



KNOWLEDGE OF HOUSEHOLD HAZARDOUS WASTE DISPOSAL ASSESSMENT AMONG RESIDENTS IN ODIO-AMA BAYELSA STATE, NIGERIA

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Abstract

Aim/Objective: Household hazardous waste comprises products commonly used in homes that contain substances capable of causing harm to human health and the environment if improperly handled or disposed of. This study assesses residents' knowledge, attitudes, and practices regarding household hazardous waste disposal and examines factors influencing disposal behaviors. **Methods:** A descriptive survey design was employed, using structured questionnaires administered to residents within the study area. **Results:** Findings from this study revealed that while many residents were aware of the potential dangers associated with hazardous household waste, a significant proportion lacked adequate knowledge of proper disposal methods. Common disposal practices included mixing hazardous waste with general household refuse, open dumping, and burning, which pose environmental and public health risks. Factors such as educational, access to disposal facilities, environmental awareness, and government regulations were significantly influence disposal practices. **Conclusion:** The study concludes that inadequate awareness and limited access to appropriate waste management systems are contributing factors to improper household hazardous waste disposal. We therefore recommend that the government should make frantic effort to intensify public education campaigns, improved waste collection infrastructure, and implement effective policies that will promote safe disposal practices and protect environmental sustainability and public health.

Keywords:

Disposal, Hazard, Household, Respondents, Waste.

INTRODUCTION

Community infrastructure and government presence shape HHW knowledge through both direct provision of information and the implicit communication of norms about what constitutes appropriate waste management. Communities with functional waste collection services, designated disposal sites, and visible regulatory enforcement are more likely to develop community norms around waste segregation and appropriate disposal, which in turn scaffold individual knowledge and practice (Mmereki *et al.*, 2017).

Hazardous waste in households is leftover materials from residential sources containing corrosive, toxic, flammable, or reactive ingredients. When these are not properly managed, they pose major threat to the health of residents and the environment (United States Environmental Protection Agency [US EPA, 2023]). This term includes range of products used and abandoned in domestic settings, including pharmaceuticals, electronic waste, pesticides, paints and paint thinners, herbicides, motor oils, batteries, cleaning agents, disinfectants etc. Distinguishing HHW waste from general domestic waste is due to hazardous character of its constituents ie contents that render standard municipal waste disposal pathways harmful and potentially dangerous to humans (Idowu *et al.*, 2019; Hasan *et al.*, 2019).

Nigerian households have experienced the most commonly generated HHW items include organophosphate and pyrethroid pesticides used widely in agricultural, lead-acid domestic pest control, electronics, oil-based paints, dry-cell batteries from vehicles, expired pharmaceuticals (antibiotics and antimalarial), household cleaning agents such as caustic soda, ammonia, chlorine, and electronic waste etc (Osibanjo and Nnorom, 2007; Babayemi and Dauda, 2009; Ogwueleka 2009). Flood event of 2022, that inundated large areas of Yenagoa Metropolis and its environs including Odio-Ama, removed hazardous materials from domestic storage /disposal sites across large areas giving way to the release of pesticide residues, battery acids, and other pharmaceutical products into flood waters resulting in public health significance of HHW management (Wilson, 2007; Babayemi and Dauda, 2009; **Okeke *et al.*, 2021**; Ajumobi *et al.*, 2023).

In the riverine settlements like Odio-Ama, where fishing make up their primary livelihood, the oil from engine boat fuel residues, antifouling paints, and battery acid represent extra locally significant categories of HHW that affect aquatic lives and the communities depending upon them (Ovuakporaye and Emoyan, 2022; US EPA, 2023). Improper disposal of household Hazardous waste in most urban and pre-urban communities ranging from open dumping to mixing with municipal solid waste, contributes outrageously to soil and water contamination increasing the incidence of respiratory and dermatological illness (WHO, 2017; Kumar *et al.*, 2022).

Flammable HHW (including paint thinners, petrol, certain insecticide sprays and cooking alcohol causes fire hazards that are dangerous in densely packed residential settings in most Nigerian communities (Mmereki *et al.*, 2017). Corrosive HHW including battery acids can lead to chemical burns and destroys organic materials including metal infrastructure when in contact. Pharmaceutical packaging, blister packs with residual active ingredients, are regularly overlooked while they are toxicologically significant consumer product HHW source among Nigerian households (Babayemi and Dauda, 2009; Adeyi and Torto, 2014; Mmereki *et al.*, 2017; Idowu *et al.*, 2019; Federal Ministry of Environment, 2019).

The increasing households generated hazardous waste coupled with low public awareness has become a pressing environmental and public health concern in Nigeria (NESREA, 2011). Home improvement activities such as painting, wood treatment, and plumbing generate waste paints, varnishes, solvents, and pipe cement adhesives.

MATERIALS AND METHODS

Research Design

The researchers adopted a descriptive study design to access resident's knowledge of household Hazardous waste (HHW) disposal in this study. This design allows the researchers to gather quantitative data at a single point suitable for identifying knowledge level and associated factors.

Study Setting

The research was conducted in odio-ama in Brass local Government Area Bayelsa state. This is an ancient, Nembe speaking ijaw community located at the costal settlement at the edge of the Atlantic Ocean and the st. nicholas river. Odioama is a community with a reach culture, like fishing, masquerade performance and traditional wrestling and traditional music.

Sample Size and Sampling Techniques

The study population consists of all household families in odio-ama of about 15,000 people according to (Wikipedia)The target population was house hold members living in dwelling houses within the area. The population was calculated using the Taro Yamane's formula

= $Pop(N) = 15,000$ (estimated) population of odio-ama community.

$N =$ sample size

$N =$ population size

$E =$ level of precision

Substitution

$N = 15,000$

$1 + 15,000(0.05)^2$

$N = 15,000$

$1 + 15,000(0.0025)$

$N = 15,000$

$1 + 37.5025$

$N = 389.6 \sim 38.0$

10% margin of error was used to get a manageable sample size. There for the sample size for the study was 100 responded.

Instrument Design

The data collection instrument was a structured questionnaire built to capture resident awareness, knowledge and practices regarding household Hazardous waste disposal. It was design for face-to-face administration using tablet (kobo tool box) to minimize missing data and to ensure rapid data capture.

Method of data Collection

A structured questionnaire was developed and used based on literature review and validated tool (e.g UNEP HHW questionnaire) for distribution to the residents.

Data Analysis: The data obtained from this study were analyze using SPSS version 25.0, Chicago USA and express in simple frequencies table and percentage.

RESULTS

The analyze results and their interpretation from the respondents on the assessment of resident knowledge regarding household Hazardous waste disposal are presented in this section. A total of 100 questionnaires were distributed and retrieve successfully representing a 100% response rate.

Table1: Demographic characteristics of the Respondents

Variable	Frequency	Percentage
Male	42	42%
Female	58	58%
Total	100	100%

Interpretation

The table above shows that 42% responder were male representing 42% while 58 respondent were female representing 58% of the studied population. This indicates that female constituted the majority of the respondent in the study.

Table 2: Age distribution of the Respondents

Age range	Frequency	Percentage
18 – 25 years	20	20%
26 – 35 years	35	35%
36 -45 years	25	25%
64 years and above	20	20%
Total	100	100%

Interpretation

This result indicates that respondents between 26 -35 years how the highest percentage 35% bracket close right responder age 18 - 25 years and 46 years and above each represented 20%

Table 3: Educational Status of respondents

Educational status	Frequency	Percentage
Primary education	15	15%
Secondary education	50	50%
Tertiary education	35	35%
Total	100	100%

Interpretation

The above table shows that most respondents had secondary education (50%) followed by tertiary education (35%) while only 15% has primary education.

Table 4: Awareness of Residents knowledge regarding household Hazardous waste

Response	Frequency	Percentage
Aware	72	72%
Not aware	82	82%
Total	100	100%

Interpretation

The above table indicate that 72% of responded were aware of household hazardous waste while 82% were not aware suggesting a relatively high level of unawareness among residents.

Table 5: Knowledge/example of Household hazardous Waste

Example Identified	Frequency	Percentage
Batteries	30	30%
Paint/chemical	25	25%
Expired medicine	20	20%
Cleaning agent	15	15%
Do not know	10	10%
Total	100	100%

Interpretation

The table above indicates that batteries were the most commonly identified example of hazardous waste (30%) compare to 10% of respondents that could not identify any example.

Table 6: Knowledge of Proper Disposal Methods

Disposal Method	Frequency	Percentage
Special waste	0	20%
Collection centers		
Recycling	25	25%
Burning	20	20%
Dumping with general Waste	55	55%

Interpretation

The results from table 6 above shows that there is no special waste collection center while 75% still practice unsafe method such as burning and dumping with general waste.

Table 7: Sources of Information on Hazardous Waste Disposal

Sources of information	Frequency	Percentage
Televisions / radio	35	35%
Social media	25	25%
Health workers	20	20%
Friends /family	20	20%
Others	5	5%
Total	100	100%
Interested		

Television and radio served as major source of information for respondents (35%) followed by social media (25%).

Table 8: Perception of risk associated with improper Disposal

Response	Frequency	Percentage
Yes	80	80%
No	20	20%
Total	100	100%

Interpretation

The majority of respondents (80%) believe that improper disposal of household hazardous waste poses health and environmental risk.

Table 9: Challenges faced in Proper Disposal

Challenges	Frequency	Percentage
Lack of disposal Facilities	45	45%
Lack of awareness	25	25%
Poor Government Support	20	20%
High cost in disposal	10	20%
Total	100	100%

Interpretation

Lack of disposal facilities was identified as the majority challenge by 45% of respondents.

DISCUSSION

The study found that 72% of respondents were aware of household hazardous waste (HHW), while 28% were not aware. This indicates a relatively good level of general awareness among residents of Odio-Ama Community. The finding is consistent with previous research which reported that residents may have general awareness of hazardous waste but often lack adequate knowledge of the specific hazards and appropriate disposal methods (Aigberua *et al.*, 2017; Idowu *et al.*, 2019). The relatively high awareness observed in this study may also be associated with the respondents' access to information through television, radio and social media.

The study further revealed that batteries (30%), paints/chemicals (25%), and expired medicines (20%) were among the most commonly identified household hazardous wastes. However, 10% of respondents could not identify any example. This suggests that although awareness exists, some knowledge gaps remain. Similar observations have been reported by Babayemi and Dauda (2009), who noted inadequate knowledge of household hazardous waste categories among Nigerian residents.

Regarding disposal practices, the findings showed that 55% of respondents disposed of hazardous waste together with general household waste, while 20% practiced burning. Only a small proportion reported recycling, and no effective special collection facility was identified. This finding agrees with Idowu *et al.* (2019), who reported that unsafe disposal practices remain common in communities where appropriate waste-management facilities are limited. The

continued practice of burning and mixing HHW with general waste is of concern because such practices can result in environmental contamination and human exposure to hazardous substances. The study also found that 80% of respondents recognized that improper HHW disposal poses health and environmental risks. This suggests that residents generally understand the potential consequences of poor waste disposal, even though this awareness does not always translate into safe practices. This difference between knowledge and actual practice supports the KAP perspective discussed in the literature, which indicates that knowledge alone may not result in behavioural change when structural barriers exist (Launiala, 2009; Zorpas *et al.*, 2015; Ike *et al.*, 2019).

Finally, lack of disposal facilities (45%) was the major challenge identified by respondents, followed by lack of awareness (25%) and poor government support (20%). This finding indicates that improper disposal in Odio-Ama may be influenced not only by individual knowledge but also by the availability of appropriate disposal infrastructure. This is consistent with Mmereki *et al.*, 2017 and Abuga *et al.*, 2011, who observed that accessible waste-management facilities and supportive institutional systems are important for translating knowledge into appropriate waste-disposal practices. Overall, the findings indicate that residents of Odio-Ama have reasonable general awareness of household hazardous waste and its risks, but this awareness has not translated fully into safe disposal practices. The major barriers appear to be inadequate disposal facilities, insufficient public education, and limited institutional support.

CONCLUSION

An observation from this study shows that the resident has a fair level of knowledge regarding household hazardous waste disposal. However, despite the level of awareness observed in this study, improper disposal practices still exist among some resident due to inadequate disposal facility, insufficient public enlightenment and poor waste management system.

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