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Solid Waste Disposal Practices of Households in Housing Estates in Awka Anambra State

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Abstract

The study investigated solid waste disposal practices of households in Awka.Specifically, itdetermined types of solid waste generated by households; methods of household solid waste disposal practices, problems households encounter in their solid waste disposal practices and ways of solving the problems households encounter in their solid waste disposal practices. The population was made up of 287 homemakers. The sample of the study was 211 homemakers consisting of 98 from Iyiagu Housing Estate and 113 from real Estate Housing Estate both in Awka. Questionnaire was used for data collection. The data was analysed using mean and standard deviation. The major findings were that putrescible matter was the commonest waste generated by households. Household do not sort their solid waste before disposal. The result also revealed that some of the problems encountered by households includes: irregular waste collection by ANCEPA, inadequate facilities and equipments for waste collection. It was concluded that environmental education should be given to household on proper waste collection and disposal practices. The government should provide resources so that regular house to house collection of solid waste should be done by ANCEPA.

Keywords: Solid, Waste Generation, Disposal, Practice, Households.

Introduction

Waste disposal practice is one of the major challenges facing households in Nigeria. This challenge has occupied the attention of the federal, state and local government authorities for many years (Nunwbia, 2014). Advocates of environmental protection have called for appropriate legislation and regulation to control and protect Nigeria environment from further deterioration particularly in connection with waste management in cities and urban areas (Oleyoyegbe, 1995).

The volumes of waste being generated in urban areas of Nigeria are parallel to its economic dimension and population growth (Olarlere, Mathew&Dkehinde 2015). Egum (2012) opined that waste characteristics vary according to season, income level, population, industrial production. Thus, waste can either be in liquid or solid form. Liquid wastes include all dirty water from bathroom, toilet (water

closet), kitchen and some rain water collected by gutters, while solid wastes include all other rubbish household members accumulate such as waste foods, pieces of papers, broken bottles, ashes from firewood, cloths, cellphone bags, empty cans and tins and even broke plates. These wastes need to be properly disposed to ensure good health of household members. The quality of health of household members depends to a large extent on the hygienic condition of the home and the environment.

Households are group of people living together in common residence or apartment as consuming units in a physical environment. The daily household activities and consumption practices are bases of waste generation. Solid wastes practices are bases of waste generation which is the primary focus of this study. Solid waste is consequences of human activities which involves the production of goods and services and the consumption of natural resources (Ukwe, 2004). The major types of wastes generated in Nigerian households include decayed organic waste (food ruminants, leaves, and animal) and non-decayable inorganic waste (tins, can, synthetic wrappers, plastic containers, glass, cellophane bags etc). Modebe, Ezeama, Ogbuagu&Agam (2011) reported that solid waste generated by households in Awka includes putrescible matter, cellophane bags, paper and cartons and bottles/glasses/plastics and faulty appliances.

There are various methods of waste disposal practices which includes land filing which involves burying the waste in abandoned or unused quarries, mining or burrow pits and covering it with layers of soil; incineration involves subjection of solid organic wastes to combustion at a very high temperature of about $10{,}0000^{C}$ so as to convert them into residue or gaseous products; open dumping; whereby dumping can be done on open land or sea; composting; this is an aerobic, biological process of degradation of biodegradable organic matter; hog feeding; this involves feeding animals like pigs with left over materials of waste; mechanical destructor; this involves the use of mechanics to destroy waste materials and recycling of waste which means ducking waste materials and transforming them into raw products, results in saving natural resources, saving energy, reducing disposal cost, reducing harmful emission to air and water, saving money and creating job (Adogu, Uwalewe, Egenti, Okwuoha&Nkwocha, 2015).

Furthermore, poor waste disposal practice could lead to various diseases, infections and infestation. Another problem is the issue of absence of storage facilities (waste bins with tight fitted cover), irregular visitation of refuse collectors, use open trucks for refuse collection and dumping refuse in gutters and unapproved dump site. (Modebe et al 2011; Stanley &Owhor, 2018).

Globally about 1.3 billion tons of waste are generated while in Nigeria

about 0.035% are generated by households (Izugbara&Umoh, 2004) Nigerians in urban and rural areas generates about 0.49kg of solid waste per day with households and commercial centers contributing about 10% of total urban waste burden of which about two third of the wastes are dumped indiscriminately on the streets and in the drains thus posing serious environmental health hazards (Lawal, 2004)

A south African study found that out of the 5million tons of waste produced every year, only 5% is disposed of at designated sites, which implies that most of the waste in that country is deposited in environmentally unsafe site (Ogbola, Chimuka&Tshivhase, 2011). In Nigeria the case is not different as Adogu et al (2015) reported that in Lagos Nigeria that some of the open pits used for refuse disposal are located near residential areas and poses a threat to human health and the environment. According to Okoye, Ogwuejiofo& Okoye (2008) many urban centers in Nigeria are suffering from the menace of improper waste disposal practice which has resulted in health problems, high level of pollution, traffic problems, poor aesthetics and flooding.

In urban centers like Awka, residents are known to dump their waste on the streets during rain which usually block drainage channels causing erosion problems (Okoye, 2004). Awka town is an urban area and the capital of Anambra State with rapid growth in population and infrastructural development. The population keeps increasing due to the presence of both federal and state establishments and increased commercial activities. According to Onu& Obi, (2016), the agricultural waste alone generated in Awka is about 17,825 tonnage/month. Most of the solid wastes generated by various households in Awka are indiscriminately disposed along the streets, in drainages at night or during the rain and in empty plots around homes thereby littering the streets and major roads, thus living the environment in a dirty state.

Purpose of the Study

The main purpose of this study was to investigate the solid waste disposal practices of households in housing estates Awka. Specifically, the study determined:

1. types of solid wastes generated by households.
2. methods of household solid waste disposal practices.
3. Problems households encounter in their solid waste disposal practices

Methodology

***Area and design of the study*:**The design used for the study is a survey research design. The area of the study was Awka. The study was carried out in the government owned housing estates in Awka. The housing estate were bungalows built by government and given to public servants on owner occupier basis. The estates (Iyi-agu housing estate and Real estate) have some dump sites which were

overflooded with solid wastes.The wastes were not cleared regularly.

***Population for the Study*:** The population of the study consists of 287 homemakers drawn from 287 households that make up the estates. One hundred and twenty-nine (129) homemakers from Iyi-Agu Housing Estate and Onehundred and fifty-eight (158) homemakers from Real Estate Housing Estate. The age range of the homemakers were between 25-70 years. The homemakers were literate as about 70% had tertiary education while 25% had secondary education and 5% had primary education.

Sample for the study: The sample of the study was 211 homemakers consisting of 98 from Iyi-Agu Housing estate and 113 from Real Estate Housing Estate in Awka. They were randomly selected.

***Instrument for Data Collection*:** Instrument used for data collection was a structured questionnaire titled solid waste disposal practices of households (SWDPH). It was divided into two sections. Section A sought for demographic data while section B contained information based on the purposes of the study. The scoring of the items was based on a 4-point scale as follows: Strongly Agreed (SA), Agreed (A), Disagreed (D), and Strongly Disagreed (SD) with the value of 4, 3, 2 and 1 respectively. The instrument was validated by three Home Evonomics lectures in tertiary institutions. The reliability of the instrument was determined using Crobatch Alpha which yielded 0.86 reliability co-efficient.

***Data Collection method*:** The data collected was through the help of three research assistants selected and briefed on how to administer and collect data from the respondents. All the 211 questionnaires were administered but only 168 was returned.

***Data Analysis techniques*:** The data collected was analyzed using mean and standard deviation.Mean of 2.50 was used as basis for decision making for the specific purposes. Any item with mean value of 2.50 and above regarded any of the following: "solid waste generated" "method of disposal"; "problem encountered by households" or "way of solving problem".

Results

Table 1: Mean Responses on Types of Solid waste generated by Household in Awka.

S/No	Types of solid waste generated by households	Mean	SD	Remark
1.	Woods	2.82	0.92	GEN
2.	Sweeping/Ash residues	2.34	1.01	NGEN
3.	Bottles/glasses/plastics	2.55	0.98	GEN
4.	Papers and cartons	2.56	1.02	GEN
5.	Cellophane bags/ Wrappings	2.87	0.94	GEN
6.	Faulty appliances	2.40	1.30	NGEN
7.	Putrescible matters (Biodegradables)	3.96	0.08	GEN

GEN = Generated; NGEN= Not generated.

Table 1 reveal that out of the seven items listed as types of solid waste generated by households in Awka, only five of the items are types of solid waste generated by households. Two of the items are not generated. Item number 1 on the Table had the highest mean score of (3.96) while item number 2 had the lowest mean score of (2.34).

Table 2: Mean Responses on methods of households solid waste disposal

S/No	Households solid waste disposal practices	Mean	SD	Remark
	Ways households' sort solid waste			
1.	Solid wastes are sorted	1.92	0.75	NM
2.	Solid wastes are sorted according to types before disposal.	1.76	0.59	NM
	Facilities used for Waste Collection			
3.	Containers with cover	2.52	0.95	M
4.	Containers without cover	2.78	0.82	M
5.	Cellophane bags	2.74	0.92	M
	Households Solid Waste Collection and Disposal Practices			
6.	Door-to-door collection by government agency	2.68	0.94	M
7.	Tipper and trucks used for collection	2.52	0.95	M
8.	Open dumping	1.98	0.89	NM
9.	Incineration in front or back of homes	2.78	0.82	M
10.	Community dump site	2.82	0.85	M
11.	Gutters used as dump site	2.08	0.97	NM
12.	Land fills	3.14	0.86	M
	Frequency of Waste Disposal			
13.	Everyday	2.52	0.95	M
14.	Every other day	2.88	0.72	M
14.	Once in two weeks	3.14	0.86	M
15.	Once a week	3.93	0.07	M
16.	Once a month	1.96	0.70	NM

M=Method of solid waste disposal; NM=Not method of solid waste disposal

Table 2 shows that households adopted twelve items out of seventeen items as households solid waste disposal practices in Awka as these items met the cut-off point of 2.5 and above while five items were not adopted as household solid waste disposal practices in Awka with a cut-off point less than 2.5. The table revealed that number 23 had the highest mean value of 3.93 while item number 9 had the lowest mean value of 1.76.

Table 3: Mean Responses on problems households encounter in their solid waste disposal practices

S/No	Problems Households encounter in the solid waste disposal practices	Mean ($\bar{x}$)	SD	Remark
1.	Lack of planning at national and state level on how solid waste should be managed.	3.10	0.68	P
2.	Lack of training in SWM and availability of qualified waste management.	3.12	0.57	P
3.	High tax collection rates	2.51	0.8	P
4.	Unwillingness of user to pay for the service.	3.14	0.61	P
5.	Absence of effective waste management legal framework.	2.58	0.07	P
6.	Inadequate facilities and equipment for refuse collection.	3.10	0.54	P
7.	Lack of environmental education and public awareness and participation.	3.20	0.49	P
8.	Insufficient funding of by government to cover the costs associated with waste collection, storage, treatment and disposal.	3.16	0.05	P
9.	Irregular waste collection by ANSPA	3.10	0.54	P

P=Problem of solid waste disposal=Not problem of solid waste disposal

Table 3, reveals that all the 9 items were accepted as problems households encounter in their solid waste disposal practices. The result revealed that item number 31 had the highest mean value of 3.20 while item number 27 had the lowest mean value of 2.51.

Discussion of Findings

Finding in Table 1 reveals that 7 items were accepted as types of solid waste generated by households in Awka. The result revealed that the major type of solid waste generated by households is putrescible matters. This is in line with the finding of Modebe et al (2011) who reported that putrescible matters form the bulk of the household waste generated by the respondents. The result also revealed that cellophane bags, papers and cartons and bottles/glasses/plastics formed part of the major types of solid waste generated by household living in the two housing estates in Awka with a mean value of 2.87, 2.56 and 2.55 respectively. This is not in line with the finding of Modebe et al (2011) in Awka. They reported that these items formed the smallest portion. This is in line with the study carried out in two Ghanaian University were this type of waste were generated in the campuses (Denery, Kuusonana, & Owusu-Sekyere 2018).

The result in Table 2 revealed that eighteen items out of twenty-one items were accepted as households solid waste disposal practices in Awka.The result revealed that solid waste was not sorted before disposal in Awka. This is in line with the report of Adogu et al (2015) in Owerri municipal were 88.3%

of households do not separate their waste before disposal, sorting and sort according to types were rejected as ways of solid waste disposal practice in Awka and this is in line with the report of Niragude, Naik, Prasad & Magara (2014) in an urban slum area of south India were dust bin was present in (44.1%) of households but only (18.9%) were having separate dust bin for dry and wet refuse. The report shows that most of the households have no knowledge regarding segregation.

Another report by PuriAnnash et al in Nnrgude et al (2014) in Jalandhar city observed that solid waste is not segregated but were dumped indiscriminately by the families. This reflects the need to create awareness in Awka on the need for segregation or sorting waste and proper disposal of solid waste. Sorting of waste ensures that recycling materials are separated and reused. Resources like separate dust bins should be provided.

The result also revealed that facilities use by household for waste collection includes containers without cover, cellophane bags and containers with cover with a mean value of 2.78, 2.74 and 2.52 respectively. Containers with cover had lowest mean acceptance. This shows that majority of households use container with covers in their waste collection. This is in line with the report of Adogu et al (2015) were (51.4%) of their respondent collect their waste in container with cover. This is also in line with the outcome of the report of Modebe et al (2011) in Awka. This suggests that households should have refuse container with good lids to store their wastes (Nnwbia, 2014).

The study revealed that collection and disposal of solid waste by household is done by door-to-door collection by government agency while majority of the respondents also reported that they went out to the trucks and tippers to dump their refuse. This is in agreement with the finding of Modebe et al (2011) who reported that home collection service is given by environmental agency (ANCEPA) 4.5% while 68.5% were out to the tippers and trucks to dump their refuse when they are moving around their vicinity. The result also revealed that majority of the respondents dump their refuse in community dump site while some use gutters as dump site. This is in agreement with the finding of Modebe et al (2011) and also in line with the findings of Adogu et al (2015) in Owerri municipal. This shows that the households are not aware of propare waste disposal practices. This is in congruence with the report of Okoye (2004) who said that many urban centers like Awka, residents are known to dump their waste on streets during rain which usually block drainage channels causing erosion. Landfillshad the highest mean acceptance in this study and is not in line with the report of Stanley et al (2018) who said that 23.3% of their respondents thought that their refuse was disposed on a landfill. Adogu et al (20150 reported that (66.3%) resident in Owerri municipality preferred open dumping as a method of waste disposal while this is in variance

with the present study as open dumping did not met the cut-off point. Sanitary landfills which are well engineered facilities with liners, leachate collection and treatment system and gas collection system are currently used to safeguard human health and protect the environment (Stanley et al, 2018). Stanley et al (2018) also reported that in some part of Nigeria where landfills are available, they are usually the unsanitary type created from said mining activities into which waste could be deposited.

Majority of households in Awka dispose their refuse once a week with a mean value 3.93. This is in variance with the report of Stanley *et al* (2018) who reported that in their study area in Port Harcourt that a major part of the residents disposed their waste twice a week due to convenience, however accumulation of waste for a long time leads to susceptibility to infections and diseases (Stanley *et al*, 2018).

Table 3 shows the problems households encounter in their solid waste disposal practices. All the items in table 3 were accepted as problems households encounter. Item number 31 lacks of environmental education and public awareness and participation had the highest mean acceptance of 3.20 and is in line with the finding of Popoola, Ayangbile&Acheleye (2016) in Ibadan North who reported that education and awareness is need for citizen to put off the long-acquired habit of indiscriminate waste disposal habit which is eminent. Public health educators/environmentalists should mobilize to educate people on the need for proper waste disposal practices (Popoola et al (2016). The study also revealed absence of effective waste management legal/framework, irregular waste collection by (ANSEPA) and inadequate facilities and equipments for refuse collection as a problem. This is in line with other studies and this goes to suggest that there is need for payment of fines for indiscriminate disposal practices as this will help checkmate the culture and attitude of indiscriminate disposal of waste among households. Effective collection service by government agency is also important for propare waste disposal practice as this will go a long way in reducing nuisance along the streets and air pollution due to the bad odour that emanates from the dump site. There is need for co-operation among residents in the sameneigbourhood concerning their willingness to pay for services from ANSEPA.

Recommendations

Based on the findings, it was recommended that:

- Anambra State environmental protection agency should step up campaigns on proper waste disposal practices.
- Strict enforcement of sanitation laws on defaulters should be encourage by the government.
- Regular and effective waste collection and disposal practices should be done by government agency in-charge of sanitation.

- ❖ Environmental education should be given to the households on propare waste disposal practices.

Conclusion

Awka is the capital of Anambra State with high population density which increases on a daily basis with increasing corresponding waste generation rate. The problems of improper solid waste disposal practices of households can be reduced by educating the households, on propare methods of waste disposal practices and helping them to understand the danger of indiscriminate waste disposal practices. ANCEPA should always make sure that wastes generated by household are evacuated on a regular basis. Environmental education should be given to household on propare methods of household waste collection and disposal practices. There is need for adequate funding by the government tocover the cost associated with waste collection, storage, treatment and disposal. Resources should be provided so that regular house-to-house collection of solid waste should be done by ANSEPA.

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