Knowledge and Management of Ménage Solid Waste among Residents of Apapa Local Government Area, Lagos State, Nigeria

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Abstract:- The study examined knowledge and management of ménage solid waste among residents of Apapa local government area of Lagos State. It was a descriptive cross sectional survey study in which a total of three hundred and ninety-nine (399) ménages were selected by multistage sampling technique and studied using structured questionnaire. Four research questions were raised and answered while two null hypotheses were formulated and tested at .05 level of significance. Data were analyzed using mean, standard deviation and Chi-square. Results from the study showed that food residues, nylon, diapers and plastics were the mostly generated ménage wastes among the residents. The waste management methods well known to the residents are open dumping, open burning and land filling. Findings revealed that the residents have good knowledge of the risk associated with improper waste management. It was also discovered that the rate of waste dumping is significantly higher than the rate of evacuation and this poses challenges to management. There was no significant association between knowledge and waste management practices among the residents (P> 0.05). Also, there was no statistically significant association (P> 0.005) between residents' academic qualifications and waste management practices. Conclusions were made and the study recommends amongst others that Lagos State Waste Management Agency (LAWMA) should be more frequent in the collection of refuse. Environmental education should be offered to the residents through the local government officials. This will encourage strict adherence to proper and appropriate waste management practices among the residents.

Keywords:- Knowledge, management, ménages, solid waste, Apapa, Lagos.

I. INTRODUCTION

Trash from menages, which include food scraps, paper, plastic, rags, metal, and broken glass, is a major contributor to ménage solid waste (MSW). According to Agwu (2012), contemporary cityscapes have become increasingly characterized by the presence of solid wastes. Agwu (2012) said that the problems posed by uncollected solid wastes are overwhelming our cities. For this reason, city dwellers often experience the negative effects on their personal and public safety. The outcry about the health effects of exposed and fermenting trash has not been measured, but it is certainly felt. While developing nations are making progress toward their clean water access targets, they are falling short in terms of sanitation, according to a 2010 United Nations report (Agwu, 2012). Approximately 2.4 billion people would likely face the danger of preventable sicknesses and death by the year 2017 due to insufficient sanitation, according to a joint assessment by the World Health Organization (WHO) and the United Nations International Children's Education Fund (WHO &UNICEF, 2012). The research also highlighted how basic sanitation issues like a lack of toilets or a deteriorating sewage system contribute to the spread of deadly illnesses like cholera and diarrhea, which claim the lives of one child every 21 seconds. As a result, well-organized waste management is crucial.

When solid wastes are collected, stored, treated, and disposed off properly, they pose no threat to human health, plant life, animal life, or the environment at large. One of the most pressing problems in the world's poorest nations is the improper disposal of solid waste (Kofoworola, 2017). It is the process of directing trash in a methodical approach that does not compromise public health or the environment. Every city must have a system in place to properly manage its solid waste if it wants to maintain a healthy urban environment (Latifah et al., 2008). The environmental and health consequences of improper waste management are evident in Lagos State, but the problem is widespread. In light of its deleterious impact on the environment, solid waste management has emerged as a pressing concern across the world (Adekunle et al., 2011). However, solid waste is one of the three primary environmental challenges in Nigeria and Lagos State in particular, despite the fact that humans rely on the environment for survival. Inasmuch as man's own existence is tied to the production of trash, the issue of solid waste is one with deep roots in human history (Momodu et al., 2011). As a result, proper waste management is crucial to the environment being able to support life to its limits. Poor and out-of-date waste management standards are a recurrent concern for local authorities and environmental groups in many developing nations (Zamorano et al., 2019). One of the most pressing issues in modern cities is the absence of adequate garbage collection infrastructure (Kofoworola, 2017). Poor documentation of waste generation rates and its composition, inefficient storage and collection systems, disposal of municipal wastes with toxic and hazardous waste, indiscriminate disposal or dumping of wastes, and inefficient utilization of disposal site space are all persistent issues impacting solid waste management.

Kadafa (2017) claims that in recent years, solid waste management has become one of the most pressing issues for Nigeria's state and local government environmental protection organizations. The pace at which solid trash is being produced is outstripping the capacity of government agencies to enhance their financial and technological resources to keep up. Oladejo and Amosun (2020) estimated that approximately 20-30% of the 32 million tons of yearly solid trash generated in Nigeria was collected. At 0.5 kilograms per day, Lagos is one of the world's most wasteful cities. Daily garbage pickup in Lagos totals more than 10,000 tons. Both population and economic growth have contributed to this quick expansion. Rising urban populations, shifting lifestyle preferences, and fast technological advancements have all increased the demand for goods and services, necessitating the production of new commodities and services (Bakare, 2020). These causes, together with inefficient recycling efforts, have contributed to a rise in both the overall volume and diversity of solid wastes. According to Zamorano et al. (2019), a wide variety of factors, including increased urbanization, illegal city structure and developments, rapid population growth, rapid development, and shifts in consumption patterns, contribute to the production of a vast quantity of trash, both organic and inorganic. Apapa LGA's waste management authorities have challenges in developing long-term solutions to the issue of trash management due to the area's rapidly increasing waste creation rates and LAWMA's lack of timeliness. Waste management systems may benefit greatly from community involvement if environmental education and awareness are prioritized. The establishment of an efficient solid waste management system is greatly aided by environmental literacy, education, and awareness. The extent at which waste management techniques are influenced by environmental education and public knowledge of the dangers of pollution depends on the amount of environmental consciousness (Seriki-Mosadolorun, et al, 2017). Apapa LGA's existing solid waste management system does not appear to be paying any attention to this problem. Sustainable environmental practices are the end aim, but before they can be put into action, people must first recognize the gravity of the problem.

Public health, economic, environmental, and political concerns all call for better solid and liquid waste management in the ménage region, which is why this issue deserves more attention from local councils and authorities (Klundert& Anschutz, 2016). Given these concerns, it is important to understand how the region as a whole, approach its ménage waste management. This study will fill a need in our understanding of waste management in Lagos State, Nigeria by providing a comprehensive analysis of the state of the sector in Apapa LGA at the present time. This research is an early step in bridging the gap between theoretical and practical approaches to solid waste management in the nation, with the ultimate goal of improving such practices in the Apapa Local Government Area (LGA) of Lagos State. The study's findings will serve as a guide for ongoing system improvement through strategic planning and regular follow-up evaluation.

II. PURPOSE OF THE STUDY

Specifically, the study determined:
- Types of Ménage solid waste generated among the residents
- Residents' knowledge of waste management methods
- Residents' knowledge on associated risks of improper waste management
- Menage solid waste management practices among the residents

A. Research Questions
The following research questions guided the study:
- What are the types of Ménage solid waste generated among the residents?
- What are the waste management methods known to the residents?
- What are the associated risks of improper waste management?
- What are the solid waste management practices adopted by the residents?

B. Research Hypothesis
- **H_{o1}:** There is no significant association between knowledge and waste disposal practices among residents of Apapa LGA, Lagos State.
- **H_{o2}:** There is no significant association between residents' academic qualifications and waste management practices.

III. METHODOLOGY

- **Study Design:** The study adopted a descriptive cross-sectional survey design on knowledge and practices of ménage waste management among residents of Apapa LGA of Lagos State, Nigeria.
- **Description of Study Area:** The research was carried out in the Apapa LGA, one of the twenty LGAs that make up Lagos State, situated on the western side of the Lagos Island enclave in western Nigeria. The dry season in Apapa LGA lasts from November to March, whereas the rainy season lasts from April to October. At 26 degrees Celsius, the average humidity in Apapa LGA is 80 percent. Apapa LGA was chosen for the study due to its congestion and pollution.
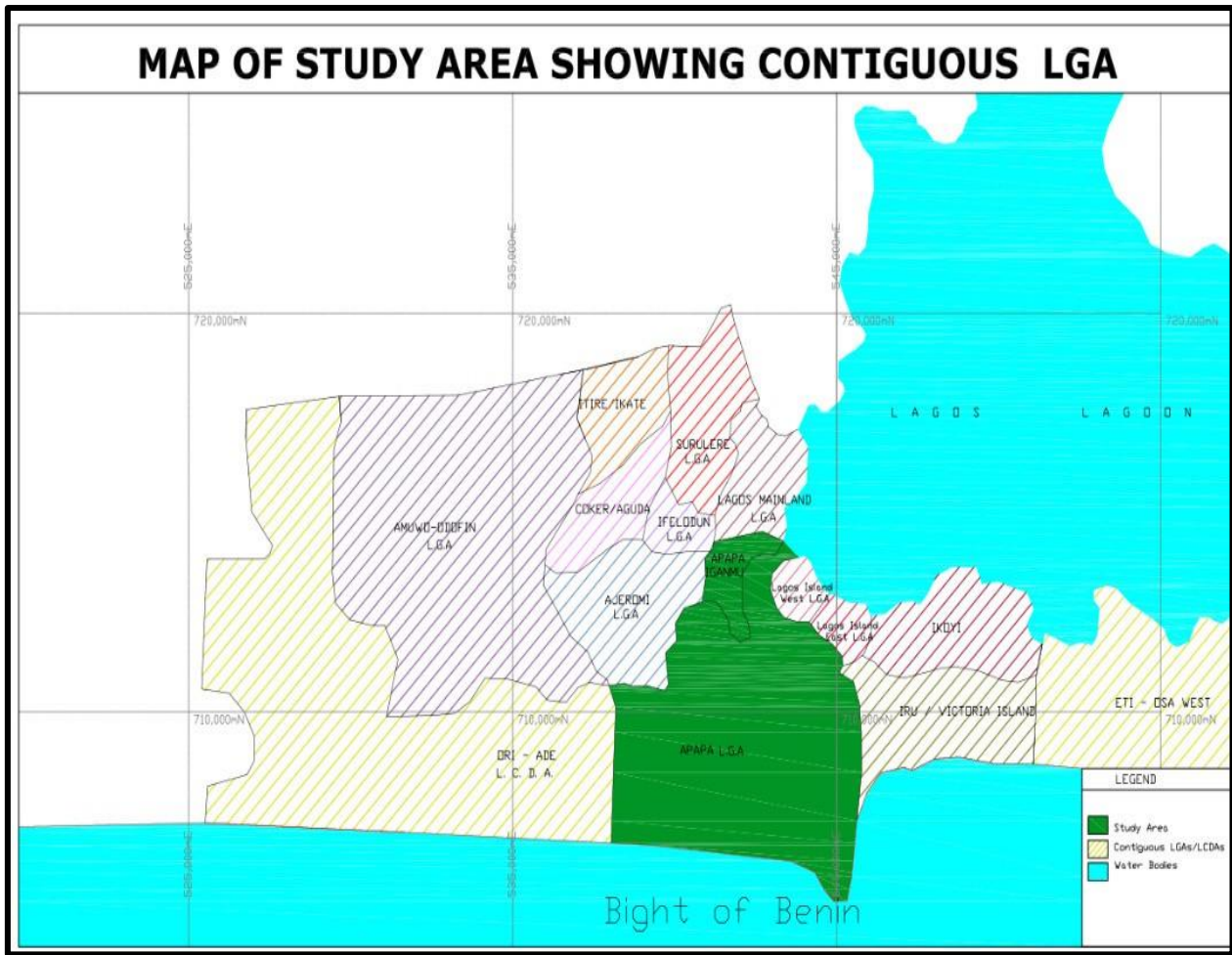
Fig. 1: Study area in relation to other LGAs in Lagos Metropolis

Source: Modified from Lagos state Transport Master Plan Progress Report, 2010

- **Study Population:** The population for this study was 217,362 (Lagos State Ministry of Science and Technology, 2006)

- **Sample for the Study:** Three hundred and ninety-nine (399) individuals of ménages in Apapa LGA who were 18 years of age or older were included in the research. The Taro Yamane formular for estimating sample size was used to calculate the population sample size. The ménages for the research were chosen using a multistage sampling process. At the first stage,Apapa LGA was purposefully chosen for the research because it is situated in Lagos Central, as well as because of its high degree of congestion and environmental pollution concerns connected with inadequate trash management techniques. The second stage included selecting two communities from the Local Government area. Ijora and Badia were chosen as the two locations. At the third stage, 399 ménage members aged 18 and above were chosen from the population size. The ménages were chosen using a systematic random sampling approach. As a result, two volunteers from each tenth home were chosen for questionnaire administration.

- **Instrument for Data Collection:**A standardized questionnaire was employed for data gathering. The survey's title was "Knowledge and Practices of Ménages'

Solid Waste Management" (KPMSWM). It was split into two halves.Section A sought demographic data, while Section B focused on the research questions. The internal consistency of the questionnaire was determined using Cronbach's Alpha, which provided an alpha score of 0.82.

- The researchers delivered 399 copies of the questionnaires to ménage members who were 18 years or older. Efforts were taken to ensure that the items were entirely filled, with no missing information. Three hundred and ninety-three (393)/ 98%, of the distributed questionnaires were returned.

- **Method of Data Analysis:**Simple percentage, mean, standard deviation, and Chi-square were used to evaluate the data. The demographic features of the research participants were presented using simple percentages. Mean and standard deviations were used to answer the research questions, while Chi-square was used to test the hypotheses. Mean ratings of 2.5 and above were regarded as agreed upon, while mean ratings of 2.49 and below were regarded as disagreed upon.

- **Ethical Consideration:** Permission for this study was obtained from the Local government council. Informed consent was gotten from the residents and confidentiality of information was maintained throughout the study.

IV. RESULTS

Variables	Proportion	Percentage (%)
Age		
18-27	186	47.3
28-37	128	32.6
38-47	46	11.7
>47	33	8.4
Educational Qualification		
Primary	88	22.3
Secondary	195	49
Tertiary	110	27.9
Employment Status		
Employed	119	30.3
Not employed	26	6.6
Self employed	248	63

Table 1: Demographic Characteristics of the Residents (N=393)

Data in Table 1 shows that majority (47.3%) of the residents were between ages 18-27 years. Forty-nine (49%) of the residents had secondary school education while 27.9% had tertiary education. Sixty-three percent (63%) were self employed, 6.6 % were not employed while 30.3% were employed.

S/N	Waste generated	X	SD	Remark
1.	Food residue	3.96	0.98	Agreed
2.	Nylon	3.92	0.97	Agreed
3.	Metal	2.53	0.87	Agreed
4.	Diapers	3.89	0.97	Agreed
5.	Glasses	2.53	0.87	Agreed
6.	Plastics	3.58	0.95	Agreed
7.	All of the above	3.24	1.02	Agreed

Table 2: Mean and Standard Deviation on Waste Generated by Menages

Data presented in Table 2 shows that food residues, nylon, diapers and plastics are the mostly generated ménage solid waste. Their mean values ranged from 3.58 to 3.96. Also, the ménagesagreed that they generate all of the listed items at one time or the other (X= 3.24). The standard deviation values of the responses were within ranges of 0.87 to 1.02.

S/N	Waste management methods	X	SD	Remark
1.	Open burning	3.59	0.91	Agreed
2.	Open dumping	3.65	0.75	Agreed
3.	Burying	2.94	1.02	Agreed
4.	Composting	2.19	1.03	Disagreed
5.	Land filling	3.59	0.91	Agreed
6.	Incinerator	2.20	1.02	Disagreed

Table 3: Mean and Standard Deviation on Waste Management Methods Known to the Residents

Table 3 shows that item 2 (Open dumping) had the highest mean value (3.65, SD=0.75), followed by items 1(Open burning) and 5(Land filling) with equal mean values (3.59, SD=0.91). This indicates that the major waste management methods known to the residents are open dumping, open burning and land filling.

S/N	Associated risk of improper waste disposal	X	SD	Remark
1.	Contamination of edible products which increases the burden of infection and diseases	3.24	1.06	Agreed
2.	Environmental pollution	3.65	0.75	Agreed
3.	Provides breeding sites for pest, snakes and rats	3.10	0.97	Agreed
4.	Increases the likelihood of disease transmission	3.40	1.05	Agreed
5.	It could lead to diarrhea, dysentery, gastrointestinal Problems, dengue fever and cholera among humans	l3.89	0.98	Agreed
6.	It bring about disturbing odour, unsightly waste and stress related problems	3.59	0.91	Agreed

Table 4: Mean responses on Residents' Knowledge on Associated Risks of Improper Waste Management

Table 4 shows that all the items listed were agreed upon as risks associated with improper waste management. Their mean values ranged from 3.10 to 3.89. The standard deviation values of the responses were within 0.75 to 1.06. This implies that the residents are knowledgeable on the risk associated with improper waste management.

Waste management practices of residents	X	SD	Remark
Waste Gathering and Storage			
- There is a temporary solid waste bin in the house	3.27	1.06	Agreed
- Waste basket	2.53	0.87	Agreed
- Waste nylon	2.31	1.04	Disagreed
- Plastic bag	2.36	1.03	Disagreed
- Containers with covers	3.00	1.05	Agreed
- Containers without covers	2.87	0.72	Agreed
- Waste separation before disposal	2.22	1.02	Disagreed
- No waste separation before disposal	3.40	1.05	Agreed
Frequency of Waste Disposal			
- Everyday	2.20	1.02	Agreed
- Three (3) times a week	2. 23	1.02	Agreed
- Once a week	2.52	0.87	Agreed
- Once a month	3.24	1.06	Agreed
Reasons for Delay in Refuse Disposal			
- Irregular collection of refuse by government	3.77	1.03	Agreed
- Inadequate waste collection agencies	2.84	1.57	Agreed
- High cost of patronizing waste collection agents	3.24	1.06	Agreed
- For reclamation of lands in the swampy areas	2.70	1.00	Agreed
Final Waste Disposal Sites			
- LAWMA picks it up from the house to a designated dump site	2.56	0.85	Agreed
- I pay cart pushers to pick it up	2.84	1.09	Agreed
- I take it to the refuse dump nearby	3.10	0.97	Agreed
- I burn them	3.29	1.02	Agreed
- I bury the refuse in the pit	2.40	0.91	Disagreed
- Menage refuse are used as landfills	3.65	0.75	Agreed
- Menage waste are disposed through compost	2.20	1.02	Disagreed

Table 5: Mean Responses on Residents' Waste Management Practices

According to Table 5, solid waste was mostly collected and stored using solid waste bins (X= 3.27, SD=1.06), containers with covers (X=3.00, SD=1.05), and containers without covers. Residents utilize garbage baskets seldom (X= 2.53, SD=0.87). Residents also agreed that they do not segregate their garbage before disposal (X= 3.40, SD= 1.05). On garbage disposal frequency, once a month had the highest mean value (X3.24, SD= 1.06). Reasons for delay in refuse disposal had the highest mean values of 3.77 and 3.24, respectively, for irregular collection of trash by government and high expense of patronizing waste removal agents. Furthermore, on ultimate waste disposal sites, the

use of trash as landfills had the greatest mean value (3.65, SD=0.75), followed by open dump (3.10, SD= 0.97), burning (3.29, SD=1.02), and cart pusher services (2.84, SD=1.09).

Waste Management Practices of Menages			
	$X^2(R)$	P-value	Remark
Knowledge of waste management	37.206	0.060	> 0.005

Table 6: Association between knowledge and waste management practices among residents of ApapaLGA

Table 6 shows that there is no significant association between knowledge and waste management practices among the residents. This indicates that the residents' knowledge of waste management does not significantly influence their practices.

Waste Management Practices			
	X^2 (R)	P-value	Remark
Academic Qualifications	34.136	.063	> 0.005

Table 7: Association between residents' academic qualifications and waste management practices

Inferring from Table 7, there is no significant association (P> 0.005) between residents' academic qualifications and waste management practices. This shows that the residents' waste management practice was not influenced by their educational qualifications.

V. DISCUSSION OF FINDINGS

According to Table 1, the bulk of the population were between the ages of 18, 27. 49% of inhabitants had a secondary education, while 27% had a higher education. In addition, a sizable proportion of inhabitants (see table 1) were self-employed. This suggested that the majority of inhabitants are literate and self-sufficient.

Findings in Table 2 revealed that all the items mentioned were agreed upon as ménage produced solid waste. The greatest mean values were found in food residues, nylon, diapers, and plastics. This supports the findings of Adogu et al. (2015), who found that food residues are the most common sort of waste created by ménages. Our results are consistent with the study of Modebe and Edema (2011), who discovered that the most prevalent types of waste created by ménages include food leftovers, rubbish, and cellophane bags. This suggests that ménage's consumption habits have an impact on their garbage creation. This conclusion is consistent with the findings of Keser et al. (2012), who said that ménage consumption pattern is a key driver of volume and types of waste creation, which are impacted by socioeconomic level, environmental, and demographic variables.

According to Table 3, the most prevalent waste management techniques used by locals are open dumping, open burning, and land filling. This might be due to the fact that these ways are more convenient. Aderemi and Falade (2012) defined open dumping as the most basic and widely utilized technique of solid waste disposal. Our findings are also consistent with those of Adogu et al. (2015), who suggested that a considerable proportion of ménage produced solid waste is disposed off in landfills. While open dumps are common in underdeveloped countries, the practice has fallen out of favor in wealthy ones. Sanitary landfills are well-engineered facilities (with liners, leachate collection/treatment systems, and gas collection systems) that are utilized to preserve human and environmental health. Due to the fact that these contemporary landfills are often subject to severe federal and state restrictions, they are specifically sited, constructed, and executed to maintain excellent environmental health (National Solid Waste Management Association [NSWMA], 2011). This is not the case in certain sections of Lagos State, Nigeria, where unclean dumps are not subject to rules and are often located for convenience. Some of these open dumps in Lagos State are situated near residential areas, posing a hazard to human and environmental health. Furthermore, open burning, which has been recognized as a regularly used management practice, pollutes the ecosystem. This conclusion supports the Department of Environmental Quality's (2016) argument that open burning is a well-known and widely used strategy in a number of metropolitan areas since it minimizes the amount of garbage received at the dump and extends the life of the dump site. There are several detrimental repercussions of open burning on both human and environmental health. Pollutants are released into the atmosphere when waste is burned uncontrollably. Dioxins, particulate matter, polycyclic aromatic compounds, volatile organic compounds, carbon monoxide, hexachlorobenzene, and ash are among the contaminants (Seriki-Mosadolorun, et al, 2017). According to Smith (2015), all of the aforementioned contaminants pose significant dangers to human health. He went on to say that dioxins are capable of causing a slew of health issues; they may harm reproduction, development, disturb hormone systems, and even cause cancer. According to Agboola and Agunbiade (2019), particulate matter causes smoke and haze, which contribute to air pollution and environmental damage.

According to the data in Table 4, residents are aware of the risks associated with inappropriate waste management. Our results are consistent with those of Wadad (2022), who stated that 95.9% of respondents were aware that bad waste management causes illnesses or diseases, indicating that the majority of their respondents are aware of the health implications of faulty waste management. Inadequate waste management techniques contaminate food items, increasing the burden of sicknesses and diseases among residents. If solid waste is not properly disposed off, it may cause serious health concerns and a highly unpleasant living environment, as well as providing nesting grounds for insect-vectors, vermin, snakes, and rodents, increasing the probability of disease transmission. It may also damage drinking water and the environment. Aleluia and Ferro (2016) classified the consequences of ménage solid waste management ineffectiveness on public health into physical, biological, noncommunicable illnesses, psychological, and ergonomic health concerns. Many illnesses are induced as a result of biological vectors, including diarrhea, dysentery, gastrointestinal disorders, worm infection, food poisoning, dengue fever, cholera, leptospirosis, and bacterial infection; skin, nose, and eye irritation; and respiratory symptoms (Lan, Heederik and Wouters, 2020). Noncommunicable illnesses are another type of health impacts that may be linked to inadequate ménage solid waste management. According to some research, pollution from the dumpsite may cause cancer of the liver, pancreas, kidney, larynx, and non-Hodgkin lymphoma. Birth defects, preterm newborns, congenital diseases, and Down's syndrome are some health impacts worth noting in this group (Suleman, Darko, Agyemang-Duah, 2015). In addition to physical and biological repercussions, ineffective ménage waste management may result in psychological effects such as unpleasant odors, ugly waste, and thinking, cognitive, and stress-related issues (Oyedotun, et al, 2020). Aside from the aforementioned health issues, solid waste clogs the drainage system and creates significant flooding during the rainy season, leaving the bulk of Apapa LGA inhabitants with little choice but to abandon their houses and return when the flood had gone. As a result, proper waste management methods are required.

Table 5 found that the ménages' trash is mostly collected and stored using solid waste bins, that a large number of residents store their garbage in containers with covers, and that some store waste in containers without covers. Furthermore, people confirmed that they do not segregate their garbage before disposal. This is consistent with the results of Adogu (2015), Modebe and Ezeama (2011), who discovered that a substantial percentage of menages keep their garbage in closed containers outside the home and that the majority of them do not separate their waste before disposal. The majority of people said that they disposed off their rubbish on a monthly basis owing to the government's irregular pickup of refuse and the high expense of paying waste collection agencies. As a result, the environment is unattractive. Poor waste management procedures are not ideal since they constitute potential sources of infection as well as air pollution.

The findings demonstrated that there was no significant relationship (p> 0.005) between residents' knowledge and trash management methods. This suggested that residents' understanding of trash management had little effect on their behaviors. Although, Apapa LGA inhabitants displayed strong understanding of the risk concerns connected with inappropriate waste management practices, it did not seem to have affected their trash disposal and management procedures. This might be due to contextual variables such as insufficient garbage collection companies in the research region, irregular rubbish collection by the government, and other causes (see table 5). This meant that Apapa inhabitants have not benefited from a working government garbage management organization. As a consequence, their inadequate waste management procedures have resulted in a low-quality environment. These results contradicted Modebe and Ezeama (2011) conclusions, who said in their research that the majority of their respondents disposed off their garbage via government waste management agencies, with just a handful discarded in an illegal place.

Table 7 found no significant association (P> 0.005) between residents' academic attainments and waste management methods. This demonstrated that ménages' waste management practices were unaffected by their educational degrees. Although, Apapa LGA population are literates, this has had little impact on their waste management habits. As a result, environmental awareness is required for long-term development results. According to Pandian et al. (2011), attaining sustainable development outcomes requires a knowledge of the intricacies of linkages between problems of state interest. It entails developing mutually advantageous trade-offs and strengthening the social, economic, and environmental quality of urban regions, which has a significant impact on the health of all city dwellers. Failure to realize the connections between human activities, society, and the environment at large, as well as the influence of one on the other, may have far-reaching implications, jeopardizing all components of the overall eco-system (Pandian et al, 2011).

VI. CONCLUSION

If solid trash is not properly disposed off, it may cause serious health concerns as well as a highly unpleasant living environment. According to the survey, food residues, nylon, diapers, and plastics were the most often created ménage trash among the residents. Residents are familiar with trash management practices such as open dumping, open burning, and land filling. The locals are well aware of the dangers of incorrect garbage management. The causes for the delay in garbage disposal were identified as irregular collection of rubbish by the government and the high expense of using waste collection providers. There was no significant association between residents' knowledge and trash management methods (P> 0.05). Furthermore, there was no statistically significant (P> 0.005) association between residents' academic attainments and trash management methods. Due to the harmful impact on public health, the management of ménage solid and liquid waste is critical for

public health, economic, environmental, and political reasons.

VII. RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proffered:

- The government should make appropriate measures to establish methods for regular garbage collection in order to prevent frequent habit of open dumping among the residents.
- The Lagos State Waste Management Agency (LAWMA) should collect garbage more often.
- Environmental education should be provided to communities by local government authorities. This will motivate them to strictly adhere to proper and suitable waste management techniques.
- As a kind of sensitization for citizens, environmental awareness through workshops should be held on a regular basis.

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