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WASTE DISPOSAL MANAGEMENT AS CORRELATE OF ENVIRONMENTAL PROBLEMS IN ILORIN METROPOLIS

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Abstract

The study examined waste disposal management as correlate of environmental problems in Ilorin Metropolis. It examined the influence of waste burning on air quality; dumping of waste in drainages on flooding; and open dumping on water pollution. Descriptive research design was employed for the study. A sample of 400 heads of households were selected using multistage sampling technique of simple random and purposive sampling techniques. A researcher developed questionnaire titled "Questionnaire on Waste Disposal Management and Environmental Problems" (QWDMEP) was used. The reliability of the questionnaire was tested using Spearman Brown Rank Order which yielded a correlation coefficient of 0.75. Three hypotheses were tested at .05 alpha level of significance. Pearson product moment correlation was used to test the data collected for the study. The findings revealed that:

- i. waste burning as a waste disposal strategy has significant influence on the quality of air in Ilorin Metropolis [Calc. r -value = 0.428 $\geq$ Crit. r -value = 0.197];
- ii. dumping of waste in drainages as a waste disposal strategy has a significant influence on flooding in Ilorin Metropolis [Calc. r -value=0.531 $\geq$ Crit. r -value=0.197]; and
- iii. open dumping as a waste disposal strategy has significant influence on water pollution in Ilorin Metropolis [Calc. r -value=0.631 $\geq$ Crit. r -value= 0.197].

It was concluded that burning of waste, dumping of waste in drainages and open dumping instigate flooding, pollution of air and water in Ilorin Metropolis. It was recommended that public burning of waste as a waste disposal strategy should be discouraged; the dumping of waste in drainages and water bodies should be avoided; and open dumping of waste should be properly coordinated and monitored.

Keywords: *Waste; Environmental problems; Flooding; Air quality; Water pollution*

Introduction

Waste is organic and inorganic material produced by households, commercial and industrial establishments that have no economic value to the owner (UNICEF, 2006). Waste management includes collection, transportation, processing, recycling or disposal of waste materials. Increase in population, improvement in wages and expansion of urban areas contribute to the increase in the amount of waste generated in less developed countries (UNICEF, 2001; Blanchard, 2009). The increasing amount of waste arising from urban areas and its consequent disposal has been one of the major environmental and economic problems in most developing countries (Brunner & Fellner, 2007; Blight, 2008). In some developing countries, urban residents often dispose their waste materials into the nearest lowlands, rivers and sea (Nouri, Fatemi, Danekar, Fahimi, & Karimi, 2009; Kanat, 2010). This inappropriate waste disposal method threatens the environment (Chien & Shih, 2007; Asase, Yanful, Mensah, Stanford & Amponash 2009) and thus increases the costs of waste management (Asafu-Adejaye, 2000; Cointreau, 2006; De Oliveria & Borenstein, 2007).

Effective waste management leads to improvement in environmental quality and reduces health problems associated with poor environmental sanitation. Ilorin, the capital of Kwara State in North Central Nigeria has experienced rapid urbanization and population growth (Adedibu, 1985; National Population Commission, 2006), which in turn have the effect of increasing the amount of waste generated. In the past, the government had taken on the primary responsibility for the management of waste but it has not been very effective. To improve effectiveness in waste management, the Kwara State Government enacted an environmental sanitation edict in 1984. The edict made it imperative for Ilorin residents to clean their environment on every second Saturday of the month. These efforts were geared towards keeping the town clean of waste materials; however this has not been very successful. In order to increase efficiency in waste management in Ilorin, the Kwara State Government encouraged private sector's participation. For example, "Ola Clean" a private firm was contracted in 2004 and was charged with the responsibility of keeping Ilorin, the State capital clean, and formalize recycling process in the state. Presently, Ola Clean is involved in waste management in partnership with the Kwara State Waste Management Council (a governmental agency).

The challenge of effective and efficient instruments to manage household waste materials has become a priority for policy-makers in Kwara State. To tackle the challenge, developing sustainable waste management strategies is important. Urban residents' preferences regarding waste management will help in planning the strategies. This is important because the success of waste management policy in urban areas is to a large extent dependent on acceptance by the residents. Although waste may occur in solid, liquid and gaseous states, this study has focused on solid waste because it is the most conspicuous one and can be easily noticed by the urban residents. Adewuyi, Komine, Yasuhara and Murakami (2009) asserted that continuous indiscriminate disposal of municipal solid waste is accelerating and is linked to poverty, poor governance, urbanization, population growth, poor standards of living, low level of environmental

awareness and inadequate management of environmental knowledge. Most of these wastes are generated from domestic sources and are mostly characteristics of household waste (Ayotamuno & Gobo 2004).

Municipal waste management is the collective process of sorting, storage, collection, transportation, processing, resource recovering, recycling and disposal of waste. In Nigeria, wastes are usually dumped on roadsides, available open pits, flowing gully water and drainage channels (Babayemi & Dauda, 2009). The indiscriminate disposal of municipal waste is increasingly a prominent habit in most urban cities of Nigeria. Unlike urban cities, in rural communities, municipal solid waste quantity are less and managed in household backyards by burning, composting, as feeds to animals and occasionally disposed at dump sites. In Nigeria the processes involved in the management of waste are, storage, collection, transportation and disposal at dump sites.

There are different techniques of municipal solid waste disposal but the common techniques are landfill, incineration, composting and anaerobic digestion and recycling (Igbinomwanhia 2011). Although presently in Nigeria the prominently practiced municipal waste management technique is open dumping, land fill, followed by open burning while incineration method is seldom put to practice. Incineration is a cost effective municipal waste disposal option which is seldom applied in Nigeria hospitals where medical waste are incinerated at a minimal scale (Ogwueleka, 2009). The cheapest and simplest method of waste disposal is landfill. The resulting environmental impact of landfills is enormous but could be mitigated provided sanitary precautions are undertaken and waste reduction is advocated. Landfills were responsible for 49 percent of England's methane emissions in 2007 (Burney, Phillips, Coleman & Rampling, 2011). Moreover, recycling which is an environmentally friendly option is not fully adopted. There is no formal recycling sector in Nigeria. Waste are recycled informally by scavengers who buy un-used valuables from people and also go to legal and illegal dumpsites in search of materials that can be re-used and recycled.

Department for Environmental Food and Rural Affairs (DEFRA, 2013) affirmed that a variety of air pollutants have known or suspected harmful effects on human health and the environment. These pollutants are primarily the products of burning, power generation or motor vehicle traffic. These pollutants may not only prove a problem in the immediate vicinity of these sources but can travel long distances. DEFRA (2013) further explained that exposure to air pollution can lead to serious symptoms and conditions affecting human health. This mainly affects the respiratory and inflammatory systems, but can also lead to more serious conditions such as heart and cancer diseases.

The United States Environmental Protection Agency (EPA, 2015) pointed out that exposure to ozone for six to seven hours, even at relatively low concentrations significantly reduces lung function and induces respiratory inflammation in normal, healthy people. It can be accompanied by symptoms such as chest pain, coughing, nausea and pulmonary congestion.

Abiodun and Akinola (2014) affirmed that the bulk of waste generated in our environment are dumped into river courses which has led to a number of waste

accumulation along the river courses and drainages resulting to water pollution, drainage blockage, infrastructural degradation, land pollution, flooding, erosion, as well as spread of diseases like cholera, diarrhea and many other water borne diseases.

Purpose of the Study

1. Determine whether waste burning as a waste disposal strategy will have any significant influence on the quality of air in Ilorin metropolis.
2. Determine whether dumping of waste in the drainages as a waste disposal strategy will have any significant influence on flooding in Ilorin metropolis.
3. Determine whether open dumping of waste as a waste disposal strategy will have any significant influence on water pollution in Ilorin metropolis.

Research Hypotheses

The following hypotheses were formulated to guide the study:

1. Waste burning as a waste disposal strategy will not have any significant influence on the quality of air in Ilorin metropolis.
2. Dumping of refuse in drainages as a waste disposal strategy will not have any significant influence on flooding in Ilorin metropolis.
3. Open dumping of waste as a waste disposal strategy will not have any significant influence on water pollution in Ilorin metropolis.

Methodology

A descriptive research of survey was used for this study. The population includes all the people of Ilorin metropolis. According to National Population Commission Census (2006), the population of Ilorin metropolis is 781,934 as at the last population census. There are three (3) Local Governments Areas (Ilorin East, West and South Local Government Areas) in Ilorin Metropolis. A multistage sampling technique was used; stage one: simple random sampling technique was used to select two out of the three Local Governments in Ilorin; stage two: purposive sampling technique was used to select ten wards from the twenty-two wards present in the two selected Local Government; stage three: simple random sampling technique was used to select four (4) streets from each of the ten (10) wards; finally, purposive sampling technique was used to select ten (10) heads of households from all the streets that were selected for the study. A total of four hundred (400) respondents were selected for the study. A validated questionnaire was used to collect data from the respondents. The instrument was subjected to a reliability test using Spearman Brown Rank Order which yielded a correlation coefficient of 0.75. The completed questionnaire was collected, sorted, coded and analyzed using the inferential statistics of Pearson Product Moment Correlation (PPMC) at 0.05 alpha level of significance.

Results

Hypothesis 1: Waste burning as a waste disposal strategy will not have any significant influence on the quality of air in Ilorin metropolis.

Waste Disposal Management as Correlate of Environmental Problems in Ilorin

Table 1: PPMC analysis of the influence of burning of waste on air quality

Variable	No of respondents	Mean	Standard Deviation	Df	Calc. r-value	Crit. r-value	Decision
Waste burning and Air quality	400	46.51 13.11	3.612 1.301	398	0.428	0.197	H ₀ rejected

Table 1 shows Pearson "r" analysis of the influence of waste burning on air quality in Ilorin metropolis. The table shows the mean and standard deviation 46.51 ± 3.612 and the Calc. r-value of 0.197 with 398 the degree of freedom at 0.05 alpha level of significance. Since the calculated r-value is greater than the critical r-value (Calc. r-value = 0.428 $\geq$ Crit. r-value = 0.197), the hypothesis is rejected.

Hypothesis 2: Dumping of refuse in drainages as a waste disposal strategy will not have any significant influence on flooding in Ilorin metropolis.

Table 2: PPMC analysis of the influence of waste dumping in drainages on flooding

Variable	No of respondents	Mean	Standard Deviation	Df	Calc. r-value	Crit. r-value	Decision
Drainage dumping and Flooding	400	42.90 23.01	3.824 1.321	398	0.531	0.197	H ₀ rejected

Table 2 above shows the mean and standard deviation 42.90 ± 3.824 and the calculated r-value of 0.197 with 398 degree of freedom at 0.05 alpha level of significance. Since the calculated r-value is greater than the critical r-value (Calc. r-value = 0.531 $\geq$ Crit. r-value = 0.197), the hypothesis is rejected.

Hypothesis 3: Open dumping of waste as a waste disposal strategy will not have any significant influence on water pollution in Ilorin metropolis.

Table 3: PPMC analysis of the influence of open dumping on water pollution

Variable	No respondents	Mean	Standard Deviation	Df	Calc. r-value	Crit. r-value	Decision
Open dumping and Water Pollution	400	52.23	4.221	398	0.631	0.197	H ₀ rejected
		19.21	1.210				

Table 3 shows the mean and standard deviation of 52.23 ± 4.221 and the calculated r-value of 0.197 with 398 degree of freedom at 0.05 alpha level of significance. Since the calculated r-value is greater than the critical r-value (Calc. r-value = 0.631 $\geq$ Crit. r-value = 0.197), the hypothesis is rejected.

Discussion

Hypothesis 1 stated that waste burning as a waste disposal strategy will not have any significant influence on the quality of air in Ilorin metropolis. This hypothesis was rejected; this implies that there is a significant influence of public burning of waste on air quality in Ilorin metropolis. This finding is in line with the findings of Defra (2013), who pointed out that a variety of air pollutants which are primarily the products of burning, power generation or motor vehicle traffic have known or suspected harmful effects on human health and the environment.

Hypothesis 2 stated that dumping of refuse in drainages as a waste disposal strategy will not have any significant influence on flooding in Ilorin metropolis. This hypothesis was rejected; this implies that there is a significant influence of open dumping of waste on flooding in Ilorin metropolis. This is in line with the finding of Abiodun and Akinola (2014), who affirmed that the bulk of waste generated in our environment are dumped into river courses which has led to a number of waste accumulation along the river courses and drainages resulting to water pollution, drainage blockage, infrastructural degradation, land pollution, flooding, erosion, as well as spread of diseases like cholera, diarrhea, typhoid fever which are water borne.

Hypothesis 3 open dumping of waste as a waste disposal strategy will not have any significant influence on water pollution in Ilorin metropolis. This hypothesis was rejected; this implies that there is a significant influence of open dumping of waste on water pollution in Ilorin metropolis. This is in line with the findings of Chien and Shih (2007) and Asase (2009), who pointed out that inappropriate waste disposal method threatens the environment and deteriorates environmental quality by polluting the air and water.

Conclusion

Based on the findings of the study, it was concluded that:

1. There is a significant influence of waste burning as a waste disposal strategy on the quality of air in Ilorin metropolis.
2. There is a significant influence of dumping of refuse in drainages as a waste disposal strategy on flooding in Ilorin metropolis.
3. There is a significant influence of open dumping of waste as waste disposal strategy on water pollution in Ilorin metropolis.

Recommendations

Based on the findings and conclusion of this study, the researchers recommend that:

1. Public burning of waste as a waste disposal strategy should be discouraged.
2. The dumping of waste in drainages and water bodies should be avoided.
3. Open dumping of waste should be properly coordinated and monitored.

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