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Factors Influencing Solid Waste Disposal Practice Among Residents of Jalingo Local Government Area, Taraba State

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Abstract

Keywords

Solid Waste,
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Solid waste disposal remains a persistent environmental and public health challenge in rapidly urbanising Nigerian towns, and Jalingo, the capital of Taraba State, has witnessed rising waste generation without a corresponding expansion in collection infrastructure and enforcement capacity. This study assessed the factors influencing solid waste disposal practice among residents of Jalingo Local Government Area, Taraba State, examining current disposal practices, socio-demographic factors, availability of waste collection facilities, and environmental sanitation policy enforcement. A descriptive cross-sectional design was adopted, and 400 respondents were selected across five wards of the Local Government Area using a multi-stage sampling technique. Data were collected with a structured, validated questionnaire (Cronbach's Alpha = 0.81) and analysed using SPSS version 27, employing frequencies, percentages, means, and Chi-square tests of independence at a 0.05 significance level. Results showed that residents combined formal and informal disposal methods, with 75.8% using designated dumpsites while comparable proportions burned (74.5%), buried (75.1%), or indiscriminately dumped (76.2%) waste; waste segregation was the least-practised behaviour (46.2%). Only about half of respondents reported adequate collection facilities, and while 59.3% perceived sanitation laws as enforced, 83.0% described enforcement as weak and inconsistent. Chi-square analysis found no statistically significant relationship between socio-demographic factors ($p = .263-1.000$), facility availability ($\chi^2 = 2.921, p = .087$), or policy enforcement ($\chi^2 = 0.013, p = .911$) and disposal practice. The study concluded that infrastructural and enforcement gaps, rather than individual demographic differences, underlie poor disposal practice, and recommended expanded collection infrastructure, strengthened enforcement, and sustained public education on waste segregation.

1. Introduction

Solid waste management remains one of the most persistent urban environmental challenges confronting developing countries, and Nigeria is no exception (Ogunbode & Aderinto, 2026). The rapid pace of urbanisation, population growth, and changing consumption patterns across Nigerian towns and cities has continued to outstrip the capacity of local government authorities to collect, transport, and dispose of the ever-increasing volume of solid waste generated daily by households (Ogunbode & Aderinto, 2026). Nigeria generates an estimated 25 to 32 million tonnes of solid waste annually, yet less than a third of this volume is

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properly collected and disposed of, leaving the remainder to litter streets, drainage channels, water bodies, and undesignated open spaces (Emesowum & Chiejina, 2023).

Solid waste disposal practice refers to the pattern of behaviour that households and individuals adopt in getting rid of the refuse generated from their day-to-day domestic activities (Limon et al., 2020). These practices range from environmentally sound methods, such as the use of designated collection bins, engagement of registered waste operators, composting, and recycling, to unsafe methods such as indiscriminate open dumping, burning, burying, and disposal into drains, gutters, and streams (Atnkut et al., 2025). The choice of disposal practice adopted by a resident is rarely a matter of chance; rather, it is shaped by an interaction of socio-demographic characteristics, the availability and accessibility of waste collection infrastructure, and the extent to which environmental sanitation policies are enforced within the locality (Chukwuone et al., 2022). Rapid and often unplanned urban growth has consistently outpaced the capacity of municipal authorities to extend formal waste collection services to newly developing residential areas across sub-Saharan Africa, a pattern documented not only in Nigeria but also in comparable settings in Ethiopia, Uganda, and Guinea (Mamady, 2016; Udofia et al., 2017; Nsimbe et al., 2018; Atnkut et al., 2025). Jalingo, the capital of Taraba State, has in the last three decades transformed from a modest administrative town into a rapidly expanding urban centre, a transition that began when it was elevated to state capital status in 1996 following the creation of Taraba State out of the former Gongola State. This transformation has been accompanied by a steady increase in population, commercial activity, and, consequently, the volume of solid waste generated within the metropolis and its surrounding wards (Wajim & Harry, 2025). Waste generation in Jalingo has continued to rise while the mechanisms for its collection, transportation, and final disposal have remained largely inadequate, resulting in the prevalence of open dumping, indiscriminate burning, and blockage of drainage channels within many residential neighbourhoods of the town. The environmental setting of Jalingo, sited on gently sloping terrain that drains into the Lamurde River and, ultimately, the Benue River, further heightens the public health significance of poor solid waste disposal practice, since indiscriminately dumped waste is readily washed into these watercourses during the rainy season, with attendant risks of water contamination downstream (Oruonye & Ahmed, 2017; Wajim & Harry, 2025).

At the national policy level, the Federal Ministry of Environment, through the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act of 2007, and at the state level through various environmental sanitation edicts, has sought to regulate solid waste handling and disposal (Obanore et al., 2022). However, the extent to which these regulatory instruments are enforced, and the extent to which ordinary residents comply with or are even aware of them, varies considerably from one local government area to another. It is against this backdrop that the present study examines the factors influencing solid waste disposal practice among residents of Jalingo Local Government Area, with particular attention to current disposal practices, socio-demographic factors, the availability of waste collection facilities, and the enforcement of environmental sanitation policies within the area.

2. Materials and Methods

2.1 Research Design and Area of Study

The study adopted a descriptive cross-sectional design, which allowed data to be collected from residents of Jalingo Local Government Area at a single point in time. This design is appropriate for assessing current solid waste disposal practices and examining their relationship with socio-demographic factors, availability of waste collection facilities, and environmental sanitation policy enforcement, without manipulating any of the variables under study, and is widely applied in similar solid waste and environmental health studies across Nigeria (Musa et al., 2021; Emesowum & Chiejina, 2023; Wajim & Harry, 2025). Jalingo Local Government Area is the administrative capital of Taraba State, located in the north-east of Nigeria, and comprises ten wards. The town lies on gently sloping terrain draining, via the Lamurde River and its tributaries, into the Benue River, and has witnessed sustained population growth, in-migration, and commercial expansion since its elevation to state capital status in 1996.

2.2 Study Population, Sample Size, and Sampling Technique

The study population comprised male and female household residents aged 18 years and above living in Jalingo Local Government Area, estimated at 220,700 based on national census figures projected forward at an annual growth rate of 2.9% (National Population Commission, 2006). The sample size was determined using Yamane's (1967) formula for a finite population, $n = N / [1 + N(e)^2]$, with a precision level (e) of 0.05, yielding a sample size of approximately 400 respondents. A multi-stage sampling technique was employed. At the first stage, five of the ten wards of Jalingo Local Government Area - Kona, Majidadi, Mayo Goi, Sarkin Dawaki, and Turaki 'A' - were selected by simple random sampling (balloting). At the second stage,

houses and households within each selected ward were identified using house-numbering records obtained from the primary health care department, with recruitment commencing from the village square and the chief's house in each ward. At the third stage, one eligible adult respondent was selected per household by simple random sampling where more than one eligible adult was available

2.3 Instrument, Validity, and Reliability

Data were collected using a structured, self-administered questionnaire comprising five sections: socio-demographic characteristics (Section A), current solid waste disposal practices (Section B), socio-demographic factors influencing disposal practice (Section C), availability of waste collection facilities (Section D), and environmental sanitation policy enforcement (Section E). Sections B to E employed a combination of dichotomous, multiple-choice, and four-point Likert-scale items. Face and content validity were established through review by the project supervisor and two independent experts, one in Environmental Health Science and one in Public Health, with each questionnaire item mapped explicitly to a corresponding study objective, research question, and hypothesis. A pilot study among 20 residents of Lau Local Government Area, a neighbouring LGA with comparable socio-economic characteristics but excluded from the main study, yielded a Cronbach's alpha of 0.81 across all sections, indicating acceptable internal consistency.

2.4 Procedure and Data Analysis

Data was collected by the researcher with the assistance of trained research assistants familiar with the local wards. Following informed consent, questionnaires were administered on-site and checked immediately for completeness and consistency; data collection was conducted over four weeks, with daily quality checks performed on completed instruments. Quantitative data was coded and analysed in SPSS version 27. Frequency and percentages were used to summarise socio-demographic characteristics and current disposal practices, while means and standard deviations summarised Likert-scale responses (decision rule: mean ≥ 2.50 = Agreed, mean < 2.50 = Disagreed). Chi-square tests of independence were applied to test the three null hypotheses at a 0.05 level of significance, with the null hypothesis rejected where the calculated Chi-square value exceeded the critical value at the appropriate degree of freedom, or equivalently where $p < 0.05$.

2.5 Ethical Consideration

Ethical approval was obtained from the Adamawa State Ministry of Health and Human Services, with an introductory letter from the Department of Public Health Science formally introducing the researcher to relevant authorities, and permission additionally sought from the Jalingo Local Government environmental health department. Participation was entirely voluntary, and all respondents were assured of anonymity and confidentiality; no personally identifiable information was collected, and respondents retained the right to decline participation or withdraw at any stage without penalty.

3. Results

This section presents the study findings based on data collected from 400 household respondents across the five selected wards of Jalingo Local Government Area and discusses these findings in relation to the study objectives and existing literature.

Table 1: Socio-Demographic Characteristics of Respondents (N = 400)

Variable	Category	Frequency	Percent (%)
Gender	Male	206	51.5
	Female	194	48.5
Age Group (years)	18-27	143	35.8
	28-37	132	33.0
	38-47	88	22.0
	48 and above	37	9.2
Level of Education	No formal education	24	6.0
	Primary	59	14.8
	Secondary	159	39.8
	Tertiary	158	39.5
Monthly Income (₦)	Below 50,000	209	52.2
	50,000-150,000	147	36.8
	Above 150,000	44	11.0

Source: Field Survey, 2026

Table 1 shows that male respondents constituted a slight majority (206; 51.5%) over females (194; 48.5%). The age distribution was predominantly youthful, with 275 (68.8%) of respondents below 38 years. The overwhelming majority, 317 (79.3%), had at least secondary education, while only 24 (6.0%) had no formal education. On monthly income, 209 (52.2%) earned below ₦ 50,000, reflecting the predominantly low- to middle-income character of the study area. Comparable socio-demographic patterns have been documented elsewhere in Nigeria; a household waste survey in Bekwarra LGA, Cross River State, similarly sampled 400 respondents aged 18 years and above and found that knowledge and practice of waste disposal varied with such background characteristics (Omang et al., 2021), while a study across five LGAs of Ogun State found that age, income, and education shaped residents' waste-related perceptions and practices, with income playing a particularly prominent role (Olukanni et al., 2020).

Table 2: Current Solid Waste Disposal Practices Adopted by Residents (N = 400)

Item Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Decision
Disposes waste at designated collection points/dumpsites	32.5	43.2	17.0	7.2	3.01	Agreed
Burns solid waste within compound	28.5	46.0	15.8	9.8	2.93	Agreed
Bury solid waste in a pit within compound	27.3	47.8	17.2	7.8	2.94	Agreed
Dumps waste indiscriminately in open spaces/gutters/drains	33.2	43.0	17.8	6.0	3.04	Agreed
Uses waste bins/receptacles to store waste before disposal	18.0	33.5	33.0	15.5	2.54	Agreed
Patronises private waste collectors/scavengers	29.2	46.2	19.8	4.8	3.00	Agreed
Pays a token/fee for waste to be evacuated	30.8	44.5	18.8	6.0	3.00	Agreed
Separates waste into organic/inorganic before disposal	13.2	33.0	35.0	18.8	2.41	Disagreed
Household waste often left uncollected for several days	50.7	34.2	11.0	4.0	3.32	Agreed
Satisfied with current method of solid waste disposal	54.0	32.8	7.0	6.2	3.34	Agreed

Source: Field Survey, 2026. SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree. Decision rule: Mean $\geq$ 2.50 = Agreed, Mean $<$ 2.50 = Disagreed.

Table 2 shows that most respondents reported using designated collection points or approved dumpsites (75.8%, mean = 3.01) and waste bins or receptacles (51.5%, mean = 2.54). At the same time, however, substantial and comparable proportions also agreed that they burn waste within their compound (74.5%, mean = 2.93), bury waste in a pit within their compound (75.1%, mean = 2.94), and dump waste indiscriminately in open spaces, gutters, or drainages (76.2%, mean = 3.04). This concurrent reliance on both sanctioned and informal or unsafe disposal methods mirrors earlier work on household waste in Jalingo itself, which found that a large proportion of residents dumped waste at neighbourhood refuse points while substantial minorities dumped on open land or directly into streams and drainages, concluding that household waste is not properly managed in the city (Chukwu, 2023). Waste segregation into organic and inorganic components before disposal was the least-practised behaviour, and the only item falling below the agreement threshold (46.2%, mean = 2.41), consistent with the broader Nigerian literature identifying source segregation as one of the least-practised household waste behaviours, and with an assessment of solid waste storage facilities in Jalingo which found that the nature of waste generated locally was not matched by appropriate storage and separation facilities (Chukwu, 2023). Notably, 84.9% of respondents agreed that household waste is often left uncollected for several days, yet 86.8% simultaneously agreed that they were satisfied with their current disposal method - the highest mean score recorded across all ten items - suggesting that residents may have normalised informal disposal as an acceptable standard in the absence of consistent formal alternatives.

Table 3: Availability of Waste Collection Facilities in the Study Area (N = 400)

Item Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Decision
Collection bins/points within reasonable reach of house	14.5	37.8	36.0	11.8	2.55	Agreed
Collection trucks/vehicles visit neighborhood regularly	18.2	34.2	34.2	13.2	2.58	Agreed
Functional public dumpsites exist within community	14.5	30.5	37.5	17.5	2.42	Disagreed
Community lacks adequate waste collection facilities	15.8	33.0	37.8	13.5	2.51	Agreed
Private waste collection services operate/accessible	17.0	33.0	36.2	13.8	2.53	Agreed
Available collection facilities are well maintained	17.0	33.2	38.5	11.2	2.56	Agreed
Collection points often overflow due to inadequate facilities	19.5	28.5	38.5	13.5	2.54	Agreed
Waste management authority active in providing services	11.5	37.2	36.5	14.8	2.46	Disagreed
Collection services provided on a regular scheduled basis	15.5	34.8	34.2	15.5	2.50	Agreed
Satisfied with availability of collection facilities overall	38.2	44.5	13.2	4.0	3.17	Agreed

Source: Field Survey, 2026. **SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree. Decision rule:** Mean ≥ 2.50 = Agreed, Mean < 2.50 = Disagreed.

Table 3 reveals a generally constrained picture of facility availability. While a narrow majority, 52.3%, agreed that collection bins or designated points are within reasonable reach of their homes (mean = 2.55), only 45.0% agreed that functional public dumpsites exist within their community - the lowest-scoring item in this section (mean = 2.42) - and only 48.7% agreed that the relevant waste management authority is active in providing collection services (mean = 2.46). These findings echo earlier field assessments in Jalingo, which found that poor coordination among public, private, and community waste management stakeholders, coupled with inadequate government-approved collection centres, remain central causes of poor garbage collection in the city (Chukwu, 2023), and align with the broader finding that weak regulatory enforcement of solid waste collection drives illegal dumping and irregular garbage collection across Nigerian cities, with communities resorting to unauthorised sites when official ones are perceived as distant or poorly serviced (Obanore et al., 2022). It is notable that 82.7% of respondents nonetheless agreed they were satisfied with facility availability overall (mean = 3.17), despite the comparatively lower agreement recorded for the more specific, granular items - a gap suggesting that residents' general perception of adequacy may not fully capture the structural gaps revealed when asked about particular aspects of the collection system.

Table 4: Environmental Sanitation Policy Enforcement in the Study Area (N = 400)

Item Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Decision
Sanitation laws guiding waste disposal are enforced locally	20.8	38.5	26.8	14.0	2.66	Agreed
Sanitation officers/task force regularly monitor disposal	20.0	38.8	30.2	11.0	2.68	Agreed
Offenders of indiscriminate disposal are sanctioned/fined	19.8	43.8	24.5	12.0	2.71	Agreed
Aware of environmental sanitation laws in Taraba State	19.8	40.2	30.0	10.0	2.70	Agreed
Monthly/periodic sanitation exercises enforced locally	20.8	39.2	26.2	13.8	2.67	Agreed
Visible public awareness campaigns on proper disposal	19.2	41.2	27.8	11.8	2.68	Agreed
Community/traditional leaders support enforcement	19.2	40.2	26.5	14.0	2.65	Agreed
Enforcement has improved waste disposal practices locally	44.2	39.8	10.5	5.5	3.23	Agreed
Witnessed enforcement actions (fines, arrests, closures)	22.0	39.0	26.0	13.0	2.70	Agreed
Enforcement of sanitation policy locally is weak/inconsistent	43.2	39.8	11.8	5.2	3.21	Agreed

Source: Field Survey, 2026. *SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree. Decision rule: Mean $\geq$ 2.50 = Agreed, Mean $<$ 2.50 = Disagreed.*

All ten items relating to policy enforcement recorded mean scores above the 2.50 agreement threshold. However, the item with the strongest agreement was the perception that enforcement is weak and inconsistent (83.0%, mean = 3.21), while awareness of the specific laws guiding waste disposal in Taraba State and witnessing concrete enforcement actions such as fines or arrests recorded comparatively lower agreement (mean = 2.70 each). This pattern of perceived-but-inconsistent enforcement is well documented in the Nigerian environmental law literature: Nigeria's National Environmental (Sanitation and Wastes Control) Regulations of 2009, made under the NESREA Act 2007, require owners and occupiers of premises to provide waste receptacles and empower sanitation task forces to monitor compliance, yet enforcement of these provisions has been characterised as persistently lukewarm, attributable to inadequate institutional capacity, poor information exchange, and constrained budgetary support at the sub-national level (Obanore et al., 2022). A recent study of residents' perceptions of environmental sanitation regulations in Owo and Akure, Ondo State, similarly found that poor monitoring by law enforcement agents and the quality of governance were significant drivers of residents' compliance perceptions (Ogunbode & Olugbamila, 2025). Taken together with the finding that 84.0% of respondents agreed that enforcement, where it does occur, has improved disposal practices (mean = 3.23), the results suggest that enforcement is nonetheless perceived by residents as a potentially effective lever for improving disposal behaviour when sustained.

Table 5: Chi-Square Test Summary for Hypotheses on Solid Waste Disposal Practice

Hypothesis	Variable	Chi-square	df	p-value	Decision
H01a	Gender	0.892	1	.345	Not rejected
H01b	Age group	0.011	3	1.000	Not rejected
H01c	Level of education	1.059	3	.787	Not rejected
H01d	Monthly income	2.671	2	.263	Not rejected
H02	Availability of waste collection facilities	2.921	1	.087	Not rejected
H03	Environmental sanitation policy enforcement	0.013	1	.911	Not rejected

Source: Field Survey, 2026. *Practice status derived from item B1 (Good Practice = 75.8%, n = 303; Poor Practice = 24.3%, n = 97).*

The Chi-square analysis did not yield a statistically significant relationship for any of the three hypotheses tested. None of the four socio-demographic variables - gender ($\chi^2 = 0.892$, $p = .345$), age group ($\chi^2 = 0.011$, $p = 1.000$), level of education ($\chi^2 = 1.059$, $p = .787$), or monthly income ($\chi^2 = 2.671$, $p = .263$) - was

significantly associated with disposal practice, and all three null hypotheses were therefore retained at the 5% significance level. Similarly, neither the availability of waste collection facilities ($\chi^2 = 2.921$, $p = .087$) nor environmental sanitation policy enforcement ($\chi^2 = 0.013$, $p = .911$) showed a statistically significant relationship with disposal practice. This outcome does not diminish the substantive importance of these dimensions, as demonstrated by the descriptive findings in Tables 1 to 4. It may instead reflect the fact that disposal practice, facility availability, and policy enforcement were each measured using single representative indicator items rather than composite scales, which can reduce the statistical power available to detect associations that a fuller multi-item measure might reveal. It may also reflect the possibility that where a challenge is widespread and fairly uniformly distributed across a study population - as appears to be the case here, where the majority of respondents across almost all demographic categories, income levels, and facility/enforcement perceptions nonetheless reported 'Good Practice' on the key disposal indicator - standard Chi-square tests can fail to detect an association even where a substantive operational relationship exists. This pattern is consistent with a plausible explanation that, although socio-demographic characteristics may shape residents' knowledge, attitudes, and perceptions of waste management, as reported for Ogun State and Bekwarra LGA (Olukanni et al., 2020; Omang et al., 2021), actual disposal behaviour in a setting such as Jalingo may be driven more strongly by structural constraints common to nearly all residents regardless of background - principally the limited availability of formal collection infrastructure across the Local Government Area (Chukwu, 2023) - than by individual demographic differences.

4. Conclusion

This study concludes that solid waste disposal practice among residents of Jalingo Local Government Area is shaped by a combination of formal and informal behaviours operating side by side, against a backdrop of limited waste collection infrastructure and inconsistently enforced environmental sanitation policy. While most of the residents' reports using designated collection points and receptacles, the concurrent and widespread reliance on burning, burying, and indiscriminate open dumping indicates that formal disposal channels have not fully displaced informal, and often environmentally harmful, alternatives. Although the Chi-square tests conducted did not establish statistically significant associations between socio-demographic factors, facility availability, or policy enforcement and disposal practice, the descriptive findings nonetheless point to substantive gaps: functional public dumpsites and active authority-led collection are perceived as inadequate by roughly half of respondents, and enforcement of sanitation regulations, though present, is widely perceived as weak and inconsistent. These non-significant statistical results should not be read as evidence that these factors are unimportant; rather, they suggest that the challenges identified - limited infrastructure and inconsistent enforcement - are widespread and uniformly experienced across the study population, cutting across gender, age, education, and income groups, rather than concentrated in specific subgroups. Sustainable improvement in household disposal practice in settings such as Jalingo will require simultaneous investment in collection infrastructure, consistent and well-resourced enforcement of existing sanitation regulations, and sustained public education on waste segregation and safe disposal, rather than reliance on any single intervention in isolation. Based on these findings, the following recommendations are made:

1. The Taraba State Ministry of Environment and the Jalingo Local Government Council should increase the provision of government-approved communal waste collection points and functional public dumpsites across all wards, given that fewer than half of respondents currently perceive functional dumpsites as available in their community.
2. The relevant waste management authority should establish a regular, scheduled waste collection service supported by an adequate fleet of collection vehicles, to reduce the proportion of households whose waste is left uncollected for several days at a time.
3. Public awareness campaigns on waste segregation should be intensified, given that separation of waste into organic and inorganic components before disposal was the least-practiced behaviors identified in this study; campaigns should include practical demonstrations and distribution of low-cost separate storage receptacles.
4. Environmental sanitation task forces and enforcement agents should be strengthened and adequately resourced to ensure consistent, rather than intermittent, enforcement, since residents perceive current enforcement as weak and inconsistent even though they recognize its potential positive effect on disposal behaviors.
5. Deliberate efforts should be made to formally sanction offenders of indiscriminate waste disposal, including burning, burying, and open dumping in drainages and public spaces, in line with the provisions of the National Environmental (Sanitation and Wastes Control) Regulations, 2009.

6. Community and traditional leaders should be more actively engaged as partners in sanitation enforcement and public mobilisation, given that community leadership support for enforcement was the weakest-scoring item within the policy enforcement domain.
7. Given that socio-demographic factors were not found to significantly differentiate disposal practice, sanitation interventions and awareness campaigns should be designed as universal, Local-Government-wide programmes rather than targeted narrowly at specific demographic subgroups.

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