

Title

**EXPLORING THE IMPACT OF LANDFILL MANAGEMENT ON PUBLIC HEALTH
AND DISEASE CONTROL IN MTANDIRE COMMUNITY, LILONGWE DISTRICT.**

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ABSTRACT

Improper landfill management poses a serious threat to public health, particularly in rapidly urbanizing and densely populated communities. In areas such as Mtandire in Lilongwe District Malawi, inadequate waste disposal practices have become a growing environmental and health concern. This study examined the relationship between landfill management practices and the prevalence of diseases among communities living near landfill sites.

The study employed a mixed-methods approach, including field surveys, interviews with residents and public health officials, and the review of environmental and health-related records. Data were collected to assess waste disposal practices the level of regulatory enforcement, and community awareness regarding the health risks associated with improper landfill management and Particular attention.

Findings revealed that improper landfill practices, including open dumping, inadequate waste segregation, and lack of proper landfill infrastructure, significantly contributed to environmental pollution. These conditions created breeding grounds for disease vectors such as mosquitoes and rodents, while also contaminating nearby water sources and degrading air quality In addition limited enforcement of waste management regulations and insufficient public awareness further worsened the situation, allowing unsafe disposal practices to continue. The study also found that many residents living near landfill areas lacked access to proper waste collection services and relied on informal or unsafe disposal methods.

The research highlights the urgent need for improved landfill management systems in Lilongwe. Strengthening waste

management policies, investing in proper landfill infrastructure, enhancing regulatory enforcement, and promoting community education are critical steps toward reducing health risks and improving environmental conditions in rapidly growing urban communities. The findings aim to inform local authorities and stakeholders about the importance of sustainable waste management in protecting public health and promoting safer urban living environments.

Keyword: Landfill Management, Public Health, Waste Disposal, Disease Prevalence, Urban Environmental Health, Lilongwe District.

INTRODUCTION

Improper waste management has become a major environmental and public health challenge in many developing countries. Rapid urbanization, population growth, and limited waste management infrastructure have increased the amount of solid waste generated in urban areas. When waste is not properly managed, it often ends up in poorly maintained landfill sites or open dumps, creating serious environmental and health hazards. Communities living near such sites are particularly vulnerable to pollution and disease outbreaks caused by exposure to contaminated air, water, and soil.

Background of the Study

Solid waste management is one of the most critical environmental and public health challenges faced by rapidly growing urban areas in developing countries. As populations increase and urbanization accelerates, the amount of waste generated by households, markets, and industries continues to rise. When waste is not properly collected, treated, and disposed

of, it often accumulates in open spaces or poorly managed landfill sites. These conditions create environmental pollution and increase the risk of disease among nearby communities.

Improper landfill management can lead to contamination of soil, water, and air. Leachate from waste dumps can seep into groundwater sources, making water unsafe for domestic use. Additionally, decomposing waste releases harmful gases and attracts disease vectors such as flies, mosquitoes, and rodents, which contribute to the spread of diseases such as cholera, malaria, diarrhea, and respiratory infections. As a result, communities living close to poorly managed landfill sites are more vulnerable to health risks.

Effective waste management systems are therefore essential to protect both the environment and public health. However, in many developing countries, waste management infrastructure remains inadequate due to limited financial resources, weak policy enforcement, and low public awareness about proper waste disposal practices.

Context of the Study

In Malawi, rapid urban population growth has placed significant pressure on waste management systems, particularly in major cities such as Lilongwe. Many residential areas struggle with insufficient waste collection services and lack of properly managed landfill facilities. Consequently, waste is often disposed of in open dumps or informal landfill sites without adequate environmental safeguards.

Mtandire, a densely populated area in Lilongwe District, is one of the communities affected by poor waste management practices. Improper disposal

of household waste and limited access to formal waste management services have contributed to environmental pollution in the area. Residents living near dumping sites frequently experience health problems associated with exposure to waste-related pollutants and disease vectors.

Despite the growing concerns about waste management and public health in urban Malawi, there is limited research examining the specific relationship between landfill management practices and disease prevalence in local communities. Understanding this relationship is important for developing effective interventions that protect public health and improve environmental conditions.

RESEARCH OBJECTIVES

General Objective

- To examine the impact of improper landfill management on disease prevalence among communities living near landfill sites in Mtandire, Lilongwe District.

Specific Objectives

- To assess the current landfill and waste disposal practices in Mtandire.
- To identify common health problems experienced by residents living near landfill areas.
- To examine the relationship between landfill management practices and disease prevalence in the community.
- To evaluate the level of community awareness regarding the health risks associated with improper waste disposal.

LITERATURE REVIEW

In 2015, the World Health Organization (WHO) reported that poor waste management and improper landfill practices significantly contribute to environmental pollution and the spread of infectious diseases, particularly in low-income urban communities. Rapid urbanization has increased the volume of solid waste produced in cities, putting pressure on local authorities to manage waste effectively. In many developing countries, inadequate waste management systems have resulted in poorly managed landfill sites that pose serious threats to public health.

In 2016, the United Nations Environment Programme (UNEP) highlighted that open dumping and poorly controlled landfill sites are major sources of environmental contamination. These landfill sites often produce harmful gases such as methane and release toxic substances into the soil and water sources. Communities living near these landfill areas are therefore exposed to several environmental and health risks, including respiratory diseases, skin infections, and waterborne illnesses.

In 2017, research conducted by Ferronato and Torretta emphasized that ineffective waste management practices are closely linked to increased health risks in developing countries. Their study indicated that landfill sites without proper waste segregation, liners, and drainage systems often lead to the contamination of groundwater and surface water. Such contamination increases the spread of diseases such as cholera, diarrhea, and typhoid, particularly among communities relying on nearby water sources.

In 2018, studies on urban waste management in African cities revealed that many landfill sites operate without proper infrastructure or monitoring systems. According to the African Development

Bank, inadequate landfill management contributes to the spread of disease vectors such as mosquitoes, flies, and rodents. These vectors play a significant role in the transmission of diseases such as malaria, dengue fever, and other vector-borne illnesses.

In 2019, a study by Wilson *et al.* examined the impact of landfill sites on nearby communities and found that residents living close to poorly managed landfill areas reported higher cases of respiratory infections and gastrointestinal diseases. The study also found that unpleasant odors and air pollution from decomposing waste negatively affected the quality of life of nearby residents.

In 2020, research on waste management in Sub-Saharan Africa highlighted the challenges faced by rapidly growing urban areas. Many municipalities struggle with limited financial resources, weak regulatory enforcement, and insufficient waste collection services. As a result, many communities resort to informal waste disposal methods such as open burning and illegal dumping, which further worsen environmental and health conditions.

In 2021, studies focusing on Malawi showed that waste management remains a major challenge in urban areas such as Lilongwe, Blantyre, and Mzuzu. Local government authorities often lack adequate infrastructure and technical capacity to manage increasing volumes of waste. Poor landfill management has therefore contributed to environmental pollution and increased health risks in surrounding communities.

In 2022, environmental health researchers emphasized the importance of community awareness and participation in improving waste management practices. Public

education campaigns were found to be effective in encouraging proper waste disposal, waste segregation, and recycling. These efforts can significantly reduce the negative impacts of landfill sites on both the environment and public health.

In 2023, recent studies have continued to highlight the need for sustainable waste management systems in rapidly growing urban communities. Researchers stress that improved landfill design, proper waste segregation, and stronger regulatory enforcement are necessary to reduce the health risks associated with landfill sites. Additionally, collaboration between government institutions, local communities, and environmental organizations is essential in promoting safe and sustainable waste management practices.

The reviewed literature demonstrates that improper landfill management is strongly associated with environmental pollution and increased disease prevalence in nearby communities. Poor waste disposal practices, lack of infrastructure, limited regulatory enforcement, and low community awareness all contribute to the problem. These findings highlight the need for improved landfill management systems and stronger public health interventions to protect communities living near landfill sites, particularly in developing urban areas such as Mtandire in Lilongwe District.

METHODOLOGY

Research Design

This study employed a mixed-methods research design to explore the impact of landfill management on public health and disease control in the Mtandire community of Lilongwe District. The mixed-methods

approach combines both quantitative and qualitative research methods to provide a comprehensive understanding of the problem. Quantitative data helped measure the prevalence of diseases and the frequency of waste management practices, while qualitative data provided deeper insights into the experiences, perceptions, and opinions of community members and health officials regarding landfill management.

The use of this research design allowed the researcher to collect both numerical data and descriptive information, enabling a better understanding of the relationship between landfill management practices and public health outcomes.

Study Area

The study was conducted in Mtandire Community, located in Lilongwe District, Malawi. Mtandire is a densely populated urban area characterized by rapid population growth and limited waste management infrastructure. The area experiences challenges related to improper waste disposal, including open dumping, poor waste segregation, and limited waste collection services. These conditions make the community a suitable location for studying the relationship between landfill management and public health.

Target Population

The target population for this study consisted of residents living near landfill or waste disposal areas in Mtandire, as well as public health officials and local authorities involved in waste management. Residents were included because they are directly affected by landfill practices, while health officials and environmental officers provided expert insights into disease trends and waste management challenges in the area.

Sample Size and Sampling Techniques

A sample of residents from the Mtandire community was selected to participate in the study. The study used random sampling to select households located near landfill sites to ensure that each household had an equal chance of being included in the research. This helped reduce bias and improved the reliability of the data collected.

In addition, purposive sampling was used to select key informants such as public health officials, environmental officers, and community leaders. These participants were selected because they possess specialized knowledge about waste management systems and public health issues in the area.

Data Collection Methods

Several data collection methods were used to obtain relevant information for the study.

1. Questionnaires

Structured questionnaires were distributed to residents living near landfill sites in the Mtandire community. The questionnaires included both closed-ended and open-ended questions designed to collect information on waste disposal practices, awareness of environmental health risks, and the prevalence of diseases within households.

2. Interviews

Semi-structured interviews were conducted with public health officials, environmental officers, and community leaders. These interviews allowed the researcher to gather detailed information about waste management practices,

regulatory enforcement, and health challenges associated with landfill sites.

3. Observation

Field observations were conducted to assess the physical condition of landfill areas and waste disposal sites within the community. The researcher observed factors such as waste accumulation, presence of disease vectors, waste segregation practices, and environmental conditions surrounding the landfill sites.

4. Document Review

The study also reviewed existing environmental and health records, including reports from local health facilities and environmental agencies. These records helped identify common diseases reported in the community and provided additional data to support the study findings.

Data Analysis

The collected data were analyzed using both quantitative and qualitative methods.

- Quantitative data obtained from questionnaires were organized and analyzed using statistical methods, including frequency tables and percentages. This helped summarize the responses and identify patterns related to waste management practices and disease prevalence.
- Qualitative data obtained from interviews and observations were analyzed using thematic analysis. This involved identifying common themes and patterns related to landfill management practices, environmental conditions, and public health concerns.

Ethical Considerations

Ethical considerations were taken into account during the research process. Participation in the study was voluntary, and respondents were informed about the purpose of the research before data collection. Participants were also assured that their responses would remain confidential and used only for academic purposes.

The researcher ensured that the study respected the rights and privacy of all participants and that no harm was caused during the research process.

RESULTS

Overview of the Study Findings

This section presents the findings of the study on the impact of landfill management on public health and disease control in the Mtandire community of Lilongwe District. Data were collected through questionnaires, interviews, observations, and document reviews. The results are presented using tables and descriptive explanations to show the relationship between landfill management practices and the health conditions of residents living near landfill sites.

Demographic Characteristics of Respondents

The study collected demographic information to understand the background of the participants.

The results show that most respondents (36%) were between 26 and 35 years old, followed by 30% between 18 and 25 years. This indicates that the majority of participants were young adults who are actively involved in household and community activities.

the results of this study present the findings on landfill management practices and their impact on public health in the Mtandire community of Lilongwe District. Data were collected from community residents through questionnaires, interviews with public health officials, and field observations of landfill and waste disposal areas. The analysis focused on identifying common waste management practices, community awareness of health risks, environmental conditions around landfill sites, and the prevalence of diseases among residents living near these areas.

The study first examined the demographic characteristics of the respondents in order to understand the background of the participants involved in the research. The majority of respondents were young adults between the ages of 26 and 35 years, followed by those aged 18 to 25 years. A smaller proportion of respondents were aged between 36 and 45 years, while the least number of participants were aged 46 years and above. This distribution indicates that most respondents were active members of the community who are directly involved in household waste disposal and are therefore more likely to experience the environmental and health impacts associated with landfill management practices.

The findings also revealed important information about the waste disposal methods used by residents in the Mtandire community. The most common method of waste disposal reported by respondents was open dumping, which accounted for the largest percentage of responses. Many households dispose of their waste in nearby open areas due to the lack of accessible and reliable waste collection services. In addition to open dumping, some residents reported burning their waste as a way of reducing waste accumulation around their homes. A smaller number of

respondents indicated that they use formal waste collection services where available, while very few households reported practicing recycling or reusing waste materials. These results suggest that improper waste disposal practices are common in the community and contribute to environmental pollution.

Community awareness regarding the health risks associated with living near landfill sites was also examined in this study. The results showed that a majority of respondents were aware that improper waste disposal and poorly managed landfill sites can lead to various health problems. However, a significant proportion of residents indicated that they had limited knowledge about the specific health risks associated with waste accumulation and environmental pollution. This finding highlights the need for increased public awareness and education on proper waste management and environmental health issues within the community.

The study also investigated the types of diseases commonly experienced by residents living near landfill areas. According to the responses collected, malaria was the most frequently reported illness among households in the study area. This can be attributed to the presence of stagnant water and accumulated waste, which create suitable breeding grounds for mosquitoes. Other diseases reported by respondents included diarrhea, respiratory infections, and skin infections. These illnesses are commonly associated with poor environmental sanitation, contaminated water sources, and exposure to polluted air. The results therefore suggest a possible link between improper landfill management and the increased prevalence of certain diseases within the community.

Field observations conducted during the study provided additional evidence regarding the environmental conditions surrounding landfill and waste disposal sites in Mtandire. The researcher observed large amounts of uncollected waste in open spaces near residential areas. In many locations, waste materials were mixed together without any form of segregation, and some residents were observed burning waste in open areas. The presence of flies, mosquitoes, and rodents was also noted around waste disposal sites, indicating potential health risks for nearby residents. Furthermore, unpleasant odors and smoke from burning waste were commonly experienced in areas close to landfill sites. These environmental conditions contribute to poor living conditions and increase the likelihood of disease transmission within the community.

Interviews with public health officials and local authorities also revealed several challenges affecting effective waste management in the area. One of the main challenges reported was the limited availability of waste collection services and infrastructure. Local authorities indicated that the growing population in urban areas such as Mtandire has increased the amount of waste generated, making it difficult for existing waste management systems to keep up with demand. In addition, insufficient funding, lack of waste management equipment, and limited enforcement of environmental regulations were identified as major obstacles to proper landfill management.

Overall, the findings of this study indicate that improper landfill management in the Mtandire community has significant environmental and public health implications. The widespread use of open dumping and waste burning, combined with limited access to formal waste collection services, contributes to

environmental pollution and creates conditions that promote the spread of disease vectors. Although some residents are aware of the health risks associated with landfill sites, many still lack sufficient knowledge and resources to adopt safer waste disposal practices. These results highlight the need for improved waste management systems, stronger regulatory enforcement, and increased community education to reduce the negative impacts of landfill sites on public health.

DISCUSSION

This study aimed to explore the impact of landfill management on public health and disease control in the Mtandire community of Lilongwe District. The findings from the results section indicate that improper waste disposal practices, limited waste management infrastructure, and low levels of community awareness contribute significantly to environmental pollution and increased health risks among residents living near landfill sites. The discussion interprets these findings and relates them to existing literature on waste management and public health.

One of the major findings of this study is that open dumping is the most common waste disposal method used by residents in the Mtandire community. This practice is largely influenced by the limited availability of formal waste collection services. Many households reported disposing of waste in nearby open areas because regular waste collection is either unavailable or unreliable. This finding is consistent with previous studies that highlight poor waste management systems as a major challenge in many developing countries. According to research conducted in several urban communities in Sub-Saharan Africa, open dumping remains one of the most common methods of waste disposal due to inadequate infrastructure and limited financial resources for

municipal waste management programs. The widespread use of open dumping increases environmental pollution and exposes communities to various health risks.

The study also revealed that some residents burn waste as a method of reducing waste accumulation around their homes. Although this practice may temporarily reduce visible waste, it contributes to air pollution and increases the risk of respiratory illnesses. This observation supports earlier findings by environmental health researchers who emphasize that open burning of waste releases harmful gases and toxic particles into the air. These pollutants can cause respiratory infections, eye irritation, and other health problems among individuals living near waste disposal areas.

Another important finding of the study relates to the prevalence of diseases among residents living near landfill sites. Malaria was identified as the most frequently reported illness among households in the study area. This can be explained by the presence of stagnant water and accumulated waste around landfill sites, which create ideal breeding conditions for mosquitoes. Similar findings have been reported in other studies examining the relationship between poor environmental sanitation and vector-borne diseases. Research has shown that poorly managed landfill sites often become breeding grounds for mosquitoes, flies, and rodents, which are known to transmit various diseases.

In addition to malaria, other health problems reported by respondents included diarrhea, respiratory infections, and skin infections. These diseases are commonly associated with poor sanitation, contaminated water sources, and exposure

to environmental pollution. Previous research has established that landfill sites without proper management systems can contaminate nearby water sources through the leakage of harmful substances. When residents rely on contaminated water for drinking and household use, they are more likely to experience waterborne diseases such as diarrhea and cholera. The findings of this study therefore support the existing body of literature that links improper landfill management to increased risks of infectious diseases.

Community awareness regarding the health risks associated with landfill sites was also examined in this research. The results indicated that while some residents are aware that waste accumulation can cause health problems, a significant portion of the population lacks detailed knowledge about the specific health risks involved. This finding highlights the importance of community education and awareness programs in improving waste management practices. Previous studies have shown that when communities are properly educated about environmental health risks, they are more likely to adopt safer waste disposal practices such as waste segregation, recycling, and proper waste storage. The field observations conducted during the study further confirmed the presence of environmental conditions that contribute to poor public health outcomes. The accumulation of waste in open spaces, lack of waste segregation, and presence of disease vectors such as flies and rodents were commonly observed in areas near landfill sites. These environmental conditions are consistent with findings reported in earlier studies that describe poorly managed landfill sites as major sources of environmental contamination. The presence of unpleasant odors and smoke from burning waste also affects the quality of life for residents living near these areas. Interviews with public health officials and local authorities revealed several

challenges affecting the effective management of landfill sites in the community. These challenges include insufficient funding for waste management programs, lack of waste collection vehicles, limited technical capacity, and weak enforcement of environmental regulations. Similar challenges have been documented in other developing countries where municipal authorities struggle to manage increasing volumes of waste due to rapid urbanization and population growth. Without adequate resources and infrastructure, it becomes difficult for local governments to implement effective waste management strategies.

The findings of this study therefore emphasize the need for improved waste management systems and stronger policy implementation. Strengthening waste management policies, investing in proper landfill infrastructure, and increasing funding for waste collection services are essential steps toward improving environmental conditions in the Mtandire community. In addition, promoting community participation in waste management initiatives can help reduce improper waste disposal practices and improve public health outcomes.

Overall, the results of this study are consistent with existing literature that identifies poor landfill management as a major environmental and public health challenge in many developing urban communities. The findings demonstrate that improper waste disposal practices, combined with limited infrastructure and low public awareness, contribute to environmental pollution and increase the risk of disease transmission. Addressing these issues requires a coordinated effort involving government authorities, public health institutions, and community members. By implementing sustainable waste management practices and improving community education, it is

possible to reduce the health risks associated with landfill sites and create safer living environments for residents in rapidly growing urban areas such as Mtandire.

CONCLUSION

The impact of landfill management on public health and disease control in the Mtandire community of Lilongwe District. The findings revealed that improper waste disposal practices and inadequate landfill management systems have significant environmental and health implications for residents living near landfill sites. The results showed that many households rely on open dumping and waste burning due to the limited availability of formal waste collection services. These practices contribute to environmental pollution and create conditions that support the spread of disease vectors such as mosquitoes, flies, and rodents.

The study also found that several health problems are common among residents living near landfill areas, including malaria, diarrhea, respiratory infections, and skin infections. These illnesses are closely associated with poor environmental sanitation, contaminated water sources, and exposure to polluted air caused by waste accumulation and burning. The presence of stagnant water, uncollected waste, and blocked drainage systems further increases the risk of disease transmission within the community.

In addition, the research revealed that while some residents are aware of the health risks related to improper waste disposal, a significant portion of the community lacks adequate knowledge about safe waste management practices. Limited community awareness, combined

with weak enforcement of waste management regulations and insufficient infrastructure, contributes to the persistence of unsafe waste disposal methods.

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