

PATTERN AND HEALTH IMPACT OF SOLID WASTE MANAGEMENT ON RESIDENTS IN ATIBA LOCAL GOVERNMENT AREA OF OYO STATE

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Abstract

This paper examined pattern and health impact of solid waste management on residents in Atiba local government area (LGA) of Oyo State. A stratified random sampling technique was used to select a sample population of 300 male and female residents in Atiba LGA, in the study. A structured questionnaire scrutinized by experts in the field of public health and environmental health was used for the study. A reliability value of 0.87 correlation coefficient was obtained with the use of test-retest method. Descriptive research survey was adopted. In all, three research hypotheses were formulated and tested at 0.05 alpha level of significance. Data collected were analyzed by the use of chi-square (χ^2) statistical method. The result of the study showed that residents of Atiba LGA adopted similar approach in their practicing of waste management. It was also revealed that residents in Atiba LGA expressed different opinions with respect to their understanding of health risks associated with unscientific waste management. Based on these findings, the study recommended that environmental health officers and other health workers should mount regular health education on hazards associated with improper disposal of waste products. It was also recommended that government should legislate against indiscriminate dumping of waste products.

Introduction

As long as human beings exist, solid waste generation is inevitable. Households and industries generate waste and constitute problems to the health of the general populace. According to Tony and Shola (2007), solid wastes have become a problem that deepens with the development of nations in industries and economic activities.

Owojaiye (2002) and Oyerinde (2000) observe lifestyles, technological advancement, lawlessness and illiteracy of Nigerians as factors promoting environmental pollution. Problems posed by high rate of urbanisation, rapid population growth and the attendant socio-economic consequences on the well-being of the citizenry are manifesting in myriads of environmental challenges (Ibraheem and Adeagbo, 2001).

Moeller (2005) asserts that rapid population growth, increase in industrial manufacturing, urbanisation and technological advancement created rise in demand for food and other essentials. This has increased the amount of waste being generated daily by each household. In advanced countries like United States, 158 million tons of municipal solid waste is produced annually (U.I.S. environmental protection agency, 2009).

Solid waste according to Akerele, Akinbola and Garba (1996) is also known as refuse. Slack, Gronow and Voulvoulis (2005) and Moeller (2005) define solid waste as any garbage, refuse, sludge from waste treatment plant, water supply treatment plant, or air pollution control facility and other materials, including solid, liquid, semi-solid, contained gaseous resulting from industrials, commercials, mining and agricultural operations from community activities. Also, solid wastes are waste materials with less than 70 per cent water; such as garbage (food wastes), rubbish (paper, plastics, woods, metals, used containers, glass), demolished products (bricks, masonry and papers), sewage treatment residues (sludge and solid from domestic sewage), as well as discarded materials (Bassis, 2004).

Cointreus (2002) claims that refuse disposal is the process of discarding materials which have no consumer value to the person that abandoned it. Similarly, Moses (2004) is of the opinion that refuse disposal is a process of collecting and discarding garbage and other waste materials in a hygienic manner.

Waste management is viewed as the collection, transportation and final treatment of wastes in such a way that they are no longer injurious to the health of the people and the environment. (Nonye, 2007). Olokor (2000) equally defines waste management as a cost-effective protection of people and environment in compliance with government regulations.

Characteristics of the waste include, corrosiveness, ignitability, reactive and toxicity (Moeller, 2005). Waste are either combustible or non-combustible while some are non-hazardous, hazardous, radioactive and sometimes mixed in nature (Nonye, 2007, Moeller, 2005). Identified groups at risk from the unscientific waste disposal are; waste workers, children, people living in areas where there is no proper waste treatment method, population living close to waste dump sites, workers in facilities producing toxic and infectious materials, human scavengers and those whose water supply has become contaminated either due to waste dumping or leakages from landfill sites (Centres for disease and control, 2009).

Ibraheem (2000) and Briggs (2002) outline sanitary landfills, incineration and composting as the standard and scientific means of solid waste management. Other scientific methods identified are; dewatering and back-filling of reserved pit, chemical treatment of reserved pit, land farming of wastes, drilling and cutting, chemical fixation or solidification, microbiological treatment and open dumping which are not well-advocated for except outskirt of the town (Anderson, 2003; Olokor, 2000; Jackson and Lane, 2000).

Narayana (2008) shows that only 20 per cent of the respondents have access to a solid waste collection. In India, about 90 per cent of waste is currently disposed off by open dumping.

Health problems emanating from poor methods of solid waste management as observed by Ibraheem (2000) and Oluwande (1997) include obnoxious smell, contamination of underground water and emission of large amount of smoke and gases. Barlaz, Kaplan, Ranjithan and Rynk (2003), Goorah, Esmiyot and Boojhawon (2009) and Kouznetsova, Hauang, Ma, Lessner and Carpenter (2007) express the following as impacts of solid waste on human health thus: chemical poisoning through chemical inhalation, low birth weight, cancer, congenital malformation, neurological disease, nausea and vomiting and increase in hospitalisation of diabetic residents living near hazard waste sites.

Improper handling and poor waste disposal methods were identified as major causes of environmental pollution, which provides breeding grounds for pathogenic organisms and encourages the spread of infectious diseases like cholera, diarrhoea and typhoid fever, (Owadugbe, 2010; Sofoluwe and Bennett, 1995, Nonye, 2007). In

Accra, Ghana, the presence of houseflies in the kitchen during cooking is correlated with the incidence of childhood diarrhoea. Also, an association was found between waste burning and incidence of respiratory health symptoms among adults and children (Owadugbe, 2010).

Sanitary disposal of solid waste will help reduce the incidence of infectious diseases, preventing the transmission of diseases, maintaining the aesthetic value of the environment, preventing water contamination and air pollution among other values (Nonye, 2007; Modebe, Onyeonoro, Ezeamu, Ogbuagu and Agam, 2011).

Statement of the Problem

Indiscriminate waste disposal is one of the major public health threats in Atiba local government area (LGA) of Oyo State. Uncompleted buildings, undeveloped plots of land, drainages, bridges and water way channels have been converted to waste dumping sites. Several buildings in the area of study are without toilets and good sanitary means of disposing household wastes. The impact assessment of environmental health officers and allied workers in managing solid waste in the area of study is less felt. This ugly situation has constituted nuisance and pose detrimental effects on the health of the residents. Based on this, this paper investigates the pattern and health impact of solid waste management on residents in Atiba LGA of Oyo state.

Research Questions

1. Do residents of Atiba local government practice scientific pattern of solid waste management?
2. Do residents of Atiba local government understand health risks of unscientific solid waste management?
3. Do the residents of Atiba local government understand health benefits of scientific solid waste management?

Research Hypotheses

1. There will be no significant impact of understanding pattern of scientific waste management on health of residents in Atiba local government area of Oyo State.

2. There will be no significant impact of understanding of health risks of unscientific solid waste management on health of residents in Atiba local government area of Oyo State
3. There will be no significant impact of understanding of health benefits of scientific solid waste management on health of residents in Atiba local government area of Oyo State.

Purposes of the Study

Main purpose: This study attempt to establish impact of scientific waste management on health of residents in Atiba local government area of Oyo State.

Specific Purpose

1. To know impact of existing practice of scientific management on health of residents of Atiba local government area of Oyo State.
2. To proffer dependable solution to problem associating with unscientific waste management among residents of Atiba local government area of Oyo State.
3. To establish impact of scientific waste management to health and well being of resident.
4. To provide explanation for poor mode of waste disposal in Atiba local government area of Oyo State.

Methodology

The research method adopted for this study is a descriptive survey research. The population comprises adult male and female residents of Atiba LGA of Oyo State. A stratified random sampling technique was used to select 60 respondents in five populated communities in the study area, namely; Sabo, Agunpopo, Koso, Boroboro and Oroki to make a sample size of 300 respondents.

A self-structured questionnaire validated by two experts in the field of public health and environmental management was used for the study. The instrument was pilot tested twice at interval of four weeks and reliability correlation coefficient of 0.87r was obtained using Pearson product moment correlation coefficient.

Data collected was analysed with the use of chi-square (χ^2) statistical method. The results of the analysis are presented in the next-section.

DATA PRESENTATION AND ANALYSIS

Hypothesis one: There will be no significant impact of understanding pattern of scientific waste management on health of residents in Atiba local government area of Oyo State.

Table 1: Impact of scientific waste management on health of residents in Atiba local government area of Oyo State

S/N	ITEM	YES	%	NO	%	χ^2 Value	Dec.
1	Several households are not practicing open dump system o waste management in my locality.	94	31.3	206	68.7	8.60	Accepted
2	Opened refuse burning is commonly practised among many households in my locality.	219	73	81	27		
3	Sanitary landfill is a common pattern of managing waste in my locality.	86	28.7	214	71.3		
4	Composting is not commonly used among households in my locality.	214	71.3	86	28.7		
5	Incineration of waste is commonly done in my locality.	80	26.7	220	73.3		

χ^2 cal = 8.60; Df = 4; p<0.05 alpha level; critical value = 9.50

The findings from the analysis in Table 1 shows the calculated chi-square (χ^2) value of 8.60 against the critical table value of 9.50 at 0.05 alpha level of significance with the degree of freedom (df) 4. Since the calculated value is lesser than the critical table value, the above hypothesis is hereby accepted. This means that the practice scientific waste management have little impact on health of residents in Atiba local government this is because of their previous knowledge and practices.

Hypothesis Two: There will be no significant impact of understanding of health risks of unscientific solid waste management on health of residents in Atiba local government area of Oyo State

Table 2: Impact of understanding health risks of unscientific waste management on health of residents in Atiba local government of Oyo State

S/N	ITEM	YES	%	NO	%	X ² Value	Dec.
1	Underground water close to waste disposal site(s) cannot be easily contaminated	217	72.3	83	27.7	96.20	Rejected
2	Infectious diseases can emanate from poor solid waste management	210	70.0	90	30.0		
3	Improper waste management cannot induce respiratory problems.	113	37.7	187	62.3		
4	Congenital malformation can result from certain hazardous solid waste.	199	66.3	101	33.7		
5	Poor method of solid waste management generates foul odors	201	67	99	33		

X² cal = 96.20; Df = 4; p<0.05 alpha level; critical value = 9.50

The second hypothesis looks at health risks of unscientific solid waste management. Table 2 shows calculated value of 96.20 against the critical value of 9.50 at 0.05 alpha level of significance with the degree of freedom (df) 4. Therefore, since the calculated value is greater than the critical table value, hypothesis is two hereby rejected. This means that understanding of health risks of unscientific waste management

often helped in prevention of spread of diseases and promote health of resident in Atiba local government area of Oyo State.

Hypothesis Three: There will be no significant impact of understanding of health benefits of scientific solid waste management on health of residents in Atiba local government area of Oyo State.

Table 3: Impact of understanding health benefits of scientific waste management on health of resident in Atiba Local Government Area of Oyo State

S/N	ITEM	YES	%	NO	%	X ² Value	Dec.
1	Scientific solid waste management prevents transmission of diseases.	94	31.3	206	68.7		
2	The aesthetic value of an environment is enhanced through scientific solid waste management.	219	73	81	27	8.60	
3	Scientific solid waste management reduces incidence of infectious diseases.	86	28.7	214	71.3		
4	Air pollution is ameliorated through scientific solid waste management.	214	71.3	86	28.7		
5	Underground water contamination is prevented through scientific solid waste management.	80	26.7	220	73.3		

$$X^2 \text{ cal} = 72.60; Df = 4; p < 0.05 \text{ alpha level}; \text{critical value} = 9.50$$

The result from the tested hypothesis three above shows the calculated value of 72.60 against the critical table value of 9.50 at alpha level of significance with degree of freedom (df) 4. Since the calculated

Accepted

value is greater than the critical value, the stated hypothesis is rejected. This means that understanding of health benefits of scientific waste management improve and promote health and well being of residents in Atiba local government area of Oyo State.

Discussion of Findings

The result in Table 1, reveals that residents of Atiba local government are not significantly different in their practice of scientific pattern of solid waste management. The finding from the study shows that majority of residents in Atiba were dumping their refuse in open places. Also, burning of refuse was commonly practised among the majority of the respondents in the area while sanitary landfill, composting and incineration of solid waste management remain unpracticed by the majority. This result was supported by Narayana (2008) that stated about 90 per cent of waste was currently disposed by open dumping.

The result of tested hypothesis two shows that residents in Atiba local government are different in their understanding of health risk associated with unscientific solid waste management. It is revealed that unscientific waste management can contaminate underground water, generate foul odour, spring up infectious diseases and result in congenital malformation if a pregnant woman is exposed to some hazardous waste such as metallic and radioactive substances. Observably, few among the respondents are not aware that respiratory problems can emanate from poor solid waste management.

The findings in Table 3 reveals that residents are different in their understanding of benefit accruable from scientific methods of solid waste management. The majority of respondents are well-acquainted with the health benefits associated with scientific solid waste management such as prevention of disease transmission, enhanced aesthetic value, reduces incidence of infectious diseases, ameliorated air pollution and prevention of underground water contamination. This result is buttressed by Nonye (2007) and Modebe, Onyeonoro, Ezeamu, Ogbugu and Agam (2011) which opine that sanitary disposal of solid waste will help reducing the incidences of infectious diseases, preventing transmission of diseases, maintaining aesthetic value of the environment, preventing water contamination and air pollution.

Conclusion

Based on the findings from the tested hypotheses in this study, the following conclusions are drawn:

- Understanding of scientific waste management pattern have little impact on residents in Atiba local government, because of their previous experience and practices.
- Understanding of health risks of unscientific waste management have impact on health of residents in Atiba local government area of Kwara State.
- Understanding of health benefits of scientific waste management help to improve health and well being of residents in Atiba local government area of Oyo state.

In all, majority of residents in Atiba local government understand health risks and benefits associated with both unscientific and scientific solid waste management respectively.

Recommendations

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

1. Environmental health officers and other health workers should endeavour to mount prompt health education to intimate people on hazards associated with improper disposal of solid waste in their environment.
2. Governments at all levels should try as much as possible to provide all equipment and facilities needed for carrying out environmental sanitation;
3. Governments should formulate an enabling law to check violators of environmental policies and edict on solid waste management;
4. Government at various levels should employ more environmental and sanitary officers that will ensure effective and efficient disposal of waste products and enforcement of existing sanitary laws.
5. Government should make adequate provision for disposal of waste products generated by members of the public.
6. Residents in Atiba should endeavour to adhere strictly to all health promotive measures.

7. residents should also should desist from practice of unscientific method of waste disposal.

References

- Akerelle, J. E., Akinbola, A. A. and Garba, A. O. 1996. Waste disposal and environmental hazard control. Lagos: West African Health Examination Board.
- Anderson, C. L. 2003. Community health St. Louis: CV. Mosby Company.
- Barlaz, M., Kaplan, P., Ranjithan, S. and Rynk, R. 2003. Evaluating environmental impacts of solid waste management alternatives. Biocycle, 52-56
- Bassis, L. 2004. Waste disposal www.unich.edu/85265/society/wstedisposal.htm
- Briggs, L. A. 2002. Environmental health: In issues in health education. Port Harcourt: Roni ventures (176-207)
- Cneters for Disease and Control 2009. Solid waste. Retrieved July 16. <http://www.cdc.gov/nceh/ehs/NALBOH/NALBOH-4.pdf>
- Cointreus, S. (2002). Basic environmental health. London Oxford University press.
- Goorah, S. Esmyot, M. and Boojhawon, R. (2009). The health impact of non-hazardous solid waste disposal in a community: the case of the Mare Chicose landfill in Mauritius. Journal of Environment Health, 72(1): 48-54
- Ibraheem, M. B. and Adeagbo, N.A. 2001. An overview of environmental problems in Oyo State. A paper presented at the workshop for local government workers in Oyo State, 15th & 16th January, 2001.
- Ibraheem, M.B. 2000. Municipal solid waste management issues in Oyo State. A paper presented at the workshop for Oyo State local government health officers, 22nd December, 2000
- Jackson, S. M. and Lane, S.T. 2000. Personal and Community Health. Tindall, London: Bailliere Publishing Co.
- Kouznetsova, M. Hauang, X, Ma, J., Lessner, L. and Carpenter, D., 2007. Increased rate of hospitalization for diabetes and residential proximity of hazardous waste sites. Environmental Health Perspectives, 115(1): 75-80
- Modebe, I. Onyeonoro, U.U. Ezeama, N. Ogbuagu, C.N. and Agam, N.E. 2011. Public health implication of household solid waste

- management in Awka South East Nigeria. The Internet Journal of Public Health ISSN: 2155-6733
- Moeller, D.W. 2005. Environmental health (3rd ed). Cambridge, MA: Harvard University Press.
- Moses, A. 2004. Strengthening public participation in solid waste management in Nigeria: An education viewpoint. Journal of Environment Health, 1(2): 14-16.
- Narayana, T. 2008. Municipal solid waste management in India: From waste disposal to recovery of resources. Journal of Waste Management, 29:1163-1166
- Nonye, O. 2007. Attitudes and waste disposal habits of students of Alvan Ikoku College of Education, Owerri Nigerian School Health Journal, 19(1): 17-24
- Olokor, C.O. 2001. Hazardous wastes: Its production, effects, disposal and control in Nigerian industries. Oyo JONAPHER-SD, 2(2): 258-267
- Oluwande, P.A. 1997. Provision of environmental health facilities for healthful school living in Nigeria. Nigerian School Health Journal, 1(1):19-23
- Owadugbe, S. 2010. Solid waste management in Lokoja metropolis. Accessed online July 2010 <http://www.greatestcities.com/users/owagde>.
- Owojaiye, S.O. 2002. The polluted Nigerian environment: causes and consequences of human safety. Nigerian School Health Journal, 14(12): 67-72
- Oyerinde, O. O. 2000. Municipal sanitation Ilorin. Monograph, Department of Physical and Health Education, University of Ilorin
- Slack, R.J. Gronow, J.R. and Voulvoulis, N. 2005. Household hazardous waste in municipal landfill, contaminant in leachate. Science Total Environment: 337(1-3): 119-137
- Sofoluwe, G.O. and Bennett, F.J. 1995. Principles and practice of community health in Africa. Ibadan: University Press Limited.
- Tony, D. and Shola O. 2007. Patterns of household solid waste management in Oto-Awori council development area of Lagos State. Nigerian School Health Journal 19(1): 91-98

U.I.S. Environmental Protection Agency 2009. Proposed revision to definition of solid waste frequent questions. Retrieved July 17, 2009

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