



RESEARCH ARTICLE

PUBLIC HEALTH IMPACTS OF IMPROPER SOLID WASTE MANAGEMENT IN JOS METROPOLIS, NIGERIA

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ABSTRACT

Inadequate solid waste management continues to pose a significant public health challenge in rapidly urbanizing cities across low- and middle-income countries. This study assessed the multidimensional public health impacts of improper solid waste management among residents of Jos metropolis, Nigeria. A cross-sectional survey design was adopted, involving 401 respondents selected through a multistage sampling technique. Data were analyzed using descriptive statistics. Findings revealed a high burden of waste-related diseases, such as cholera (17.4 percent), typhoid (14.9 percent), malaria and dengue fever (13.6 percent), and diarrhea (13.5 percent). Respiratory conditions such as asthma (11.0 percent) were linked to exposure from open waste burning. Psychological effects were also substantial, with social stigma (40.6 percent), sleep disorders (20.1 percent), as well as stress and anxiety (17.9 percent) being most prominent. Residents' demonstrated strong awareness of public health risks associated with improper waste management, particularly gastrointestinal diseases (87.5%) These diseases may no doubt, disrupt economic activities and increase healthcare costs. The study concludes that improper solid waste management in Jos Metropolis poses significant physical, psychological, and public health risks. It was recommended that strengthening urban waste management systems, integrating environmental and mental health considerations into public health planning, creating public awareness about the menace are essential for improving population health and achieving sustainable urban development.

Keyword: Health, solid waste, impact, waste management, diseases

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1.0. INTRODUCTION

Solid waste management remains both an environmental and public health challenge in many developing countries, particularly in urban centers in Nigeria. Rapid population growth, urbanization, and increased consumption have accelerated both the quantity and diversity of household solid waste generation (Ibrahim et al., 2021), particularly cities such as Jos metropolis. Meanwhile, existing waste management systems struggle to keep pace with these demands (Agbeni et al., 2025). Inefficiencies in waste collection, transportation, and final disposal have resulted in many residential areas being littered with refuse, contributing to insanitary conditions, blocking drainages system and environmental degradation (Wuyep et al., 2024). These conditions create an environment conducive to disease vector proliferation and pollute land and water resources, posing serious threats to community health and quality of life (Aluko et al., 2022).

Inadequate solid waste management has, been consistently linked to adverse physical health outcomes (Adeniyi, 2023). Studies conducted in Nigerian urban contexts have associated poor waste disposal with increased incidences of vector-borne and water-borne diseases, including malaria, typhoid, cholera, and other infectious conditions common around open dumpsites and stagnant refuse (Agbeni et al., 2025; Benjamin & Benjamin, 2023). These health effects are not confined to acute infections. Improper disposal and open burning of waste release noxious gases and particulate matter that aggravate respiratory health problems and contribute to long-term morbidity in affected populations.

Beyond physical health, emerging evidence indicate that exposure to poorly managed waste environments can influence psychological well-being. Persistent exposure to foul odors, unsightly waste heaps, and pest infestations often produces stress, anxiety, and diminished overall life satisfaction among community residents (Aluko et al., 2023). Although relatively under-studied in Nigeria compared to physical health outcomes, these psychosocial dimensions area increasingly recognized as important facets of how environmental risk exposures influence community health behaviour.

Perceptions of health risks associated with solid waste management influence both individual and community health behaviors, yet these perceptions remain poorly understood in many urban settings. While some residents recognize the link between improper waste practices and disease outcomes, others may disconnect environmental hazards from specific health consequences due to limited awareness, cultural beliefs, or adaptive coping strategies (Shimfe & Waiji, 2025). This variation in risk perception influences how people engage with public messaging, participate in waste disposal behaviors change interventions, and comply with environmental regulation.

In addition to health effects, poor solid waste management imposes socio-economic burdens on households and communities. The financial cost of treating waste-related illnesses, loss of productivity due to illness and reduced property value in polluted neighbourhoods can escalate economic hardship, especially among low-incomes urban residents (Benjamin & Benjamin, 2023). Although informal waste economies such as scavenging for recyclables- provide some income opportunities, they often operate outside regulatory frameworks and expose workers to health hazards without adequate protection or benefit.

Despite growing recognition that inadequate solid waste management negatively affects human health and socio-economic condition (Emesto & Atilio, 2024). However, much of the existing research in

Nigeria has physical environmental effects. Few studies have integrated multiples health dimensions, including physical health outcomes, psychological trauma, risk perceptions, and socio-economics implications, particularly in the context of household waste practices in a single, analytical framework. Similarly, there is limited localized empirical evidence from Jos metropolis, a rapidly urbanizing Nigeria city that captures these multidimensional impact concurrently, especially with respect to residents live experiences and perception.

2.0. Description of the Study Area

The study was conducted in Jos metropolis, located in Plateau State, North-Central Nigeria. The Metropolis lies between Latitudes 9°45' and 9° 55' N; and Longitudes 8°45' and 8°58' E (see Figure 1). The terrain is predominantly upland, underlain by Jurassic Younger Granite Formations. Jos experiences a bi-model climate, comprising a rainy season from April to October and a dry season from November to March. Mean annual rainfall ranges between 1,400 and 1,500 mm, while average temperatures during the wet season are about 22° C. Rapid urbanization, population growth, and diverse socio-economic activities within the metropolis have contributed to increased solid waste generation, making the area suitable for investigating household waste management practices.

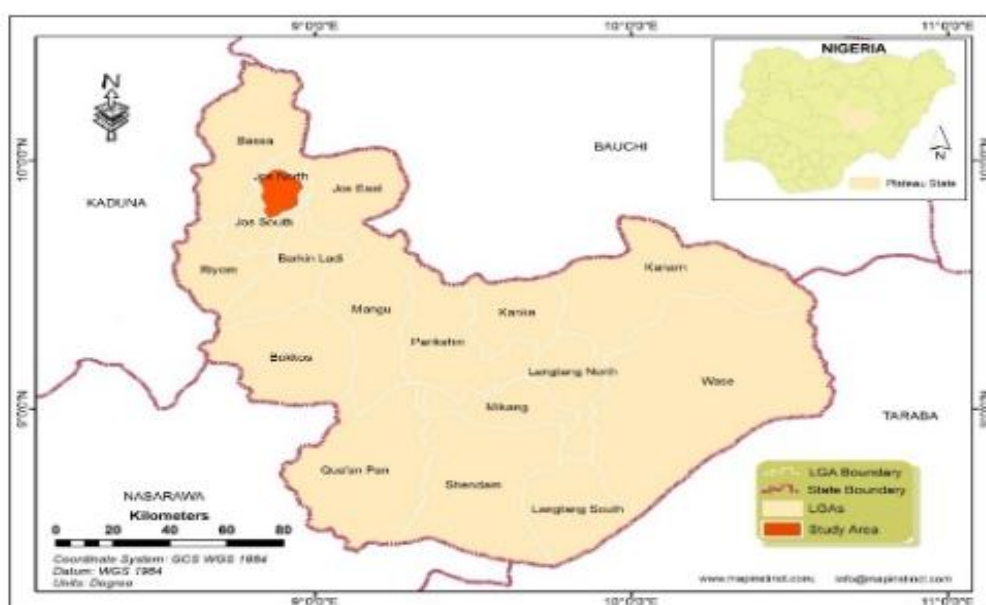


Figure 1: Map of Plateau State

Source: National Centre of Remote sensing, Jos (2019)

3.0. MATERIALS AND METHODS

A quantitative cross-sectional research design was adopted to examine the health impacts of poor solid waste management. The design was considered appropriate for capturing physical ailments and psychological trauma on residents, perceived public health effects of improper solid waste management, and perceived fatality risks using analysis of data collected at a point in time. The study population of household include Abattoir, Angwan–Daba, Angwan Rogo, Angwan -Rukuba, Dadinkowa, Gangare, Rantya, Rayfield, Rikkos and Tudun-wada. The sample size of 401 respondents

was determined using the Yamane (1967) Formula. A stratified sampling technique was employed to ensure proportional representation of respondents from Jos North and Jos South LGAs, followed by simple random sampling for respondents' selection within each stratum.

Data were primarily collected using semi-structured questionnaire, complemented by key informant interviews, and direct field observations. The questionnaire was subjected to expert validation and pilot testing to ensure clarity and reliability. Data collection was conducted over a three-week period, ensuring adequate coverage of the selected wards. Collected data were coded and analyzed using descriptive statistical techniques, including frequency counts, mean, and percentages, to address the study objectives. The analytical approach adopted enabled systematic interpretation of results. The results were presented in tables and charts

4.0. PRESENTATION OF RESULTS AND DISCUSSION

4.1. Presentation of Results

Ailments Associated with Improper Waste Management

Figure 2 has revealed some diseases associated with poor solid waste management among residents of Jos metropolis. Results showed that the common water- and vector-borne diseases were cholera (17.4 percent), typhoid (14.9 percent), malaria/dengue fever (13.6 percent) diarrhea (13.5 percent), and dysentery (13.2 percent). Respiratory conditions such as asthma (11.0 percent) and sinusitis (7.9 percent) were also reported, likely reflecting exposure to smoke from open waste burning. The presence of Lassa fever cases (8.5 percent) shows increased of rodent infestation linked to unmanaged waste.

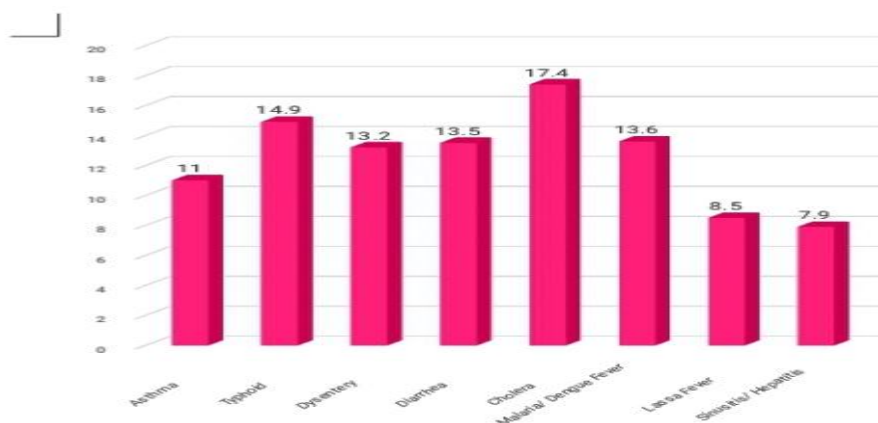


Figure 2: Ailments Associated with Improper Waste Management

Psychological Trauma of Improper Solid Waste Management

Figure 3 shows the psychological impacts of poor solid waste management in the study area. Results indicated that social stigma was the most commonly reported psychological effect, accounting for 40.6 percent. This indicates social discomfort and marginalization associated with living in poorly management of waste in environments. More so, sleep disorders (20.1 percent), stress and anxiety (17.9 percent), cognitive impairments (13.2 percent) and depression (8.1 percent) further demonstrated the mental health burden of prolonged exposure to unsanitary surrounding. Unpleasant offensive odors, coupled with smoke from burning waste can perpetuate fear of disease outbreaks among the residents.

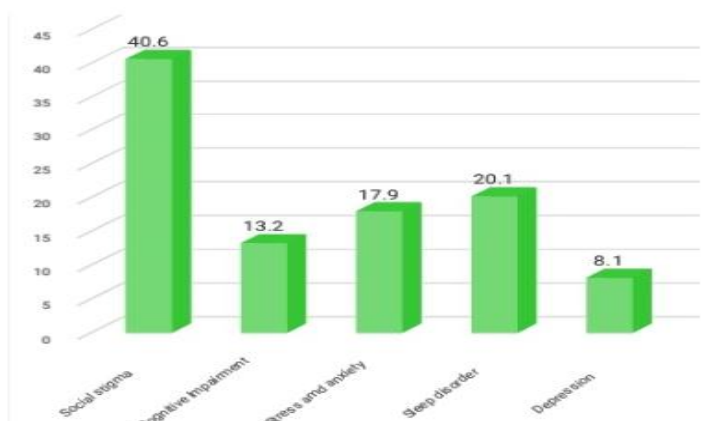


Figure 3: Psychological Trauma of Improper Solid Waste Management

Perceived Public Health Effects of Improper Solid Waste Management

Analysis of residents' perception on the public health effects of improper waste management was done and results are shown on Table 1. Results have shown that residents in the study area widely perceived solid waste management as a major threat to public health. The findings show a very high level of agreement among respondents across most of the identified health risks with a mean agreement of 79.1 percent, compared with 18.6 percent unsure, and only 2.3 percent disagreement. This indicates a strong public awareness of the health implications of poor waste disposal practices. Specifically, the majority of the residents agreed that improper waste management contributes to gastrointestinal diseases (87.5 percent), breeding of disease vectors ((87.0 percent), and aggravation of asthma due to waste burning (87.0 percent).

Table1: Perceived Public Health Effects of Improper Solid Waste Management

Effect	Agree	Unsure	Disagree
Gastro-intestinal diseases	351 (87.5)	45(11.2)	5(1.3)
Breeds disease vectors	349(87.0)	49(12.2)	3(0.8)
Burning waste aggravates asthma	349(87.0)	49(12.2)	3(0.8)
Burning waste soffucates	341(85.0)	49(12.2)	11(2.8)
Exposure to tetanus infection	332(82.8)	60(15.0)	9(2.2)
Increased hospital admissions	326(81.3)	50(12.5)	25(6.2)
Sharp objects may hurt scavengers	307(76.6)	82(20.4)	12(3.0)
Risks of disease outbreaks	267(66.6)	129(32.2)	5(1.2)
Risk of food poisoning	234(58.4)	158(39.4)	9(2.2)
Mean percentage	79.1%	18.6%	2.3%

Source: Authors' Analysis (2026).

Perceived Fatality Risks of Improper Solid Waste Management

Figure 4 displays the perceived fatality risks of improper solid waste management in Jos metropolis. The results showed that 58.3 percent strongly agree that the diseases related to improper waste disposal are deadly, 27.7 percent agreed, 10.5 percent were not sure, 2.0 percent disagreed, while 1.5 percent strongly disagreed. This pattern shows that about 86.0 percent of residents generally agreed that diseases associated with poor solid waste management can be deadly. A small minority (3.5 percent) disagreed, while 10.5% remains "not sure". The "not sure" category indicates a non-trivial

minority with uncertainty into awareness and action that need to be taken to address these unsanitary practices of waste management in the study area.

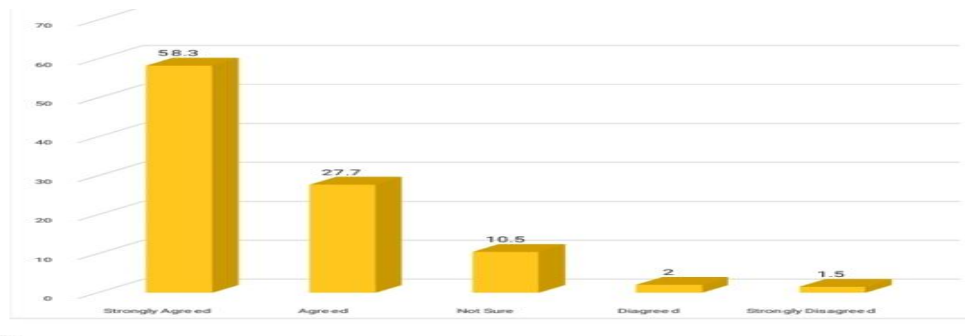


Figure 4: Perceived Fatality Risks of Improper Solid Waste Management

4.2. DISCUSSION OF FINDINGS

The findings from this study have revealed that improper solid waste management in Jos metropolis is associated with a complete set of public health impacts, consistent with emerging evidence from Nigeria and other urban settings in low – and middle-income countries. The high prevalence of water and vector-borne diseases such as cholera typhoid, malaria and environmental contamination help to foster the proliferation of pathogenic vectors and microbial hazards (Benjamin & Benjamin, 2023). These patterns align with findings from other Nigerian communities where poor waste disposal is correlated with increased disease burden and compromised environmental health conditions (Umoru & Nafinji, 2025).

Ndoeche (2026) reported the recent Lassa fever outbreak in Plateau State, which recorded 11 confirmed cases and four deaths. Similarly, Samuel on Tuesday 03 February this year (2026) reported the death of a senior resident Doctor attributed to Lassa fever at Bingham University Teaching Hospital, Jos North LGA. He lamented that healthcare workers were among those affected, highlighting the occupational risks posed when environmental conditions favor rodent proliferation and spread of pathogens. This sad event reinforces the findings that poor waste management and environmental sanitation contribute significantly to the transmission of solid waste-related infectious diseases that pose serious risks to both healthcare workers and the wider community.

Respiratory outcomes such as asthma reported by respondents are also consistent with recent literature showing that open burning of solid waste contributes to particulate air pollution and respiratory morbidity in urban populations (Olaboopo, 2024). The emergence of psychological effects, such as social stigma, stress, and sleep disturbances in the present study expands the understanding of waste management implications far beyond traditional physical health outcomes. While the psychological dimensions of waste exposure remain under-studied, evidence indicates that degraded environmental conditions place psychological stress on residents, influencing their overall well-being and community perceptions of safety and sanitation (Chhabra, Kaur, & Singh, 2023). This supports a broader environmental health perspective that recognizes psychological stressor as part of the public health burden associated with environmental degradation.

Residents strong perceptions of public health risks, particularly regarding gastro-intestinal diseases, vector breeding, and respiratory problems, reflect heightened environmental health awareness, as



trend observed in other Nigerian urban populations (Oladejo & Amosu, 2020). However, consistent with recent studies, awareness does not necessarily translate into improved practices in the absence of effective waste management infrastructure and enforcement mechanisms. Research on public perceptions in other Nigerian cities has similarly identified weak regulatory enforcement and limited civic engagement as barriers to sustainable sanitation outcomes.

5.0. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

Improper Solid Waste Management in Jos metropolis poses a significant public health challenge with interconnected physical, and psychological, effects. The study identified a high burden of waste-related communicable and respiratory diseases, alongside notable psychological distress among residents. Despite high awareness of health risks, continue exposure reflects systemic deficiencies in waste management system rather than knowledge gaps. These findings have shown that improper solid waste management is not merely environmental nuisance, but a significant public health concern requiring the need to recognize solid waste management as a core public health intervention essential for improving urban health outcomes and reducing preventable disease burden.

5.2. Recommendations

Considering the results and conclusion reached, this recommends as following.

1. Municipal Authorities should strengthen solid waste management systems through improved collection coverage, provision of appropriate disposal facilities, and enforcement of sanitation regulation.
2. Solid waste management should be integrated into urban public health planning with collaboration between environmental health officers and primary healthcare services to monitor.
3. Community-based waste management initiatives, including waste segregation and recycling, should be promoted to enhance sustainability and local participation.
4. Open waste burning should be discouraged through regular enforcement and provision of safer disposal alternatives and informal recycling activities should be regulated to protect residents.
5. Routine maintenance of drainage systems is essential to prevent flooding and related health risks
6. Public health education and risk communication should be sustained to reinforce safe waste practices.

Conflict of Interest

The authors declare that no conflict of interest exist in this manuscript.



Declaration of Artificial Intelligent (AI) USE

This manuscript was prepared through the combined contributions of all authors, including contributions to the study design, data, content development, results, interpretation, and related scholarly work. The authors acknowledge the use of ChatGPT (Open AI) to assist with grammar checking, language refinement, reference formatting. This AI-assisted tool was not used as authors and did not replace the intellectual contributions or scholarly judgment of the authors. All AI-assisted outputs, including content, references, and interpretations, were carefully reviewed, revised, verified, and approved by the authors. The authors accept full responsibility for the accuracy, integrity, and final content of the manuscript.

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