



Knowledge Of Solid Waste Management Among The Residents Of Port Harcourt Metropolis Of Rivers State, Nigeria

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BSTRACT

This study investigated the knowledge of solid waste management among the residents of Port Harcourt Metropolis, Nigeria. Descriptive survey design was adopted and a population which consisted of one million, eight hundred and sixty-five persons (1,865,000) was used. Simple random sampling was done to select the sample size for the study which was a total of four hundred and forty (440) respondents. Data was collected using a structured questionnaire and analyzed using SPSS version 25. Analytical tools such as mean, standard deviation, and chi-square at 0.05 alpha level were employed. The findings of this study showed that, 284(70.5%) had high level on knowledge on solid waste management. Also, there was a significant relationship between socioeconomic status ($X^2=51.35$, $df=8$, $p=0.00$), educational level [$X^2=126.55$, $df=6$, $p=0.00$] and knowledge, there was no significant relationship between age [$X^2= 8.71$, $df=6$, $p= 0.19$] and knowledge on solid waste management. The study concluded that the residents of Port Harcourt Metropolis had a high knowledge of solid waste management. Based on these, recommendations were proffered to improve the practice of solid waste management.

Keywords: Knowledge, Management, Metropolis, Solid, and Waste

INTRODUCTION

Solid waste management has remained an uncontrollable environmental problem in Nigeria. This problem has manifested in several ways which include creation of illegal dumpsite, litters of waste around street corners and untimely evacuation of solid waste from the dumpsites. The practice of dumping waste product in Africa has become a subject of major concern for world environmental protection agencies. Solid waste management has remained intractable environmental sanitation problem in Nigeria. This problem manifested in the form of piles of indiscriminate disposal of uncovered waste and illegal dumpsite along their roads and at street corners in cities and rural areas (Opara, 2009). The effects of indiscriminate refuse/waste disposal have been a thorny issue in contemporary urban and rural communities in developing countries (Ogbonna, 2011).

Port Harcourt metropolis presents a ghastly picture, the neglect of filled refuse bins in recent time has its effect on the inhabitants. Many areas around the homes are littered with domestic refuse sewage waste, garbage and other wastes from industrial operations. Industrial operations are characterized by the generation of large volume of waste in the form of solids, liquid and gases. Some of these wastes are toxic and so have negative impacts on our health, environment, water and air.

Waste management refers to unwanted or unusable material that is produced through the activity of humans and can have different forms. Waste can be liquid, solid or gas with each having its disposal

method and a way of managing the waste. According to Moore (2012) waste can mean many things to different people. Waste are substances which have no purpose or usefulness, seen as nuisance that need to be discarded by the generator of the waste (Tamunobereton-ari *et al.*, 2012). The Resource Conversion and Recovery Act (RCRA) (2020) states that “solid waste” means any garbage or refuse, sludge from waste water treatment plant, water supply treatment plant or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

Librarianship studies and information technology (2017) defined knowledge as familiarity, awareness, or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering or learning. Knowledge can refer to a theoretical or practical understanding of a subject. In this context, knowledge of solid waste management refers to the awareness on the different kinds of solid waste generated, the storage methods, treatment, transportation, and disposal methods. Eshwari *et al.* (2019) revealed that 60.3% of the people had good knowledge of solid waste management. Also, in a study conducted by Shahzadi *et al.* (2018) 72.0% had good level of knowledge of solid waste management. There seems to be appreciable awareness and knowledge about waste disposal among people in Nigeria but most of them are only aware of the crude and traditional methods and are oblivious of the modern methods such as incineration and recycling (Ayodeji, 2012).

It is expected that government would in due course arrive at the means to combat solid waste and reduce their negative impact on the residents of the area and the perception of our cities as being dirty, chaotic, and full of traces of rotting or fermented garbage that emit odors harmful to human health. Obviously, the timely removal of accumulated solid wastes requires much more than our governments at all levels are presently engaged in. Many have not cared to think about how their health can be affected. Waste management authorities collect refuse from households and public containers on regular basis in Port Harcourt metropolis. As a result, most individuals or households’ resort to open dumping of refuse, engage refuse collector, burn or bury waste. Solid waste management is a serious sanitary problem in Port Harcourt Metropolis. The problem seems to be defying solution. Many sell foods items like frozen food, fish, meat, fruits, pepper etc around these littered refuse and people still patronize them with the swarm of flies. Canteens are located in those dirty environment and people still buy those foods and eat there. This reveals a lot about their level of knowledge of solid waste management, hence a call for a research work. The study provided answered the research question on the level of knowledge on solid waste management possessed by the respondents.

The following null hypotheses guided this study:

H₁: There is no significant relationship between socioeconomic status and knowledge of the people towards solid waste management

H₂: There is no significant relationship between age and their knowledge on solid waste management.

H₃: There is no significant relationship between the level of education of the residents and their knowledge on solid waste management.

METHODOLOGY

The different methods used in carrying on this research were discussed under the following sub-headings:

Area of the study

This research was carried out in Port Harcourt metropolis located in Rivers State. Port Harcourt is a local government in Rivers State Nigeria. Port Harcourt metropolis is divided into four zones namely: Trans-Amadi, Diobu, Borokiri and GRA zones (Allwell and Samuel, 2014). It consists of two different ethnic groups; the Okrika (ijaw) in the south and Ikwerre (igbo) in the north. It is surrounded by Okrika in the south, Eleme in the east, Obio-akpor in the north and Degema in the west respectively. It is a heterogenous city consisting of people of different ethnic nationalities.

It stands on latitudes 6059’ to 706 N of the equator and longitude 4040’ E to 4055 E of the Greenwich meridian. It is in the Niger Delta and lies along the Bonny River an eastern distributary of River Niger

which is 66km upstream of the Gulf of Guinea (Oyegun, 1994; Onyegun, 1997). Port Harcourt City Local Government Area is the core of the Port Harcourt municipality with a current population of about 1,865,000 persons and a combined land and water area of 186km² (170km² and 16km²) respectively (National Population Commission, 2006).

Port Harcourt local government consist of 20 electoral wards and 28 communities. This study area currently has a number of government owned tertiary institutions which includes, Rivers State University, University of Port Harcourt, Ignatius Ajuru University of Education, Captain Elechi Amadi Polytechnic, Kenule Besor Wiwa Polytechnic, Rivers State College of Health Science and Technology.

Research Design

This study adopted a descriptive cross-sectional research design. This design examines the relationship between one independent variable and other dependent variables of interest as they exist in a defined population at a single point in time or over a short period of time (Rakesh and Priya, 2019). This design has been successfully utilized by Stanley and Owhor (2018). This design was used to investigate the knowledge of solid waste management among the residents of Port Harcourt metropolis.

Population for the study

The population of the study consisted of the residents of Port Harcourt metropolis, (1,865,000) from (National Population Census, 2006). Inclusion criteria for this study were person of the age of 18 and above. Exclusion criteria: persons below the age of 18.

Sample and sampling technique

The sample size for the study was 440 which was determined. A simple random sampling was used to select 10% from each zone, which reads 110 from each zone. A total number of four hundred and forty persons were selected for this research.

Instruments for Data Collection

The instrument used for data collection is a constructed questionnaire titled (KSWM). This contained series of questions (question statement) which was used to deduce answer or information about the practice of waste disposal from the respondents. The questions were divided into two (2) sections. Section one provided demographic information of the respondents such as age, sex, and educational qualification among others. Section two provided general information on their knowledge of solid waste management.

Reliability of the instrument

Reliability is the degree to which the research instrument gives consistent results after repeated trials. Cronbach's Alpha was used to test for reliability of the instrument, using SPSS- Statistical Package for Social Sciences version 25. A reliability coefficient of 0.761 was obtained and considered acceptable.

Method of data analysis

In this study, research questionnaires answered and collected were analyzed and represented in charts, frequency and percentage distribution, mean and standard deviation tables. A criterion of determining knowledge was employed, a proportion less than 40 per cent was considered poor level of knowledge, 40-69 per cent average, 70 per cent and above was considered high. While for the inferential statistics, data was analyzed using statistical package for social science version 25.0. ANOVA and Chi-square were used to test the study hypotheses at 0.05 level of significance. A test was considered significant at $p < 0.05$ (Ramsey, 2016).

RESULTS

The results of the study are presented below in tables

What is the knowledge of solid waste management possessed by the residents of Port Harcourt metropolis?

Table 4.1: Knowledge of solid waste management

SN	Items	Yes F (%)	No F (%)	Decision
1	Ever heard of solid waste	333(82.6)	70(17.4)	High
2	Know what Solid waste management entails	235(58.3)	168(41.7)	Average
3	Waste is any item with no value for the owner	287(71.2)	116(28.8)	High
4	Waste can be recycled or reused for other things	286(71.0)	117(29.0)	High
5	Healthy method of waste disposal can reduce smells, breeding of vectors and harmful emissions around dumpsites	383(95.0)	20(5.0)	High
6	Proper method of waste disposal can reduce malaria, typhoid fever, catarrh, diarrhea, cough among others	377(93.5)	26(6.5)	High
7	Incineration is the best method of solid waste management	319(79.2)	84(20.8)	Poor
8	Proper disposal of waste increases the beauty or aesthetics of the environment, there by leading to healthy environment	379(94.0)	24(6.0)	High
9	Improperly disposed waste can obstructs the gutters, surroundings, and roads in your area	383(95.0)	20(5.0)	High
10	Waste management can provide income and create jobs for people	325(80.6)	78(19.4)	High
11	Waste management the responsibility of the government alone	194(48.1)	209(51.9)	Average
12	Waste management is for the old alone	64(15.9)	339(84.1)	High
13	Waste management is for the poor alone	123(30.5)	280(69.5)	High
	Overall	284(70.5)	119(29.5)	High

Table 1 revealed the level of knowledge of the respondents on solid waste management. The overall result showed that 284(70.5%) had high level on knowledge on solid waste management while 119(29.5%) had poor level of knowledge on solid waste management. For instance, 93.5% of the respondents had high on proper method of waste disposal can reduce malaria, typhoid fever, catarrh, diarrhea, cough among others. 95.0% of the respondents also had high knowledge on improper disposed waste can obstructs the gutters, surrounding and roads in the environment and also, 80.6% of the respondents knows that waste management can provide income and create jobs for people.

Table 2: X^2 test showing the relationship between socioeconomic status and knowledge of solid waste management

Socioeconomic status	Knowledge of solid waste mgt			Total	df	X^2 -value	p-value	Decision
	Low F(%)	Average F(%)	High F(%)					
<10,000	18(25.7)	11(15.7)	41(58.6)	70(100)	8	51.35	0.00	Rejected
10,000-20,000	8(9.5)	29(34.5)	47(56.0)	84(100)				
21,000-30,000	6(6.6)	26(28.6)	59(64.8)	91(100)				
31,000-40,000	2(3.2)	7(11.3)	53(85.5)	62(100)				
≥41,000	2(2.1)	16(16.7)	78(81.3)	96(100)				
Total	36(8.9)	89(22.1)	278(69.0%)	403(100)				

Table 2 showed the relationship between socioeconomic status and knowledge of solid waste management of the respondents. The result showed that there was a significant relationship between socioeconomic status and knowledge of solid waste management (X^2 -value = 51.35; df = 8, p = 0.00).

Thus, the null hypothesis which states that there is no significant relationship between socioeconomic status and knowledge of the people towards solid waste management was rejected.

Table 3: X^2 test showing the relationship between age of the respondents and their knowledge on solid waste management.

Age of Respondents	Knowledge of solid waste mgt.			Total	Df	X^2 -value	p-value	Decision
	Poor F(%)	Average F(%)	High F(%)					
18-22 years	8(7.1)	24(21.4)	80(71.4)	112(100)	6	8.71	0.19	Accepted
23-27 years	8(7.8)	19(18.6)	75(73.5)	102(100)				
28-32 years	14(13.9)	19(18.8)	68(67.3)	101(100)				
33 years and above	6(6.8)	27(30.7)	55(62.5)	88(100)				
Total	36(8.9)	89(22.1)	278(69.0)	403(100)				

Table 3 showed the relationship between the age of the respondents and their knowledge on solid waste management. The result showed that there was no significant relationship between their age and knowledge on solid waste management (X^2 -value = 8.71; df = 6, p = 0.19). Thus, the null hypothesis which states that there is no significant relationship between the age of the respondents and their knowledge on solid waste management was accepted.

Table 4: X^2 test showing the relationship between the level of education of the respondents and their knowledge on solid waste management

Level of education	Knowledge of solid waste mgt.			Total	Df	X^2 -value	p-value	Decision
	Poor F(%)	Average F(%)	High F(%)					
No formal education	22(42.3)	21(40.4)	9(17.3)	52(100)	6	126.55	0.00	Rejected
Primary	8(12.1)	19(28.8)	39(59.1)	66(100)				
Secondary	4(2.6)	35(23.0)	113(74.3)	152(100)				
Tertiary	2(1.5)	14(10.5)	117(88.0)	133(100)				
Total	36(8.9)	89(22.1)	278(69.0%)	403(100)				

Table 4 showed the relationship between the level of education of the respondents and their knowledge of solid waste management. The result showed that there was a significant relationship between their level of education and knowledge of solid waste management (X^2 -value = 126.55; df = 6, p = 0.00). Thus, the null hypothesis which states that there is no significant relationship between the level of education of the residents and their knowledge on solid waste management was rejected.

DISCUSSION OF FINDINGS

The result showed that 284(70.5%) had high level on knowledge on solid waste management while 119(29.5%) had poor level of knowledge on solid waste management. For instance, 93.5% of the respondents had high on proper method of waste disposal can reduce malaria, typhoid fever, catarrh, diarrhea, cough among others. 95.0% of the respondents also had high knowledge on improper disposed waste can obstructs the gutters, surrounding and roads in the environment and also, 80.6% of the respondents knows that waste management can provide income and create jobs for people. This finding could be as a result of some awareness programmes and announcement done via media on waste management carried out in that area. This result is in line with the findings of Laor *et al.* (2018) and Adogu *et al.* (2015) which revealed that 73% respondents had high knowledge about solid waste

management in their study conducted among the residents of Chiang Rai province of northern Thailand and 90% of the respondents were aware of solid waste management respectively. It was also in agreement to Shahzadi *et al.* (2018) study that showed 72.0% had good level of knowledge on solid waste management. Also, in collaboration with the findings of Sisay *et al.* (2017) showed that 81.8% of the respondents had good knowledge, Eshwari *et al.* (2019) revealed that 60.3% of the people had good knowledge of solid waste management. Pussadee *et al.* (2017) in his findings revealed that 73% had high level of knowledge on solid waste management. This study revealed that the respondents are knowledgeable about refuse management. This is in line with the finding reported by Yadavannavar *et al.* (2010) that it may be due to the fact that majority of the respondents have tertiary education, that 91% of the respondents were aware of refuse management. Adeyemo *et al.* (2013) also agreed with that of Ehrampoush and Moghadan (2005) which showed that the knowledge of more than 65% of students was better than moderate. This is in line with Ihuoma (2012) which reported that the effect of poor waste management has resulted in eye sore, unpleasant odour and breeding ground for rodents, flies, insects and other diseases vectors, consequently encouraging the outbreak of diseases such as cholera, parasitic worm, malaria, typhoid fever, diarrhea, hepatitis etc. This similarity found between the present study and the previous ones might be due to the homogeneity of the study population and the concepts studied.

The result showed that there was a significant relationship between socioeconomic status and knowledge of solid waste management (X^2 -value = 51.35; df = 8, $p = 0.00$). thus, the null hypothesis which states that there is no significant relationship between socioeconomic status and knowledge of the people towards solid waste management was rejected. This finding might be influenced by those earning higher are prone to be more knowledgeable about waste management and its services. They are aware of the health implications of improper waste disposal. This finding corroborates with the result of Laor *et al.* (2018) that states that the relationship between socio economic status and knowledge of the respondents. It was also in line with the result from Agwu (2012) which reported that social class had a significant relationship with the residents of Port Harcourt knowledge on solid waste management. Siti and Mohammed (2020) found out that employment did not have significant relationship with knowledge; employment ($p = .367, > 0.05$). The uniformity of these findings (present and previous) might be related to similar characteristics of the study population and study area.

The result showed that there was no significant relationship between their age and knowledge on solid waste management (X^2 -value = 8.71; df = 6, $p = 0.19$). Thus, the null hypothesis which states that there is no significant relationship between the age of the respondents and their knowledge on solid waste management was accepted. This finding might be due to the age of a person doesn't depict their level of knowledge, and also with the current trend of social media, the younger ones tend to get more information from sources online before the older ones. This finding was in agreement with the result of Siti and Mohammed (2020) which revealed that year of birth did not have significant relationship with knowledge; year of birth ($p = .174, > 0.05$). The result was in variance to the findings of Laor *et al.* (2018) that reported socio-demographic variables like age was statistically significant($p=0.000$) associated to knowledge at 0.05 level. The result is not similar to Garang *et al.*(2016) and Laabar *et al.* (2012) that reported that a less than 20 years-old group was found that they had the highest percentage with low level of knowledge on solid waste management knowledge when compared with other age groups. Also, the finding of knowledge found most among the younger ones was in line with that of Agwu (2012) in a study conducted at Port Harcourt, it was revealed that with respect to age, Port-Harcourt city residents below 25 years of age have significantly higher knowledge of waste management than those above 25 years of age. The similarity and difference between the findings of the present study and the from the previous ones might be due to the location of the study

The findings revealed that majority of the respondents (88.0%) with tertiary level of education had high level of knowledge on solid waste management, following those with secondary level of education (74.3%), primary level of education (59.1%) and no formal education (17.3%). Hence, based on educational level, knowledge was found most with those with tertiary level of education. The result showed that there was a significant relationship between their level of education and knowledge of solid

waste management (X^2 -value = 126.55; df = 6, p = 0.00). Thus, the null hypothesis which states that there is no significant relationship between the level of education of the residents and their knowledge on solid waste management was rejected. The result was not unforeseen because knowledge and information makes up a semi-circle of the educational system. This result is akin to the results from Jatau (2013) which indicated that the calculated chi-square value is more than the table chi-square value. This implies that level of education has statistically significant influence on the knowledge of the impact of improper waste management. Also, this finding corresponds with the finding of Samuel (2006) who found that level of education had statistically significant influence on the knowledge of environmental sanitation. The finding of this study was in support with the result of Siti and Mohammed (2020) which revealed that educational level did not have significant relationship with knowledge; educational level (p = .339, > 0.05). The similarity between the result of the present study and previous ones might be due to uniformity of the concepts studied.

CONCLUSION

Based on the findings of the study, the residents of Port Harcourt metropolis had high knowledge, of solid waste management. The knowledge of solid waste management was significantly related to the socio-economic status and educational status of the respondents.

RECOMMENDATIONS

Based on the result of this study, the following recommendations were made:

1. Government and health care workers should organize health education programmes at the community level to re-emphasize on the link between good health and a clean environment.
2. Government and environmental/public health officers should advice stores and shops owner selling eatable and edible items close to the dumpsite to relocate from environs around the dumpsite to avoid the contamination of the food items and reduce the risk and spread of diseases.

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