

Domestic Waste Management and Urban Residential Environment: Focus on Akure, Nigeria

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ABSTRACT

The problem of waste generation, handling and disposal has reached a disturbing level in Nigerian urban centres. This study attempts to examine the impacts of domestic waste on the residential environment of some selected neighbourhoods of Akure, capital city of Ondo State, Nigeria based on the waste disposal methods currently employed by the inhabitants of each building. The paper studied two areas of the city namely: Oke Aro and Isolo. The study summarizes and interprets findings from empirical survey of some residential buildings randomly selected within the study area through the use of questionnaire, direct observations, housing demographic and facility survey to elicit relevant data relating to social, economic and environmental variables. Three hundred buildings within the study areas were studied which represents about 30% of the total number of buildings in the areas. Data obtained were collated and presented in the single factor descriptive analysis while health records were obtained from the few available health institutions. Findings show that health of individuals cannot be considered in isolation of the buildings and the environment in which they live. The paper recommends public enlightenment, environmental and health education, enforcement of environmental and waste disposal protection laws and re-introduction of old sanitary inspectors with corresponding policy statements.

Keywords: *building structures, built environment, domestic waste, impacts, management, urban*

1. INTRODUCTION

In most cities in Nigeria, waste management issues have become a glaring challenge. In recent years, there has been a phenomenal increase in the volume of wastes generated daily in the country (Olanrewaju & Ilemobade, 2009). This is due to the huge volume of waste generated in the cities on a daily basis which calls for proper handling in order to protect the environment and the population. Hoornweg (1999) emphasized that waste is inseparable from life because as long as man is alive, he stores up, uses, and disposes off materials and the complexity of waste which modern civilization produced is directly related to the living standard, socio-economic and cultural attributes of that particular environment.

Over the years, concerted efforts have been made to adequately solve the problems created by the emanation of wastes. Akaninyere and Atser (2001) examined the typology, characteristics and future trends of solid waste and asserted that the major components of waste are degradable materials (food remnants, paper, and rags) and non-biodegradable plastics, tins, metals, bottles, glass, and bones. The study asserted that in several Nigerian cities, garbage contributes substantially more than other components, this could be explained by the fact that most activities which affect the environment stem from the need for food; its production, processing and preparation (See table 1).

Table 1: Constituents of Municipal Solid Waste Generated in Akure and South-Western Nigerian Cities

City	(%)					
	Garbage	Paper	Sand (grit)	Plastic	Glass	Metal scraps
Ile-Ife	77.9	5.3	7.5	7.3	1.1	0.8
Oyo	62.1	18.5	4.3	10.6	1.4	3.1
Ijebu-Ode	58.7	19.6	4.7	14.7	1.8	0.5
Akure	59.5	14.5	11.0	1.7	6.3	7.2
Ado-Ekiti	60.4	21.4	11.5	4.3	2.2	0.2
Abeokuta	57.8	26.2	3.4	8.7	2.2	1.6
Ibadan	64.9	14.2	6.5	9.9	1.7	2.9
Osogbo	58.2	17.8	9.9	12.1	0.6	1.4
Iyin-Ekiti	60.9	15.3	18.6	14.0	0.8	0.4

Igede-Ekiti	58.1	19.3	17.7	3.6	1.1	0.2
Odeomu	47.8	37.7	12.3	1.2	0.4	1.4
Mean	60.5	19.1	9.8	7.1	1.7	1.8

Source: Adepetu et al (1999) as adapted from I. K. Adewumi (2001); Cited in Olanrewaju, et al (2009)

Moreover, the high proportion of food remnants could be looked at from the fact that this component of waste encompasses all forms of food waste from both domestic and commercial origins. Oreyomi, (1998) maintained that improper disposal of solid waste poses serious danger to the handlers and the people living around the wastes as disposal sites carry along rodents, insects and other vermin, which could transmit diseases such as typhoid fever, dysentery, diarrhea, cholera, yaws, and other diseases.

A study carried out by Ogedengbe and Oyedele, (2006) showed that the rate of change in domestic waste quantities and composition in developing and developed countries is unprecedented. It further asserted that generally the greater the economic prosperity and the higher percentage of urban population, the greater the amount of solid waste generated. According to Akinola and Salami (2001), waste disposal is one of the important aspects of urban management crises in Nigeria. The study noticed that management of solid waste generated within the urban centers has become one of the most intractable problems of development due to a phenomenal increase in

the volume and range of waste generated in many developing countries of the world, Nigeria inclusive. This is a direct consequence of urbanization.

Waste management in any city is of paramount importance due to the risk posed to human beings and to the environment. Encarta Dictionary, 2008 describes it as the activities that deal with waste before and after it is produced, including its minimization, transfer, storage, separation, recovery, recycling, and final disposal. Knowledge of the sources of waste and type in an area is required in order to design and operate appropriate solid waste management systems (Gumbo 1996, Famuyigbo 1998). Waste management is a labour and capital-intensive function that often consumes 20 to 50 percent of municipal operating budget (Oyinlola, 1998 and Thomas, 2000).

Domestic waste constitutes the highest percentage of waste generated in Akure. The situation in several other South-Western Nigerian cities also shows that the percentage of domestic wastes is considerably high compared to wastes from other sources. See Table 2.

Table 2: Main sources of Municipal Solid Waste in South-Western Nigeria

City	Domestic (%)	Commercial (%)	Agricultural (%)	Industrial (%)
	Abeokuta	73.90	17.50	8.20
Ado-Ekiti	78.90	14.30	4.10	2.70
Akure	70.30	18.60	6.30	4.80
Ibadan	66.10	20.30	2.20	11.40
Igede-Ekiti	75.10	11.00	12.40	1.00
Ijebu-Ode	79.50	14.00	3.50	3.00
Ile-Ife	67.40	28.40	1.00	1.10
Iyin-Ekiti	79.60	2.20	11.60	6.60
Ode-Omu	91.20	1.80	5.90	1.10
Osogbo	68.20	23.50	2.10	6.20
Oyo	90.50	6.50	2.00	3.00
Mean	76.42	14.37	5.39	3.76

Source: Adewumi et al (2005); Culled from Olanrewaju, et al (2009)

It is the major type of waste concerned in this paper due to the fact that aforementioned fact. It has a direct bearing on quality of housing of any urban residential area. It is different from other types of waste because it is directly related to households. The contents of household wastes are majorly food materials. Others are papers, broken furniture, plastic materials, disposable diapers, worn-out

fabrics, etc. Most household wastes are biodegradable, hence attract organisms, insects and rodents that can transmit diseases to humans and this spreads very fast when in close proximity to residences. (Ogedengbe and Oyedele, 2006). Table 3 shows the quantity of domestic wastes generated in Akure and other South-Western Nigerian cities.

Table 3: Biodegradable Solid Wastes Generated from Domestic Activities in Akure and some cities of South Western Nigeria

City/ State	Population (year 2003)	Biodegradable wastes (Metric tons(T) per week)
Akure	316, 925	46,271
Ibadan	1,650, 806	33,050

Ijebu-Ode	330, 799	54,773
Osogbo	253, 430	38,852
Oyo	371, 355	69,128

Source: Adewumi et al (2005); Culled from Olanrewaju, et al (2009)

Akure, the capital city of Ondo State in Nigeria has been experiencing expansion in terms of population density and explosion and this phenomenon is concomitant with multiplication of waste. Hence, the issue of waste management becomes a greater challenge. Over the years, the way and manner in which refuse is disposed in the city has consistently lacked monitoring and control. The resultant effect is deterioration of the environment which culminates in pollution. This study examines this existing problem in Akure as it relates to the residential environment of the study areas.

When residents dispose wastes close to residences, as is the case with some residents in the study area, the organisms concomitant with such refuse can act as agent of degradation. This will make the residential environment to be of poor quality, hence, the buildings will require renovation or maintenance more frequently. The quality of man's environment is an integral contributor to the overall quality of families and individuals quality of life (Adedeji, 2005). It is expected that when the environmental sanitation standards of a city improves, there will be improvement in the living condition and health security of the inhabitants. This will generally advance the quality and aesthetics of the environment at large. This paper attempts to examine the effects of improper handling and disposal of domestic wastes on the lives and health conditions of urban dwellers in Akure. In other words, it aims to investigate the effects of domestic waste management on residential environments in Akure.

2. OBJECTIVES

The objectives of the research are to:

- i. identify the refuse dumps within the study area and their proximity to the houses within the area.
- ii. identify the waste disposal methods commonly used in the study area; and
- iii. evaluate the effects of each waste disposal method on the residential environment.

3. DOMESTIC WASTE MANAGEMENT IN NIGERIAN CITIES

Waste management is a matter of great concern, especially in less developed countries. The magnitude of the waste management needs of the populace in these

countries rises phenomenally by the day. This is on account of rapid growth and urbanization occurring there, and the lack of a commensurate increase in housing stock (Lewin, 1981). Housing quality is usually examined in terms of the quality of design, building materials, standard of construction, and the provision and performance of public amenities. Olotuah (2006) citing Jagun (1983) affirmed that 75% of the dwelling units in urban centres in Nigeria are substandard and the dwellings are sited in slums. The environment in which the buildings are located in most cases is squalid, and this usually leads to slum conditions.

When waste disposal sites are in close proximity to residential structures, such environment is adversely affected as organisms that thrive in such dirty places are also agents of disease outbreak. Therefore, the aim of shelter as a place where people live and play in a hygienic manner is defeated when the stench from the nearby dump sites is a constant menace. In addition, these dump sites can contaminate ground water which in turn affects the purity of the water fetched from wells, hence, if residents of a city are devoid of access to portable water, it will take its turn on their health. This is a precarious situation and it adversely affects the residential environment.

In addition, a medium sized urban center like Akure need to be investigated to collect existing data and make appropriate resolutions. This can be used to avert the future eruption of the non-habitability and environmental problems being suffered by bigger cities like Lagos, Ibadan and Kano; and caused by the inadequate planning at the inception of their growth and development. This becomes imperative now that the political and economic statuses with the accompanying population influx are influencing the development of Akure. Hence, the choice of the study area is for the applicability to other cities in Nigeria and other developing countries.

4. WASTE MANAGEMENT AND URBAN HOUSING QUALITY

Housing quality is a matter of great worry, most especially in developing countries. The magnitude of the housing needs of the populace in these countries rises phenomenally by the day (Olotuah, 2006). This is on account of rapid growth and urbanization occurring there, and the lack of a commensurate increase in housing stock (Lewin, 1981). The inadequacy of the quality of most urban housing stems mainly from the poor physical state of the buildings. They are often unsafe and insecure and do not provide adequate shelter from the element of

weather. Plates 1, 2 and 3 show some locations within the study area where the residents dispose their refuse. The pictures reveal the poor quality residential environment occasioned by improper refuse disposal in an unhygienic manner.



Plate 1: A water body polluted with waste in the study area
Source: Field Survey, 2011



Plate 2: One of the open dump sites in the study area
Source: Field Survey, 2011



Plate 3: Refuse dumped inside drainage channels which hinders free flow of run-off
Source: Field Survey, 2011

Arbitrary waste disposal is a serious threat to the immediate environment because it leaves the environment dirty and polluted thus posing a danger to the health of the inhabitants. Notice the collapsed building in Plate 1. Such conditions are not sustainable due to the fact that they contribute to the degradation of the environment. Sustainability in essence needs to be put into consideration so that future generations would be able to benefit optimally from the environment. Observe in plate 3 that refuse materials were dumped into drainage channels. This usually results in flooding. The scenes created in the pictures above explain explicitly the existing condition of the residential environment within the study area. There is need for upgrading of this environment in order to forestall further degradation of the environment. It is palpable that urban renewal is essential in the study area. Table 4 summarizes the environmental impacts of the various methods of waste disposal methods employed in the study area.

Table 4: Environmental Impacts of Waste Management Methods

S/N	Refuse Disposal Method	Environmental Impacts
1	Burning	-Co2 emission -Reduce air quality -Contributes to global warming
2	Controlled Tipping	-No negative impact -Cleaner residential environment
3	Landfills	-Air pollution -Soil degradation -Contamination of ground water -Constitutes breeding grounds for rodents and other harmful creatures -Contributes to prevalence of diseases such as; cholera, typhoid, malaria, dysentery, etc

4	Road side/ drainage	-Blockage of drainage channels; flooding -Air pollution -Breeding ground for mosquitoes and other harmful insects -Contributes to prevalence of diseases such as; cholera, typhoid, malaria, dysentery, etc
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Source: Researcher’s field survey (2012)

5. METHODOLOGY

Data were sourced through the following instruments:

5.1 The Primary Source

- a. Administration of questionnaires: the use of multiple choice questionnaires was employed to collect data from the sample population.
- b. Camera: photographs of the various waste disposal sites were used to enhance a pictorial understanding of the research focus.

The questionnaire was designed to meet the stated research objectives. Closed-ended questions were used to record people’s perception of their residential spaces and their manner of waste disposal.

5.2 Secondary Source

This consist of data generated by persons, government and non-governmental agencies and provided additional information other than those received from the field study. They include books, maps, theses, texts, journals, libraries and visits to websites. Records from the available health centres were also obtained to get the prevalent diseases in the areas.

A total of 300 questionnaires were administered to acquire information analysed. This was done by using higher-level students (400 level students) of the Federal University of Technology, Akure, under the supervision of the researcher. Training was done alongside their field

experience to enlighten them on the contents of the questionnaire and how to administer them. 300 questionnaires were retrieved, totalling 100% of the administered number.

The research design follows a multistage description framework covering survey, analysis and interpretation. The research instrument used is a well structured questionnaire to elicit required information relating to socioeconomic and environmental conditions of the households as well as the characteristics of the dwellings in which the people live. A sampling frame of 1041 was considered and a sample size of 300 cases representing 30% spread over the study area through random sampling in order to ensure that it was fully representative of the population of the audience of the study. The neighbourhoods were sampled through the base maps by the use of stratified sampling method. The analysis focused on the physical conditions as well as the general environmental conditions of the dwelling units. Single factor descriptive analysis was used to analyse the data retrieved from the questionnaires.

6. DATA PRESENTATION, ANALYSIS AND DISCUSSION

Analysis of data in table 1 below shows the home ownership status of the respondents in both areas. It reveals that an average of 69.5% of the respondents rented the apartments they live while 30.5% of them are landlords in Isolo and Oke Aro respectively. It then became palpable that most of the landlords lived in other parts of the town and rented out their apartments in the area.

Table 5: Respondents home ownership type

Item	Isolo Area (%)	Oke Aro Area (%)	Average (%)
Owner occupier	44.0	17.0	30.5
Rented apartment	56.0	83.0	69.5
Total	100%	100%	100%

Source: Field Survey, 2011

The analysis of the average monthly income of household heads in table 2 shows that 14.39% of the household heads earn below ₦7, 500.00 monthly, 58.16% earn between ₦7, 500.00 and ₦25, 000.00, 13.34% earn between ₦25, 000.00 and ₦40, 000.00 while 9.55% earn ₦40, 000.00 monthly and above. Also the analysis of

average monthly income of the household heads reveals that more than 50% of the people earn less than N25, 000per month. This is in fact a testimony that the low-income group and the less privileged in the society occupy the two communities.

Table 6: Average monthly income of Head of households

Income level	a) ISOLO (%)	Oke Aro Area (%)	Average (%)
Below N7, 500	18.0	14.5	16.25
N7, 500-N25, 000	56.0	b) 58.5	57.25
N25, 000-N40, 000	14.0	12.5	13.25
N40, 000- above	12.0	14.5	13.25
Total	100%	100%	100

Source: Field Survey 2011

Analysis in table 3 shows the proximity of the dump sites to the residences. An average of 58% of the respondents in Isolo and Oke Aro areas respectively responded that the dumps sites in the area are within 50 meters from their

residences, yet, majority of them dump their refuse in the surrounding of their buildings. This reveals the level of their ignorance on the dangers posed by improper disposal of wastes.

Table 7: Distance of residences to dump sites

	Isolo Area (%)	Oke Aro Area (%)	Average (%)
Below 50m	56.0	61.0	58.5
51m – 100m	33.0	22.0	27.5
Above 100m	11.0	17.0	14.0
Total	100	100	100

Source: Field Survey, 2011

The analysis of the state of buildings in table 4 shows that 12.4% of them are in sound state, 20.2% requires minor repairs, 63.8% needs major repairs, while 3.6% of them are dilapidated. Findings show that most of the buildings in the two neighborhoods are in very poor state as only about 12.4% of them are in sound condition. A greater proportion of the buildings require minor or major repairs to bring them to good quality. The state of repairs of the

buildings takes into consideration the soundness of the roofs, walls, floors and foundations. The soundness of wall and floor means there is absence of cracks, surface wear, tearing or peeling off of surface plaster and paints. Socio-economic characteristics of the inhabitants of the buildings such as household size, income classification significantly contribute to the poor state of repair of the buildings.

Table 8: State of buildings in the two neighbourhoods

State	Isolo (%)	Oke Aro Area (%)	Average (%)
Sound	13.6	11.2	12.4
Require minor repair	21.9	18.5	20.2
Require major repairs	60.1	67.5	63.8
Dilapidated	4.4	2.8	3.6
Total	100%	100%	100%

Source: Field Survey 2011

The state of refuse disposal as revealed in table 5 is generally absurd which emanates from the laissez-faire approach of the people towards indiscriminate dumping of refuse and delay in evacuation by the waste management authority. Refuse dumps littered the environment which were an eyesore. 68.5% dispose their refuse indiscriminately out of which 41.2% dump theirs in open spaces. Such constitute breeding grounds for rodents, flies, mosquitoes, snake and harbour for other dangerous animals as well as hindering the free flow of run-off.

11.7% burnt theirs within the residential environment thereby causing air pollution, while 19.8% dispose theirs in controlled tipping. However, interview conducted with the waste management board revealed that they do not visit some of those streets due to bad roads that hinder access to such streets and the insufficient number of waste disposal vehicles. A study carried out by Olotuah, (2006) in Oba-Ile, Nigeria shows that frequency of collection refuse is a predictor variable for housing quality.

Table 9: Methods of Refuse Disposal

	Isolo Area (%)	Oke Aro Area (%)	Average (%)
Free Range – Road side / Drainages	26.7	27.9	27.3
Landfills	43.2	39.2	41.2
Controlled Tipping	20.5	19.1	19.8

Incinerating / Burning	11.5	11.9	11.7
Total	100	100	100

Source: Field Survey, 2011

Table 6 shows the underlying reasons for improper refuse disposal in the study area. Majority of the respondents dumped their waste as a result of closeness of dump site to their residences. This shows that they are ignorant of

environmental and health impacts of such actions. An average of 19% responded that they do so because the waste management authority does not visit their streets to collect their refuse.

Table 10: Reasons for dumping refuse indiscriminately

	Isolo Area (%)	Oke Aro Area (%)	Average (%)
Proximity to residence	45.0	48.0	46.5
No affordable alternative	20.0	21.0	20.5
No response	15.0	13.0	14.0
The waste management authority does not come to my street	20.0	18.0	19.0
Total	100	100	100

Source: Field Survey, 2011

Table 7 shows the main sources of water supply in the area. An average of 83% sourced their water from hand-dug well, most of which are located in unkempt environment without covers and rings, while an average of 17% get theirs through the boreholes sunk within the

area. This prevailing situation does not guarantee quality water supply in the area as the water sources are not treated before use; hence, the people stand a greater risk of contacting serious water borne diseases.

Table 11: Sources of water supply

	Isolo Area (%)	Oke Aro Area (%)	Average (%)
Well(hand-dug)	78.0	88.0	83.0
Borehole	22.0	12.0	17.0
Public mains	Nil	Nil	Nil
Total	100	100	100

Source: Field Survey, 2011

In table 8, it is observed that an average of 58.5% of the respondents maintained that dump sites are within 50 meters from their wells/boreholes, while an average of 27.5% in responded that the dump sites are between 51

meters to 100 meters from the wells/boreholes. This shows that the ground water is at a risk of being polluted, hence, the risk of being infected by water borne diseases.

Table 12: Proximity of wells/boreholes to dump sites

	Isolo Area (%)	Oke Aro Area (%)	Average (%)
Below 50m	56.0	61.0	58.5
51m – 100m	33.0	22.0	27.5
Above 100m	11.0	17.0	14.0
Total	100	100	100

Source: Field Survey, 2011

7. HEALTH HAZARDS AND THEIR CAUSATIVE FACTORS

The most prevalent disease and the ecological problem identified in the area, as shown in Figure 1 is malaria fever, accounting for 29.6%. Others in their order of magnitudes include typhoid fever, measles, diarrhoea, cholera, dysentery and some communicable diseases prevalent in the tropics. Their identified causative factors include inadequate sanitary services (57.4%), poor water

supply (14.8%), unkempt environment (14.8%), overcrowding (12.2%) and poor drainage system (0.9%). Other health issue investigated involved the availability of health institution within the neighbourhood. About 73.9% indicated non-availability of any within their reach. They are either located farther away from their dwellings or completely absent. Only 26.1% are sure of having at least a chemist store or a mini health clinic within their neighbourhood, thus, low level health care and environmental education.

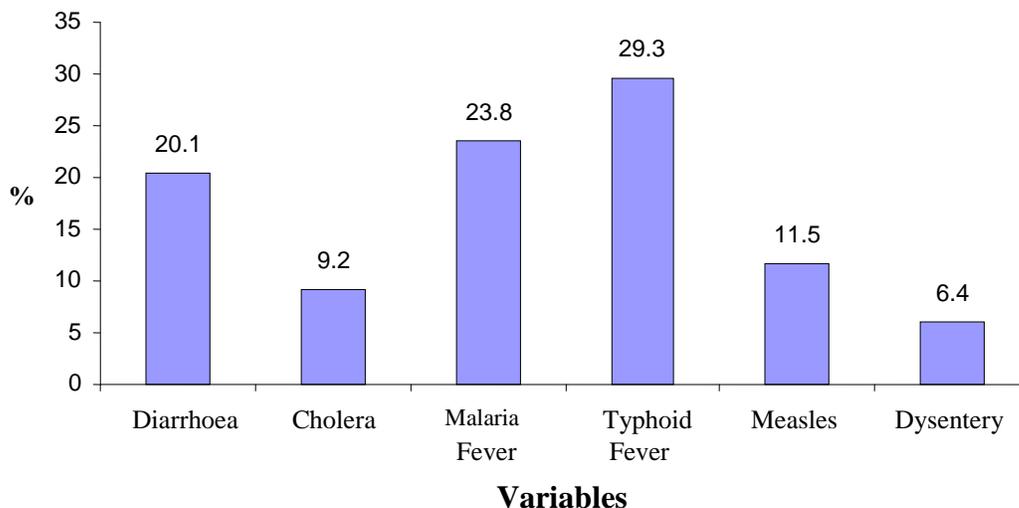


Fig. 1: Environmental Related Problems and Diseases in the study area.
Source: Field Survey, 2011

8. CONCLUSION

This study is based upon data obtained from survey questionnaires. It covered selected areas of Oke Aro and Isolo in Akure metropolis. The data confirms that majority of the respondents did not dispose their wastes properly in protection of the environment. This has adversely affected the residential environment within the study area. A close look at the methods of waste disposal in the areas was carried out and it was discovered that the area can be described as slums. This is the reason that most of the landlords prefer to live in other parts of the town. There is therefore a need to enhance these areas in order that the minimum required quality for residential areas is attained.

9. RECOMMENDATIONS

Based on the major findings in this research, it has become imperative to put up some recommendations that are necessary to improve the environmental and health conditions of the people.

- a. The first thing that needs urgent attention is in the area of public enlightenment and environmental and health education. Residents of these areas should be educated on the effect of improper dumping of refuse. Without grassroots environmental education and enlightenment, enforcement of environmental sanitation and waste disposal laws has a very little prospect of success. There is therefore a need to educate the people about the danger of living in disheveled environment, particularly in the study area. This appears to be a possible solution as a preventive measure against the prevailing environmental hazards in the country, as education promotes health.
- b. Also, the existing laws and regulations guiding environmental sanitation and health should be reviewed and enforced with stiffer actions in order to make them more effective.
- c. Also, more attention should be given to waste disposal management through adequate funding.

- d. Likewise, poverty has been identified as the major underlying cause of poor environmental and good health because the poor are incapable of paying for the required amenities for healthy living. As a result, the ongoing national policy on sustainable minimum wage should be extended to all and sundry.
- e. Governments should be alive to their responsibilities of making basic amenities that would enable families and individuals have access and maintain good healthy environment.
- f. Residential neighbourhoods should be provided with properly designed waste disposal points in order to protect the environment from pollution.

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