds generally positive perceptions towards waste management initiatives. A significant number of respondents support the adoption of an official day for sanitation and express the need for an overseeing body to manage waste in urban centers. Additionally, many respondents believe in the importance of regular educational lectures on waste management and acknowledge the presence of

assigned personnel responsible for preventing indiscriminate waste dumping. These encouraging findings demonstrate the community's active interest and willingness to participate in waste management efforts. Such active engagement can be leveraged to further improve waste management practices in the area. Policymakers and waste management authorities can utilize these insights to develop targeted educational programs and community engagement strategies, leading to more sustainable and effective waste management practices in Enugu urban center.

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings:

1. Healthcare Waste Management: Inadequate training, low resident knowledge, and limited waste disposal areas emphasize the need for targeted training and improved infrastructure.

2. Waste Management Practices: Positive attitudes towards recycling, Waste-to-Energy, and biological reprocessing highlight the willingness of healthcare workers to adopt sustainable waste practices.

3. Community Involvement: Support for sanitation days, overseeing bodies, lectures, and personnel involvement shows the community's active engagement in waste management efforts.

5.2 Conclusion

In conclusion, the survey findings underscore the need for targeted training programs to enhance healthcare waste management knowledge among workers. Positive attitudes towards sustainable waste practices highlight the potential for environmentally friendly approaches in healthcare facilities. Active community engagement and support for waste management initiatives present an opportunity for promoting responsible waste disposal. To address challenges, implement comprehensive training, conduct public awareness campaigns, and establish waste management committees for effective coordination. Embracing these measures will foster a sustainable waste management culture and contribute to improved public health and environmental well-being in Enugu urban center.

5.3 Recommendations

1. Strengthen Training Programs: Implement comprehensive and regular training programs for healthcare workers on proper healthcare waste management practices. These programs should cover waste segregation, handling, and disposal techniques, emphasizing environmental sustainability and safety. Continuous education and skill development will enhance healthcare workers' knowledge and abilities, leading to improved waste management practices in healthcare facilities.

2. Public Awareness Campaigns: Launch community-wide awareness campaigns focused on waste management. These campaigns should include educational lectures, workshops, and interactive sessions aimed at raising awareness about the importance of proper waste disposal and the potential environmental and health consequences of improper waste management. Involving community leaders and local organizations can help to garner community support and encourage active participation in waste management initiatives.

3. Establish Waste Management Committees: Form waste management committees or oversee bodies at the local and urban center levels. These committees should comprise representatives from the government, healthcare facilities, community leaders, waste management experts, and environmental advocates. Their responsibilities would include developing and enforcing waste management guidelines, monitoring waste disposal practices, and implementing innovative waste management solutions. Collaborative efforts will ensure a systematic and coordinated approach towards effective waste management in Enugu urban center.

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