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ASSESSMENT OF HOUSEHOLD SOLID WASTE MANAGEMENT PRACTICES IN SELECTED COMMUNITIES OF ABEOKUTA METROPOLIS, OGUN STATE, NIGERIA

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Abstract
Inadequate solid waste management remains an important environmental and public-health challenge in rapidly urbanized communities. This study assessed household solid waste management practices, disposal behaviours/ methods, environmental and residents' perceptions, and reported factors affecting waste management practices in selected communities of Abeokuta Metropolis, Ogun State, Nigeria. A community-based cross-sectional study was conducted among 360 adult household residents from sixselected communities in Abeokuta Metropolis. Sixty respondents were recruited from each community. Data were collected through self-reportedstructured questionnaires and face-to-face interviews. Information was obtained on household waste characteristics, storage, transportation, disposal practices, waste-collection services, environmental perceptions, and community participation. Data were analysed using descriptive statistics and were based on self-reported questionnaire/interview responses. Food and vegetable residues were the most frequently reported waste type (91.1%), followed by paper/cardboard (80.8%) and plastics, bottles, and sachet materials (74.4%). Manual carrying was the predominant reported method of waste transportation (42.8%), followed by scavengers (24.4%). Burning was the most commonly reported disposal practice (55.0%)open dumping (25.3%). Waste collection was predominantly reported as monthly (48.3%). Waste accumulation (85.0%), flooding (75.8%), unpleasant odour (63.4%), and insect proliferation or disease outbreaks (62.5%) were among the commonly perceived consequences of poor waste management. Although 90.8% of respondents believed that environmental awareness could help reduce health implications, only 30.8% reported participating in community clean-up activities. Household solid waste management in the selected communities was characterized by inadequate collection, reliance on informal transportation, open burning, and indiscriminate open dumping. The findings support the need for improved collection services, source segregation and recycling, enforcement of environmental regulations, community participation, and environmental health education. Because the study was descriptive and relied partly on self-reported information.

Keywords
Solid waste management; household waste disposal practices; waste collection; environmental health; Abeokuta Metropolis

1. INTRODUCTION

Solid waste generation is an inevitable consequence of human activities and socio-economic development. Rapid population growth, urbanization, changing consumption patterns, and increasing commercial activities have substantially increased the quantity and diversity of waste generated worldwide. Globally, more than 2 billion tonnes of municipal solid waste are generated annually, and this quantity is projected to increase considerably in the coming decades, particularly in rapidly urbanizing regions [1; 2; 3]. The increasing volume of waste has placed considerable pressure on existing waste-management systems and has intensified concerns regarding environmental quality, public health, and sustainable urban development.

Solid waste comprises discarded materials generated from residential, commercial, institutional, industrial, and other human activities. These materials may include organic matter, plastics, paper, recyclables, street sweepings, and construction debris, alongside potentially hazardous components [2; 4; 5]. Effective solid waste management encompasses a chain of activities, including waste storage, collection, transportation,

treatment, recycling, resource recovery, and final disposal. The effectiveness of these activities is fundamental to maintaining environmental quality, protecting public health, and promoting sustainable communities [6; 7; 8].

Despite its importance, solid waste management remains a persistent challenge in many low- and middle-income countries. Rapid urban expansion is frequently accompanied by inadequate waste-collection infrastructure, insufficient disposal facilities, limited recycling capacity, weak institutional arrangements, and inadequate environmental awareness. Consequently, substantial quantities of waste remain uncollected or are disposed of through uncontrolled methods [9; 10]. In Nigeria, indiscriminate waste disposal remains a concern in many urban areas, where waste may be deposited along roadsides, in open spaces, drainage channels, and other unauthorized locations [10; 11]. Inadequate waste management has consequences beyond environmental aesthetics.

Uncontrolled accumulation and open dumping may contribute to soil and water contamination, deterioration of air quality, obstruction of drainage systems, and conditions favourable to disease vectors. The decomposition of organic waste can generate unpleasant odours and greenhouse gases, while open burning may release harmful air pollutants [10]. These concerns demonstrate that solid waste management is an important component of environmental protection and community well-being.

Nigeria produces over 32 million tons of solid waste every year, and only a small part is collected [12]. Most of this waste emanates from homes, local businesses, craftspeople, and traders who dispose of things in their surroundings. Improper handling of waste has led to many environmental problems such as drainage blockages and dirty water systems [13].

Abeokuta Metropolis, like many other fast-growing urban areas in Nigeria, faces challenges related to rising waste production and managing waste across different residential and economic areas. Population differences, economic and social features of the population, access to waste collection services, people's awareness of environmental issues, and the availability of disposal facilities affect how waste is stored and disposed of. However, there is limited specific information on how waste-management practices differ in populated and non-populated areas in Abeokuta Metropolis, and the factors that can influence how residents dispose of their waste. Understanding this is important for creating targeted solutions that can improve waste collection, encourage better disposal habits, and minimize the environmental harm caused by improperly managed waste.

Therefore, this study focuses on selected communities in Abeokuta Metropolis and describes the perceived household waste-management practices and residents' perceptions of waste-management services and environmental consequences.

The study was guided by the following research questions: what type of household solid waste is commonly generated in the selected communities? What types of storage, transportation, and disposal practices are used by households? How do residents perceive the adequacy of waste-collection services and the environmental consequences of poor waste management? What factors do residents perceive as limiting the effectiveness of solid waste management? What forms of environmental awareness and community participation do residents consider to be useful?

Despite increasing attention to solid waste management in Nigerian urban areas, important gaps remain in understanding household-level waste generation, storage, transportation, and disposal practices, as well as residents' perception of waste collection services. The study was guided by the relationship between household characteristics, waste management services, and awareness. Household characteristics and socioeconomic factors may influence access to waste services and disposal choices. The availability and accessibility of collection facilities may influence whether households use formal or informal disposal methods, while environmental awareness and community participation may influence willingness to adopt environmentally preferable practices. Existing evidence frequently focuses on waste management and community-level information on household practices. In Abeokuta Metropolis, there is a need for descriptive evidence that brings these dimensions together across selected communities.

2. MATERIALS AND METHOD

2.1. The Study Area

Abeokuta is a metropolitan city that serves as the capital of Ogun State, and it shares a border with Lagos, Ondo, Osun, and Edo States. Abeokuta metropolis cuts across four Local Government Areas, namely: Abeokuta South, Abeokuta North, Odeda, and Obafemi/Owode Local Government Areas. Abeokuta covers an approximate area of 40.63 km^2 and lies within longitude $3^0 17'$ and $3^0 26'$ E and latitudes $7^0 10'$N and $7^0 15'$ N [14]. Abeokuta is on the basement complex of igneous rocks overlaid by several sedimentary rocks located within the rainforest region of Nigeria.

Increasing human population in Abeokuta has also translated to an increase in waste generation. Solid wastes are regularly being dumped along the streets of Abeokuta, with an estimated waste generation of 0.60 kg/person/day. However, only 50% of these generated solid wastes are evacuated by the Ogun State Environmental Protection Agency, concerned citizens, and private contractors [14]. The remaining 50% is

being buried, burnt, dumped openly, or disposed of in the lagoon, streams, and drainages [14]. Figure 1 shows the map of the studied area.

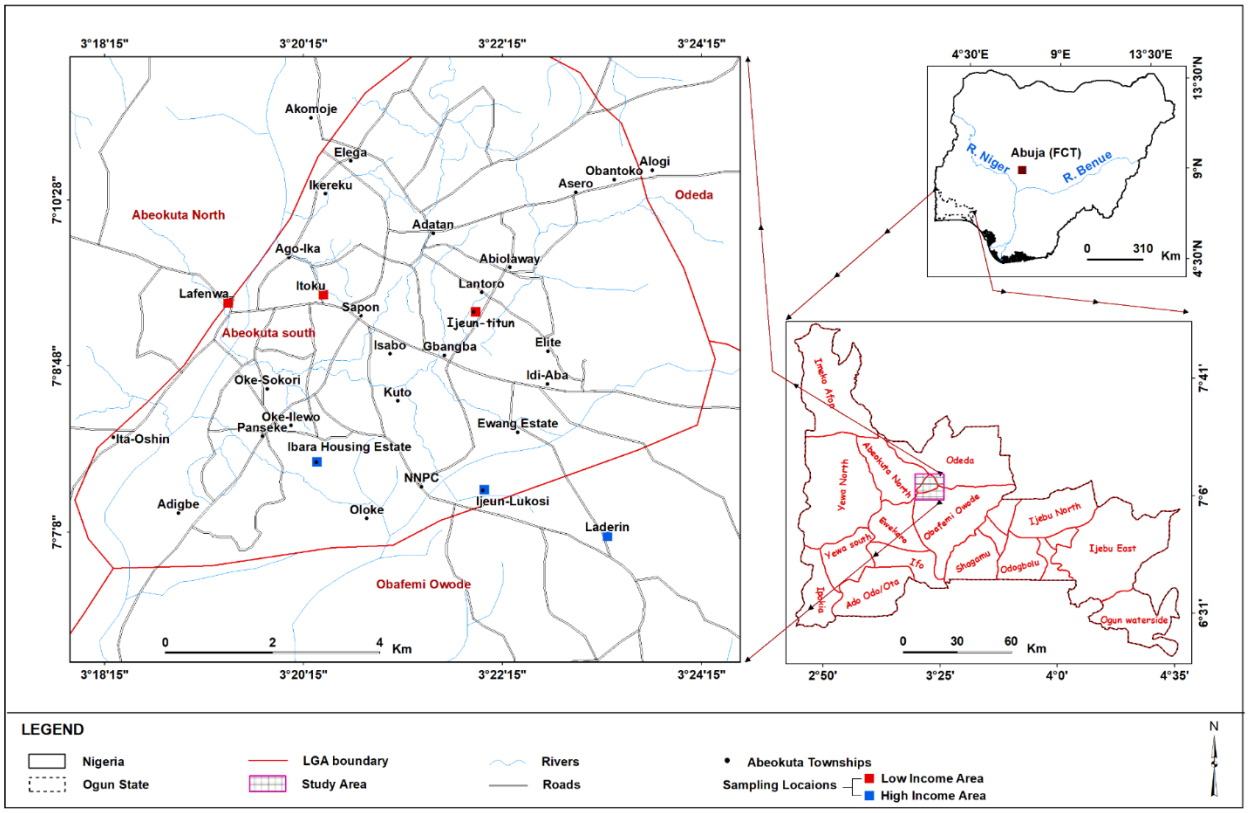


Figure 1: Map of the sampled site

2.2 Study Design and Sampling

A community-based cross-sectional study was conducted among adult household residents in six selected communities of Abeokuta Metropolis. A total of 360 respondents participated in the study, with 60 respondents recruited from each community. Simple random sampling was reported as the respondent selection approach. The equal allocation of 60 respondents per community provided an equal number of respondents from each selected community. The communities included Ijeun-Lukosi, Laderin, Ibara Housing Estate, Lanfenwa, Ijeun-Titun, and Itoku. The study was designed to assess household waste management practices and residents' perceptions in the selected communities. The study does not provide a documented statistical comparison between the socioeconomic groups; the present analysis is reported descriptively rather than as inferential comparisons between the groups.

2.3 Inclusion/Exclusion criteria

The study involved only individuals from the selected communities, primarily focusing on those aged 18 years or older, who were in a good state of physical and mental health. The participants were those who had resided in the selected communities for at least one year; this was necessary to ensure they were familiar with the waste management practices in their locality. Only people who gave verbal consent were recruited for this study

Individuals below 18 years, residents who had lived in the study area for less than one year, and individuals who declined participation were excluded.

2.4 Sources of Data and Methods

Pre-sampling analysis tests for questionnaire data were conducted using 10% of sampled size. The nearer the value to one (1), the more reliable the data (the value is between 0.5-1.0). Also, 10% of residents in proximity to the selected study sites were used for pretesting of the questionnaire. A validity test was carried out on the responses of the respondents; a result of 70% indicated that the households/residents really understood the questions in the questionnaire used for assessment.

2.5 Questionnaire Administration

Primary data were generated from a structured questionnaire administered through face-to-face interviews. The questionnaire was used to obtain information on respondents' sociodemographic characteristics, household waste types, storage practices, transportation and disposal methods, individual perceptions

regarding waste management services, community participation, and health concerns among residents of the six selected communities in Abeokuta Metropolis.

Questionnaires were administered to 360 residents selected through simple random sampling. Trained field assistants conducted face-to-face interviews, with each interview lasting approximately 15 – 20 minutes. Responses obtained during the interviews were clarified where necessary. Questions involving waste types and perceived environmental impacts were treated according to the structure of the questionnaire. Where respondents were allowed to identify more than one waste type or environmental impact, responses were treated as multiple-response items, and percentages were interpreted accordingly.

2.6 Statistical Analysis

Completed data collected from the questionnaires were coded and entered into Microsoft Excel and subsequently analysed using the Statistical Package for Social Sciences (SPSS) version 20.0. Descriptive statistics, including frequencies and percentages, were used to summarize the respondents' characteristics, waste management practices, perceptions, and awareness. Multiple-response items were interpreted based on the number of respondents selecting each option, where applicable.

2.7 Ethical considerations

Participation was voluntary, and informed consent was obtained verbally from all participants before data collection.

3. RESULTS AND DISCUSSION

3.1 Socio-demographic characteristics of the respondents

Table 1 shows the socio-demographic data of the respondents. A total of 360 household residents participated in the study. Females constituted 59.2% (n=213), and males accounted for 40.8% (n=147) of the respondents. Respondents aged 36–45 years constituted the largest age group (32.5%), followed by those aged 26–35 years (22.5%) and 18–25 years (20.8%). Overall, 55.0% of respondents were aged 26–45 years, indicating that the sample was dominated by adults within the economically active age range. Most respondents were married (75.8%). Traders/farmers constituted the largest occupational group (40.8%), business owners (27.5%), students (16.7%), and civil servants (15.0%). Educational attainment was mixed: 31.6% had secondary education, 24.2% tertiary education, 18.3% primary education, and 25.8% no formal education. In a regular community, marital status can influence the quantity of solid waste generated because married individuals often generate more waste due to larger households and increased consumption [26].The composition of solid waste may also differ, with families typically producing more organic waste, such as food scraps, while single individuals may generate more non-organic waste, like packaging materials.

Households containing 4–6 members represented 24.2%, while 22.5% had 10–12 members and 21.7% had more than 12 members. In addition, 37.7% of respondents had lived in the community for more than 15 years. The duration of stay of respondents in the area may provide them with substantial experience of local waste-management conditions; however, duration of residence alone does not establish greater environmental awareness [15]. Respondents reporting monthly household income below ₦10,000 constituted 28.3%, while 17.5% reported income above ₦ 50,000.

3.2 Household waste composition and storage practices

Based on the question on household waste composition generated in various houses among respondents, multiple responses were allowed. The waste composition question allowed respondents to report more than one type of waste. Therefore, the percentages represent the proportion of respondents reporting each waste category and are not expected to sum to 100%.

Food and vegetable residues were the most frequently reported household waste type (91.1%), followed by paper/cardboard (80.8%), bottles, plastics and sachet water (74.4%), clothes (70.8%), wood and dried leaves (47.2%), tyres, batteries and electronic materials (42.5%), rubber/synthetic materials (40.0%). At the same time, metals, glass, bulbs and ceramics each occurred in less than 30% of the responses (Figure 2). These response frequencies indicate the prominence of organic and plastic materials among the household waste types reported by respondents. The predominance of household waste suggests that organic waste management practices should be prioritized in the study area, while the substantial proportion of plastics indicates an additional need for source segregation, recovery, and recycling.

This is similar to the findings of the work done by [8] and [16] on assessment of waste management practices among residents of Benue South and Awka, in which the most common type of waste generated was food residue followed by bottle/plastics. These plastics are often disposed of by either burning or open dumping. Burning of plastic waste will degrade the environment by increasing toxic gaseous emissions in the atmosphere and ozone layer depletion, thereby increasing the risk of non-communicable diseases [17; 18]. Furthermore, the findings of this present study are consistent with those of [26- 27]. Also, plastic wastes, which consist of items like water bottles, food containers, packaging materials, disposable plastic cutlery, and plates also contribute significantly to this category of waste. In the same vein, food waste often generated

from different households, including leftover food, food scraps, and expired products, was found to be one of the major solid waste components in the study area. According to [28] who reported that organic waste, which includes garden waste, leaves, and other organic materials generated from landscaping and maintenance activities across sites, is of significant proportion, as also found in the present study.
However, according to [29], in their assessment of solid waste generation and management in Eziobodo Community, Imo State, residential buildings account for the highest source of solid waste generation in the community, and the solid waste was predominantly organic food waste, nylon/nylon bags/nylon sachets, and plastic can/rubbers. This study is consistent with the findings in the present study, as household organic waste remains the dominant solid waste component.

Table 1: **Socio-demographic characteristics of respondents**

Characteristics	No. of Respondents	Percent
Gender		
Male	147	40.8
Female	213	59.2
Age (years)		
18-25	75	20.8
26-35	81	22.5
36-45	117	32.5
46-55	59	16.4
56 and above	28	7.8
Marital status		
Married	273	75.8
Single	87	24.2
Occupation		
Civil-servant	54	15.0
Business-owner	99	27.5
Trader/Farmer	147	40.8
Student	60	16.7
Educational status		
No formal education	93	25.8
Primary	66	18.3
Secondary	114	31.7
Tertiary	87	24.2
Number of Households		
1-3	75	20.8
4-6	87	24.2
7-9	39	10.8
10-12	81	22.5
Above 12	78	21.7
Average monthly level of income (Naira)		
<10,000	102	28.3
10000-30,000	105	29.2
30,000-50,000	90	25.0
Above 50,000	63	17.5
House property		
Bungalow	132	36.6
Flat	96	26.7
Detached house	69	19.2
Semi-detached	63	17.5
Duration of stay (Years)		
Below 5	83	23.2
5-10	78	21.6
10-15	63	17.5
Above 15	136	37.7

Among the respondents, 46.7% reported using dustbins or rubbish pits for waste storage, while 35.8% used polythene bags, and 17.5% used cardboard boxes (Figure 3). Regarding the reported duration of storage before disposal, nearly half of the households (47.5%) indicated storing their waste for approximately one month, 26.7% reported daily disposal, and 25.8% reported weekly disposal (Figure 4). This result suggests that indiscriminate dumping of waste in the study area is a common practice. This has profound negative implications for human and environmental health. The residents are placed at high risk of offensive odour

from these dumpsites, fire hazards, and contracting diseases [26]. Prolonged storage of mixed household waste can increase opportunities for odour generation, vector activity, and uncontrolled disposal, particularly where collection services are irregular[19].

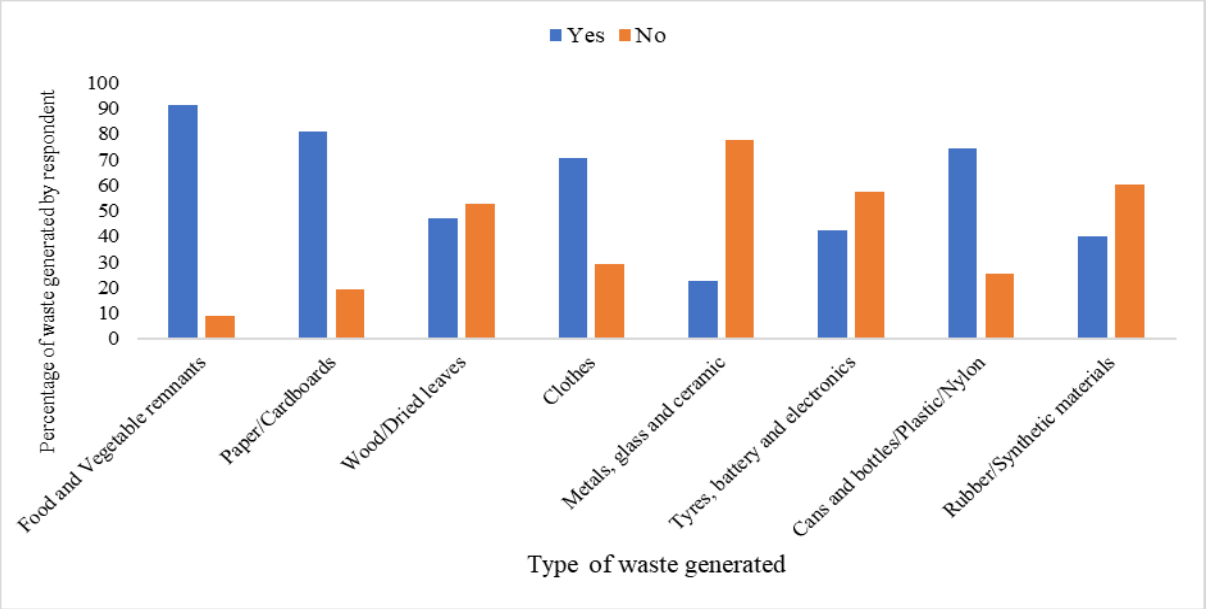


Figure 2: Type of waste generated by households

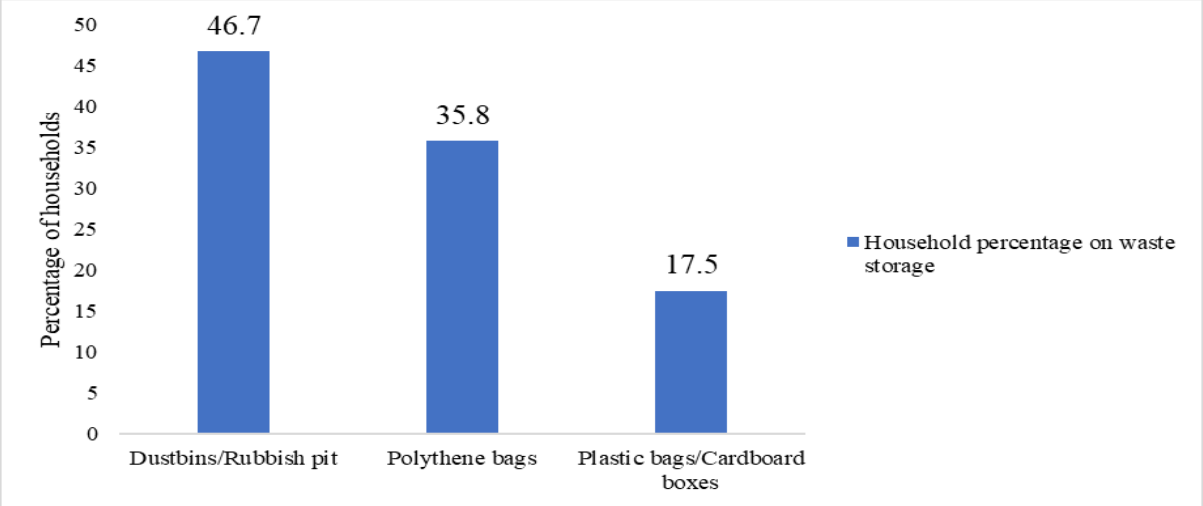


Figure 3: Storage of waste generated by households

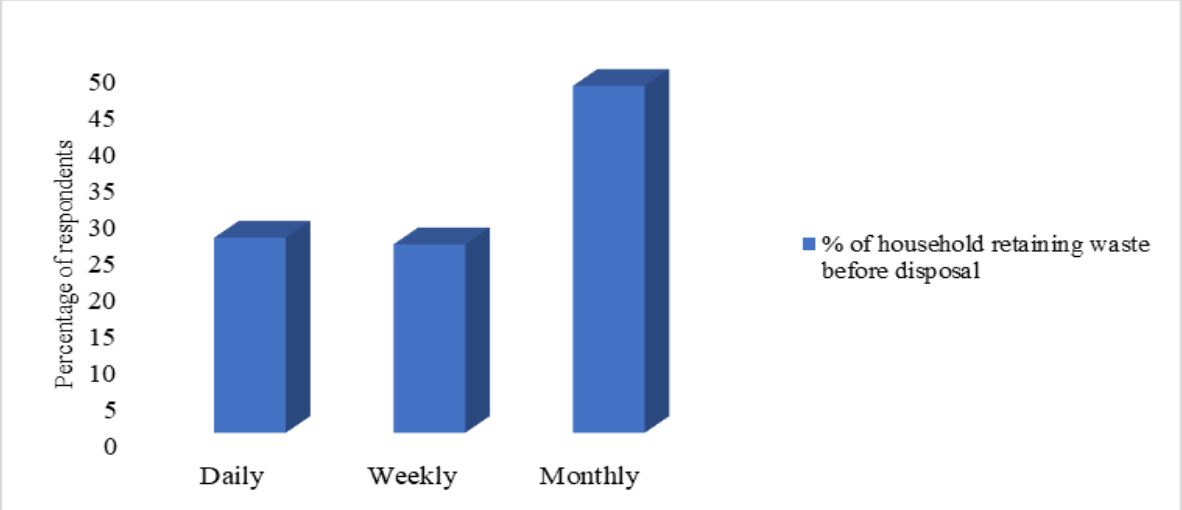


Figure 4: Duration of retaining waste before disposal

3.3 Households' perception regarding the source of drinking water in the community

The findings revealed that approximately34.0% of the respondents reported that they obtained their drinking water primarily from wells, and 27.5% relied on privately constructed boreholes within the community. In addition, 25.0% reportedly obtained drinking water from government-provided water tanks, while a small proportion of respondents indicated that stream water was their primary source of drinking water. These findings demonstrated a considerable reliance on groundwater sources, particularly wells and boreholes, among the study population (Figure 5).

3.4 Waste collection, transportation and disposal practices

Manual carrying was the most commonly reported method of transporting household waste to the disposal site (42.8%), followed by scavengers (24.4%). Other less reported methods included private organizations, trucks, and wheelbarrows as means of waste transportation (Figure 6).

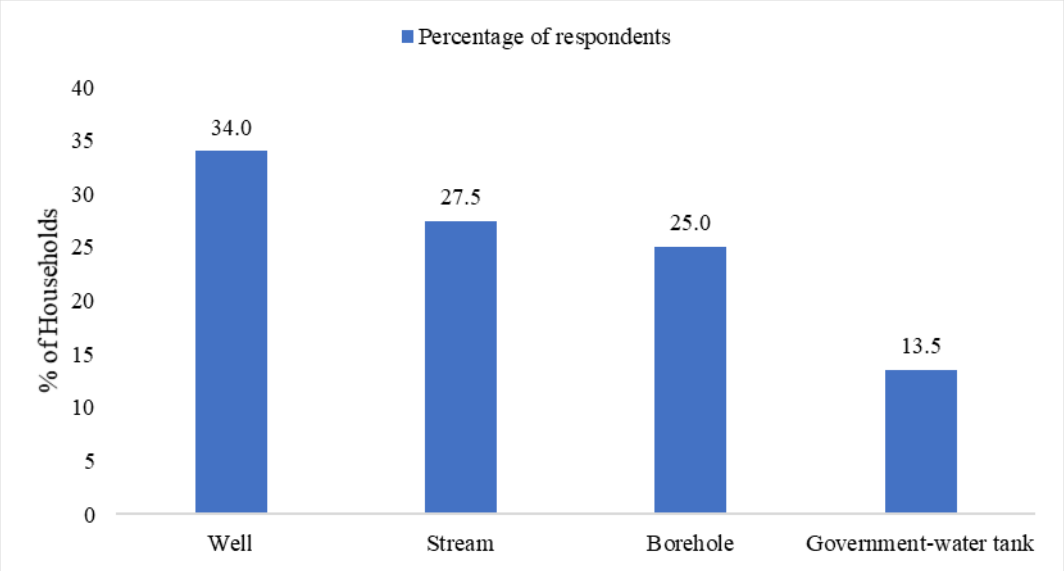


Figure 5: Source of household water

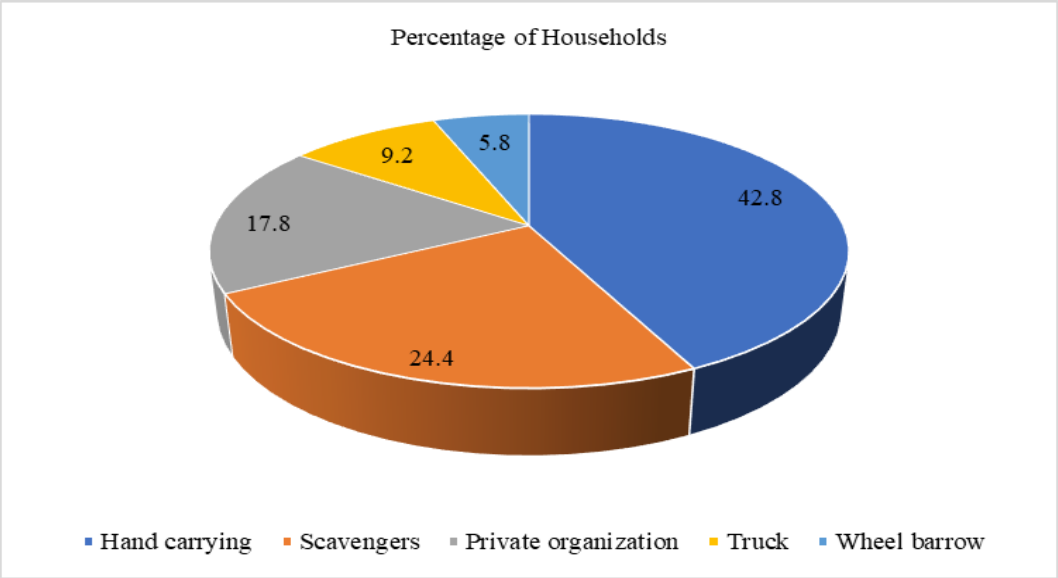


Figure 6: Household waste transportation to final disposal site

3.5 Respondents' perceptions of waste disposal and management practices

Table 2 presents household perceptions and practices related to solid-waste disposal and management. Burning was the predominant reported household waste disposal practice (55.0%), followed by open dumping (25.3%). River disposal, composting, and burying were reported by smaller proportions of the respondents. These findings describe self-reported household practices. Open dumping frequently causes water contamination, boosts the spread of vector-borne diseases, and damages land, while burning releases toxic emissions like dioxins and furans that lead to respiratory illnesses and climate change [3, 30].

The observed waste-management practices were compared with the requirements of the National Environmental (Sanitation and Wastes Control) Regulations, S.I. No. 28 of 2009. The Regulations provided a national framework for environmental sanitation and waste management and require waste to be handled appropriately and disposed of in designated facilities. They also prohibit the indiscriminate discarding of litter and require the populace or individuals generating waste to ensure that it is handled by a recognised and appropriate licensed waste transporter and disposed of at a designated waste-management facility [33; 34].

Waste collection was reported as monthly by 48.3% of respondents, weekly by 35.8%, and daily by 15.8%. Notably, 59.2% of the studied households reported selling part of their generated waste, while plastic/bottles (32.5%) and used clothes (26.7%) were the most commonly sold materials. Seventy-five percent reported paying waste-collection charges, with 55.0% considering the charges high.

Regarding accessibility, 49.2% reported that their residence was located within 10 – 15 m from a waste bin, while 28.3% indicated a distance less than 10 m. Furthermore, 50.8% of respondents reported that their septic tank was located at a distance of 10 m and above from their water source. The descriptive findings suggest that respondents reported greater reliance on nearby disposal locations. This shows that people are in the habit of dumping their refuse within a close range of their residence or where they carry out their daily activities. This justifies the huge heaps of accumulated refuse found along the roadsides, streets, and gutters at the time of the study in Abeokuta metropolis.

Overall, the findings suggest inadequate and potentially costly waste-collection services, which may contribute to the continued use of informal disposal practices. This result was similar to the work done by [20] on effects of indiscriminate solid waste disposal and environmental issues in Ibadan, Oyo State.

Table 2: Household perception on waste collector services and management practices

Characteristics	No. of Respondents	Percent
How do you dispose of your solid waste?		
Open dumping on site or bush	91	25.3
Burning	198	55.0
Throw into a river	36	10.0
Burying	15	4.2
Composting	20	5.5
Do you sell any part of the waste generated		
Yes	213	59.2
Domestic waste has been sold		
Used clothes	96	26.7
Electronics/Papers	57	15.8
Animal/poultry waste	36	10.0
Plastics/Bottles	117	32.5
How often do waste collectors collect the waste?		
Daily	57	15.8
Weekly	129	35.8
Monthly	174	48.3
Charges levied from waste collectors		
Yes	270	75.0
Charges rate by waste collectors		
High	198	55.0
Fair	84	23.3
Low	78	21.7
Distance of your residence to your waste bin		
<10 m	102	28.3
10 m - 15m	177	49.2
Above 15 m	81	22.5
Distance of septic tank to your source of water		
<10 m	183	50.8
10 m - 15m	102	28.4
Above 15 m	75	20.8

3.6 Residents' perception of the negative impacts of waste management and services

The findings indicate a substantial level of concern regarding the environmental consequences of poor solid waste management. Nearly two-thirds of respondents (63.3%) reported littering and indiscriminate disposal as a serious environmental problem. However, only 19.2% expressed willingness to pay for waste management services, suggesting a considerable gap between environmental concern and financial commitment to improved waste services (Table 3). Among respondents unwilling to pay, lack of financial resources (24.2%) and fear that collected funds could be diverted (19.2%) were prominent concerns. These

findings suggest that improving waste management cannot rely exclusively on household payment mechanisms; it also requires reliable service provision, financial accountability, and public confidence in waste-management institutions.

Waste accumulation was the most frequently identified problem reported by respondents (85.0%), followed by unpleasant odour (63.4%), rodents (31.7%), and flies (20.0%). The respondents' self-reported perceived bad odour (94.2%), flooding (75.8%), insect proliferation/disease outbreaks (62.5%), and water pollution (46.7%)as consequences of illegal dumpsites were particularly pronounced (Table 3). Respondents believed that indiscriminate dumping or illegal dumpsites contribute to perceived flooding, air and water pollution, the breeding of disease vectors, and overall environmental degradation; these responses are similar to the study by [3]. A previous study identified common outcomes of improper waste disposal, which were also observed here, including flooding and pollution of land, air, and water [30].

These perceptions are consistent with current WHO evidence that poorly managed solid waste can affect air, soil and water, obstruct drainage systems and provide conditions conducive to vectors and other disease hazards [21]. The findings therefore demonstrate that illegal dumping is perceived not merely as an aesthetic problem but as a multidimensional environmental and public-health concern.

Table 3: Residents' Perception of the Negative Impact of Waste

Characteristics	Frequency	Percentage
Littering and throwing of waste is a serious environmental issue		
Yes	228	63.3
No	132	36.7
Willingness to pay for waste management services?		
Yes	69	19.2
No	291	80.8
Reason for not being willing to pay for waste management services		
Lack of money	87	24.2
Government's social responsibility	21	5.8
Payment of tax duty	60	16.7
Fear of diversion of money	69	19.2
Preference to burn waste personally	66	18.3
Absence of waste management services	57	15.8
Main problems with the current solid waste management		
Waste lying around	306	85.0
Odour	228	63.4
Rats/Rodents	114	31.7
Flies	72	20.0
Implications posed by illegal dumpsites in your locality		
Bad odour	339	94.2
Flooding	273	75.8
Water pollution	168	46.7
Fire outbreak	57	15.2
Proliferation of insect/Outbreak of diseases	225	62.5

3.9 Perceived self-reported environmental impacts and public-health concerns

Respondents reported several health conditions among themselves and among children in their households. Among children below 12 years, malaria (60.0%) was the most frequently reported condition, followed by skin rashes (56.7%), and cough/catarrh (54.6%) smaller proportions mentioned typhoid, dysentery/diarrhoea, and hepatitis A (Figure 7). Based on the households' perception of the type of ailment common within a period of six weeks, 81% reported prevalence of malaria as one of the major diseases experienced in their community within the last six weeks, followed by cough/asthma (63.3%), diarrhoea/dysentery (48.3%), typhoid (45.8%), and skin rashes (32.5%. (Figure 8). Meanwhile, below 30% of the respondents reported that people experienced from cholera and waterborne diseases in their locality. Among respondents, malaria, cough/asthma, diarrhoea/dysentery, typhoid fever, skin rashes, cholera, and other waterborne conditions were reported. These findings represent self-reported health conditions and were not clinically verified. Health effects were also evident: when asked whether their households had experienced illnesses such as cholera due to poor waste-handling practices, below 30% of respondents confirmed they had, supporting findings from an earlier study linking waste mismanagement to disease spread [3, 31].

The study shows that open waste dumps around living areas are detrimental to good health. Waste dumps can serve as a breeding ground for mosquitoes, flies, rodents, and rats. These animals can transmit diseases to human beings either from the waste dump itself or other related sources [25].

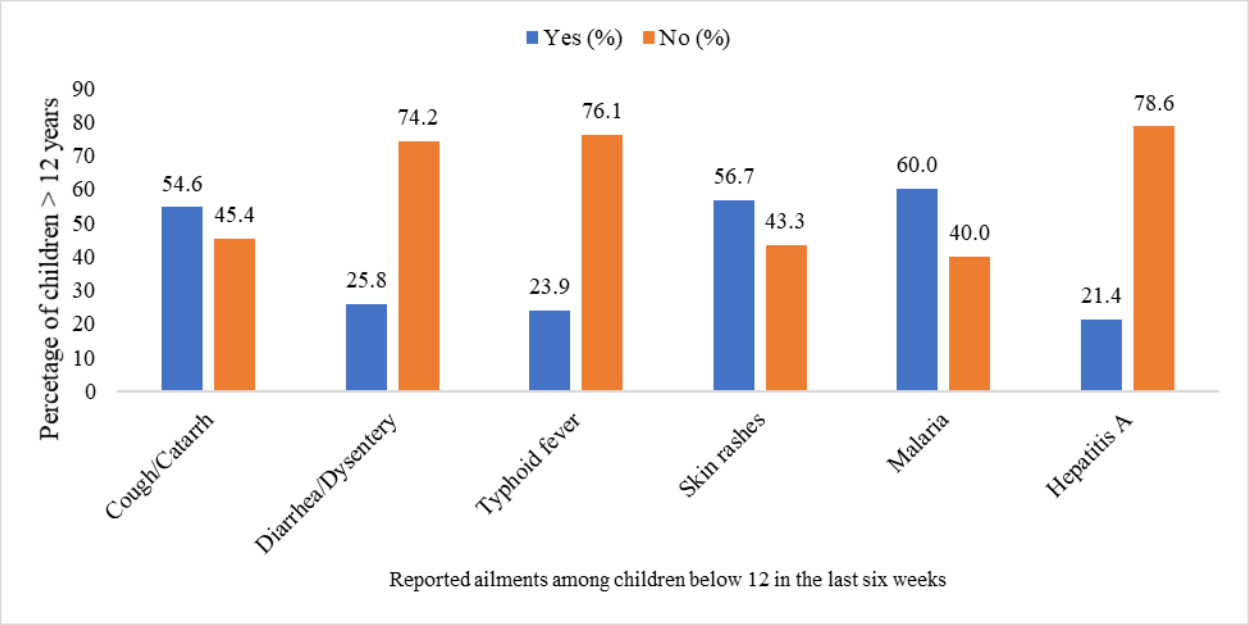


Figure 7: Reported ailments among children below 12 in the last six weeks

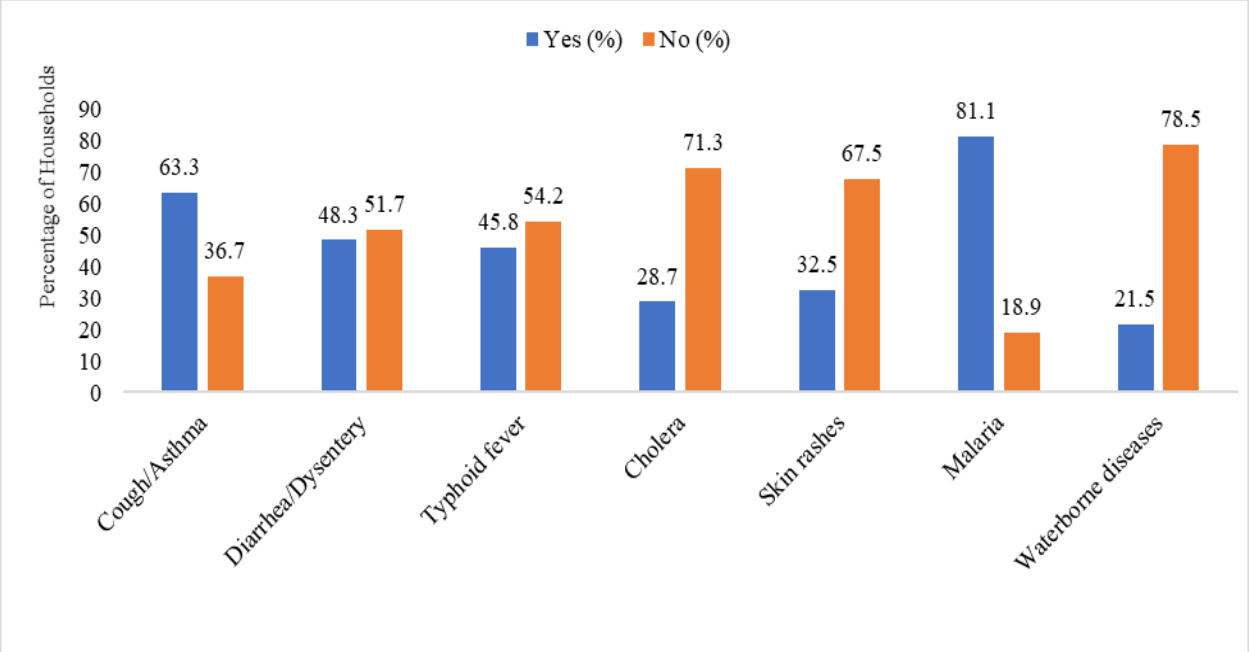


Figure 8: Self-reported ailments experienced by respondents within the previous six weeks

3.7 Creating Environmental Awareness to Combat Illegal Dumpsites

On environmental awareness, house-to-house education was identified by 45.8% of respondents as a preferred approach for changing environmental behaviour, while enforcement through fines and penalties and radio/television were identified by 31.7 and 22.5%, respectively (Table 4).

Community meetings were the most preferred medium of waste-management awareness, reported by 69.2% of respondents. These findings reflect respondents' preferences for environmental communication approaches. This finding is particularly relevant to recent research by [15] on the influence of media coverage of municipal solid waste management in Delta State, which emphasized that public awareness is an essential component of municipal solid waste management and that awareness initiatives need to operate alongside adequate physical infrastructure and institutional support.

Regarding interventions for reducing environmental pollution, restricting open dumping received the highest support (40.8%), followed by penalties for environmental pollution (36.7%), and treatment of waste before discharge (22.5%) (Table 4). Collectively, these responses indicate that residents prefer a combination of regulatory control, pollution prevention, and improved waste treatment rather than relying on awareness campaigns alone. This aligns with recent evidence indicating that publicity and policy interventions can work synergistically to reduce illegal dumping and improve waste-management outcomes.

Table 4: Creating awareness on proper waste management

Factors of waste reduction	Frequency	Percent
Ways environmentalists help in changing human behavior and response to the environment		
Enforcing environmental laws that attract fines on residents	114	31.7
House-to-house education	165	45.8
Creating awareness through different media such as radio, television	81	22.5
What would you suggest in a waste management system to reduce environmental pollution in your area?		
Restrict open dumping	147	40.8
Waste should be treated before discharge	81	22.5
Penalties for those who pollute the environment	132	36.7
Methods of creating awareness		
Radio	24	6.7
Television	15	4.2
Newspapers	33	9.1
Internet	21	5.8
Community meeting	249	69.2
Waste disposal agency	18	5.0

3.8 Household Environmental Awareness of Illegal Dumpsites

Table 5 revealed relatively limited household participation in collective environmental management. Only 30.8% of respondents reported participating in community activities or clean-up exercises, whereas 69.2% did not participate in any community activity. This low level of participation is important because effective management of illegal dumping requires sustained community engagement. Recent research has similarly identified public participation as an important component of effective illegal-dumping management.

Access to healthcare was also relatively limited, with 49.2% reporting access compared with 50.8% who reported otherwise. Although this variable does not establish a causal relationship between waste exposure and health outcomes, the finding is important in communities experiencing inadequate waste services because poor waste management can increase exposure to environmental hazards.

Drainage was the predominant reported method of liquid-waste disposal (46.7%), followed by pit disposal (32.5%) and water closets (20.8%). Reliance on drainage systems for liquid waste disposal may increase the risk of environmental contamination, particularly where they are inadequate or poorly maintained. 51.7% of respondents did not perceive their water source as contaminated, while 48.3% believed that contamination had occurred.

Table 5: Household Environmental Awareness on Illegal Dumpsites

Variables	Frequency	Percent
Do you participate in any community activities or clean-up?		
Yes	111	30.8
No	249	69.2
Do you have access to health care?		
Yes	177	49.2
No	192	50.8
How do you dispose of your liquid waste?		
Water closet	75	20.8
Pit	117	32.5
Drainage	168	46.7
Do you feel that the water you use is contaminated?		
Yes	174	48.3
No	186	51.7
Factors reducing the efficiency of the waste management system		
Insufficient fund/ no financial sacrifices for environmental protection	261	72.5
Inadequate trained personnel/poor enforcement of waste management regulations	219	60.8
Lack of proper education	273	75.8
Poor equipment	168	46.7
Increasing population and industrialization	321	89.2
Creating awareness of waste management will combat health implications		
Yes	327	90.8

The major factors perceived to reduce the efficiency of the waste-management system were increasing population and industrialization (89.2%), lack of proper environmental education (75.8%), inadequate

funding (72.5%), inadequate trained personnel/poor enforcement of regulations (60.8%), and poor equipment (46.7%). These findings suggest that the waste-management challenge is multifactorial, involving demographic pressure, institutional capacity, financing, human resources, and public awareness.

Lastly, a very high proportion of respondents (90.8%) believed that increased awareness could help reduce the health implications of poor waste management, providing strong support for incorporating environmental-health education into waste-management programmes. Nevertheless, the findings also indicate that awareness should be combined with accessible collection services, effective enforcement, appropriate infrastructure, and transparent financing. This result is in line with the findings of work done by [22] and [23] on knowledge, attitude, and practices on waste management of people living in Ife North and Ogbomoso, respectively, which indicated that the respondents were knowledgeable in refuse management.

4. CONCLUSION

Illegal and poorly managed household solid waste management in the selected communities of Abeokuta Metropolis was characterized by substantial generation of organic and plastic waste, prolonged storage, inadequate collection frequency, open burning, and open dumping. Respondents also reported environmental concerns including bad odour, flooding, waste accumulation, insect proliferation, and perceived water pollution. Although most respondents recognized the importance of environmental awareness, participation in community clean-up activities was relatively low. These findings provide descriptive evidence on household waste management practices in the selected communities.

Regular and reliable household waste collection should be strengthened because 48.3% reported monthly collection and 35.8% reported weekly. Accessible collection and disposal facilities should be provided by local authorities and waste management operators to reduce uncontrolled disposal. Open burning and dumping should be discouraged through environmental education and appropriate enforcement and source segregation, and recycling should be promoted due to the frequent reporting of food/vegetable waste and plastics, indicating opportunities for household segregation, composting, and recycling. Only 30.8% reported participation in community clean-up activities; community leaders and environmental agencies should therefore strengthen community-based sanitation programmes. Waste service providers should improve transparency and communicate clearly on waste service charges since the majority of the respondents in the study reported paying waste-collection charges.

Some residents were unwilling to grant access to their homes or participate in the interviews, due to security concerns during data collection. However, this was partly mitigated through the assistance of recognized residents as interview guides who facilitated access to households and improved respondents' willingness to participate. The cross-sectional design limits the ability to establish temporal or causal relationships between waste management practices and self-reported health outcomes. The reported health conditions were not clinically verified, and environmental conditions such as water, air pollution, and soil were not objectively measured but were based on self-reported information. In addition, the original analysis was descriptive and did not generate respondent-level inferential statistics comparison between study categories. Therefore, the findings were interpreted as descriptive evidence from the selected communities rather than a statistically comparative study.

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