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# Factors affecting solid waste management among residents in Ilorin south local government area, Kwara State, Nigeria

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## ABSTRACT

*The study examined factors affecting solid waste management among residents in Ilorin South Local Government Area of Kwara State, Nigeria. The population of the study comprises of all the residents of Ilorin South Local Government Area of Kwara State. The research design used for the study was a descriptive cross-sectional survey which involved the use of a multi-stage sampling technique to choose 200 respondents participated in the study through the use of a structured questionnaire. The reliability of the instrument for the study was established using test-retest method. The reliability coefficient of 0.84 was obtained using Pearson Product Moment Correlation Coefficient. Frequency counts and the percentage were used to analyse demographic data of the respondents while inferential statistics of chi-square was used to analyse the result of the stated hypotheses at 0.05 alpha level. The result of the findings revealed that inadequate funding, poverty and inadequate sanitation facilities contributed significantly to the problem of solid waste management in Ilorin South Local Government Area of Kwara State, Nigeria. The study recommends that Government and non-government organization should provide sanitation facilities to residents of Ilorin South Local Government to make it easy for them to manage their solid waste effectively.*

**Keywords**: Solid waste management, Sanitation facilities, inadequate funding.

## INTRODUCTION

Solid waste generation is an inevitable consequence of human activities that entail the utilisation of natural resources, either directly or indirectly. The generation of solid waste has exhibited a consistent upward trend throughout time, mostly due to worldwide transformations linked to several causes including population growth, consumer patterns, and industrial advancements. Solid trash is a prevalent presence in various locations, particularly in densely populated urban areas throughout the country (Adedibu, 1988). The generation of solid waste is a consequence of the exponential growth in population, extensive urbanisation, and shifts in societal patterns and behaviours. The rise in population and income levels leads to a corresponding increase in the production of products and services, resulting in the release of effluents into the environment. Waste can be defined as any material that lacks direct value to the producer and hence necessitates disposal. In a similar vein, waste might be defined as any substance that is

discarded due to being deemed undesirable (Ita, 2003). According to Okecha (2000), solid wastes encompass the entirety of waste materials resulting from human and animal activities, typically in a solid state, which are abandoned due to their perceived lack of value or desirability. Solid wastes are the residual outputs generated from industrial processes or materials that may be legally mandated for disposal. Solid waste can be categorised using various criteria, including its origin, potential impact on the environment, usefulness, and physical characteristics. According to the source, solid wastes can be categorised into three main types: Municipal Solid Wastes, Industrial Solid Wastes, and Agricultural Solid Wastes. Currently, metropolitan areas in Nigeria are grappling with the challenge of effectively managing the increasing accumulation of solid garbage within their surroundings. The serene and secure strategic locations are currently being encroached upon by the disorderly presence of unmanaged and excessive accumulations of solid garbage originating from various sources such as households, kitchens, marketplaces, retail areas, and commercial establishments.

Waste management encompasses the utilisation of various methodologies to assure the systematic implementation of activities related to the collection, transportation, compaction, treatment, and final disposal of waste materials. Waste management can be characterised as a systematic approach aimed at efficiently regulating the generation, storage, retrieval, transportation, treatment, and final disposition or use of waste, with the objective of ensuring sanitary, aesthetically pleasing, and cost-effective practises. According to Uchegbu (1998), waste management encompasses a comprehensive range of activities, including administrative, financial, legal, and planning duties, in addition to the physical components of garbage processing, trash management encompasses the treatment and handling of many forms of trash, including rubbish, sewage, and other byproducts resulting from human activity, with the aim of safeguarding human health and preserving the environment. The approaches employed in the management of solid waste encompass waste reduction, reuse, and recycling. The 3R's of waste management, as identified by Oreyomi (1998), are commonly referred to as such. According to Ogundele (2004), the concept of solid waste management encompasses many activities such as the collection, storage, transportation, processing, and disposal of solid waste. These activities are carried out in accordance with established standards of public health, conservation, aesthetics, and environmental considerations. Solid waste management encompasses the comprehensive management and handling procedures involved in the proper treatment and disposal of solid waste items, starting from their creation at the sources. The act of disposing rubbish outside of residential premises is a prevalent practise among individuals residing in rural areas. Notably, this practise is not limited to rural settings, as it also manifests in metropolitan environments. Solid waste management is a significant environmental health concern in both urban and semi-urban areas globally, including Nigeria. There is a growing recognition among the general populace regarding the inherent hazards associated with insufficient mechanisms for solid waste disposal. The current situation entails that the issue of solid waste management is closely linked to the high population density and the resulting accumulation of solid waste, which in turn increases the risk of pathogenic exposure to humans. The primary objective of solid waste

management is to enhance public health and mitigate the prevalence of diseases by implementing efficient waste management practises (Ogundele, 1997).

According to the World Bank (2019), there is a consensus that trash generation rates are increasing globally. In the year 2016, urban areas across the globe produced a total of 2.01 billion metric tonnes of solid garbage, resulting in an average per capita daily waste generation of 0.74 kilogrammes. Due to the phenomenon of rapid population expansion and urbanisation, it is projected that the annual production of garbage would see a significant surge of 70% from the levels observed in 2016, reaching a staggering 3.40 billion tonnes by the year 2050. Residents of developing countries, particularly the urban poor, have a greater degree of adverse effects from inadequately managed trash in comparison to individuals residing in developed nations. In low-income nations, a significant proportion exceeding 90% of waste is sometimes disposed of in unregulated landfills or openly incinerated. These practises have significant implications for health, safety, and the environment. Inadequately regulated waste management practises create favourable conditions for the proliferation of disease vectors, exacerbate global climate change by facilitating methane production, and may even foster urban violence. The effective management of garbage is a crucial aspect in the establishment of sustainable and habitable urban areas; nonetheless, numerous developing nations and cities continue to face significant challenges in this regard.

Numerous urban centres across Africa, Asia, and Latin America encounter significant challenges in effectively managing their garbage disposal systems. Two significant challenges that arise are the inadequate gathering and the ultimate disposal of waste materials. Despite allocating a growing amount of resources, numerous cities, notably in Africa and Asia, fail to effectively manage waste collection, resulting in the collection of less than 50% of the total waste created. The majority of waste is commonly disposed of in open dumps, where it is either put on unoccupied property or incinerated by individuals in their residential backyards. The inadequate gathering and improper disposal of waste contribute to substantial pollution issues and pose threats to both human health and the environment. A significant proportion of the global population residing in impoverished communities and slums, estimated to exceed one billion individuals, face a lack of access to adequate waste management services. The management of garbage tends to deteriorate further due to the high population expansion and urbanisation observed in many places (World Institute for Development Economics Research, 2010). The study conducted by Abdulraheem, Ologele, Suleiman, Ogwu, Umar, and Oyewole (2020) revealed that a significant portion of household waste in Abuja, encompassing waste generated by businesses, shops, offices, and various institutions such as hospitals, hotels, and restaurants, as well as construction and demolition waste, is either deposited on the streets or illegally discarded on open plots or released into nearby water bodies. This improper waste management practise leads to the obstruction. Samuel and Olamide (2016) investigated issues associated with solid waste management and environmental sanitation in the Ibadan North Local Government area of Oyo State, Nigeria. The study focused on gathering insights from various stakeholders involved in these processes. The findings indicated that the study area was affected by various factors that hindered solid

waste management and environmental sanitation. These factors included financial constraints, insufficient workforce and welfare support, inadequate provision of health services, unfavourable attitudes, inadequate maintenance of equipment, improper waste disposal practises, and the absence of planned urban structures (Samuel & Olamide, 2016). One of the prominent environmental and public health concerns in Nigeria presently pertains to the matter of solid waste generation and disposal. The issue of solid waste management is deeply rooted in history, as the generation of garbage is inherently intertwined with human existence. The issue is becoming increasingly challenging as numerous cities in developing nations struggle to cope with the rapid urbanisation, escalating pollution levels, and the growing output of waste resulting from shifting lifestyle choices and consumption habits. It is anticipated that governmental entities will eventually develop strategies to address solid waste management, thereby mitigating the adverse effects on local inhabitants and improving the public view of urban areas as unclean, disorderly, and marked by decomposing rubbish that emits noxious odours detrimental to human health. The inadequate management of solid waste within the designated study area is a significant factor contributing to the prevailing health difficulties experienced by the local population in said area.

The inadequate management and disposal of solid waste pose a significant issue, as it is linked to elevated rates of illness and death in numerous urban areas (World Institute for Development Economics Research, 2010). Due to sporadic implementation of environmental cleanliness initiatives, residents engage in indiscriminate disposal of solid waste materials. According to environmental specialists, the practise in question carries significant risks and poses a harm to the well-being of the residents in the area under investigation. The lack of effective enforcement by pertinent entities in addressing the issue of indiscriminate rubbish disposal on streets and highways highlights a significant failing in upholding current environmental sanitation legislation. Due to inadequate management of the garbage collection system, individuals have resorted to disposing of waste in locations of their choosing. Consequently, this practise has resulted in significant environmental contamination, so compromising the well-being of the populace. The irregular and unpremeditated disposal of solid trash, particularly during night-time hours, frequently constitutes a flagrant breach of applicable regulations. There exists a significant disparity in the processes of policy formation, execution, and implementation within urban areas in Nigeria.

The enormity of the solid waste issue in Ilorin South Local Government Area in Kwara State is difficult to fully grasp. The absence of public waste containers is due to the significant volume of rubbish generated within a short period, beyond the capacity of waste collectors to handle within a single day. The waste disposal sites within the designated research region are situated beside the highways, namely at the periphery of urban areas and impoverished settlements. Due to the absence of proper containment measures, the refuse frequently extends onto the roadways, impeding both vehicular movement and the drainage system. Some streets in the study region have grown troublesome despite efforts been made by local government authorities. Common issues related to solid waste management include insufficient service coverage, inconsistent

garbage collection practises, overflow of waste from bins and storage containers, and a lackadaisical attitude among individuals towards indiscriminate disposal in unauthorised areas and littering.

The majority of communities within the research region fail to effectively manage and dispose of the complete volume of trash produced by their citizens, resulting in adverse consequences for both human health and the environment. The inhabitants within the designated research region encounter various health issues, such as typhoid, malaria, cholera, yellow fever, plague, diarrhoea, onchocerciasis and encephalitis. These ailments can be attributed to inadequate management of solid waste, a factor that some residents in the study area fail to recognise as a contributing factor to their poor health. The aforementioned troubles have inspired researchers to conduct an investigation into the determinants impacting solid waste management among inhabitants in the Ilorin South Local Government Area of Kwara State. The objective of this study is to offer valuable recommendations aimed at mitigating the health issues experienced by individuals residing in the aforementioned region. The present study aims to investigate and test a set of research hypotheses. These assumptions are established based on existing literature and theoretical frameworks,

**Hypotheses**

The following hypotheses were tested at 0.05 level of significance.

1. Inadequate funding does not significantly affect solid waste management among residents in Ilorin South Local Government.
2. Poverty does not significantly affect solid waste management among residents in Ilorin South Local Government.
3. Inadequate sanitation facilities do not significantly impact on solid waste management among residents in Ilorin South Local Government.

## METHODOLOGY

The research design refers to the overall plan and structure that guides the collection, analysis, and interpretation of data in a research study. The study employed a research design characterised as a descriptive cross-sectional survey. The study's population consisted of all individuals residing in the Ilorin South Local Government Area of Kwara State. The study employed a multi-stage sampling technique including of basic, purposive, and convenience sampling techniques. In the initial phase, a selection approach known as simple random sampling was employed to choose a total of five wards from a pool of eleven wards within the designated study area. In the second stage, a purposive sampling strategy was employed to select two communities from each of the chosen wards that had the highest population densities. In the third stage of the investigation, a convenience sampling approach was employed to pick a total of 20 respondents from each of the selected settlements and 40 respondents from each of the chosen wards. Consequently, a total of 200 respondents actively engaged in the study.

The research instrument utilised in this study was a questionnaire that was produced by the researchers themselves. To ensure its validity, the questionnaire underwent a rigorous validation process, involving the assessment and approval of three

experts who specialise in the relevant topic. The instrument's reliability was determined by the utilisation of a test-retest methodology. A total of 20 questionnaires were distributed to residents of Agbabiaka village, located in the Ilorin South Local Government area. It is important to note that this community was not included in the selected settlements for the study. After a two-week interval, the instrument was re-administered, and subsequently, the findings of the two tests were subjected to comparison using the Pearson Product Moment Correlation. A reliability coefficient of 0.84 was obtained, indicating a sufficiently high level of reliability for the research instrument used in the investigation. The instrument was administered by the researchers with the assistance of four research assistants who had received training. The process of examining and interpreting data in order to uncover patterns, relationships, and insights is referred to as data analysis. The demographic data of the respondents were evaluated using frequency counts and percentages, while inferential statistics, namely the chi-square test, were employed to analyse the results of the stated hypotheses at a significance level of 0.05.

## RESULTS

### Hypothesis 1

Inadequate funding does not significantly affect solid waste management among residents in Ilorin South Local Government.

**Table 1**

*Inadequate funding as a factor affecting solid waste management among residents in Ilorin South Local Government*

| S/N | Items | SA | A | D | SD | Row Total | df | $X_c^2$ | $X_t^2$ | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Poor provision of Incinerator by the Government to burn refuse to make it difficult to manage waste | 66 (33.0%) | 72 (36.0%) | 38 (19.0%) | 24 (12.0%) | 200 | | | | |
| 2 | Inadequate employment of Public Sweepers makes it difficult to clean the environment | 71 (35.5%) | 75 (37.5%) | 42 (21.0%) | 12 (6.0%) | 200 | | | | |
| 3 | Inadequate provision of the site by the Government to dispose of refuse may increase the spread of communicable diseases | 40 (20.0%) | 56 (28.0%) | 62 (31.0%) | 42 (21.0%) | 200 | 9 | 139.07 | 16.92 | $Ho_1$ rejected |
| 4 | Poor provision of transportation of waste to the dumping site makes it difficult to manage waste | 78 (39.0%) | 81 (40.5%) | 24 (12.0%) | 17 (8.5%) | 200 | | | | |
| | Total | 255 | 284 | 166 | 95 | 800 | | | | |

Table 1 shows that the calculated Chi-square value is 139.07 and the critical value is 16.92 with the degree of freedom 9 at 0.05 alpha level. Since the calculated chi-square value is greater than the critical value, therefore, the null hypothesis 1 is not accepted. This implies that inadequate funding is a factor to solid waste management among residents in Ilorin South Local Government.

**Hypothesis 2**

Poverty does not significantly affect solid waste management among residents in Ilorin South Local Government.

**Table 2**

*Poverty as a factor affecting solid waste management among residents in Ilorin South Local Government*

| S/N | Items | SA | A | D | SD | Row Total | df | $X_c^2$ | $X_t^2$ | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | The poor income of an individual contribute to poor waste management | 62 (31.0 %) | 76 (38.0 %) | 40 (20.0 %) | 22 (11.0%) | 200 | | | | |
| 6 | Inadequate money to get incinerator for refuse disposal affect solid waste disposal | 82 (41.0 %) | 84 (42.0 %) | 20 (10.0 %) | 14 (7.0%) | 200 | | | | |
| 7 | Poor means of transporting or carrying waste makes it difficult to manage it | 66 (33.0 %) | 82 (41.0 %) | 28 (14.0 %) | 24 (12.0%) | 200 | 9 | 199.74 | 16.92 | $HO_2$ rejected |
| 8 | Insufficient money to dispose of waste properly contribute and affect solid waste | 80 (40.0 %) | 78 (39.0 %) | 31 (15.5 %) | 11 (5.5%) | 200 | | | | |
| | Total | 301 | 329 | 112 | 58 | 800 | | | | |

Table 2 shows that the calculated Chi-square is 199.74 and the critical value is 16.92 with the degree of freedom 9 at 0.05 alpha level. Since the calculated chi-square value is greater than the critical value, therefore, the null hypothesis 2 is not accepted. This implies that poverty is a factor to solid waste management among residents in Ilorin South Local Government.

**Hypothesis 3**

Inadequate sanitation facilities do not significantly impact on solid waste management among residents in Ilorin South Local Government.

**Table 3**

*Inadequate sanitation facilities as a factor affecting solid waste management among residents in Ilorin South Local Government*

| S/n | Items | SA | A | D | SD | Row total | df | $X_c^2$ | $X_t^2$ | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Inadequate incinerator to burn refuse affect the management of waste | 80 (40.0%) | 70 (35.0%) | 34 (17.0%) | 16 (8.0%) | 200 | | | | |
| 2 | Insufficient transportation for waste disposer affects the management of waste. | 78 (39.0%) | 78 (39.0%) | 26 (13.0%) | 18 (9.0%) | 200 | | | | |
| 3 | Insufficient dumping facilities make it difficult to manage waste | 82 (41.0%) | 74 (37.0%) | 30 (15.0%) | 14 (7.0%) | 200 | 9 | 228.41 | 16.92 | $H_{03}$ rejected |
| 4 | Poor adequate of environmental cleaners to take care of wastes in our community affect management of waste | 72 (36.0%) | 90 (45.0%) | 28 (14.0%) | 10 (5.0%) | 200 | | | | |
| | Total | 312 | 312 | 118 | 58 | 800 | | | | |

Table 3 shows that the calculated Chi-square is 228.41 and the critical value is 16.92 with the degree of freedom 9 at 0.05 alpha level. Since the calculated chi-square value is greater than the critical value, therefore, the null hypothesis is not accepted. This implies that inadequate sanitation facility is a factor to solid waste management among residents in Ilorin South Local Government.

## DISCUSSION OF FINDINGS

The initial hypothesis is that insufficient money plays a crucial role in the management of solid waste among inhabitants in Ilorin South Local Government. The outcome of the discovery aligns with the perspective that waste management necessitates a significant financial investment. A considerable portion of the revenue allocated by State governments is dedicated to residential waste management; nevertheless, the impact of this expenditure is overshadowed by the size of the people it serves. The available funds, or those specifically allocated, for domestic waste management are significantly insufficient to adequately finance public agencies and private sector entities engaged in the collection and disposal of domestic waste. Additionally, these funds are inadequate for procuring the necessary equipment and materials essential for the efficient disposal of domestic waste (Atsegbua, 2003). Furthermore, the findings align with the thesis positing that developing countries frequently experience financial constraints due to insufficient resources and mismanagement of fund allocation. Numerous local governments are facing challenges in attaining satisfactory levels of service quality and coverage as a result

of financial limitations. In poor and middle-income nations, metropolitan areas experience a deficiency in collection services, with around half of the people lacking access to such services. The development of sustainable solid waste management services is constrained by restricted opportunities due to budgetary constraints within the government and the neglect of adequate garbage collection (Jessica, 2015; Al-Khatib, Monou, Abu Zahra, Saheen & Kassinos, 2010).

The findings of the second hypothesis indicate that poverty has a substantial role in influencing the management of solid waste among people in the Ilorin South Local Government area. The findings of this study align with the perspective put forth by Adeoti and Popoola (2012), who argued that socioeconomic factors, specifically poverty status, influence individuals' decision-making regarding solid waste management. There are discernible disparities between those of higher socioeconomic status and those of lower socioeconomic status in terms of their selected attribute. Additionally, the findings of this study align with the perspective put out by the World Institute for Development Economics Research (2010), which asserts that garbage produced in developing nations hinders energy recovery due to its significant moisture content and abundance of organic materials. The prevailing sentiment towards incineration in poorer countries has predominantly been unfavourable. The incinerators constructed in Africa, Asia, and Latin America failed to operate as first intended. In the city of Lagos, located in Nigeria, a substantial investment of US$10 million was allocated towards the construction of incinerators. The elevated moisture content of the waste necessitated the addition of fuel to sustain burning, resulting in a substantial rise in costs. Comparable occurrences have been documented in India, Mexico, Indonesia, and Turkey. Hence, the financial constraints faced by numerous poor and middle-income cities are expected to impede the successful implementation of incineration as a method for managing municipal sanitary waste.

The findings of the third hypothesis indicate that the lack of sufficient sanitary facilities is a notable contributing element to the management of solid waste among residents in the Ilorin South Local Government Area. The discovery of the research aligns with the assertion made by Okafor (2011) that there exist only two environmentally sustainable waste disposal techniques, namely sanitary landfills and composting. Incineration has been favoured by industrialised nations due to their ample financial resources and interest in harnessing energy from trash. Singapore, a nation characterised by limited land resources, has chosen to implement incineration as its primary method of trash disposal. In instances where the existing waste management infrastructure proves insufficient or is inadequately administered, the presence of scattered garbage is seen, hence giving rise to additional health hazards. Furthermore, the findings of this study align with the perspective put forth by Ayomoh, Oke, Adedeji, and Charles-Owaba (2008), who argued that issues associated with inadequate landfill management encompass various negative consequences such as compromised public health, increased occurrence of accidents, heightened risk of flooding, contamination of both surface and groundwater sources, unpleasant odours, infestation by pests, and potential gas explosions. While the

disadvantages of landfills are well-documented, the potential impacts of alternate waste disposal methods remain uncertain and have been subject to criticism.

In conclusion, based on the findings of this study, it is evident that further research is needed to fully understand the implications of the observed trends.

## RECOMMENDATIONS

The following recommendations are made based on the findings of this study:

1. Both state and local government authorities should allocate more funds to an environmental protection agency in order to enhance the management of solid waste within the designated research region.
2. The implementation of a suitable measure by the Federal Government is necessary to address the financial challenges faced by individuals in Nigeria, which hinder their ability to obtain essential household necessities, including waste management materials. This measure is crucial in safeguarding the population against infectious diseases that arise from improper disposal of solid waste.
3. Furthermore, both governmental and non-governmental organisations should collaborate to provide sanitation facilities to the residents of Ilorin South Local Government, thereby facilitating effective solid waste management.

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