Nigerian Journal of Health Promotion
ISSN: 0995-3895
Vol. 10, 2017

HEPRAN

Solid Waste Management Practices of Printing Firms in Uyo, Akwa Ibom State

Akpan, Ubong S.
(07064242664; el_samjoy@yahoo.com)

Golda O. Ekenedo
(08033923397; r.goldaoe@yahoo.com)

Department of Human Kinetics and Health Education,
University of Port Harcourt
Rivers State

Abstract
The study aimed at determining the solid waste management practices of printing firms in Akwa Ibom State. The study was a descriptive survey. A multi-stage sampling procedure was employed in the selection of 560 workers in the printing industry while a self-structured and validated questionnaire with a reliability index of 0.91 was used as instrument for collecting data from the respondents. Descriptive statistics of percentage was used for analysis of the data collected. The findings of the study showed that the printing firms in Uyo, Akwa Ibom State had good waste collection practices in that 98.4% had waste collection bin and 56. % sorted their waste but practiced environmentally unhealthy methods of waste disposal (74.3% of workers disposed of waste by throwing them away and 37.6% threw waste into rivers and streams). Based on the findings, it was recommended among others that government should build recycling plants and encourage public support towards effective utilization through attractive policies.
Keywords: Waste Management, Solid waste, Recycling, Printing Firms.

Introduction

Waste generation has continued to rise globally with population expansion and increased economic activities. Improper management of waste has great consequences for human existence, and already, the threats are becoming manifest with global warming and attendant disasters. Hence, waste management has become an issue of global importance. Wastes are unwanted or bye products of natural or human processes. The United Nations Statistical Division (U.N.S.D.) 2003, out rightly defined waste as "materials that are not prime products (that is products produced for the market)" for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption and of which he/she disposes of.

Most of the natural occurring wastes are taken care of naturally by the environment but the man produced wastes take long times, even years and decades to decompose. Some solid wastes never decompose and would need to be recycled for use or changed into other useful products to rid the environment of its polluting effect. Wastes are categorized into solid, liquid and gaseous wastes. One of the most abounding wastes in our environment today is the solid waste. According to Miller (2002) solid waste is general waste that is not a liquid or a gas, originating from industrial, domestic, municipal or agricultural sources. About forty percent of solid wastes at dumps are products of printing firms (Meis, 2011).

Good management of waste from the printing firm is a major challenge especially in developing nations like Nigeria. Most methods of waste management practiced in Nigeria including open dumping and burning are unhealthy to the environment. Healthy forms of waste management methods include, incineration, sanitary landfill, composting, reusing and recycling. These have environmental advantages of reducing pollution in the environment, reducing the rate of disease-causing agents that affect humans residing in such areas and increasing the aesthetic condition of the particular environment. Recycling of paper waste causes 35% less water pollution and 74 percent less air pollution than making virgin paper (The United States Environmental Protection Agency, 2007). It also minimizes water and air pollution.

Uncontrolled dumping and improper waste handling causes a variety of problems, including contaminating water, attracting insects and rodents, and increasing flooding due to blocked drainage canals or gullies. In addition, it may result in safety hazards from fires or explosions. Improper waste management also increases greenhouse gas (GHG) emissions, which contribute to climate change. Planning for and implementing a comprehensive program for waste collection, transport, and disposal along with activities to prevent or recycle waste can eliminate these problems, hence, the need for proper waste management.

Solid waste management is a term that is used to refer to the process of collecting and treating solid wastes (Conserve Energy Future - CEF, 2017). More elaborately, Solid Waste Management is defined as the discipline associated with control of generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economics, aesthetic, engineering and other environmental considerations (LeBlanc, 2017).

Six components of solid waste management as outlined by LeBlanc (2017) include: Waste generation; Onsite handling, storage, processing; Waste collection; Waste transfer and transport; Waste processing and recovery; and Disposal. Waste generation refers to activities involved in identifying materials which are no longer usable and are either gathered for systematic disposal or thrown away. Onsite handling, storage, and processing are the activities at the point of waste generation which facilitate easier collection. For example, waste bins are placed at the sites which generate sufficient waste. Waste collection, a crucial phase of waste management, includes activities such as placing waste collection bins, collecting waste from those bins and accumulating trash in the location where the collection vehicles are emptied. Waste transfer and transport are the activities involved in moving waste from the local waste collection locations to the regional waste disposal site in large waste transport vehicles. Waste processing and recovery refer to the facilities, equipment, and techniques employed both to recover reusable or recyclable materials from the waste stream and to improve the effectiveness of other functional elements of waste management. Disposal is the final stage of waste management. It involves the activities aimed at the systematic disposal of waste materials in locations such as landfills or waste-to-energy facilities.

Common methods of solid waste management include: Sanitary landfill; Incineration; Recovery and Recycling; Composting; and Pyrolysis (Conserve Energy Future - CEF, 2017). Sanitary landfill is the most popular solid waste disposal method used today. Garbage is basically spread out in thin layers, compressed and covered with soil or plastic foam. When the landfill is full, it is covered with layers of sand, clay, top soil and gravel to prevent seepage of water. Incineration involves burning of solid wastes at high temperatures until the wastes are turned into ashes. Incinerators are made in such a way that they do not give off extreme amounts of heat when burning solid wastes. The good thing about this method is the fact that it reduces the volume of waste up to 20 or 30% of the original volume. Recycling or recovery of resources is the process of taking useful but discarded items for next use. The process aims at reducing energy loss, consumption of new material and reduction of landfills. In composting, biodegradable yard waste is allowed to decompose in a medium designed for the purpose. Only biodegradable waste materials are used in composting. Good quality environmentally friendly manure is formed from the compost and can be used for agricultural purposes. Pyrolysis is a method of solid waste management whereby solid wastes are chemically decomposed by heat without presence of oxygen. The solid wastes are changed into gasses, solid residue and small quantities of liquid.

The primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials on human health and environment to support economic development and superior quality of life (LeBlanc, 2017). Proper solid waste management is an integral part of environmental conservation that should be observed by individuals and companies globally. This will keep the environment clean and reduce health and settlement problems.

The quest for knowledge and information storage has immensely increased the amount of waste in the printing industry. Oil, paper waste, rag and effluent are the by-product of the printing industry. However, papers constitute forty percent of the solid wastes disposed of at dumps (Meis, 2011), and are commonly found littered everywhere. Over sixty percent (60%) of wastes produced by printing companies are papers (Waste Watch, 2004). A study in Accra and Kumasi, Ghana, that investigated the causes and sources of waste in printing houses revealed that paper was the most wasted material in the printing house (Chea, 2008). They are organic wastes and can be recycled over and over again. Printing industry is associated with wastes that are environmentally unfriendly. In a general printing environment solid waste could consist of empty containers, used film packages, outdated materials, damaged plates, developed films, dated materials, test production, bad printing or spoilage, damaged products, and scrap paper (Eco-innovation, 2013). When burned, they release volatile organic compounds due to the solvent used in some of them into the atmosphere. The volatile organic compound contains methane gas which is more toxic than carbon monoxide released by the combustion of other solid wastes. Methane has 25 times higher global warming potential than carbon dioxide (IPCC working group 1, 2007).

Akwa Ibom State has various printing firms that produce paper for domestic and commercial use in residential abodes, schools and institutions, government parastatals, companies, industries and other private businesses in the state. The state relies greatly on products from printing firms, hence the boost of such business in the state. However, as found in many cities in developing country, garbage litter in the environment most often suggest poor waste mangagement by both government and private organizations. To buttress this, researches carried out in parts of the country have found improper waste management practices among the population such as indiscriminate dumping of refuse (Akpen, Tyagher & Ogori, 2005; Ogundele, 2005; Musa, 2006; Banjo, Adebambo and Dairo, 2009), inadequate dump sites and waste collection bins (Olakunle & Adewale, 2005;

Ogundele, 2005; Musa, 2006), and poor waste management services by government agencies (Nwankwo, 2008). Most common unhealthy practices were dumping of refuse in drainages which causes flooding and allowing refuse to stay in refuse collection centers for unusually long period of time thus becoming potential sources of disease spread.

Uyo is the capital city of Akwa Ibom State in South-South Nigeria. The state has been lauded in recent times for its developmental strides. In fact, it has been branded a garden city due to the beautification of its environment. It may be tempting to think that as a result, of the acclaimed environmental status, Uyo would be different from other cities in Nigeria in terms of waste management, but personal experience has proved otherwise. However, since no study to the researchers' knowledge has been conducted to determine solid waste management practices in the printing industry in Uyo and being mindful of the volume of solid waste being generated by the industry, and the health risks associated with improper management of such waste, this study was considered pertinent. The objective of the study was, therefore, to determine the solid waste management practices of printing industries in Uyo, Akwa Ibom State.

Research Question

What are the solid waste management practices of printing firms in Uyo, Akwa Ibom State?

Methods

A descriptive survey design was employed in carrying out the study. The population for the study consisted of all the workers of printing industries in Uyo, Akwa Ibom State. Multi-stage sampling procedure involving simple random, and snowball sampling techniques was used to select 560 participants from the population of study. A structured and validated questionnaire with a reliability of .91 was used as instrument for data collection. Four hundred and ninety-eight copies of the questionnaire were duly completed and returned out of the 560 copies distributed giving a return rate of 89%. Data collected were analysed using frequency counts and percentage.

Results

Research Question: What are the solid waste management practices of printing firms in Uyo Senatorial district of Akwa Ibom state?

Table 1: Solid Waste Management Practices of the Printing Firms.

ITEMS	f	%
Have waste bins	490	98.4
Sort wastes	280	56.2
Containers Used for Waste Collection		
Water proof	42	8.4
Pail	23	4.6
Basket	433	86.9
Frequency of Waste Disposal		
Daily	461	92.6
Thrice in a Week	8	1.6
Twice in a Week	18	3.6
Once in a Week	11	2.2
Frequency of Waste Collection		
Waste collectors collect waste daily	26	5.2
Waste collectors collect waste thrice in a week	56	11.2
Waste collectors collect waste twice in a week	315	11.2
Waste collectors collect waste once in week	101	20.3
Methods of Disposal		
Throw away	370	74.3
Burning	187	37.6
Burying	5	1.0
Reusing	3	0.6
Composting	2	0.4
Incineration	16	3.2
Selling	15	3.0
Recycling	34	6.8
Dumping inside rivers and streams	54	10.8

Data in the above table shows that a greater percent of the respondents (98.4%) had waste bins while about an average percent (56.2%) of the respondents sorted their waste. On the containers used for waste collection, basket ranked top, being used by 86.9%, followed by waterproof (8.4%) and then pail (4.6%). It is further shown from the table that a greater percent (92.6%) of the respondents disposed of their waste on a daily basis, while 1.6% disposed of their waste thrice a week, 2.2% twice a week and 3.6% once a week.
However, the table further showed that thrice in a week had the highest response (63.3%) on waste collection, followed by once in a week (20.3%) and then twice a week (11.2%). Furthermore, the table showed that 74.3% of workers in printing firms threw away their wastes at dumpsites while 37.6% burnt their wastes. Also, 10.8% of them dumped wastes inside rivers and streams, while 6.8% recycled wastes. Only 0.6% reused their waste.

Discussion of Findings

The findings of this study have shown that printing firms in Uyo, Akwa Ibom State had good solid waste management practices with regards to having waste collection bin (98.4%), and daily disposal of refuse (92.6%). This finding is an encouraging one but contrary to that of Olakunle & Adewale, (2005), Ogundele, (2005) and Musa, (2006) where waste collection bin was found to be inadequate among their respondents. Also encouraging is the finding that little above half of the population (56.2%) sorted their wastes. Waste sorting is not a common practice in most developing countries. Proper waste collection is the first step towards waste management.

From the findings as shown in the table, 74.3% of workers disposed of waste by throwing them away. This amounts to indiscriminate dumping of refuse as found in previous studies by Akpen, Tyagher and Ogori (2005) in Benue, Ogundele (2005) in Ado Ekiti and Musa (2006) in Ankpa and Banjo, Adebambo and Dairo (2009) in Ijebu-Ode. Only few practiced good disposal methods. Chea (2008) has also found in Accra and Kumasi, Ghana that methods of waste disposal were environmentally unfriendly. This practice aggravates environmental health problem as it creates room for water contamination, attraction of insects and rodents, and increasing flooding due to blocked drainage canals or gullies. Disposal of paper waste as revealed in this study was also done by burning (37.6%) and stream and river dumping (10.8%). This unhealthy practice prevails in developing countries such as Nigeria mainly due to lack of incinerators and sanitary landfill facilities. This situation might stem from slow pace of development, corruption in the government, improper allocation and management of government funds. Moreover, Nwankwo (2008) had observed poor waste management services by government agencies in his study in Owerri, Imo State. From the study, it was also discovered that only 14% of the total respondent practiced good disposal methods. This is disheartening and predicts a worse environmental situation if intervention measures are not put in place immediately to reverse the case.

According to the result of this study, only 3% of respondents sell their waste papers. This could be due to absence of recycling company in the region. Selling of paper wastes is lucrative and cost nothing except for the space it consumes pending when buyers come for it

Burying of wastes was practiced by a percent of the population. This might be as a result of stress involved in digging pits, or the incessant digging of them when others get filled, or the unavailability of space for continuous digging. Rivers and stream dumping was practiced by ten percent of the respondents. This was observed to be rampant among printing industries located few miles away from water bodies and ravines. During rainy periods floods transports the wastes to nearby streams and ravines, thereby depleting natural resources therein.

Conclusions

This study clearly showed that workers in printing firms in Akwa Ibom State practiced unhealthy waste management methods. The predominant methods practiced include throwing away waste and burning them as well. Recycling of waste which is the safest and most acceptable practice globally is yet to be embraced by the printing firms due mainly to lack of logistics on ground especially from the government.

Implications for Health Education and Promotion

Environmental health promotion is one of the contemporary health issues requiring awareness creation and mass education in order to avert and reverse the impending effects of global warming on planet earth. The findings of the present study has revealed the need for the design of appropriate multi-component environmental health intervention programme targeting the printing industry and comprising of awareness programmes, educational programmes, and supportive environment programmes such as health policies and provision of infrastructures and appropriate waste management facilities.

Furthermore, the school health education curriculum needs to be continuously revised to reflect contemporary practices in environmental health promotion. As such, children will from childhood imbibe the culture of healthy environmental practices which they are expected to carry over to adulthood.

Recommendations

Following from the findings of the study, it was recommended that,

1. Printing firms increase efforts at reusing their paper wastes or sell them to people that reuse them for various businesses, thereby making more gains. This will help reduce the heaps of refuse at dumps and as well the rate of emission of pollutants into the atmosphere when they are burnt.
2. Printing firms located within the same vicinity can collaborate and construct standard sanitary landfill for their joint use.
3. Government should as a matter of urgency build recycling plants and make policies that will elicit favourable response from the public.
4. Finally, responsible government agencies and non-governmental agencies should endeavour to develop and implement environmental health education and promotion programmes for employers and employees of the printing industry so that they can be helped with the knowledge and skills required in proper industrial waste management.

References

Akpen, G. D., Tyagher, S. T. & Ogori, P. O. (2005). Solid waste management in urban areas of Benue state, Nigeria. *International Journal of Environmental issues, 3*(2), 54-58.

Banjo, A. D., Adebambo, A. A. R., & Dairo, O. S (2009). Inhabitants' perception on domestic waste disposal in Ijebu Ode, Southwest Nigeria. *African Journal of Basic & Applied Sciences, 1*(3-4), 62-66.

Chea, A. C. (2008). Causes and sources of waste in the printing industry in Ghana: A study of printing houses in the cities of Accra and Kumasi. *International Business Research. 1*(3), 22-31. Retrieved from http://www.ccsenet.org/journal.html

Conserve Energy Future – CEF (2017). *What is solid waste management?* Retrieved from http://www.conserve-energy-future.com/sources-effects-methods-of-solid-waste-management.phpv

LeBlanc, R. (2017). *An Introduction to Solid Waste Management*. Retrieved from https://www.thebalance.com/an-introduction-to-solid-waste-management-2878102

Meis, R. (2011). *An option for a cleaner environment; The paper issue: Alternatives and solutions*. www.frugal marketing.com/ dtb/paper-issue.shtml

Miller, G. T. (2002). *Living in the Environment : Principles, Connections and Solution (12th Ed).* Wadsworth Group Brooks / Cole.

Musa, S. D. (2006). Solid waste management in Ankpa. *Journal of Environmental Studies,1*,35-44.

Nwankwo, B. O. (2008). Solid waste generation and management among traders in Owerri municipal markets, Imo State. *Journal of Environmental Health, 5*(2), 58-63.

Ogundele, J. A. (2005). Environmental consequences of urban degradation in Nigerian cities: A study of Ado Ekiti territorial region. *International Journal of Environmental issues, 3(2),* 60-69.

Olakunle, O. S. & Adewale, A.A. (2005). The municipal solid waste dump-sites in Ogbomoso township, Nigeria. *International Journal of environmental Issues, 3*(2), 90-103.

United States Environmental Protection Agency (2007). *Recycle on the go: Basic information.* Retrieved from http;//www.epa.gov/epaoswer/osw/ conserve/onthego/info/index. htm.