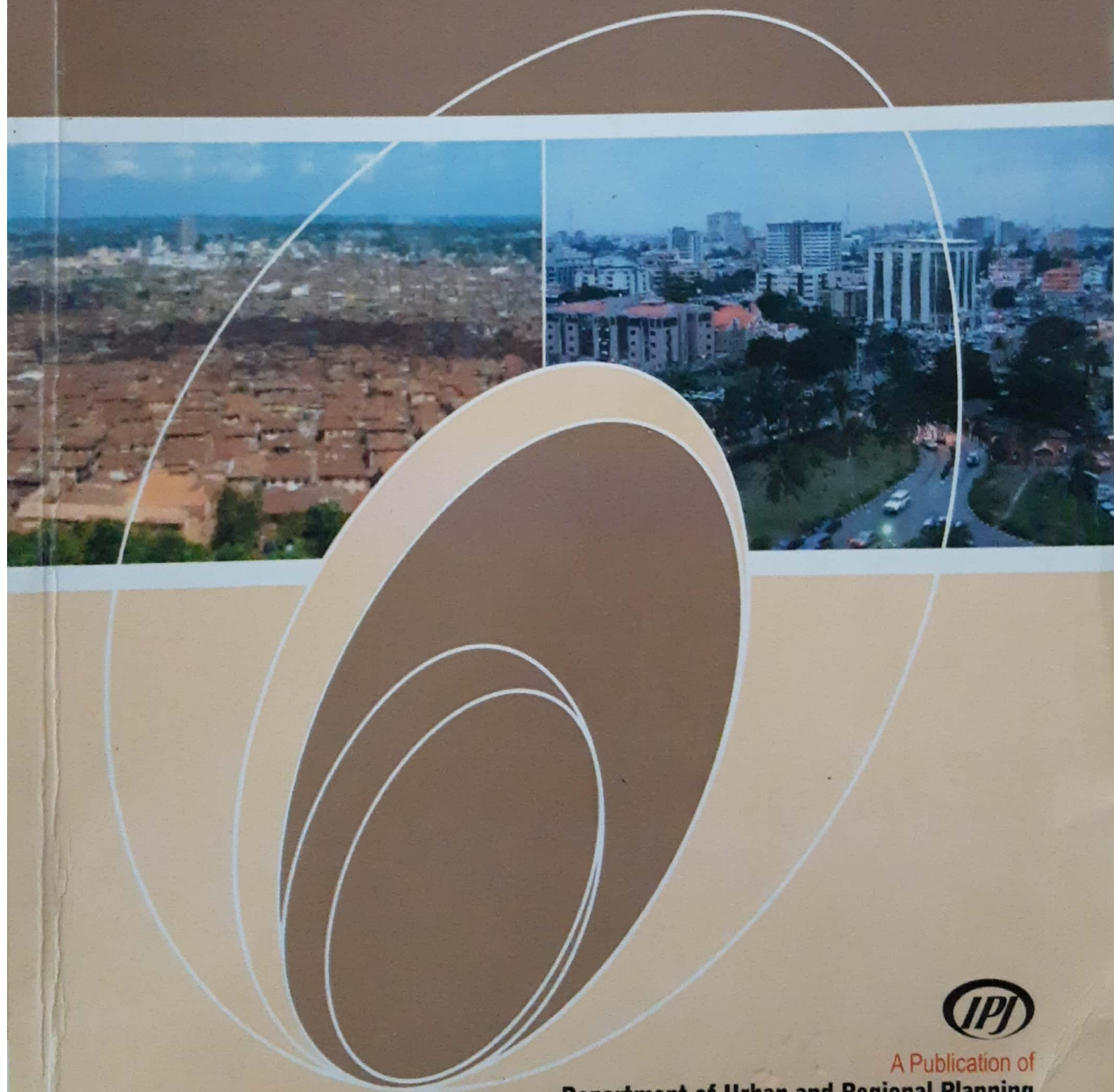


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Patronage Pattern of Informal Waste Collectors in Ibadan, Nigeria

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Abstract

The high rate of waste generation in Ibadan and the inability of the government to ensure total collection have resulted in limiting waste collection service to high and middle income residential areas of the city, thereby neglecting the low income neighbourhoods. The gap in municipal waste collection services has consequently led to patronage of informal waste collectors by residents of the low income areas. This paper therefore examined the nature of patronage of informal waste collectors in the city of Ibadan, Nigeria. A total of 1060 structured questionnaires were administered on purposively selected residents in the five municipal local government areas of Ibadan. Descriptive statistics and Pearson correlation analysis were used to show the nature and effects of patronage of informal waste collectors on solid waste management. The study established that availability of informal waste collectors, reduction in waste storage time and low collection cost were the major motives for regular patronage of informal waste collectors. The result of Pearson correlation analysis confirmed the hypothesis that availability of informal waste collectors facilitates prompt disposal of waste. The study concluded that based on the vehicular accessibility problem of the high density neighbourhoods coupled with the dwindling resources available to the government, reliance on informal waste collectors will persist for a long period of time. Therefore, effective partnership between the government and informal waste collectors was recommended.

Keywords: Municipal Solid Waste Management, Informal Waste Collectors, Patronage, Residential Neighbourhood.

1.0. Introduction

Third world cities have undergone rapid urbanization in the last fifty years. While the number of urban dwellers in the world is expected to double between 2010 and 2030, nearly 90% of this increase will take place in the developing world, where growth rates exceed 3% a year - three times that of the developed countries (UN - Habitat, 2009). Urbanization in the developing countries implies the expansion of slum areas and the creation of new ones which consequently intensifies pressure on urban infrastructure in many cities that are already overburdened with the provision of urban services (Coleman and Rajabu, 2010). However, because most third world cities lacked the resources to meet the demand for services of which waste management is one of the most required, urban dwellers usually seek to create alternatives to fill the gap in service provision by municipal governments (Visvanathan and Glawe, 2010). Waste is any unavoidable material resulting from domestic activity or industrial operation for which there is no economic demand and which must be disposed of (Sridhar, 1998). Municipal waste management is the collection, keeping, transportation, treatment and disposal of waste materials in such a way as to render them harmless to human and animal life, the ecology and environment and local aesthetics. It is an organized and systematic channeling of waste

through practically, economically and technically appropriate recovery and disposal route in accordance with acceptable public safeguards (Medina, 2001)

As noted by Akinwale (2005), the volume of wastes generated in most Third World cities continues to increase at a faster rate than the ability of the authorities to effectively manage it. Comparatively, the quantity of solid waste generated in developed countries' cities is higher than in third world cities, yet municipal solid waste management remains inadequate in the latter cities. For instance, waste generation rates in United States and Japan are 526,200 tones/day (2 kg/capita/day) and 140,224 tones (1.1 kg/capita/day), respectively, with over 95% collection rate achieved in both countries, compared to Nepal where waste generation rate is 0.5 kg/capita/day but collection rate is less than 40% (World Bank, 2008). The reason for this, as maintained by Larbi (2009), is that collection, transportation and disposal of municipal solid waste represents a large expenditure for developing countries' cities. Waste management usually accounts for 30 to 50% of municipal operational budget, but despite the high expenditure, the developing countries' cities collect only 50 to 60% of the refuse generated. For example, in Mumbai (in India) about 50% of the wastes generated are collected, 33% are collected in Karachi (in Pakistan),

40% in Yangon (in Myanmar), 50% in Cairo (in Egypt), and 42% in Dar es Salam (in Tanzania) (Hornweg, 2009), 43% in Lagos, Nigeria (LAWMA, 2012), and 52% in Ibadan (Ola, 2016). Consequently, authorities in most of these cities usually limit waste collection to low density (high income) residential neighbourhoods.

However, attempt by high density neighbourhood residents to ensure that their wastes are evacuated promptly and to find alternative to municipal collection which is virtually non-existing have led to patronage of informal waste collectors who are very active and perhaps exist to fill the gap in waste collection by municipal authorities. Informal waste collectors are a group of informal private waste operators involved in the house-to-house waste collection at a fee, using specially built carts, wheel barrows, head pots or baskets, donkey and horse carts. Since the activities of this group of workers are neither monitored nor regulated by the municipal authorities, what then is the nature and effects of their patronage by urban dwellers on municipal waste management? This is the question this paper seeks to answer using Ibadan, Nigeria as example.

2.0. Literature Review

Literature reviewed for the study focused mainly on the operational features of informal waste collectors. Collection of waste

by Informal Waste Collectors (IWCs) is carried out in accordance with the spontaneous needs of households and small commercial institutions. Thus, collections are done without any fixed schedule and the service is delivered by itinerant individuals (Masocha, 2006; Sembiring and Nitivattananon, 2010). Push carts are mostly used by IWCs to transport waste to disposal points. Waste collectors usually dump waste in public waste containers if available. In the absence of public containers the IWCs disposed waste in nearby open spaces and rivers rather than transporting it to the municipal dumpsites (McLean, 2000; Ola, 2016). Another feature of informal waste collection is the ability to work freely without any adverse administrative interference (Liyala, 2011). Since waste collection is done mainly based on the request of households and small commercial institutions, payments are made for every service the users receive rather than based on monthly arrangements (Eisenberg, 2009).

They usually arrange service fees based on compromise reached between them and the clients. The collection fees are often negotiated and fixed prior to the very start of the delivery of the service and adjusted through the course of the service (Zelalem, 2006). Service fees are usually collected without any kind of receipt (Pacheco, 2008). For those who operate in group, the revenue they earn most of the times is shared

among members of the enterprise on daily basis. The informal waste collectors are also well informed about the adverse consequences of the quality of service they deliver and the way they handle their clients. They appear extremely polite to their clients and sometimes prefer to adopt the well versed motto of hoteliers that says "customers are always right" (Medina, 2005). In addition, the informal waste collectors have no well-defined territories of solid waste collection; rather, each waste collector has his own clients situated as intermingling with others in the same locality. Hence, two adjoining housing units could have different clients of waste collection services (Medina, 2007).

3.0. The Study Area

Ibadan, the largest indigenous city in tropical Africa and the capital of Oyo state is the study area. It is located between longitude $7^{\circ}20'E$ and $7^{\circ}40'E$ and latitude $3^{\circ}35'$ and $4^{\circ}10'$. It is 145km north-east of Lagos and 345km south-west of Abuja, the federal capital. The development of Ibadan has been influenced by the traditional and colonial urbanization. It was founded in 1829 and occupied by immigrants who moved into the city in search of security from inter-tribal wars in Yoruba land (Fatokun, 2011). Since its founding, the city has had rapid growth both spatially and demographically. Developed land area in 2011 was 463.33km²

(Hoekstra, 2012) while the 2013 population of Ibadan, using 2.83% growth rate (National Population Commission, 2007), was estimated at about 3million. Ibadan is made up of 11 local government areas (LGAs), namely: Ibadan North-east with its Headquarters at Iwo Road; Ibadan North with its Headquarters at Agodi; Ibadan South-east with its Headquarters at Mapo; Ibadan South-west with its Headquarters at Ring Road; Ibadan North-west with its Headquarters at Onireke; Egbeda with its Headquarters at Egbeda; Lagelu with its Headquarters at Iyana Offa; Ona-Ara with its Headquarters at Akanran; Oluyole with its Headquarters at Idi-Ayunre; Ido with its Headquarters at Ido and Akinyele with its Headquarters at Moniya.

The residential areas in Ibadan can be classified into high, medium and low-density areas (Fig. 1). The high-density areas comprise the pre-industrial traditional housing areas of Ibadan. These areas are characterised by narrow streets, poor environmental conditions, physical planlessness, inadequate infrastructural facilities and low living standard (Onibokun, 1999). High density residential land use characterises the larger part of the city (Fig. 1). The medium-density zone is a hybrid of the traditional and modern lifestyles. Many of the buildings have adequate access with basic facilities and amenities moderately provided. The inhabitants are mostly the working

class. The buildings are usually blocks of flats or storey buildings built in the traditional form. The medium-density areas in the city include: Ajibade, Abayomi, Joyce-B Road, Liberty, Oluseyi, and others. The low-density areas vary from the high and medium-density areas. Most of the buildings are single family units. Most high-income people are found in the low-density areas (Onibokun, 1999). Among the low-density areas are Bodija, Oluyole, Jericho, Iyaganku, Agodi, Idi-Isin, Felele, and others.

The Oyo State Solid Waste Management Authority (OYSWMA) is the statutory body established in 1997 by the state government to undertake waste collection, processing and disposal in the city. In addition, 259 private refuse companies were licensed by the state government to complement the efforts of the OYSWMA in waste collection, particularly in the low density areas of the city (OYSWMA, 2013). The informal private sector is observed to be very active in solid waste management particularly in the largely inaccessible waste-ridden high density areas of the city due to patronage by the residents.

4.0 Research Methodology

Data for this study were collected from both primary and secondary sources. A multi-stage sampling approach in which the local government areas (LGAs) form the basic primary sampling unit was

adopted. Ibadan is made up of 11 LGAs out of which 5 are predominantly urban while the remaining 6 are partly rural. The 5 urban LGAs with each having varying number of localities were selected for survey. These are: Ibadan South West, Ibadan South East, Ibadan North West, Ibadan North East and Ibadan North. Preliminary survey revealed that patronage of informal waste collectors was limited to high density localities in all the LGAs. Thus, 3 high density localities where Informal Waste Collection predominated were sampled in each of the LGAs (Table 1). Considering the fact that not every resident in the selected localities patronized Informal Waste Collectors, a total of 1060 households patronising the Informal Waste Collectors were identified and purposively sampled.

A structured questionnaire containing information on the socio-economic characteristics of the respondents, volume of waste generated per day (Note that hand-held balance scale was used in measuring the waste generated by the respondents), reasons and effects of patronising informal waste collectors on waste generated among other questions were used in obtaining information from the respondents. The questionnaire administration was targeted at the household heads because of their critical role in deciding waste disposal means for households. Secondary sources of information

include journal articles, textbooks and unpublished materials such as dissertations, monographs and mimeo. Data analysis involved the use of both descriptive and inferential statistics. Descriptive tools employed were simple frequencies and percentages while Pearson

Correlation was used in testing the study hypothesis.

Table 1: Sampled Localities and Users of Informal Waste Collectors in the Selected LGAs

LGAs	Localities	Sampled Users (100%)
Ibadan South-West	Oke-Ado	72
	Idi-Arere	89
	Agbokojo	71
Ibadan North-East	Bashorun	49
	Iwo Road	79
	Oke-Adu	76
Ibadan South-East	Oniyere	68
	Labo	58
	Oke Oluokun	64
Ibadan North-West	Oke - Seni	66
	Olopomewa	58
	Opoyeosa	78
Ibadan North	Ode Oolo	73
	Oke Itunu	75
	Yemetu	84
Total		1060

Source: Author's Analysis

5. Results and Discussions

Results of the study are presented and discussed under three broad headings: Socio-economic characteristics of respondents; Waste

generation and management habit in the study area; and Effects of Informal Waste Collection on Solid Waste Management

Socio-Demographic Profile of the Respondents

The socio-economic variables considered were sex, marital status, education, occupation, income and household size. Since both male and female naturally generate waste, the survey was not targeted at a particular sex. The study revealed that of the one thousand and sixty (1,060) sampled residents, 63.9% were females while the remaining 36.1% were males (Table 2). Analysis of respondents' marital status shows that those that were married accounted for 82.8%; 11% were single; those divorced accounted for 1.9%; and the respondents who were separated from their spouses but not divorced as well as the widows/widowers accounted for 1.5% and 2.7%, respectively (Table 2). Analysis of the educational status of the respondents shows that they had one form of education or the other. Notably, holders of HSC/OND/NCE/HND/B.Sc accounted for 47.2% of the sampled population. Those who had secondary education accounted for 23%, those who had primary education accounted for 15.6%, while those with training in craftsmanship and Quranic education represent 6.9% and 2.5% respectively. Some 4.9% had no formal education (Table 2). The high percentage of respondents with tertiary education also reflected in their occupational status as some 37% of the sampled residents were civil servants while

42.9% indicated trading as their primary economic activity. Some 10.7% of the respondents were artisans, 2.2% were clergymen, 2.7% were students, 1% were engaged in farming while apprentice and retirees accounted for 1.4% and 2.1%, respectively (Table 2).

In analysing the income structure of the respondents, the general categorisation of income into low, medium and high was adopted. The monthly income below N40,000 was categorized as low. Income between N40,000 and N100,000 was regarded as medium, while monthly income above N100,000 was grouped as high. Following these categorisation, one can conclude that majority (51.9%) were medium income earners. Those in the low income category accounted for 41.5% while 6.6% of the respondents were within the high income category. Theoretically, income largely determines the level and quality of services demanded by individuals. Ordinarily, one would have expected those in the middle-income earning bracket to be able to afford mechanised refuse contractors, but the inability of these contractors to provide waste services in their neighbourhoods, coupled with inaccessibility of these neighbourhoods by waste trucks appears to be responsible for the patronage of Informal Waste Collectors. It is pertinent to note that the large percentage of middle income earners among the

respondents may be due to the high number of civil servants in the sampled neighbourhoods. This calls for a rethink on the concept of high-density neighbourhoods being home to low income earners.

The household size was categorised into three - small, medium and large sizes. Following Afon's (2008) categorization, any household with six members and below was grouped as small-sized household. The

medium-sized household had between six and ten members, while households with more than ten members were regarded as large-sized households. As presented in Table 1, small-sized households accounted for 61.8%; medium-sized households represented 25.8%; and large-sized households accounted for 12.4%.

Table 2: Socio-Economic Characteristics of the Respondents

Variables		Frequency	Percentage
Gender	Male	383	36.1
	Female	677	63.9
	Total	1060	100.0
Marital Status	Single	117	11.0
	Married	878	82.8
	Divorced	20	1.9
	Separated	16	1.5
	Widowed	29	2.7
	Total	1060	100.0
Education	Primary	164	15.5
	Secondary	244	23.0
	Tertiary	500	47.2
	Vocational	73	6.9
	Quranic	26	2.5
	Informal	52	4.9
	Total	1060	100.0
Occupation	Trading	455	42.9
	Civil Service	392	37.0
	Artisan	108	10.2
	Clergymen	23	2.2
	Studentship	29	2.7
	Farming	11	1.0
	Apprentice	15	1.4
	Unemployed	22	2.1
	Total	1060	100.0
Income	Low (N1-N39,999)	440	41.5
	Medium (N40,000-N100,000)	550	51.9
	High (Above N100,000)	70	6.6
	Total	1060	100.0
Household Size	Small (1-5)	655	61.8
	Medium (6-10)	274	25.8
	Large (Above 10 persons)	131	12.4
	Total	1060	100.0

Source: Author's Analysis

Waste Generation and Management Habit in the Study Area

Four main issues investigated in the study and presented in this section in relation to waste generation and respondents' waste management habit are: Types and Volume of waste generated; Respondents' waste storage practice; Respondents' waste disposal rate; and respondents' waste disposal practice

Types and Volume of Waste Generated

The following waste types- paper, polythene/sack and food remnants - were generated by virtually every respondent. However, there is visible variation in the generation of certain types of waste. For instance, 76.5% of the sampled residents generated leaves; some 74.9% generated maize husks; some 65.7% generated animal faeces; 65.4% generated fruit waste; while

60.2% of the sampled residents generated paper waste. Less than 50% of the respondents generated dead animal, textiles, glass and metal wastes; 29.1% generated wood, 26.3% generated e-waste, 26.1% generated construction debris while 25.4% generated ash/dust.

Considering the volume of waste generated daily by the respondents, 61.2% of the sampled respondents recorded an average daily waste generation rate of between 0.1 and 2kg; 21.6% generated an average of between 2.1 and 4.0kg per day; 7.2% generated an average of between 4.1 and 6.0kg per day; 5.6% generated an average of between 6.1 and 8.0kg per day; 3.2% generated an average of between 8.1 and 10kg per day while 1.2% of the sampled respondents generated above 10kg but not more than 25kg per day (Table 3). The mean daily waste generation is 4.015kg.

Table 3: Volume of Waste Generated

Volume	Frequency	Percentage
0.1 - 2kg	649	61.2
2.1 - 4kg	229	21.6
4.1 - 6kg	76	7.2
6.1 - 8kg	59	5.6
8.1 - 10kg	34	3.2
Above 10kg	13	1.2
Total	1060	100.0

Source: Author's Analysis

Respondents' Waste Storage Practice

There are many means employed by the respondents in storing their wastes. About 41% preferred plastic dustbin. Other means of storing wastes by the

respondents were out-of-use bucket (25.7%), sack (16.3%), polythene bag (8.4%), basket (5.6%) and paper dustbin (3.4%) (Table 4). The relative high percentage of households using plastic dustbin (a more hygienic and

modern method of waste storage) can be explained by a substantial percentage of the sampled residents

in the middle-income-earning bracket as well as relative high literacy level in the areas as earlier

Table 4: Respondents' Waste Storage Practice

Waste storage practices	Frequency	Percentage
Plastic Dustbin	430	40.6
Bucket out-of use	272	25.7
Sack	173	16.3
Polythene bag	89	8.4
Paper dustbin	60	5.6
Basket	36	3.4
Total	1060	100.0

Source: Author's Analysis

Respondents' Waste Disposal Rate

Studies have shown that household size, income and economic activities individuals engage in, largely influence the volume of waste generated by an household, which consequently determines the rate of disposal of the waste (Zurbrugg, 2003; Diaz, Savage and Eggerth, 2007; Jiburun and Jiburun, 2010; Medina, 2011). Some 14.8% and 30.7% of the respondents

disposed their wastes daily and every couple of days respectively while 36.7% and 15.1% disposed their wastes once in a week and every two weeks (Table 5). It is pertinent to note that the frequency of waste disposal contributes significantly to better environmental health. The relative high literacy level recorded among the respondents may have facilitated their prompt disposal of waste.

Table 5: Respondents' Waste Disposal Frequency

Waste Disposal Rate	Frequency	Percentage
Everyday	157	14.8
Every couple of days	325	30.7
Every week	389	36.7
Every two weeks	189	17.8
Total	1060	100.0

Source: Author's Analysis

Respondents' Waste Disposal Practice

Considering the fact that only those who patronized the informal waste collectors were sampled, it is safe to assume that all the respondents employed informal

waste collectors as their major means of disposing their wastes. The reasons for patronage of informal waste collectors by the respondents vary. While over half (52%) patronised them because they were readily available to attend to their

refuse collection need, 32% patronised them because it facilitated reduction in storage period of waste. It can be deduced from the data presented above that there was willingness on the part of the people to consume services at a fee if they had easy access to the services. This essentially explains why only 6% indicated low cost of service as their

major reason for patronising informal waste collectors. For instance, about 70% of the respondents paid between N20 and N100 per collection as waste collection fee. Some 10% of the sampled residents indicated availability of informal waste collectors and reduction in waste storage time as their major reasons (Table 6).

Table 6: Reasons for Patronizing Informal Waste Collectors

Reasons	Frequency	Percentage
Availability of service	551	52.0
Reduction in waste storage time	339	32.0
Low collection cost	64	6.0
All of the above	106	10.0
Total	1060	100.0

Source: Author's Analysis

Effects of Informal Waste Collection on Solid Waste Management

To empirically determine the effects of patronage of informal waste collectors on the respondents' waste generation rates and disposal frequency, two hypotheses were formulated and tested. The hypotheses are:

- i. There was no significant relationship between residents' patronage of informal waste collectors and households' waste generation rate.
- ii. There was no significant relationship between residents' patronage of informal waste collectors and

households' waste disposal rate.

The first hypothesis was tested using Pearson correlation analysis. The residents' patronage of informal waste collectors was correlated to households' waste generation rate. The result is presented in (Table 8). The correlation analysis shows that the P-value of $0.766 > 0.05$. This indicates automatic rejection of the null hypothesis and acceptance of the research hypothesis that there was significant relationship between household waste generation and patronage of the informal waste collectors. In other words, availability of waste collectors gave the residents the courage to generate as much waste as possible and to

store the waste for eventual evacuation by the collectors anytime

the households desired to do so.

Table 8: Pearson Correlation Analysis (Patronage vs Volume of Waste Generated)

	Households that patronise informal waste collectors	Volume of waste generated per day (in tonnes)
Households that patronise informal waste collectors	1	-.010
Pearson Correlation		.766
Sig. (2-tailed)		879
N	903	
Volume of waste generated per day (in tonnes)	-.010	1
Pearson Correlation	.766	
Sig. (2-tailed)	879	1031
N		

Source: Author's Analysis

Note: The ordinal variable was transformed before analysis.

The second hypothesis was tested using Pearson correlation analysis. The residents' patronage of informal waste collectors was correlated with households' waste disposal rate. The result is presented in (Table 9). The table shows that the P-value of $0.092 > 0.05$. Thus, the null hypothesis will be rejected and the research hypothesis that there was significant

relationship between household waste disposal rate and patronage of the informal waste collectors will be accepted. In other word, availability of waste collectors gave the households the opportunity to dispose their refuse through the informal collectors anytime households desired to do so.

Table 9: Pearson Correlation Analysis (Patronage vs P-

Household	P-
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Moreover, the respondents considered informal waste collectors' operation more effective due to their ability to reach larger number of people in the high-density neighbourhoods and the provision of door-to-door services to the people at affordable fees. Thus, while municipal waste service coverage may be limited to low and medium density residential neighbourhoods due to the structure of the high-density residential neighbourhoods which restricts vehicular access as well as due to the rapid physical expansion of Ibadan (Salami, 1997), the informal waste collectors have the ability to penetrate every nook and cranny of the city. There was, therefore, a consensus of opinion among the respondents that the informal waste collectors should be effectively integrated into the solid waste management scheme of Oyo State if the state government aims to achieve total waste evacuation in Ibadan.

6. Conclusion and Recommendations

The study has identified the nature, patterns, reasons and frequency of patronage of informal waste collectors by the high density residents. As revealed in the paper, utilisation of informal waste collectors was limited to high density residential neighbourhoods due largely to the non-availability of municipal waste collection services in those neighbourhoods. As noted in the

paper, the non-availability of municipal services was partly caused by the limitations imposed by the accessibility deficiencies of the neighbourhoods which did not permit easy vehicular access. Therefore, it is believed that municipal waste collection services may not be available to these neighbourhoods in the nearest future, thus, reliance on informal waste collectors in the neighbourhoods may persist for a long period of time. It is, therefore, imperative for the state government to embark on an effective partnership with the informal waste collectors in order to ensure sustainable waste management in Ibadan and Oyo State in general. To achieve this, the following measures should be embarked upon.

There is the need for the State Government to review the state laws and policies on solid waste management to ensure the incorporation of the informal waste collectors into the waste management scheme of the city/state. This will give legal backing to the activities of the waste collectors and invariably allow them to freely access their clients without any form of molestation from the government officials.

Government should also put in place less cumbersome registration procedures for the informal waste collectors operating in the city and according them all the rights and privileges of waste management

within the city. For the sake of convenience of the waste collectors, the Environmental Health Services Departments of the Local Governments should be allowed to register the collectors operating in their domain.

Provision of comprehensive capacity building, training and re-training programmes for the informal waste collectors should also be embarked upon by the Government. This will ensure and enhance greater efficiency and effectiveness in their operation. The programme should be provided periodically and every collector must be mandated to attend the programme at little or no cost. The Oyo State Ministry of Environment should collaborate with Oyo State Waste Management Authority to achieve this.

There is also the need for the Ministry of Environment, Oyo State Waste Management Authority and the Environmental Health Services Departments of the Local Governments to embark on comprehensive sensitisation of the city's residents on the need to ensure hygienic waste disposal practices by continuing patronage of the informal waste collectors or using public waste containers. This however, calls for adequate provision of waste containers in the city especially the high density neighbourhoods. The Local and State Governments should partner with the high density communities to ensure effective policing of the neighbourhoods in

order to minimise or eradicate indiscriminate dumping of waste in illegal dumps by the residents themselves and informal waste collectors.

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