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Case Study

Solid Waste Disposal Attitude in Sango Ota, Ogun State: Implication for Sustainable City Development in Nigeria

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Solid waste disposal attitude is multidimensional and a complex issue that is prominent in urban areas. It is a global phenomenon confronting both developed and developing countries Sango Ota in Ogun State Nigeria has become an industrial region that attracts other activities and increases in population responsible for high volume of solid waste generation. In this paper, the current disposal means, waste collection method, resident attitude role of government in recent time will be achieved through the use of a questionnaire. Congestion, environmental pollution and health hazard was found to be the significant consequence of improper solid waste disposal with high Wald value and sig. value<0.05 level of significance. Majority of the respondents who chose burning, roadside dumping and flood/canal dumping were of the opinion that payment for either government/private waste collection in their area is expensive (51.1%) compared to other means of disposal. The implication of the findings for waste disposal attitude in achieving sustainable city development in Nigeria tackling solid waste problem in urban cities through public awareness, attitudinal change in achieving waste reduction, provision of collection point within neighbourhood and provision of accessibility to each dwelling with adequate drainage system.

Keywords: Solid waste, Disposal, Attitude, Sustainable city, Development

INTRODUCTION

The solid waste problem in urban centres is becoming deity debate. Increase in population due to rural-urban migration and under development of rural areas contribute immensely to urbanisation. Solid waste is wastes generated from the daily activities of man and animal that requires being disposed of. The rate of indiscriminate dumping of refuse in an urban environment is an eyesore to sustainable city development. It has effects on the environmental quality and negative effects on the health status of inhabitants. Improper disposal and management of solid waste result into various types of pollution that contaminate the urban landscape (Alam & Ahmade, 2013; Mbu, 2015). This can be attributed to high population and demand for food, shelter and other commodities used daily by different household.

To achieve a sustainable development in Nigeria, it requires efficient management of solid waste, degraded environment cannot sustain an adequate growth and it impacts negatively on the entire development of a nation and reduce urban functionality (Chukwuemeka et. al., 2012). There is a need for behavioural and attitudinal change in achieving solid waste disposal method that have an impact on sustainable environment. Further elaborated on needs to adopt a more efficient approach not to prevent environmental education

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Environmental education and public participation option lead to an increasing awareness that environmental precautions are important for continued socio-economic development and conducive environment that is free from pollution. Health and safety issues also arise from improper waste disposal as it attracts flies that can spread diseases in an area. Attention should be given to production, distribution and consumption aspect of an area as well as waste collection and disposal attitude including waste collection and disposal techniques that reduces waste in urban centre.

The study investigates attitude of Urban residents on waste disposal which is very germane to the present situation where environment needs to develop sustainable city programme, for adequate orderliness in Sango Ota, therefore, the following objectives would be very important: examine the socioeconomic characteristics of the inhabitants, identify different types of solid waste generated, examine the solid waste disposal practices and attitudes of households towards waste disposal method.

Study Area

Sango Ota is located in Ado-Odo local government area of Ogun State, Nigeria between latitude 60^{o} 30' N-60^{o} 50 N' and longitude 30^{o} 02'E – 30^{o} 25'E, Sango Ota is a commercial centre of Ogun State and its nearness to Lagos state attract many people to settle in the area. It is the fourth largest city in Ogun State with a total population estimated to be 527,242 in 2006 census Lagos – Abeokuta Expressway and Idi-Iroko road have contributed immensely to growing population and high commercial activities. The population provides cheap labour to industries in Ota. Over 70% of Ota road are untarred and inaccessible due to dense networks of footpath (Salau, Lawson and Odunbaku, 2013). The growth is attributed to the accessibility that prompts the development of vast land for residential purposes. Waste disposal attitude in Sango Ota has become an eyesore due to the unplanned and inadequate layout plan that cause improper dumping of refuse.

LITERATURE REVIEW

Solid waste is discarded materials generated from various land-use such as residential, industrial, public places and commercial areas. Increase in population, uncontrolled and unplanned nature of environment contributed to the attitude of disposal in urban areas as concluded by (Butu and Mshelia, 2014; Alam and Ahmade, 2013; Chukwuemeka, Ugwu and Igwegbe, 2012; Agwu 2012). Urbanisation contributes to waste disposal manner and existing manpower and equipment do not meet the present activities and consumption rate of total population (Efe, 2013; Oyeniyi, 2011). "The indiscriminate dumping of refuse started in the tail end of 2008 after the sudden stoppage of construction on the Sango-Ota overhead bridge by Julius Berger Plc., a project which became necessary to ease traffic in the commercial settlement. Blocked drainages and poor sanitary condition, among others, are the ugly sights that dot the streets. With the advent of the rainy season, sanitary situation has gone worse" (Akinfenwa, 2010). Oyeniyi (2011) concluded that physical configuration of neighbourhood and conflict in land use planning that produced poorly constructed accessibility without adequate drainage system and other environmental problems include traffic congestion and flooding. The problem is prevalent in an area with a nuclear pattern.

The pattern of development within a highly populated is not related to the sustainable city development. This requires awareness of the impact of waste in an environment. Nigeria needs to stress environment education and awareness to reduce habit of indiscriminate waste disposal (Bayemi and Dada, 2009). Studies by Omole, Tenebe, Emenike, Umoh and Badejo (2015); Olukanmi & Mnenga, (2015); Afangideh, Joseph & Atu, (2012); Anyawu and Adesua (2014) and Butu & Mshelia (2014). The poor attitude of urban inhabitants on waste disposal has a negative impact on the health status and environmental degradation Atangideh, Joseph & Atu (2012), Boadi (2008) & Metungwe (2016). Meanwhile, Adeyemo, Oyediran & Ayafegbeh (2013) concluded that attitude and practice of official responsible for waste management were not effective and needs for workshop and seminar for the official. Anyanwu & Adefila (2014) observed that the inadequate fund, shortage qualified manpower unethical attitude of the public waste manager pose danger on achieving clean and healthy environment.

According to Okechukwu, Okechukwu, Noye-Norteu & Owusu Agyei (2012) studied health perception of indiscriminate waste disposal in Ghana, concluded that inadequate sanitation equipment has posed serious environmental and sanitation problems that resulted from indiscriminate dumping of refuse causes major health issues to children and mothers in a community. Lawuo Madugu & Mnyawi (2014) examined perseverance of poor solid waste management system in Dodoma municipality, Tanzania, concluded that there should be a provision of at least three (3) containers that comprise various types of waste at different points. This would have an impact on the attitudinal change of inhabitants.

Buenrostro, Marquez & Ojeda (2014) concluded that educational background and poverty level of inhabitants contributed to disposal attitude, generation volume and waste composition. Ali et. al (2015) concluded on perception and attitude of people toward achieving sustainable development policy maker should promote public and private partnership for successful implementation of segregation techniques the benefit to

waste disposal attitude and sustainable management. Indhira, Senthil & Vadivel (2015) investigated awareness and attitudes of people perception towards disposal of waste Kumbakonam and Tamilnadu in India, they discovered that the wastebins are accessible but not clear in time and the open burning resulted in poor visibility along the roadside and vacant land.

Waste disposal attitude has constituted a serious environmental degradation in urban centres in developing nations. Household waste generation constitutes pollution from various open burning in different areas in Lokoja affect inhabitant health (Adetunji, Atomode & Isah (2015). " typical solid waste management system in a developing country displays an array of problems, including low collection coverage and irregular collection services, crude open dumping and burning without air and water pollution control, the breeding of flies and vermin, and the handling and control of informal waste picking or scavenging activities" (Bartone, 1995).

Previous researchers revealed that the poor degrade the environment than the rich. Murad & Siwar (2017) described the urban poor and low-income earners are victims of environmental pollution. Inadequate waste disposal system in developing countries including Nigeria attributed to the occurrences of diseases that wide spread in low-income group, a huge amount of money will be spending on drugs due to the nonchalant attitude of the people towards effective waste disposal and this can also aggravate poverty level. Mshelia (2015) conclude that, adequate and responsive legal and legislative provisions should be made to strengthened and enforce control and management of development and environmental consequences. Alam and Ahmade (2013) highlighted causes of increase in solid waste as population growth, increase in industrials manufacturing, urbanization and modernization and "increases in the global population and the rising demand for food and other essentials, there has been a rise in the amount of waste being generated daily by each household"

Mshelia (2015) examined solid waste as a problem for urban environmental sanitation in Nigeria but highlighted constitutional constraint, nonchalant attitude, urbanisation, technical deficiencies, finance and accessibility to collection point were a major problem facing waste management in urban centres. Waste disposal attitude and generation from household, industrial and commercial areas increase with recent population growth and rate of consumption in urban centres. The composition of waste generated in a particular area determines the disposal method and practices that influence patterns of waste management.

RESEARCH METHOD

The study made use of both primary and secondary data. Primary data were observed through observation guide, the total number of 139 questionnaires were used which comprises of the socio and economic characteristics of the inhabitants, different types of solid waste generated, their solid waste disposal practices and attitude. While secondary data were obtained from existing literature related to waste disposal practice. Descriptive analysis was used to investigate the characteristics of different waste disposal practices of the study population. The ordinal logistic regression analyses were conducted to know the influence of socio-economic and demographic factors on the community residents waste disposal practices, the methods embraced, consequences of improper waste disposal in their area, and household attitudes towards waste disposal. To access the likelihood that the respondents will adopt good disposal of waste in their community, three variables were considered; sex, age and educational qualification. To predict the likelihood of consequences of improper solid waste disposal, educational qualification of the respondents was also considered. For the components of the questionnaire, item and reliability analyses were applied using Cronbach's Alpha technique. Currently, the cut-off for statistical significance is set at.

RESULTS FINDINGS AND DISCUSSION

Cronbach's Alpha statistic of 0.758 in table 1 indicates a high level of internal consistency for the scales used under study and can also be used as a reliability test for individual contribution of all the factors considered in decision making process.

Table 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.758	.745	7

Socio-economic and demographic characteristics

There were a total number of 139 respondents. About 36.7% (51) were male with the female counterparts taking 63.3%. The marital status of the respondents indicates that 23.7% (33) were single, 54 %(75) were married, 15.1 %(21) were married, 6.5 %(9) were divorced with only widowed taking only 0.7% of the total response. It shows that majority of the respondents were male and are married. The analysis further showed that majority of the respondents were between age 21-40 years with the least age (60 years and above) accounting for only 12.9% respectively. Analysis revealed that 29.5% of the respondents have only primary education, 39.6% have secondary education and 30.9% have tertiary education respectively. Many of the visited households had 6-10 household members (41.7%). This indicated that as the number of household increases, there is a tendency for an increase in accumulated solid wastes and has consequences on the inhabitants.

Waste disposal methods

From the opinion of respondents relating to waste disposal, activities in the area. The inhabitants embraced a particular waste collection method viz Private waste collector, Government waste collector, burning, roadside dumping and flood dumping or canal dumping respectively. Waste bin was used by 41% of the respondents, 40.3% adopt the use of polythene bag while 18.7% adopted plastic bag usage. Private waste collection method was embraced by 16.5% of the total respondents with 30.9 %, 25.2%, 23% and 4.3% whose methods of waste collection were through government, burning, roadside dumping and flood/canal dumping. Plate 1 and 2 described situations of dumping site where open burning is taking place. The site serves as a place of abode for rodents and other reptiles that transmit diseases from site to nearest residential areas. The consequences ascribed to poor visibility on the highway due to frequent smoke emanating from the site because it is close to the main road. It causes offensive odour and pollution in the environment. If adequate attention is not given to the site, it will take over the road in future.

Plate 1: Roadside dumping of refuse

Plate 2: Uncontrolled open dumping

Majority of the respondents who chose burning, roadside dumping and flood/canal dumping were of the opinion that payment for either government/private waste collection in their area is expensive (51.1%) compared to other means of disposal. The respondents' observation on payment which is on high side for refuse disposal prompt canal and roadside dumping as shown in plate 3, 4,5 and 6, this is an eyesore, reduce aesthetics of the environment, causes of traffic congestion, offensive odour. The blockage results in frequent flooding that occurs in the area during the rainy season that affects both properties and life of individuals.

Plate 3: Street without adequate accessibility

Plate 4: Existing block drainage

Plate 5: Existing block drainage

Plate 6: Drainage dumping attitude

The consequences of improper solid waste disposal in those areas was manifested through various diseases occurs aftermath of indiscriminate disposal of refuse within the area. The majority of respondents (43.9%) opined that

Table 2: Ordinal Regression

	Model Fitting Information				
	Model	-2 Log Likelihood	Chi-Square	df	Sig.
Dependent variable = Attitude					
Sex	Intercept Only	30.932			
	Final	30.908	.024	1	.877
Age	Intercept Only	45.941			
	Final	42.528	9.413	2	.002
Educational Qualification	Intercept Only	44.809			
	Final	44.148	7.661	2	.000
Dependent variable = Consequence					
Educational Qualification	Intercept Only	33.984			
	Final	33.497	.487	2	.004

Link function: Logit.

Table 3: Chi-Square Test of Independence

Goodness-of-Fit				
	Pearson χ^2	df	Sig.	Decision
Dependent variable = Attitude				
Attitude*Sex	1.970	3	.579	Sex is independent on attitude of respondents towards solid waste disposal
Attitude*Age	5.380	6	.004	Age is dependent on attitude of respondents towards solid waste disposal.
Attitude*Educational Qualification	5.637	6	.009	Educational qualification is dependent on attitude of respondents towards solid waste disposal.
Dependent variable = Consequence				
Consequence*Educational Qualification	19.985	4	.000	Educational qualification is dependent on consequence of improper solid waste disposal.

Link function: Logit.

it can cause health hazard such as typhoid, cholera and malaria with 36.7% who opined that it can cause serious environmental pollution. The study opined that attitude of neighbours towards waste disposal and management. It was discovered that 23% are good with the majority of them rating their household members fair (37.4%). However, the government has been trying their best in tackling solid waste disposal problems as justified by a majority (37.4%) of the respondents.

Attitude of household members towards solid waste disposal

From Table 2, the model for the attitude of household members towards solid waste disposal on Sex does not give a significant improvement over the baseline intercept-only model. This tells that the model does not give better predictions than if we just guessed based on the marginal probabilities for the outcome categories. All other models give a significant improvement over the baseline intercept-only model. This indicates that all the models except attitude on Sex give better predictions than if we just guessed based on the marginal probabilities for the outcome categories. In addition, it can also be evidenced by the Chi-square Test of independence in table 3 that only sex of respondents does not significantly contribute to the predictions of household member's attitude towards solid waste disposal.

From the measure of determination in table 4, Nagelkerke R-square is mostly reported since it has the highest value of Pseudo R-square in measuring the goodness of fit. There are approximately 0.3%, 52.6% and 82.5% variation in respondents' attitude on solid waste disposal taking into account variables of sex, age and educational qualification. In addition, R-square of 0.604 indicates that there is 60.4% variation in the prediction of consequences of improper solid waste disposal taking into account the educational qualification of the respondents. The associated R-square shows that the model has provided goodness of fit except for predictor variable of sex on attitude whose R-squared value was low compared to others.

Table 4: Measure of Determination (Pseudo R-square)

Model	Nagelkerke R^2	Cox and Snell R2	McFadden
Attitude*Sex	0.030	0.046	0.024
Attitude*Age	0.526	0.424	0.409
Attitude*Educational Qualification	0.825	0.705	0.632
Consequence*Educational Qualification	0.604	0.534	0.501

The result of ordinal logistic regression analysis to appraise the influence of a set of factors on the likelihood that the respondent's attitude towards solid waste disposal

Table 5: Parameter Estimates (Dependent variable = Attitude)

		Estimate	Std. Error	Wald	df	Sig.
Threshold	[Attitude = 1]	-1.069	.227	22.223	1	.000
	[Attitude = 2]	.528	.211	6.277	1	.012
	[Attitude = 3]	1.826	.272	44.909	1	.000
	[Attitude = 4]	3.796	.595	40.725	1	.000
Location	[GENDER=1]	-.050	.319	.025	1	.875
	[GENDER=2]	0[a]	.	.	0	.
Threshold	[Attitude = 1]	-1.623	.453	12.843	1	.000
	[Attitude = 2]	.008	.431	9.342	1	.005
	[Attitude = 3]	1.317	.454	8.423	1	.004
	[Attitude = 4]	3.289	.693	22.526	1	.000
Location	[AGE=2]	-.490	.477	1.058	1	.004
	[AGE=3]	-.885	.501	3.122	1	.007
	[AGE=4]	0[a]	.	.	0	.
Threshold	[Attitude = 1]	-.859	.296	8.414	1	.004
	[Attitude = 2]	.744	.293	6.429	1	.011
	[Attitude = 3]	2.039	.345	35.037	1	.000
	[Attitude = 4]	4.010	.632	40.286	1	.000
Location	[Education_Qualification1=1]	.286	.396	28.520	1	.003
	[Education_Qualification1=2]	.268	.370	26.526	1	.006
	[Education_Qualification1=3]	0[a]	.	.	0	.

Link function: Logit.

in Sango area of Ogun State, Nigeria, is presented in table 5 with its odds ratio portrayed in table 6 respectively. Considering the ordinal estimates and its associated thresholds, it shows that age and educational qualification of the respondents made a statistical contribution to the model. Only predictor variable of respondents' gender does not make a statistical contribution to the model. The strongest and isolate predictors of respondents' attitude were gender, age, and education qualification with respective odds ratios of 1.051, 0.674 and 1.331. Taking gender variable into consideration, the strongest predictor of showing the excellent attitude towards solid waste disposal is female with an odd ratio of 1.051 compared to its male counterpart which had an odd ratio of 0.951 respectively. Age 60 and above among the age range depicts the strongest prediction of the attitude of respondents towards solid waste disposal with odd 0.647. Ages 21 to 40 years (odd ratio 0.413) were less likely to show good/excellent attitude toward waste disposal.

Variable of educational qualification indicated that respondents with primary education possess the strongest odd ratio (1.331) in predicting the attitude employed by household members towards solid waste disposal. Respondents with tertiary education were also less likely to show poor attitude (odd ratio 0.982) compared to those with primary and secondary (1.307) education respectively. The level of education contributed to the waste disposal attitude, awareness and impact on the people and environment, those with high education understand the consequence more than lower categories side of education.

Table 6: Predicted Odds Ratio (Dependent variable = Attitude)

Variables	Odds Estimator	Odds Estimate
Gender	Female/Male	0.951
	Male/Female	1.051
Age	60 above/21-40years	0.613
	60 above/41-60years	0.413
	41-40 years/21-40 years	0.674
Educational Qualification	Tertiary/Primary	1.331
	Tertiary/Secondary	1.307
	Secondary/Primary	0.982

However, the result of ordinal logistic regression analysis on the influence of education qualification of the respondents as a predictor of the likelihood that the respondents' opinion on consequence of improper solid waste disposal is presented in table 7 with its associated odd ratio as evidenced in table 8 respectively. This indicates that the ordinal estimates and associated thresholds portrays significant contribution of educational qualification to the model. Congestion, environmental pollution and health hazard was found to be the significant consequence of improper solid waste disposal with high Wald value and sig. value<0.05 level of significance. It can be vividly seen from the predicted odd ratio in table 9 that the odd estimates of respondents with primary, secondary and tertiary education had little variation within each other. Although, those with tertiary educational background (odds ratio 0.881) tend to be more exposed to the consequences of bad/improper solid waste disposal compared to its' primary and secondary school leavers.

Table 7: Parameter Estimates (Dependent variable=Consequence)

		Estimate	Std. Error	Wald	df	Sig.
Threshold	[Consequence = 1]	-1.834	.329	31.061	1	.000
	[Consequence = 2]	-.311	.285	1.195	1	.274
	[Consequence = 3]	.773	.292	7.024	1	.008
	[Consequence = 4]	2.900	.469	38.291	1	.000
Location	[Education Qualification=1]	-.228	.391	8.339	1	.000
	[Education Qualification =2]	-.355	.365	7.943	1	.000
	[Education_Qualification1=3]	0[a]	.	.	0	.

Empirical analysis of the research indicated that health hazards e.g. typhoid, cholera and malaria (Odd ratio 18.174) has posed the major threat to the studied area due to improper solid waste disposal. Other threats posed as outlined are environmental pollution, economic problem and congestion with their associated odd ratios of 2.160, 0.733, and 0.160 respectively. The study revealed that environmental pollution is the second major implication that affects both environment and daily activities in the area with economic problem and congestion having poor predictor weights respectively. It reduces the width of the road and burning taking place along the road reduce visibility that can cause accident, the odour emanates from the results reduce concentration of activities in the area.

From personal observation, it was gathered that there is difficulty in accessing each dwelling and majority of roads were not tarred and lack drainage system. The available roads were full of pot-holes that retained storm water in rainy season while residents lack collection point within the neighbourhood. There is a reduction in the width of existing access roads within the area and provision of drainage facilities will further reduce the road width as shown in plate 7 while plate 8 indicate an unplanned situation of the area and road condition.

Table 8: Predicted Odds Ratio (Dependent variable = Consequence)

Variables	Odds Estimator	Odds Estimate
Educational Qualification	Tertiary/Primary	0.796
	Tertiary/Secondary	0.701
	Secondary/Primary	0.881

Plate 7: Inaccessible road situations

Plate 8: Street without drainage and untarred

CONCLUSION AND RECOMMENDATIONS

Solid waste disposal attitude in Sango Ota, Ogun State, Nigeria is a serious issue that needs urgent attention. The area is growing at a faster rate due to the influx of people from urban centre of Lagos and presence of industrial and commercial activities that generate a high volume of waste at the centre of Sango Ota. The study has shown that educational background, lack of accessibility to each dwelling, unplanned nature of the study area, unavailability of collection point within the area and blockage of existing drainage system contributed to ineffective disposal and management in the study area. Findings further revealed that, there is a negative attitude towards waste disposal and management, the evidence was manifested in the way in which refuse were disposed indiscriminately that have a significant effect on the environment.

The study, therefore, recommends that there should be a proper awareness on educating the inhabitants on adequate solid waste disposal and management attitudes that will foster conducive environment that is free from various diseases and reduces money spent on buying drugs and hospital bills. Effective monitoring of waste disposal and management activities should be given priority. Various policies regarding waste disposal and management need to be reviewed regularly in line with changes in population. “Solid waste management policies and enforcement of sanitation laws in various Nigerian states should be energized, and various environmental organizations and societies to do more until the dreamed clean environment in Nigeria becomes a reality” (Babayemi & Dauda, 2009). Planning for waste management in any particular needs to pay attention to activities as well as expected population for maximum ultilisation. The internal roads should be constructed with adequate drainage system for free flow of storm water. Adequate and manageable landfills techniques should be embarked to reduce open burning that pollute the environment.

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