

SOLID WASTE MANAGEMENT PRACTICES AMONG RESIDENTS IN IMO STATE, NIGERIA.

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Abstract: Background: Improper waste management practices distort the aesthetic beauty of the environment, causing environmental pollution as well as spread of diseases. The aim of the study was to assess solid waste management practices among residents in Imo State, Nigeria. The objectives of the study were to identify types of solid waste generated at household levels and to determine patterns of solid waste disposal practices among the residents of Imo State Nigeria.

Method: Cross sectional research design was used for the study. Multistage sampling technique was adopted for the study across the communities and households in the Local Government Areas (LGAs) in Imo State Nigeria. A total of 1600 residents/households were selected for the study. Instrument used for data collection in the study was an adapted questionnaire titled Household Solid Waste Management Survey Questionnaire (HSWMSQ). Reliability of the instrument was established through test-retest method using Cronbach's Alpha which yielded coefficient of 0.749. The data collected were analysed using frequencies, percentages, mean, Standard Deviation and Chi-Square Statistics.

Results: Findings showed that majority (85.2%) of the respondents identified plastic/nylon as the major household waste. Also, majority (67.2%) of the respondents claimed that burning is the most frequently used method in disposing paper/cardboard. Rubbish bin/drum was used by 36.9% of the respondents to collect household waste always. There was significant association between the communities and practice of sorting domestic waste among the respondents ($X^2 = 64.847$; $P = 0.000$). Significant association also existed between the residents' occupation and their practice of sorting domestic waste ($X^2 = 36.929$; $P = 0.000$).

Conclusion: Poor patterns of waste disposal among the residents in Imo State constituted threat to the health of the residents. Focused health education and home visits are needed to enhance teaching of the

appropriate skills required for proper disposal of household wastes. This will ensure prevention of diseases and subsequently reduce morbidity and mortality rates.

INTRODUCTION

Household waste is one of the primary components of municipal solid waste comprising of food wastes, paper, plastic, rags, metal and glasses from residential areas [1]. Solid waste management or disposal includes all activities involved in collection, transportation, processing or recycling required to manage waste from its inception to the final disposal in an effort to reduce their adverse effects on human health [2]. Solid waste management is defined as the discipline associated with the control of generation, storage, collection, transportation, processing or disposal, and monitoring of waste materials in a way that best addresses the range of public health, conservation, economics aesthetic, engineering and other environmental considerations. [3]The primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials produced by human activities on health and environment to support economic development and quality of life [4]. Solid waste management is imperative because improperly stored refuse or garbage can cause serious health problems [5] and economic problems [6].

Solid waste management practices can differ for residential and industrial settings, for urban and rural areas, and for developed and developing nations [7, 8]. For all solid waste management issues, community members and families should be engaged in solid waste disposal. This is because waste disposal has remained a public

health concern [9]. Also, it is something that each and every household and business owners in this world need to do so as to prevent damaging the Earth's ecosystems and maintain high quality of life for the planet's inhabitants [6]. Improper waste disposal by one individual affects the entire citizenry; so, as a policy, countries should task every individual, establishments or institutions to contribute significantly to the process of keeping their communities and environment clean [10].

Awareness and knowledge of waste disposal methods or patterns will promote proper practices such as solid waste segregation and recycling. The attitude of people towards waste management can be affected by their level of knowledge and awareness of waste management (11). In addition, household participation in solid waste separation activities is dependent on the level of awareness of recycling activities in the area, household income, educational level and gender (12). Various methods of waste disposal exist which include open dumpsite, landfills, incineration, open burning and recycling of waste [13]. However, the common methods usually adopted, especially by people in developing countries are open dumpsite method and open burning [14]. Studies have shown that wastes are littered on streets, gutters, undeveloped plots or dumped into rivers and streams (15). Each method has its own disadvantages and advantages. The disposal of wastes by landfills involves the mass dumping of

wastes into a designated area. Sanitary land filling is the process of dumping municipal solid wastes in a scientifically designed area spreading waste in thin layers, compacting to the smallest practicable volume and covering with soil on daily basis [8] without creating nuisances or hazards to public health or such as the problems of insects and the contamination of ground water [14]. Unscientific and ordinary land filling usually results in contamination of ground water, large amounts of foul odor and release of methane that cause air pollution which can adversely affect the environment and prove fatal to the lives of humans and animals [16].

On the other hand, incineration is a type of disposal method that involves the burning of household solid wastes at high temperature so as to convert them into residue and gaseous products [11]. The biggest advantage of this method is that it can reduce the volume of solid wastes and decrease the amount of space they take up [13]. The problem with this method is air pollution as the incinerated materials release pollutants into the air [17].

It is against this background that the researcher deemed it necessary to empirically assess solid waste management practices among residents in Imo State, Nigeria.

Research questions:

- (1)** What are the types of solid waste generated at household levels among residents of Imo State Nigeria?
- (2)** What are the patterns of solid waste disposal practices among residents of Imo State Nigeria?

Hypothesis:

There is no significant association between age group, community, occupation, educational level and marital status with practice of sorting of household waste among residents in Imo State, Nigeria.

MATERIALS AND METHODS

Study Design: Cross-sectional research design was used for the study.

Area of Study:

This study was carried out in the communities in Imo State, Nigeria.

Population of Study:

The study population were household heads/residents in the communities in Imo State Nigeria.

Sample and Sampling Technique:

Multi-stage sampling technique was used to select households for the study. In the first stage, simple random sampling method was used to select five Local Government Areas for the study. This technique allowed all the LGAs equal chance to be selected. In the second stage, simple random sampling was used to select five (5) towns/communities from each of the selected LGAs. A total of twenty-five (25) communities were therefore used for the study. This technique also ensured that equal chances of being selected occurred within the communities/towns that make up the LGAs. In the third stage, systematic sampling technique was used to select households for the study. To get the sampling interval or the space between each selected household, the total number of households was divided by the sample size. The sampling interval was then used to select subsequent households. In each of the selected communities, sixty-four (64) households were selected for the study. So

the total numbers of households for the 25 communities was 1600 (25*64= 1600). Convenience sampling was then used to reach the household heads that met the criteria for the study.

Instrument:

Instrument used for data collection in the study was a questionnaire titled Household Solid Waste Management Survey Questionnaire (HSWMSQ) adapted by the researchers from Vitharana (1998) Household Questionnaire on the importance of Solid Waste Management for Sustainable Development. HSWMSQ comprised five sections (A–E), with a total of forty-three (43) items. Section A of the HSWMSQ elicited information on demographic characteristics of the respondents (e.g. age, occupation/employment status etc). This section is made up of six (6) items. Section B consisted of 8 items formulated to elicit information on types of household generated wastes (e.g. plastics, glass, paper etc) Section C consisted of 14 items which elicited information on patterns adopted by households in disposing their wastes (e.g. burning of household waste, burying of household waste, dumping of household waste in river or on the road, recycling of household waste etc) and sorting of household wastes. Reliability test for the instrument was done with 160 copies of the HSWMSQ which constituted 10% of the sample size administered to households in five communities which did not constitute part of the sample of the study, but had similar characteristic with the respondents in the area of study. Test retest method was used to measure the reliability of the instrument. The co-efficient obtained was 0.749.

Data collection:

The researchers obtained ethical approval for the study from the Health Research Ethics Committee, College of Medicine, Imo State University Owerri. Two (2) research assistants were recruited in each of the 25 communities used for the study by the researchers and they were instructed on how to assist in administration and retrieval of the questionnaire. Thus, a total of 50 research assistants were used for the study. The research assistants were public health nurses working at the various health centers in the communities. This category of healthcare workers were used because they were familiar with the communities and the community members recognized them as healthcare workers. To reduce bias of household selection, the visits started from the first household. To do this, numbers were assigned to the households. This ensured orderly visits to the households.

Available household heads were allowed to participate. Thus, the selection of the household heads was based on their accessibility and proximity to the researchers. In the absence of head of household that met the inclusion criteria adults above 18 years were interviewed based on their willingness to participate. The respondents were briefed on the purpose of the study and items in the instrument explained to them prior to the administration of the instrument. The interview was conducted on one to one basis.

Houses where the residents were not met at the time of the first visit were revisited later. The researchers used eight weeks for collection of data. The completed copies of the questionnaire were retrieved on the spot. A total of 1586 copies

of the questionnaire were returned. The return rate was 99.125 % (1586/1600 * 100/1%).

Data Analysis:

Data collected were coded for statistical analysis. Descriptive statistics of frequencies, percentages, means and standard deviation were used to analyze the demographic data and answer the research questions. Chi Square was used in

determining the association between of age group, community, occupation, educational level and marital status with practice of sorting of household waste among the respondents. Hypothesis was tested at 0.05 level of significance. Statistical Package for Social Science (SPSS) software, version 18.0 was used in the analysis.

RESULTS**Table 1: Socio Demographic characteristics of the Respondents**

Variable	Frequency	Percent	Mean/SD
Age	1586	100	34.8089/13.38276
Community			
Ehime Mbano	309	23.3	
Mbaise	259	16.3	
Ideato	302	19.0	
Orlu	363	22.9	
Ngor Okpala	293	18.3	
Total	1586	100	
Occupation			
Cleaner/attendant	47	3.0	
Artisan	174	11.0	
Famer	83	5.3	
Civil servant	194	12.3	
Clergyman	3	0.2	
House wife	19	1.2	
Banker	30	1.9	
Businessmen/ Entrepreneur	407	25.8	
Professionals	78	4.9	
Senior citizen	14	0.9	
Students	514	32.6	
Driver	13	0.8	
Total	1586	100	
Education			
No formal education	46	2.9	
Primary	140	8.9	

Secondary	519	33.2
Tertiary	860	55.0
Total	1586	100
Marital Status		
Single	641	40.5
Married	784	49.5
Divorced	62	3.9
Widowed	97	6.1
Total	1586	100

Table 1 shows that the mean age of the respondents was 34.8089 with Standard Deviation of 13.38276. The largest number of respondents from the communities were from Orlu LGA with 363(22.9%) while the least were from the communities in Mbaise LGA with 259(16.3%). 47(3.0%) respondents were Cleaners/Attendants, 174(11%) were Artisans. 83(5.3%) were Farmers, 194(12.3%) were Civil Servants, 3(0.2%) were Clergy men, 19(1.2%) were Housewives, 30(1.9%) were Bankers, 407(25.8%) were Businessmen/ Entrepreneurs

78(4.9%) were Professionals, 14(0.9%) were Senior Citizens, 514(32.6%) were Students and 13(0.8%) were Drivers.

46(2.9%) respondents had no formal education, 140(8.9%) respondents had primary education, 519(33.2%) respondents had secondary education and 860(55.0%) respondents had tertiary education.

641(40.5%) respondents were single, 784(49.5%) respondents were married, 62(3.9%) respondents were divorced and 97(6.1%) respondents were widowed.

Table 2: Types of Solid waste generated at household level among the residents

Types of household Waste	YES		NO	
	Frequency	Percent	Frequency	Percent
Food waste	1214	76.9	364	23.1
Plant trimming	964	61.8	597	38.2
Paper cardboard	1084	69.5	476	30.5
Plastic/Nylon	1337	85.2	232	14.8
Metal	902	58.0	653	42.0
Glass	756	48.4	802	51.6
Wood	879	56.3	681	43.7
Others	318	42.9	424	47.1

As presented in table 2, 1214 (76.9%) respondents said that they generate food wastes,

364 (23.1%) respondents said they do not generate food wastes. 964 (61.8%) acknowledged

generating plant trimmings while 597(38.2%) acknowledged not generating plant trimmings. 1084 (69.5%) of the respondents generated Paper cardboard as wastes and 476 (30.5%) do not generated Paper cardboard as wastes. 1337 (85.2%) identified plastic/ nylon as wastes they produced and 232 did not identify plastic/ nylon as wastes they produced. 902 (58.0%) identified metals as wastes they produced and 653 (42.0%)

did not identify as metals wastes they produced. 756 (48.4%) identified glass as wastes they produce while 802 (51.6%) did not identify glass as wastes they produce. 879 (56.3%) identified wood as wastes they produced and 681 (43.7) did not identify glass as wastes they produced. 318 (42.9%) identified other types of domestic wastes they produced while 424 (47.1%) did not identify other types of wastes they produced.

To assess the patterns of solid waste disposal practices among residents in Imo State, Nigeria

Table 3.1: Most Frequently Used Methods of Disposing Domestic Waste

Item	Burn	Bury	Gully	Water drainage	Bush	Dump site	Garbage truck	Reuse	Compost	Others
	n (%)	n (%)	n (%)	n (%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Food wastes	154(10.2)	117(7.7)	26(1.7)	88(5.8)	173(11.4)	427(28.2)	211(13.9)	26(1.7)	290(19.2)	1(0.1)
Plant trimming	351(23.8)	152(10.3)	16(1.1)	27(1.8)	220(14.9)	319(21.6)	73(4.7)	3(0.2)	315(21.3)	1(0.1)
Paper/cardboard	1001(67.2)	43(2.9)	15(1.0)	15(1.0)	62(4.2)	257(17.2)	75(5.0)	14(0.9)	7(0.5)	1(0.1)
Plastics	727(48.9)	99(6.7)	13(0.9)	10(0.7)	90(6.0)	312(21.0)	89(6)	137(9.2)	10(0.7)	1(0.1)
Metals	81(5.6)	198(13.6)	42(2.9)	20(1.4)	219(15.1)	406(28.0)	210(14.5)	165(11.4)	9(0.6)	101(7.0)
Glass	49(3.4)	267(18.5)	55(3.8)	19(1.3)	204(14.1)	435(30.1)	343(23.7)	67(4.6)	5(0.3)	1(0.1)

Results from table 3.1 showed frequently used methods of disposing various domestic wastes. For disposing food wastes, 154 (10.2%) did burning, 117(7.7%) bury, 26(1.7%) dispose in the gully, 88(5.8%) use water drainage, 173 (11.4%) dispose in the bush, 427 (28.2%) use the dump

site, 211 (13.9%) use the garbage truck, 26 (1.7%) reuse food wastes, 290 (19.2%) use food waste for compost and 1 (0.1%) indicated other methods they used in disposing food waste.

For disposing of plant trimming, 351(23.8%) use burning method frequently. 152(10.3%) use

burying method frequently, 16(1.1%) dispose in the gully, 27(1.8%) use water drainage, 220 (14.9%) dispose in the bush, 319 (21.6%) use the dump site, 73 (4.7%) use the garbage truck, 3(0.2%) reuse plant trimmings, 315 (21.3%) use food waste for compost and 1 (0.1%) indicated other methods they used in disposing plant trimmings.

In assessing the most frequently used methods to disposing paper/cardboard, 1001 (67.2%) burn, 43(2.9%) bury, 15 (1.0%) dispose in the gully, 15(1.0%) use water drainage, 62 (4.2%) dispose in the bush, 257(17.2%) use the dump site, 75 (5.0%) use the garbage truck, 14(0.9%) reuse paper/cardboard, 7 (0.5%) use paper/cardboard for compost and 1 (0.1%) indicated other methods they used in disposing paper/cardboard.

For disposing of plastics, 727(48.9%) use burning method frequently, 99(6.7%) use burying method frequently, 13(0.9%) dispose in the gully, 10(0.7%) use water drainage, 90 (6.0%) dispose in the bush, 312 (21.0%) use the

dump site, 89 (6.0%) use the garbage truck, 137(9.2%) reuse plastics, 10 (0.7%) use plastics for compost and 1 (0.1%) indicated other methods they used in disposing plastics.

In assessing the most frequently used methods to disposing metals, 81 (5.6%) burn, 198(13.6%) bury, 42(2.9%) dispose in the gully, 20(1.4%) use water drainage, 219 (15.1%) dispose in the bush, 406 (28.0%) use the dump site, 210 (14.5%) use the garbage truck, 165 (11.4%) reuse metals, 9(06.2%) use metals for compost and 101 (7.0%) indicated other methods they used in disposing metals.

Assessing the most frequently used methods to disposing glass result showed that, 49 (3.4%) burn, 267(18.5%) bury, 55(3.8%) dispose in the gully, 19(1.3%) use water drainage, 204 (14.1%) dispose in the bush, 435 (30.1%) use the dump site, 343 (23.7%) use the garbage truck, 67(4.6%) reuse glass, 5 (0.3%) use glass for compost and 1 (0.1%) indicated other methods they used in disposing glass.

Table 3.2: Methods/Receptacles Used to Collect Domestic Household Waste by the Respondents

Collection method	Not at all	Seldom	Often	All the time
	n(%)	n(%)	n(%)	n(%)
Plastic bag	522(35.2)	257(17.4)	469(31.7)	232(15.7)
Cardboard box	602(40.8)	363(24.6)	345(23.4)	166(11.2)
Rubbish bin / drum	200(13.6)	164(11.1)	567(38.4)	544(36.9)
Waste basket /can	250(16.8)	168(11.3)	551(37.1)	518(34.8)
Pile in the yard	700(48.1)	207(14.2)	312(21.4)	236(16.2)
Others	269(46.1)	101(17.3)	110(18.9)	103(17.7)

As presented in table 3.2, 522 (35.2%) acknowledged not using plastic bag at all, 257(17.4%) used it seldom, 469(31.7%) used it often and 232(15.7%) used it all the time. For the use of cardboard box, 602(40.8%) acknowledged not using it at all, 363(24.6%) used it seldom, 345(23.4%) used it often and 166(11.2%) used it all the time. As regards the use of rubbish bin/drum, 200(13.6%) accepted not using it at all, 164(11.1%) used it seldom, 567(38.4%) used it often and 544(36.9%) used it all the time. For the use of waste basket /can, 250(16.8%)

acknowledged not using it at all, 168(11.3%) used it seldom, 551(37.1%) used it often and 518(34.8%) used it all the time. As regards piling domestic waste in the yard, 700(48.1%) accepted not doing at all, 207(14.2%) did it seldom, 312(21.4%) did it often and 236(16.2%) did it all the time. On the other hand, 269(46.1%) accepted not using other methods at all, 101(17.3%) used other methods seldom, 110(18.9%) often used other methods and 103(17.7%) used other methods all the time.

Table 3.3: Sorting of household waste

Items for Sorting of Household wast	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Do you sort your household Waste	833	57.7	611	42.3
Would you sort your household waste if you were told by waste collection service	1066	84.3	198	15.7

Sorting of household wastes is presented on table 3.3 above. When asked if they sort their household waste, 833(57.7%) said yes while 611(42.3%) said they do not sort. 1066(84.3%) claimed they will sort their household waste if told to do so by waste collection service while 198(15.7%) claimed they will not sort their household waste if told to do so by waste collection service.

Hypothesis:

There is no significant association between of age group, community, occupation, educational level and marital status with practice of sorting of household waste among the Respodents.

Table 4: Association of age group, community, occupation, educational level and marital status with practice of sorting of household waste among respondents.

Variables	Chi Square	P. value
Age group	0.215	0.901
Community	64.847	0.000 *
Occupation	36.929	0.000 *
Education	4.733	0.197
Marital status	9.630	0.021

*= Significant at P = 0.05

Table 4 shows significant association between the community and practice of sorting household waste with Chi-Square of 64.847 and p-value of 0.000. There was also significant association between occupation and practice of sorting household waste: $X^2 = 36.929$; p-value = 0.000. Thus the null hypotheses for the community and occupation were rejected. However, there was no significant association between age group, educational level and marital status with practice of sorting household waste.

DISCUSSION

Findings from the study revealed that majority of the respondents identified plastic/nylon as their household waste (table 2). This finding is expected as there is an increase in the use of plastics in recent times for packaging things to make them as take away or beautiful. No matter how small the item, it is usually packaged with nylon or plastic leather. Nylon bags do not only have the advantages of water proof, light and tough, but also can be washed and reused [19]. In recent time, nylons are used for the packaging of ready-made semi-prepared foods, nuts, food products etc [19].

However, this result is contrary to the findings of the study carried out by other researchers [20] who reported that 90 % of the total waste

collection was from the kitchen. Similarly, some studies revealed that 93% of households disposed food debris as waste (10).

In the researchers' opinion, the differences between the findings of the previous studies and that of the present study may be attributed to the differences in the year when the studies were carried out. Some of the previous studies were conducted before 2014 while the present study was carried out recently when many people in Nigeria use nylon for bagging, shopping, packaging, etc. This most likely must have influenced the exposure to the use of nylon among the respondents in the present study. Also, the economic situation of the previous studies was not the same. With the way things are going, one do not expect that highest generated household waste will be food waste. People in the present study could be cautious of this, thus the differences existing with previous studies.

The finding of this study showed that burning is the most frequently used method in disposing household wastes (table 3.1). Backyard burning is common in many areas of the country [21], People burn trash for various reasons, either because it is easier than hauling it to the local disposal site or to avoid paying for regular waste

collection [21]. Household wastes typically burnt can include paper, cardboard, food scraps, nylon/plastics and yard trimmings. This observation is not unexpected considering the fact that nylon/plastic has been identified as the major waste generated by majority of the respondents in the present study. Thus, they burn their wastes either because it is easier for them or they do not want to haul the bulky wastes to dump sites. This result of this study is not in line with the finding of the study conducted in urban Accra (10), which showed that majority of the household respondents disposed of their wastes at community bins or had their wastes picked up at their homes by private contractors. The discrepancies in these studies could be attributed to the location/area of these studies. Urban Accra could have a well organized system of solid waste management practices unlike the area of the present study where there was no provision for picking wastes in the homes of the respondents by private contractors or designated areas mapped out for this purpose. Despite the fact that majority of the respondents in this study were students and educated (table 1), they still burn their household wastes. This still can be attributed to lack of proper waste management practice available for the people. If there was adequate waste management practices the respondents would not hesitate to make use of them. This further strengthens the need for the introduction of private contractors to be encouraged to participate in household waste management.

Findings from the study indicate that majority 544 (36.9%) of the respondents used rubbish bin drums to collect household domestic wastes

while others used plastic bags, waste baskets or even pile the wastes in their premises(table 3.2). Similarly, some studies have indicated that most of the respondents in their study used communal bins as a method of household waste collection and dustbins to store their household waste at source of generation (22). The differences between these studies and the present study could be related to the type of waste generated. Reseachers have noted that patterns of household waste disposal depend on the kind and type of waste generated (23).

Assessment on sorting of household waste revealed that a large number of the respondents said they would sort their waste when told by collection service (table 3.3). Sorting of waste should be encouraged as it helps in appropriate disposal of waste. Generally, waste should be sorted according to material, recyclability or any particular process required [13]. This finding is in agreement with the findings of the study conducted in Ghana which reported that respondents in their households separated their wastes effectively (24).

This was attributed to the awareness created concerning separation of wastes in labeled household bins. Similarly, sorting of wastes was carried out by a vast number of the respondents at household levels in peri-urban area in Colombia (20). The respondents in this previous study were likely to be more educated as they demonstrated this by separating their household waste effectively as revealed by the finding. The fact that a greater number of the respondents in the present study were educated and a little above half of the respondents claimed to sort their household waste should be an issue for

concern. One would have expected a vast majority of the respondents to be sorting their household wastes. This could be attributed to lack of motivation. However, this result is in contrast to the findings in a study in North Central Nigeria[15] which revealed that the knowledge of the respondents on sorting of household waste was very low. The differences in these finding could be related to the area of the studies.

Conclusion: Plastics and nylon constituted major household wastes among the residents in Imo State Nigeria, and generally, there is poor

REFERENCES

Fadhullah, W., Imran, N.I.N., Ismail, S.N.S., Jaafar, M.H. & Abdullah, H. Household solid waste management practices and perceptions among residents in East Coast of Malaysia. *BMC Public Health* 22,1(2022).

<https://doi.org/10.1186/5/2889-021-12274-7>

Dansu, T. & Olaclipupo-Okorie, S. Patterns of household solid waste management in Oto-Awori Council Development Area of Lagos State Nigerian School Health

Leblanc, R. (2017) An Introduction to solid waste management. Retrieved from <https://www.thebalance.com/an-introduction-to-solid-waste-management-2878102>.

Leblanc, R. (2018) Intergrated approach needed for successful diversion and recycling.

method of waste disposal . Healthcare providers need to create awareness to the public on the dangers of improper disposal of plastics and nylon on human health. Nylons and plastics contain chemicals that can enter the body and settle into the system, increasing the toxic load in the body and triggering stress. Emphasis should be placed on recycling and reuse of these products in order to minimize their negative impact on human health. Proper awareness on the importance of sorting of household wastes will help in determining appropriate methods of disposing various household wastes.

Retrieved from <https://www.thebalance.com>.

Ejaz, N., Akhtar, N., Nisar, H. & Naeem, U. A. (2010) Environmental impacts of improper solid waste management in developing countries: a case study of Rawalpindi City. *WIT Transactions on Ecology and the Environment*, vol 142. Retrieved from [www.witpress](http://www.witpress.com), ISSN doi:102495/sw100351

Ndubusi-Okolo, P.U., Anekwe, R.I., & Attah, E.Y. (2016) Waste management and sustainable development in Nigeria: A study of Anambra State Management Agency. Retrieved from <https://www.researchgate.net/publication/319341663>.

Pammani, A. & Srinivasarao, M. (2014) Municipal solid waste management in India: a review and some new results.

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International Journal of Civil Engineering and Technology (IJCIET) 5(2) 01-08.

Alam, P. & Ahmade, K. (2013) Impact of Solid Waste on Health and Environment. Special Issues of International Journal of Sustainable Development and Green Economies (IJSDE) ISSN No: 2315-4721) v-2,1-1, 2.

Emelumadu, O. F., Azubuike, O. C, Nnebue, C.C., Fazubike, N., Sidney-Nnebue, P.N. (2016) Practice, patterns and challenges of solid waste management in Onitsha Metropolis Nigeria. American Journal of Public Health Research vol. 4, No 1, 16-22.

Yoada, R.M., Chirawurah, D., & Adomgo, P. B. (2014) Domestic waste disposal practice and perception of private and perceptions of private sector waste management in Urban Accra. BMC public health doi: 10:1186/1471-2458-14-697.

Adeyemo, F. O. & Gboyesola, G. O (2013) Knowledge, Attitude and Practices on Waste Management of People Living in the University Area of Ogbomso, Nigerian International Journal of Environment Ecology, Family and Urban Studies, 3,51-56.

Banga, M. (2013) Household knowledge, attitudes and practices in solid waste segregation and recycling: the case of urban Kampala, Zambia Social Science Journal, 2, 27-39

Conserve Energy Future (2014) What is solid waste management and methods of solid waste disposal? Retrieved from www.conserve.energy.future.com/waste-management-and-waste-disposal-methods.php.

Leach, M. (2012) Effects of improper solid waste disposal Retrieved from <https://healthylivingazcentral.com/effect-s-ofimproper-solid-waste-disposal-12184010.html>

Aguoru, C.U., & Alu, C.A. (2015) Studies on solid waste disposal and management methods in Makurdi and its environs in North Central Nigeria. Greener Journal of Environmental Management and Public Safe Retrieved from <http://journals.org/EJAEMPS/publication/2015/June/HTML/0409150...>

Modebe, I. & Ezeama, N.N. (2011) Public health implication of household solid waste management in Awka South East Nigeria. The Journal of Public Health. 1.

Okonkwo, L. (2015) The Environmental and Health Implications of Solid Waste disposal. Retrieved from <http://www.truehealthonline.com/the-environmental-and-health-implications-of-solid-waste-disposal/>

Vitharana, A. D. (ND) The Importance of Solid Waste Management for Sustainable Development. University of Agder Norway

Chapamkon, (2023) Types of nylon packaging.

Retrieved from

www.chapamkon.com/en/packaging-nylon

Warunasinghe, W. A. & Yapa, P. I. (2016) A Survey on Household Solid Waste Management with Special Reference to a Peri-urban Area (Kottawa) in Colombo.

Retrieved from

<https://doi.org/10.1016/j.profoo.2016.02.038>

Environmental Protection Agency (2023) Solid Waste

www.epa.gov/emergency-response-research/solid-waste

Omambia, B. & Ogonya, M. A. (2015) Assessing Household Solid Waste management Systems in Baraton Center Kenya.

Retrieved from

<https://docplayer.net/2466748>

Suhalb, A. (2019) Waste Disposal Methods: Perception for Africa. Bio Energy Consult, Powering Clean Energy Future. Retrieved from www.bioenergyconsult.com.

Miezah, K., Obiri-Danso, K., Kadar, Z., Fel-Battoe B., & Mensah, M. (2015). Municipal solid waste characterization & quantification as a measure towards effective W.M. in Ghana. Elsevier ltd. International journal of integrated waste management. Science & technology 46 (15-27). Retrieved from <https://www.journals.Elserier.com>waste...>