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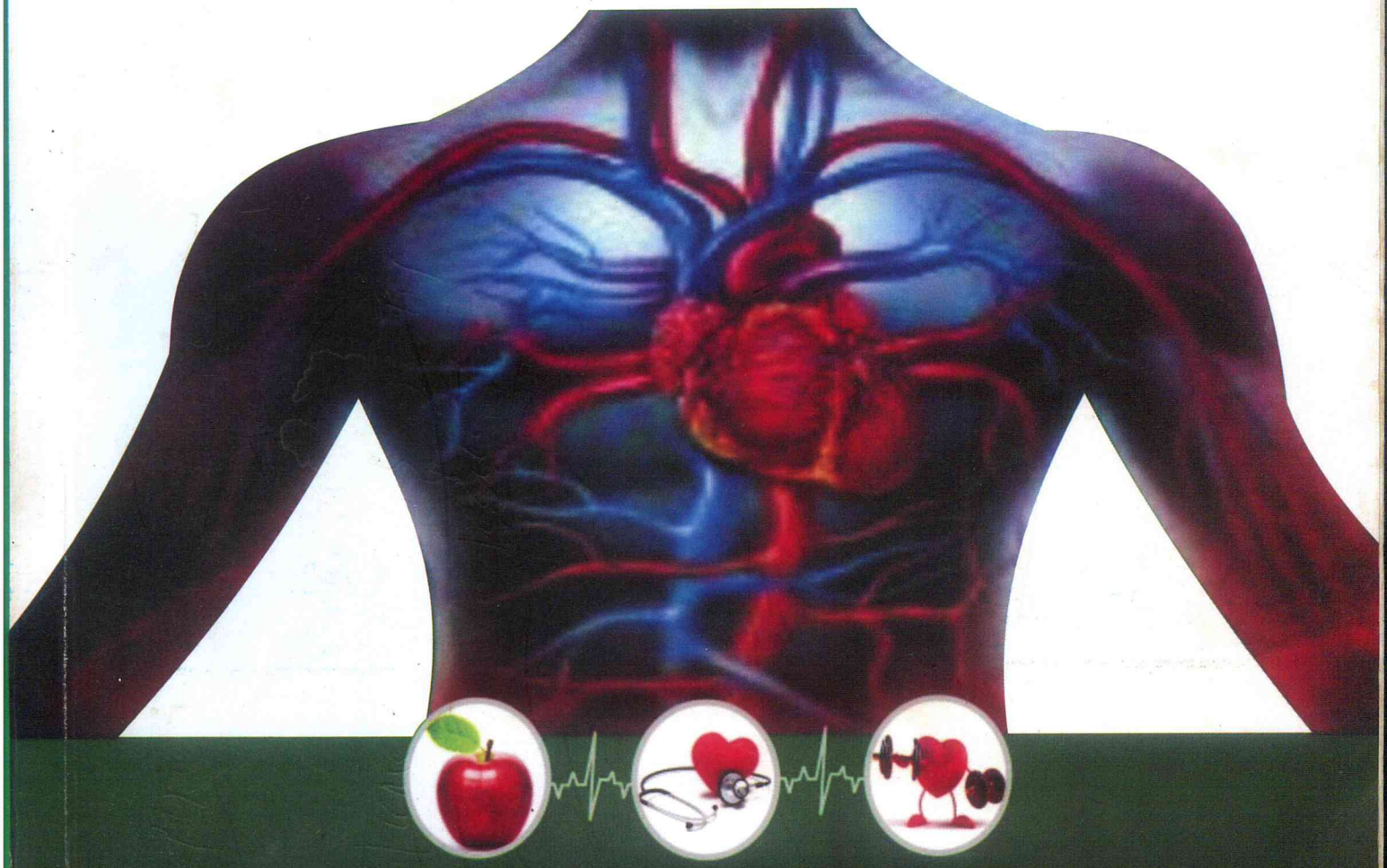

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SOLID WASTE DISPOSAL METHODS AMONG HOUSEHOLD MEMBERS IN KWARA STATE, NIGERIA

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Abstract

The study assessed solid waste disposal methods among household members in Kwara State of Nigeria. The purpose of the study was to examine the different solid waste disposal methods employed by household members in both rural and urban areas of Kwara State. An ex-post facto research design was used for the study. The population for the study comprised all heads of households in Kwara State, Nigeria. A sample of seven hundred and seventy one (771) respondents was selected using multi-stage sampling technique. A researcher developed questionnaire was validated by three experts and tested for reliability using a split half method. Data was analysed using an Independent Sample t-test. Findings revealed that respondents in both rural and urban areas of Kwara State, Nigeria used similar methods of solid waste disposal which include the use of bags (X= 2.65, 2.91), containers with cover (X= 2.83, 2.73), containers without cover (X= 2.64, 2.57) and backyard dumping for burning (X= 2.83, 2.68). They however differ in the use of polythene bags (X= 2.46, 2.70) and use of pit for dumping wastes (X= 2.54, 2.40). Findings also revealed no significant difference in the solid waste disposal methods used by household members in the study area *(p-value =0.99 > 0.05).* ***It was concluded that household members in Kwara State employ both legal and illegal methods of waste disposal. The researcher recommended that;*** *household members should try as much as possible to avoid disposing waste at their backyards, in drainages and water channels in order to prevent disease outbreaks.*

Keywords: Solid Waste, Disposal Methods, Rural Area, Urban Area, Household Members

Introduction

There is no doubt that a dirty environment affects the standard of living, aesthetics, health, and the quality of life of the general population living in it; hence, wastes must be properly treated. Waste refers to organic and inorganic materials generated from households, commercial and industrial establishments that have no monetary value to the owner (United Nation Children's Fund, UNICEF, 2012). Sridhar (2011) expressed that wastes may either be liquid or solid materials, which comes from human activities (domestic), agricultural or industrial activities, while, solid wastes are non-liquid and non-gaseous products of human activities, which are regarded as being useless by the owner. It could be in the form of refuse, garbage, or sludge.

The Environmental Pollution Group (2016), asserted that solid waste management encompasses disposal of refuse to land/sea or recovering and recreating usable substances from the waste by the process of recycling. The whole process of solid waste management involves the collection of waste, scientific dumping, and resource recovery. In a proper waste management system, refuse is usually collected using covered trucks. After waste collection, the wastes are disposed of by any of the following disposal methods; dumping, sanitary landfill, incineration, pyrolysis, composting or biogas technology. After the disposal of solid wastes, several useful products can be obtained through recycling. However, in Kwara State, this is not the usual practice. The waste management system lacks proper coordination and supervision, especially in urban centres. Wastes are collected using uncovered trucks thereby spreading some of the waste across the streets as the truck moves around the town. Disposal of waste is not monitored by the government or any concerned bodies, this makes the waste operators dump the collected refuse illegally. The rural area is also not exempted from this hazardous waste management practices.

Over the years, solid waste generation has steadily increased because of global changes associated with population, consumption, and industrial development. According to Breeze (2012), the world cities generate about 1.3 billion tonnes of solid waste per year and this volume is expected to increase to 2.2 billion tonnes by the year 2025. United Nations Development Programme, UNDP (2012) asserted that solid waste disposal is one of the major environmental health problems that the government and even citizens of Nigeria are concerned about. UNDP (2012) further reported that as of the year 2012, Lagos metropolis alone was generating about 998,081 tonnes of solid waste per year. Recent estimates also indicated that the total amount of domestic waste per annum in Nigeria is about 63million tonnes (0.45kg/capita/annum). Often, inadequacies in waste management are linked to population growth and urbanization. For instance, in Nigeria, statistics showed that the population growth rate of Nigeria as at 1991 was 3.0 per cent and an urban growth rate of about 5.5 per cent per annum, while the average waste generation rate is put at 0.49kg per day (Solomon, 2013). Urban centres in Nigeria has also witnessed a steady rise in waste generation due to urbanization and increase in population; Abuja, the nation's capital city generates between 0.55-0.58 kg of waste per person per day (Solomon,2013), Lagos state, one of the most populous cities in the world generates 11,000 metric tonnes of waste daily (Oresanya, 2015), while Minna the Niger state capital which has similar geographical characteristics with Kwara State generates about 90 tons of solid waste per day (UNDP, 2012). While Kwara 24/7, (2014) reported that the tons of waste in Kwara State has increased from 120 to 350 tons between 2000 and 2010. Ayo, Hassan, Ibrahim and Mohammad, (2012) also reported that the total quantity of waste generated per day is estimated to be about 1000 metric tons (approximate generation per capita per day is 500 grams).

Vikas and Prajes, (2016) noted that in rural areas, waste is a severe threat to the public health concern and cleanliness. Although, the form of waste generated in rural areas is predominantly organic and biodegradable, yet, it constitutes a major problem to the overall sustainability of the ecological balance of the area. For instance, it is estimated that rural people are generating solid waste (organic/recyclable) of 0.3 to 0.4 million metric tons per day respectively (Vikas &Prajes, 2016). As a result, in the absence of proper disposal of solid waste, the rural areas may be prone to outbreak of vectorborne diseases such as diarrhoea, malaria, polio, dengue fever, cholera, typhoid and other

water-borne infections such as schistosomiasis. As a result of haphazard disposal of refuse, the rural areas may be prone to outbreak of vector-borne diseases such as diarrhoea, malaria, polio, dengue fever, cholera, typhoid, and other water-borne infections such as schistosomiasis. Prevention of all these diseases is crucial to ensure optimal health among the rural people, and an important way of preventing the outbreak of diseases in these areas is through proper waste management. Proper disposal of waste is very important at the household level to avoid rat infestation. If waste generators properly dispose of wastes, many environmental health diseases would be avoided, especially in rural areas.

Although, Pravash (2012) noted that recently, the wastes that are not biodegradable, such as bottles, cans, plastics and polythene are rapidly increasing in rural areas too. This has created a big problem managing them. The consequence of this is the infestation of insect or mosquitoes reproducing in stagnant water pools on waste sites, blockage of water channels and drainages with waste bringing about several diseases. This poses certain health risks due to the presence of vermin, bugs, flies and scavenging animals particularly to workers, farmers and neighbouring residents. Most people in Kwara State seem to dispose of their waste illegally. Many at times, solid wastes such as plastic bottles, nylons, used sanitary pads, batteries, baby diapers and other waste materials are seen littered across the streets. The researchers observed that a large part of the total disease load may be due to poor sanitation and the improper solid waste management, which intensify their occurrence. More so, there is the paucity of data on how the people of Kwara State dispose of their waste. Hence, the researchers assessed solid waste disposal methods among household members in Kwara State, Nigeria.

Purpose of the Study

- The purpose of the study was to assess the solid waste collection methods employed by household members in rural and urban areas of Kwara State, Nigeria.

Research Questions

This study answered the following research question:

- What are the solid wastes collection methods employed by household members in Kwara State, Nigeria?

Research Hypothesis

- There is no significant difference in the solid waste methods employed by household members in rural and urban areas of Kwara State, Nigeria?

Methodology

This study employed a triangulation design. A triangulation design is appropriate when a researcher employs both qualitative and quantitative methods of data collection in a particular study. Therefore,

an Ex- post facto research design was used to gather quantitative data, while, a key informant interview was used to gather qualitative data for the study. The population for this study included all household heads in both rural and urban areas of Kwara State as at the time of this study. The target population comprised heads of households in the selected Local Government Areas in Kwara State which according to the 2016 projection of the National Population Commission (NPC, 2016) has a population of about two hundred and twenty-three thousand, three hundred and sixty (223,360) people. Only heads of households who were 18 years and above were part of the study. Officials of the Kwara State Environmental Protection Agency also formed part of the population for this study with a total population of 150. However, only the officials who deal directly with solid and liquid wastes formed the target population.

A sample of seven hundred and seventy-one (771) respondents was used for the study. This comprised household heads who were selected across six Local Governments Areas of Kwara State. A multi-stage sampling technique was used to select the sample for the study. This included stratified, simple, proportionate, purposive and systematic random sampling techniques.

Two instruments were used for the study namely, a key informant interview guide which was constructed in line with the variable for the study and a researcher-developed questionnaire tagged 'Questionnaire on Solid Waste Management (QSWM)'. The researcher-developed close-ended questionnaire was validated by five experts. Cronbach alpha reliability coefficient was used to determine the reliability of the instrument. The result was 0.79. The researcher with the help of four (4) instructed research assistants administered the questionnaire. Seven hundred and seventy-one (771) copies of the questionnaire were administered to the respondents from house to house daily until the required number of participants were obtained. Copies of the questionnaire were retrieved immediately to avoid any loss and the influence of any extraneous variable. The officials of the waste management agencies were also contacted in their various offices to have a one-on-one interview with them. Data collected were coded and analysed using a descriptive statistics of frequencies and percentages for the demographic data, mean and standard deviations to answer the research questions raised for the study, while, an inferential statistics of independent sample t-test was used to analyse the hypothesis for the study at 0.05 alpha level of significance. A thematic analysis was also used to report the key informant interview.

Results

Research Question One: What are the solid wastes collection methods used by household members in Kwara State, Nigeria?

Table 1: Mean scores of responses and standard deviations on solid wastes collection methods used by household members in Kwara State.

S/N	ITEMS	Rural		Urban	
		Mean	Std. Deviation	Mean	Std. Deviation
1	Most of the time solid wastes we generate are kept in bags in our household.	2.65	1.052	2.91	0.982
2	Containers with covers are used to collect solid wastes in our household.	2.83	0.895	2.73	0.868
3	Containers without covers are used in our household most of the time.	2.64	0.987	2.57	0.921
4	Usually in our household, solid wastes are separated before disposal.	2.66	0.874	2.57	0.923
5	We do not do waste separation, we just dispose them off like that.	2.69	0.941	2.72	0.894
6	Wastes in our household are collected in polythene bags.	2.46	0.933	2.70	0.906
7	Usually, containers are not used to collect wastes in our household, solid wastes are dumped at the backyard for burning.	2.83	0.896	2.68	0.969
8	There is a pit for collecting waste at a particular place in our household	2.54	0.890	2.40	0.937
	Total	**21.30**	**7.468**	**21.28**	**7.400**

Table 1 shows the method of solid waste collection used in rural and urban areas of Kwara State, Nigeria. For instance, on whether the respondents keep their refuse in bags, mean scores of 2.64 and 2.91, with standard deviations of 1.052 and 0.982 were scored by rural and urban areas respectively. On whether containers with cover are used, respondents in a rural area had a mean score of 2.83, while those in the urban area scored 2.73 with standard deviations of 0.895 and 0.868 respectively. Likewise, on whether waste separation is done before disposal, respondents in the rural area had a mean score of 2.66 while those in urban area scored 2.57 with standard deviations of 0.874 and 0.923 respectively.

On whether the respondents do not use containers at all but they usually dump the refuse at their backyard for burning, the mean score of respondents in the rural area was 2.83 while that of the respondents in an urban area was 2.68 with standard deviations of 0.896 and 0.969. On whether there is a pit for burning refuse in their household, respondents in the rural area had a mean score of 2.54 while those in a rural area had a mean score of 2.40 with standard deviations of 0.890 and 0.937. On aggregate, respondents in a rural area had a mean score of 21.30 while those in the urban area had a mean score of 21.28 with a mean difference of 0.02. This implies that the solid waste collection methods employed by household members in rural and urban areas of Kwara State are very similar. Majority of the respondents in both rural and urban areas of Kwara State, Nigeria used similar methods of solid waste disposal which include the use of bags (X= 2.65, 2.91), containers with cover (X= 2.83, 2.73), containers without cover (X= 2.64, 2.57) and dumping at the backyard for burning (X= 2.83, 2.68). They, however, differ in the use of polythene bags (X= 2.46, 2.70) and use of pit for dumping wastes (X= 2.54, 2.40).

Hypothesis one: There is no significant difference in the solid waste collection methods employed by household members in rural and urban areas of Kwara State

Table 3: Independent Sample t-test on difference in the solid waste collection methods employed by household members in rural and urban Areas of Kwara State, Nigeria

	Areas	N	Mean	SD	Df	t-value	Sig(p)
Solid waste collection methods	Rural	205	21.30	4.576	752	.011	0.99
	Urban	549	21.28	3.993			

(t -critical = 1.972, P value > 0.05)

Results of the independent t-test in Table 2 show that there is no significant difference between rural and urban in their methods of solid waste collection. This was because the calculated p-value of 0.99 is higher than the 0.05 alpha level of significance, while the calculated t value of .011 is lower than the 1.972 t critical at df 752. Therefore, the null hypothesis which states that there is no significant difference in the solid waste collection methods employed by household members in rural and urban areas of Kwara State, thus, was retained. This implies that household members in rural and urban areas of Kwara State employ similar methods of solid waste collection.

Discussion of Findings

The study revealed that there is no significant difference in the methods of solid waste disposal employed by household members in rural and urban areas of Kwara State, Nigeria. By implication, household members in rural and urban areas of the study area have similar ways of disposing of their solid waste. This finding agrees with Adogu, Uwakwe, Egenti, Okwuoha and Nkwocha (2013) in a

study on waste disposal practice who found that majority of the respondents (90.1%) knew about waste management. Open dumping was the most well-known strategy for waste disposal among the Respondents 279 (98.9percent), trailed by burning 267 (94.7%). Incineration was the least known waste disposal method. The revelation was however different in South Africa where household wastes are collected every week from households by the local bodies (Ogola, Chimuka&Tshivhase, 2011). Calhoum(2010) observed that most of the household waste in Abuja, including waste from business areas, shops, offices and institutions such as hospitals, hotels, restaurants, construction and demolition wastes, and lots more end up on the streets or are discarded illegally on open plots or released into nearby water bodies, thereby resulting in blockage of drainages, contamination of water sources and increased poor conditions of the environment in the rural and urban areas.

This finding was corroborated by a key informant, that; people do not usually patronize the private waste managers, even if they take their wastes to legal dumping sites, they do not dispose of them appropriately. They prefer to burn their wastes at the back of their house and even inside the containers placed around town (a male respondent).

Conclusion

Based on the findings of the study, the researchers concluded that most households in rural and urban areas of Kwara State, Nigeria employ both legal and illegal ways of waste disposal. The legal methods include sanitary landfill and incineration and patronage of commercial waste managers, while the illegal methods include open burning, dumping of waste in water bodies and dumping of waste in any open space.

Recommendation

Based on the conclusion of the study, the researchers recommended that; household members should try as much as possible to avoid disposing of waste at their backyards, in drainages and water channels in order to prevent disease outbreaks. They should rather take their wastes to designated sites or patronize the commercial waste collectors in order to avoid outbreaks of deadly diseases such as cholera, dengue fever, Lassa fever among others.

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