
ASSESSMENT OF LANDFILL MANAGEMENT PRACTICES AND THEIR EFFECTS ON ENVIRONMENTAL QUALITY AND HEALTH OUTCOMES AMONG COMMUNITIES AROUND OLUSOSUN LANDFILL, LAGOS STATE, NIGERIA

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Abstract

The increasing pressure of urbanisation and population growth in Lagos State has intensified solid waste generation and placed greater demands on landfill management systems. This study assessed landfill management practices and examined their effects on environmental quality and health outcomes among communities surrounding Olusosun Landfill, Lagos State, Nigeria. A descriptive cross-sectional research design was adopted among residents living within communities surrounding the landfill. A structured questionnaire, environmental observation checklist, and review of waste management practices were used for data collection. A total of 250 respondents participated in the study. Findings showed that open dumping, inadequate waste

segregation, irregular landfill covering, unpleasant odour, smoke emissions, and poor drainage management were commonly observed around the landfill environment. Residents reported frequent exposure to environmental nuisances, with respiratory discomfort, skin irritation, and recurrent malaria episodes among the commonly reported health concerns. The study established an association between poor landfill management practices and adverse environmental conditions affecting nearby communities. Strengthening landfill monitoring, improving waste treatment practices, increasing community participation, and enforcing environmental regulations are recommended to reduce health risks associated with landfill operations.

Keywords: Environmental quality, Health outcomes, Landfill management, Solid waste, Urban communities

Introduction

The management of municipal solid waste remains a major environmental concern in rapidly expanding urban centres. Cities with high population density generate large quantities of household, commercial, and industrial waste, often exceeding the capacity of existing waste management systems. In many developing countries, waste disposal continues to depend heavily on landfilling because of its relatively low operational cost and simplicity. However, poorly managed landfill sites can become sources of environmental contamination through the release of leachate, uncontrolled decomposition gases, smoke from waste burning, and the attraction of disease vectors.

Nigeria's urban centres have experienced significant growth in waste generation due to population increase, economic activities, and changing consumption patterns. Lagos State, being one of the most populated metropolitan areas in Africa, produces substantial volumes of municipal waste daily. The challenges associated with waste collection, transportation, treatment, and disposal have continued to affect environmental sanitation efforts. According to the United Nations Environment Programme (UNEP, 2021), ineffective waste management systems contribute to environmental degradation and increase exposure to health risks, particularly among populations living close to disposal facilities.

Olusosun Landfill, located in Ojota area of Lagos State, is one of the largest and most recognised landfill facilities in Nigeria. The site has served as a major destination for municipal waste generated within Lagos metropolis for several decades. Although the landfill has supported waste disposal activities within the city, concerns have been raised regarding waste accumulation, odour generation, air pollution, uncontrolled waste picking activities, and possible contamination of surrounding environmental resources.

Studies have shown that communities located near landfill sites may experience increased exposure to environmental hazards. Waste decomposition produces methane and other gases, while poorly managed leachate may contaminate soil and groundwater resources. Research by Ochechi Joseph Ugbede and colleagues has emphasised the relationship between environmental management practices and public health conditions, particularly in settings where sanitation infrastructure is inadequate. Effective waste management therefore requires not only disposal of waste but also proper planning, monitoring, environmental protection measures, and community involvement.

Despite the importance of Olusosun Landfill in Lagos waste management operations, limited attention has been given to the combined assessment of landfill management practices, environmental quality indicators, and reported health outcomes among nearby residents. Understanding these relationships is necessary for improving waste management strategies and protecting communities exposed to landfill-related hazards. The objective of this study was to assess landfill management practices and determine their effects on environmental quality and health outcomes among communities around Olusosun Landfill, Lagos State, Nigeria.

Literature Review

1 Conceptual Review

Landfill management refers to the systematic planning, operation, monitoring, and control of waste disposal facilities to minimise environmental pollution and protect human health. Effective landfill management involves waste segregation, controlled disposal, regular covering of waste materials, leachate management, gas control, and environmental monitoring.

Environmental quality around landfill areas is influenced by several factors including air quality, soil condition, water quality, waste handling practices, and sanitation conditions. Poor landfill operation may result in contamination pathways that expose residents to pollutants and disease-causing organisms.

Health outcomes associated with landfill exposure vary depending on the type and level of exposure. Previous studies have linked poorly managed waste disposal sites with respiratory symptoms, gastrointestinal illnesses, skin conditions, and vector-related diseases (Ferronato & Torretta, 2019).

2 Theoretical Review

This study was guided by the Environmental Health Risk Assessment Theory, which explains how environmental hazards interact with human populations through exposure pathways. The theory

proposes that health outcomes are influenced by the presence of hazards, human exposure levels, and individual vulnerability.

The theory is relevant to landfill environments because waste disposal sites may generate multiple hazards, including chemical pollutants, biological agents, and physical risks. Residents living close to landfill sites may experience increased exposure through inhalation, direct contact, contaminated food, or polluted water sources.

3 Empirical Review

Several studies have examined the relationship between landfill operations and community health. Ferronato and Torretta (2019) reported that inadequate waste management remains a major challenge in developing countries, contributing to environmental contamination and public health concerns. Similarly, Kaza et al. (2018) observed that rapidly growing cities require improved waste management systems to prevent negative environmental consequences.

Research in Nigeria has identified poor waste collection systems, inadequate disposal facilities, and weak enforcement of environmental regulations as major factors affecting urban sanitation. Ugbede et al. (2024) highlighted the importance of strengthening environmental management practices to reduce exposure to preventable health risks within vulnerable communities.

Although previous studies provide useful evidence, there remains a need for location-specific investigations focusing on communities surrounding major landfill facilities such as Olusosun Landfill.

Materials and Methods

1 Research Design

The study adopted a descriptive cross-sectional research design to assess landfill management practices and examine their relationship with environmental quality and health outcomes among residents living around Olusosun Landfill, Lagos State, Nigeria. The design was considered appropriate because it allowed the researchers to collect information from residents at a specific period and determine the prevailing environmental conditions and health experiences associated with landfill activities.

2 Study Area

The study was conducted among selected communities surrounding Olusosun Landfill located in Ojota, Lagos State, Nigeria. Lagos State is one of Nigeria's most urbanised areas, with intensive commercial activities, rapid population expansion, and high municipal waste generation. Olusosun Landfill occupies a strategic location within the Lagos metropolitan area and has historically served as a major disposal site for municipal solid waste generated from different parts of the city.

The communities surrounding the landfill include Ojota, Alausa, Ketu, and other residential settlements located within close proximity to the disposal facility. Residents in these areas experience direct interaction with landfill-related activities through exposure to odour, waste transportation activities, smoke emissions, and movement of waste scavengers. The environmental conditions of these communities make them suitable for assessing the possible effects of landfill operations on public health.

3 Target Population

The target population comprised adult residents living within selected communities surrounding Olusosun Landfill. The population included individuals who had lived in the study area for at least one year and were considered likely to have experienced the environmental conditions associated with landfill operations.

4 Sample Size and Sampling Technique

A total of 250 residents participated in the study. The sample size was considered adequate for obtaining information on residents' perceptions of landfill management practices, environmental conditions, and reported health experiences.

A multistage sampling technique was employed. In the first stage, communities located around the landfill were purposively selected based on their proximity to the disposal site. In the second stage, residential areas within the selected communities were identified, while households were selected through systematic sampling. One eligible adult respondent was selected from each household.

5 Inclusion and Exclusion Criteria

Residents who were 18 years and above, had lived within the selected communities for a minimum period of one year, and provided informed consent were included in the study.

Residents who were visitors, individuals who had stayed in the area for less than one year, and persons who were unable to provide responses due to communication difficulties were excluded.

6 Data Collection Instruments

Data were collected using three instruments:

- a. A structured questionnaire designed to obtain information on socio-demographic characteristics, landfill management practices, environmental conditions, and health experiences.
- b. An environmental observation checklist used to assess visible landfill conditions, including waste accumulation, drainage conditions, waste covering practices, smoke emissions, and general sanitation status.

- c. Informal environmental assessment records obtained during field visits to document conditions around the landfill surroundings.

The questionnaire consisted of four sections. Section A collected demographic information, Section B assessed residents' perceptions of landfill management practices, Section C examined environmental quality conditions, while Section D assessed reported health outcomes.

7 Validity and Reliability of Instrument

The research instruments were subjected to face and content validation by experts in environmental health and public health disciplines. Their observations were used to improve clarity, relevance, and consistency of the questionnaire items.

A pilot study was conducted among 25 residents from a community outside the selected study locations but with similar environmental characteristics. The reliability of the questionnaire was determined using Cronbach's alpha coefficient, which produced a value of 0.82, indicating satisfactory internal consistency.

8 Data Collection Procedure

Data collection was carried out through direct administration of questionnaires to selected respondents. The researchers explained the purpose of the study to participants before obtaining consent. Completed questionnaires were checked daily to ensure completeness and accuracy.

Environmental observations were conducted during field visits at different periods to capture variations in landfill activities. The researchers documented visible waste management conditions and environmental challenges within the surrounding communities.

9 Ethical Considerations

Ethical approval for the study was obtained from the appropriate institutional research ethics committee. Participation was voluntary, and respondents were informed about the purpose of the study before participation. Confidentiality of participants' information was maintained throughout the research process.

10 Data Analysis

Data collected were analysed using Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics including frequency, percentage, mean, and standard deviation were used to summarise findings. Chi-square analysis was used to determine the association between landfill management practices and reported health outcomes. Statistical significance was determined at $p < 0.05$.

Results

1 Socio-Demographic Characteristics of Respondents

A total of 250 questionnaires were administered, and all were retrieved and considered suitable for analysis, giving a response rate of 100%. The respondents consisted of 138 (55.2%) males and 112 (44.8%) females. The largest proportion of respondents, 96 (38.4%), were within the age range of 31 to 40 years.

Most respondents, 174 (69.6%), had lived in the study area for more than five years, indicating prolonged exposure to environmental conditions around the landfill.

Table 1: Socio-demographic Characteristics of Respondents

Variable	Frequency	Percentage (%)
Gender		
Male	138	55.2
Female	112	44.8
Age group		
18–30 years	64	25.6
31–40 years	96	38.4
41–50 years	58	23.2
Above 50 years	32	12.8
Years of residence		
1–5 years	76	30.4
Above 5 years	174	69.6

2 Assessment of Landfill Management Practices

Findings revealed that many respondents perceived landfill management practices around Olusosun Landfill as inadequate. About 78.4% of respondents reported frequent exposure to accumulated waste materials, while 72.8% indicated that waste segregation was rarely practised at the landfill.

Poor waste covering practices were reported by 70.4% of respondents, while 76.0% observed unpleasant odour from the landfill site. Smoke emissions from burning waste materials were reported by 65.2% of respondents.

Table 2: Reported Landfill Management Practices

Landfill management indicator	Yes (%)	No (%)
Frequent waste accumulation observed	78.4	21.6
Regular waste segregation	27.2	72.8
Proper waste covering practices	29.6	70.4
Presence of unpleasant odour	76.0	24.0
Smoke emissions observed	65.2	34.8

3 Environmental Conditions around Olusosun Landfill

The environmental assessment showed that waste accumulation, drainage problems, and odour pollution were major concerns within the surrounding communities. The observation checklist revealed visible waste deposits around some access routes, stagnant water points, and evidence of uncontrolled waste burning.

The majority of respondents, 74.8%, perceived air quality around the landfill as poor, while 68.0% reported concerns about possible contamination of nearby soil and water sources.

Table 3: Environmental Quality Indicators

Environmental condition	Frequency	Percentage (%)
Poor air quality	187	74.8
Waste accumulation	196	78.4
Drainage problems	158	63.2
Odour pollution	190	76.0
Soil/water contamination concerns	170	68.0

4 Reported Health Outcomes among Residents

The commonly reported health conditions among respondents included respiratory symptoms, malaria episodes, skin irritation, and gastrointestinal complaints. Respiratory discomfort was reported by 46.8% of respondents, while 41.6% reported frequent malaria occurrence.

Table 4: Reported Health Outcomes

Health condition	Frequency	Percentage (%)
Respiratory discomfort	117	46.8
Malaria episodes	104	41.6
Skin irritation	83	33.2
Gastrointestinal problems	61	24.4

Discussion of Findings

This study assessed landfill management practices and their effects on environmental quality and health outcomes among communities surrounding Olusosun Landfill, Lagos State. The findings revealed that residents experienced several environmental challenges associated with landfill operations, including waste accumulation, unpleasant odour, smoke emissions, poor waste segregation practices, and inadequate waste covering. These conditions suggest that although the landfill remains an important component of Lagos waste disposal system, operational practices require improvement to reduce environmental pressure on neighbouring communities.

The finding that a large proportion of respondents reported frequent waste accumulation agrees with observations from previous studies on municipal waste management challenges in developing urban areas. Ferronato and Torretta (2019) noted that inadequate waste handling and limited treatment options remain common problems in developing countries, resulting in uncontrolled disposal conditions and increased exposure to environmental hazards. Similar concerns have been reported in Nigeria, where rapid urban growth has often exceeded the capacity of existing waste management structures.

The limited practice of waste segregation identified in this study reflects a broader challenge within Nigeria's solid waste management system. Effective segregation at source helps reduce the volume of waste requiring final disposal and improves opportunities for recycling and resource recovery.

However, many landfill systems in developing countries continue to receive mixed waste, increasing the difficulty of managing environmental risks associated with disposal sites.

The environmental assessment showed that odour pollution and poor air quality were among the major concerns reported by residents. Landfills generate various gases during organic waste decomposition, including methane, carbon dioxide, and trace compounds responsible for unpleasant smells. Continuous exposure to these conditions may affect residents' comfort, daily activities, and perceived wellbeing. Previous research has linked poor landfill management with deterioration in local environmental conditions and increased concerns about respiratory health among nearby populations (Giusti, 2009; Njoku et al., 2019).

The reported health outcomes in this study showed that respiratory discomfort, malaria episodes, skin irritation, and gastrointestinal complaints were common among residents. While the cross-sectional design does not establish direct causation, the findings indicate an association between living near landfill activities and experiencing environmental health concerns. Waste disposal sites can create favourable conditions for disease vectors such as flies, mosquitoes, and rodents when waste accumulation and drainage problems are not properly controlled.

The relationship between landfill conditions and health outcomes observed in this study supports the environmental health risk perspective, which explains that human health is influenced by interactions between environmental hazards and patterns of exposure. Residents living close to poorly managed waste facilities may experience repeated contact with environmental pollutants through air, soil, water, and physical surroundings.

The findings also align with the work of Ugbede and colleagues, who have emphasised the importance of strengthening environmental management approaches to reduce preventable public health risks. Effective environmental protection requires coordinated action involving waste authorities, regulatory agencies, local communities, and private sector stakeholders.

The results highlight that landfill management should move beyond waste disposal alone and incorporate routine monitoring, environmental assessment, waste reduction strategies, and stronger community engagement. The conditions observed around Olusosun Landfill demonstrate the need for continuous improvement in urban waste management practices, especially in densely populated cities such as Lagos.

Conclusion

This study assessed landfill management practices and their effects on environmental quality and health outcomes among communities surrounding Olusosun Landfill, Lagos State. The findings showed that residents were exposed to several environmental challenges associated with landfill

operations, including waste accumulation, unpleasant odour, smoke emissions, and inadequate waste management practices.

The study achieved its objective by demonstrating that poor landfill management practices were associated with negative perceptions of environmental quality and reported health concerns among residents. Although health outcomes may be influenced by several factors beyond landfill exposure, the environmental conditions identified around the landfill represent important public health concerns requiring attention.

Improving landfill operations through better waste handling procedures, environmental monitoring, and stronger regulatory enforcement is necessary to reduce risks among communities located near disposal facilities.

Recommendations

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

1. Lagos State waste management authorities should strengthen routine monitoring of Olusosun Landfill operations to ensure compliance with environmental standards.
2. Waste segregation practices should be encouraged at household and institutional levels to reduce the quantity of mixed waste transported to landfill sites.
3. Regular covering of disposed waste materials should be maintained to reduce odour, smoke generation, and exposure to disease vectors.
4. Environmental quality monitoring programmes should be established around communities close to the landfill to assess air, soil, and water conditions regularly.
5. Community awareness programmes should be conducted to educate residents on environmental health risks associated with poor waste disposal practices.
6. Waste recycling and recovery initiatives should be expanded to reduce dependence on landfill disposal as the primary waste management approach.

Conflict of Interest Statement

The authors declare that there is no conflict of interest associated with this study.

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