SOME SOCIO-ECONOMIC FACTORS AFFECTING SOLID WASTES GENERATION AND DISPOSAL IN IBADAN METROPOLIS, NIGERIA

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ABSTRACT

This study adopted a survey design. Questionnaire was administered on 215 respondents in Ibadan metropolis selected randomly. The objectives of the study are to examined the influence of some socio-economic factors on solid waste generation and disposal in Ibadan Metropolis. The nature and composition of solid waste generated, methods of disposal and relationship that exist between the socio-economic characteristics of the people and solid waste generation and disposal were also identified. Data for this study were obtained through the administration of questionnaire and review of existing literature. The information obtained from the field was analyzed using frequency and correlation matrix. The finding showed that the composition of waste generated in Ibadan Metropolis was a reflection of variation of socio-economic factors of the people. Also, socio-economic factors such as income, age, education, occupation and building types had greater influence on the choice of method of disposal in Ibadan Metropolis. It was recommended therefore that effective solid waste management can be achieved through the adoption of urban renewal strategy on the chaotic areas, provision of sizable fund by the government and proper education to the people among others.

Keywords: *Solid waste, Ibadan, socio-economic factor*

INTRODUCTION

Nigeria among the other third world countries is witnessing an unprecedented growth of cities in recent times. This is very obvious from the estimated rate of urbanization or urban expansion which is put at 3.6% per annum though the higher growth figure of above 6% have been recorded in cities such as Lagos, Ibadan, Kaduna, Port-Harcourt, Warri e.t.c (Falade 1998). It was estimated that 374.4million are city dwellers in Africa in 2007 and is expected to hit 759.4million by the year 2030 and possibly rising to 1.2 billion by 2050 (UN Habitat 2008). The country's high population figure has series of implication on every aspect of people's socio-economic and cultural life style. For instance, with the pressure in urban population, existing facilities such as, water, electricity, road, educational institution, housing become inadequate and solid waste generation and disposal take unprecedented precarious dimension.

Still on solid waste, it was estimated that about 20kg of solid waste is generated per capita per annum in Nigeria. For instance, Lagos alone generates over10,000

tones of solid waste daily (WHO, 2006). The volume of solid waste generated sometimes over-whelmed urban administrator's capacity to plan for their collection and deposal. Attempts to solve this problem effectively have given rise to myriad of strategies involving measurable amount of capital and human resources. These strategies yielded little or no positive impact on the physical urban environment of Nigeria cities.

Extant literature is explicit of the solid waste generation and disposal. Scholars such as Rushbook and Pugh (1999), Ikuporukpo (1993) Adedibu (1990), Abumere (1983) advocated that to evolve an effective solid waste management strategy, the need to carry out research on socio-economic characteristics of the residents as well as physical characteristics of different residential districts within an urban space is of paramount importance. Despite this clarion calls at various points in time, not much study have been focused at estimating the volume, composition and per capita refuse generated in Nigeria urban centers.

For instance, Adedibu (1985) opines that the nature and composition of solid waste generation is a product of the climatic and business activities of the urban centers. Abumere (1983) in his own study of solid waste generation in Ibadan examined the effect of socio-cultural factors on land use pattern such as housing density, eating habits etc. Abumere's (1983) findings shows that solid waste accumulation is a product of chaotic landuse pattern. Also the number of household living and eating habit in a house greatly determines by the level and composition of refuse to be generated.
Ibadan is occupied with diverse commercial, social and domestic activities. All of these activities produce lots of waste which are not properply managed.
Historically, Ibadan was founded in 1830s as a refugee camp which was the consequence of the collapse of Old Oyo and Owu Empire. The settlement grew rapidly under protection of war lords such as Lagelu, Ogunmola, and Oluyole etc and imposition of the British rule in 1890. During the period as well, the area extended over 40sq km (Mabogunje 1962). The metropolitan was covered by 29km city wall and accommodated a sizeable proportion of farm, forest and river plain. The city grew up as a result of the expansion of trade, transport and communication between the city and the rest of Nigeria.

The rapid development of the city has had impact on its spatial growth, the total area in 1963 was established to be 103.85km^2 according to the first comprehensive aerial photo coverage taken at that time (Egunjobi, 1986). The city like any other Nigerian cities is characterized by chaotic landuse pattern which is a reflection of poor planning in the past. Despite the chaotic landuse pattern which characterized the urban landscape of Ibadan, residents occupy over 60%, industries account for 16.55%, commerce is just 0.34% while educational institutions occupy about 3.4% of the total land use (Falade, 1998).

Tremendous increases in population, uncoordinated growth of development and expansion of commercial activities have impact on socio-economic and environment set up of the city. The city has been plague with virtually unmanageable

rate of refuse generation and its weak disposal method. It is very common to see the heaps of refuse littering the major streets in the city. This is a reflection of the poor refuse management techniques in the city (Omuta, 1987).

An assessment of the socio-economic factors that affect solid waste generation and disposal in Ibadan is of great importance in order to safeguard the city from various problems that could emanate from improper solid waste management. The consequences of solid waste management problem are that urban streets, streams and drainage systems are usually blocked giving rise to flood disaster in most of the country's urban centers. It is on this note that the study attempts an examination of the impact of socio-economic factors on solid waste generation and disposal by positing the case of Ibadan Metropolis.

METHODOLOGY

This study used the city of Ibadan which is located on longitude $3^0$53'E of the Greenwich Meridian and latitude $7^0$34'N of the equator as a case study. It is located near the forest grassland boundary extends Westward to Abeokuta, Eastward to Ile-Ife, Northward to Ilorin and Southward to Lagos. The city currently covers an area of over 500km^2. Ibadan is the home of Yoruba tribe who occupy the indigenous core area. Other tribes such as Hausa, Igbo, Ijaw etc occupy the new residential area. Data for this study were obtained from primary source. The data were obtained through direct interview technique and questionnaire administration; information was sought out on the socio-economic and personal characteristics of the respondents. The questionnaire also addressed the issue of the composition and methods of solid waste generation, storage and disposal.

Relevant literature on solid waste generation and disposal were reviewed. Similarly, documents were obtained from various agencies concerning the waste management such as Environmental Unit of the Local Government councils of Ibadan metropolis. The local Government visited includes Ibadan North, Ibadan North East, Ibadan North-West, Ibadan South-East, Ibadan South West and Akinyele Local Government. Also visited were the Urban Sanitation Committee which comprises of the five local governments, environment units of the core area of Ibadan and Department of Geography, University of Ibadan.

Further information on the land use map of Ibadan, staff strength, equipment used for refuse storage and disposal as well as location of dumpsite in the study area were also collected from the relevant authorities. The wards and indeed the house in the study area constitute the sampling frame. The city was divided into densities namely high, medium and low density zones. The demarcation into wards was done with the aid of Urban Landuse map of Ibadan Metropolitan Area. The Map was divided into 33 density zones, 20 of which were classified as high density while medium and low densities were 7 and 6 respectively. A sample of 20% of the zones was selected using systematic random sampling technique in which one out of every five

zones was selected. In all, a total of 6 zones were selected. The zone selected includes Agodi, Aperin, Orogun, and Ojo which are in high density zone. The other two Oke-Bola and Oluyole Estate are in medium and low density zones respectively. Similarly, a systematic random sampling technique was also used for selecting the house from where respondents were selected for the interview 10% of sample of the houses were selected for the survey. One out of every ten houses was selected. In all, a total of 215 copies of questionnaire were administered on 215 households in the study area. This means that one person was selected per household for the purpose of the questionnaire administration. The data collected through this medium was analysed by analytical table of frequency and correlation analysis.

The relationship between the socio-economic factors of the people of Ibadan metropolis with solid waste generation and disposal is best explained with the use of correlation coefficient. Correlation coefficient provides the researchers with a technique for measuring the linear relationship between two variables and produce single summary statistics that describes the strength of association between them. In this analysis, variables of solid waste generation, method of storage and disposal are used as dependent variables while the socio-economic characteristics such as age, family size, educational status, income, occupation, average monthly income and type of building are dependent variables.

RESULTS AND DISCUSSION

Table 1: Socio-Econonomic Characteristics of the Respondents

Socio-economic characteristics	***Frequency***	***Percentage***
Sex		
Male	121	56.3
Female	94	43.7
Total	215	100
Age		
Under 25	36	17.2
25 - 35	77	35.8
36 - 45	35	16.8
46 - 50	21	9.8
51 - 55	12	6.0
56 - 60	20	4.7
60 +	21	9.8
Total	215	100
Marital status		
Single	55	26.6
Married	55	26.6
Divorced/separated	139	64.7
Windowed	7	3.3
Total	215	100
Educational Level		
Nonformal education	44	20.5
Koranic	9	4.2

Primary/Adult	72	33.5
Sec./Tech./Grade II	60	27.9
Post Sec./University	30	14.0
Total	215	100
Occupation		
Trading	89	41.4
Farming	1	0.5
Driving	3	1.4
Civil Service	21	9.8
Barbing	5	2.3
Unemployed	5	2.3
Retrenched	1	0.5
Retired	8	3.7
Others.	32	38.1
Total	215	100
Average Monthly Income in Naira (N)		
5,000	1	7.0
5,001 - 10,000	36	16.7
10,001 - 15,000	46	21.6
15,001 - 20,000	48	22.3
20,001 - 25,000	27	12.6
25,000 - 30,000	21	9.8
Above 30,000	22	10.2
Total	215	100
Type of building		
Residential	142	66
Industrial	36	17
Commercial	33	14
Public	7	3
Total	215	100

Source: Field Survey, 2010

Table 1 shows the socio-economic characteristics of the respondents. It could be seen from the table that there are more male household heads than females. This shows the extent to which men traditionally dominate the household in urban areas of Nigeria. It is very obvious that people between the ages of 26 - 36 years dominate the age structure of urban household. With respect to marital status, about 65% of the respondents are married while only 26.6% are single.

The proportion of the respondents with primary and adult education is very high followed by those that claimed to have secondary/technical/grade II certificate. Based on the occupations of the respondents, trading forms the basic earning in the study area followed by civil services. Information on the income of the household heads was very difficult to obtain due to the following reasons low level of education which culminates fears of being taxed, inability to keep the record of their sales and the majority are not fixed and their income is not regular. However, the table shows that majority of the respondents are between the monthly income level of N10,000 - N20,000.

Table 2: Types of Solid Waste Generated

Types of Waste	*Frequency*	*Percentage*
Leaves	97	45.1
Polythenes	27	12.6
Textile	16	7.4
Stationeries/cartons	47	21.9
Glass	2	0.9
Bones	1	0.5
Leather	3	1.4
Abattoir Waste	3	1.4
Metal/Materials	13	6.0
Others	6	2.8
Total	215	100

Source: Field Survey, 2010

Table 2 shows the various wastes observed in the study area. It could be seen from the table that leaves and other vegetable matters constitute the major waste generated in the study area. This is followed by stationeries/cartons

Table 3: Distribution of Source of Solid waste

Sources	*Frequency*	*Percentage*
Residential	128	59.5
Commercial	41	19.1
Industrial	36	16.7
Public	4	1.9
Transportation	4	1.9
Others	2	0.9
Total	215	100

Source: Field Survey, 2010

Table 3 shows information on sources of solid waste generation in Ibadan metropolis. It is evidently shown that residential landuse generates more waste than others in the study area.

Table 4: The Equipment Used For Solid Waste Storage by Household in the Study Area.

Type of equipment	*Frequency*	*Percentage*
None	13	6.0
Basket	39	18
Receptacle	69	32.2
Plastic/refined bag	52	24.3
200L or 40 gal. Steel drums	36	16.7
Concrete construction	6	2.8
Total	215	100%

Source: Field Survey, 2010

The types of equipment used by households to store solid waste in their respective home are listed on Table 4. It has been observed that majority of the households interviewed are using receptacles. This is followed by plastic and refined bag, while others claimed to use nothing for solid waste storage. They either dump it in nearby gutter, stream or open spaces.

Table 5: Method of Faecal Method Disposal in the Study Area.

Method	*Frequency*	*Percentage*
Latrine	97	45.1
Water closet	67	31.2
Nearby dumpsite	41	19.1
Nearby bush	10	4.7
Total	215	100

Source: Field Survey, 2010

From Table 5, some of the respondents are using latrine for feacal matter disposal while others are using water closet in the study. Only few are using nearby dumpsite and bush. It was observed that majority of the respondents using water closet in the core area don't have soak away. They emptied the pipe that collect the feacal from the water closet into nearby steams and gutters.

Table 6: Method of Waste Disposal by Households in the Study Area.

Method	*Frequency*	*Percentage*
Incineration	28	13
Private vehicle	32	14.9
Public container	66	30.7
Community refuse dumpsite	36	16.7
Drains & Gutter	42	19.5
Public movable vehicle	8	3.8
Others.	3	1.4
Total	215	100

Source: Field Survey, 2010

Table 6 shows the various methods by which the respondents finally disposed their solid waste in Ibadan metropolis. The table shows that about some of the respondents are using public containers that are placed in strategic places of the city. Similar proportion of the respondents claimed the use of drains and gutters, and community refuse dump site.

Table 7: Correlation between Solid Waste Generation and Socio - Economic Factors

Socio-Economic Factors	*Solid waste generation*
Sex	-0.009
Age	- 0.243
Family size	-0.169
Educational status	0.346
Occupation	0.109
Monthly income	0.223
Type of building	0.263

Table 8: Correlation between Methods of Solid Waste Storage and Socio-Economic Factors

Socio-Economic Factors	*Methods of Solid Waste Storage*
Sex	-0.015
Age	-0.035
Family size	-0.012
Educational Status	0.257
Occupation	0.012
Monthly Income	0.127
Types of Building	0.146

Table 9: Correlation between solid waste disposal and socio-economic factors of the respondents.

Socio-economic Factors	*Methods of Disposal*
Sex	-0.115
Age	0.056
Family size	0.108
Educational Status	-0.241
Occupation	-0.089
Monthly Income	-0.265
Types of Building	-0.143

Source: Computer Analysis

It is imperative to note that such factors as sex, age, family size are negatively and poorly correlated with solid waste generation in the study area as revealed on table 7. This means that educational status, occupation monthly income and types of building are significant factors influencing the type and quantity of waste generation in Ibadan metropolis. This is interpreted thus, as people acquire more education, get better job and experience rise in income level the pattern of consumption changed thereby generate different types of waste that reflect their new way of life. Also, different type of landuse generates waste that reflects their activities. For instance, it was observed from the study area that residential generates more of vegetable matter while education and public produce paper waste. In addition, transportation, industrial and commercial activities produce different kind of waste such as polyethene, pieces of iron, unwanted gadget etc. This reflects the kind output they are producing.

Table 8 also reveals an interesting relationship between the Socio-economic factors and solid waste storage in the study area. Factors such as age, sex, and family size are negatively and poorly correlated with the methods used to store solid waste by the household. This is interpreted as age, sex, and family size are not determined factors in chosing the type of equipment for storing refuse in their home. But other factors such as educational status, occupation, monthly income and types of building positively and fairly correlated with type of equipment for storing refuse by the household. This is interpreted thus: the more the household get educated and aware of the side effect of unmanaged solid waste the more they appreciate effective waste management thereby chosing the best container that will keep it from breeding of disease carrying organisms. The type of occupation determine the choice of equipment for storing refuse by household.

Moreover, the level of income determines the ability to produce the equipment that are odour free and discourage breading of disease carring organisms. Also the land use type determines the choice of equipment for storing refuse. For instance a residential land use will use odor free equipment that discourage breeding of disease carrying organisms. Table 9 also shows that age and family size determine the choice of method of solid waste disposal. This implies then as people get married, bear children and increase in family size, they generate more waste which in most cases they cannot properly managed by themselves, therefore seek more efficient means for deposing them.

Problems of Solid Waste Management in Ibadan Metropolis

Some problems that contribute to solid waste accumulation have been identified in Ibadan metropolis. The core or the traditional area of the city is characterized by slum, inaccessibility, poor condition of the environment which is an evidence of poor town planning in the previous years. This culminated into the placing of public container in places far away from majority of users. As a result of this most residents have to walk long distance before getting to where they can dump waste. Many have to indiscriminately dump their waste in nearby open spaces, drains and streams causing environmental hazard within the neighborhood.

Secondly, shortage of manpower both skilled and unskilled hampered the efficient management of refuse in Ibadan metropolis. The shortage of staff makes environmental law and order to be ineffective in the core area. The staff are needed to educate the populace and enforce law on the people. More so, lack of maintenance on the vehicle used to evacuate the refuse deposited in the containers also hampered the effectiveness of their uses. The environmental officials complain of inadequate fund to maintain their vehicle. This resulted into abandoning the containers and their contents which leads to environmental pollution and breeding of disease carrying organisms. Moreover, there is lack of cooperation between the people and the environmental health officials in charge of solid waste management. This is observing from the people who are using the containers. For instance, a household may send a teenager who will not be able to properly dispose the waste into the container. The little child would eventually dump the waste beside it which will eventually accumulate around it. The private companies that are concerned with the management of solid waste in the low density area are faced with the problem of heavy tax levied on them by the government.

CONCLUSION AND RECOMMENDATIONS

At the expiration of the life cycle of any usable item, it becomes a waste or garbage. Even man and other living things are waste once they die. To make life more comfortable for those ones still alive, the corpses are properly disposed in the grave. This study is of the opinion that every waste has its "grave" if the environment must be safe for others to live in. Though this study is particular about solid waste generation, storage and disposal, waste generally either solid or liquid should be properly treated or managed. The study shows that the people socio-economic characteristics explain almost all the variations in the solid waste generation, storage and disposal in Nigerian cities. health is wealth it can be concluded that the management of the environment is a pre-requisite for good and sound health.

However health policies that would guarantee environmental sanitation in which management of solid waste is inclusive should be encourage. People should imbibe the culture of attitudinal change. This is an important aspect that concerns every stakeholder in the environment. Those that connect pipes to streams, gutters and drainage systems instead of digging sock away are not guided by their conscience.

The government should employ an urban renewal strategy in the core area so as to implement effective environment policy in the area. Urban renewal strategy will pave way for the accessibility of refuse disposal vehicles to the core area and also allow the public container to be placed in places accessible to the public. Additional hands are needed to compliment the existing number of staff that is employed in enforcing environmental law in Ibadan metropolis. Moreover, the residents should be enlightened in the way the public containers are to be used. Environmental education should stress on the set of people that can use the container instead of young and adolescent.

The government should vote sizeable amount of money for refuse management in the city. The amount that will cover education of the people, training, workshop, maintenance of vehicle and purchasing additional one to complement the existing stock. A comprehensive survey should be carried out in the city. The survey should cover areas such as the quantity of waste generated daily, the number of people in a particular locality and the types of waste generated in different zone. The knowledge of these will help government to prepare a comprehensive maeterplan for solid management. Moreso, the private companies that are specializing in waste management should be encourage by given the tax free holiday and supplying spare parts at a subsidized rate for the maintenance of their vehicles. Lastly, since most of the refuse are organic, they can be easily converted into organic fertilizer and sell to the public for agriculture and horticultural purpose.

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