

AWARENESS AND PRACTICE OF SOLID WASTE MANAGEMENT IN THE WINNEBA MUNICIPALITY OF GHANA

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ABSTRACT

The management of solid waste has attained highest importance in this era globally but the practices of basic concepts on waste disposal are often neglected. In most communities around the world, people are much aware of the serious consequences of improper solid waste management practices but the negative attitude of implementation gives rise to chaotic situations. In Ghana, municipalities are responsible for waste management in the cities but have challenges to provide an effective and efficient system to the inhabitants. The study was conducted to obtain baseline information about waste management practices among the residents of Winneba in the Effutu municipality of Ghana. The study is a descriptive cross sectional survey in which 120 people who were randomly selected from 10 suburbs responded to a well designed and validated questionnaire as well as interview. The data obtained was tabulated and expressed into percentages for analysis. In the study, majority of people who were aware of solid waste management strategies did not put them to practice. Also, there was decrease in people's attitude towards social commitment to participate in solid waste management. Awareness on e-waste disposal was lacking and there was an urgent need to rectify this gap in knowledge and practice. The methods of solid waste management identified included open dumping, burning and burying of solid waste. The study revealed that waste was usually transported to its final destination by using closed trucks/vehicles and the frequency of collection was usually done once in a week. Effective solid waste management enhance sustainable development of any city.

Keywords: Environment, Solid Waste Management, e-Waste, sustainable development.

INTRODUCTION

The environment we live in provides support for our survival as well as other living things. Globally, efforts are being made to make people aware about the need to protect the environment. One of the main causes of environmental degradation is improper waste management in the disposal of solid waste (Vivek *et al.*, 2013). It is a major cause of pollution and outbreak of diseases in many parts of the world. What aggravates the situation is the fact that crisis related to the environment is of global concern and there is usually no permanent solution to environmental problems.

Municipalities in Ghana usually are responsible for waste management in the cities but have challenges to provide an effective and efficient system to the inhabitants. One of the cardinal factors responsible for large solid waste generation is urbanization, which introduces society to a new, modern way of life, an improved level of awareness, new skills and learning process. However, when the rate of urbanization gets out of control, it poses a big challenge to governance, and institutional capabilities become inadequate and ineffective to manage waste (Amuda *et al.*, 2014).

The generation of solid waste is an important byproduct of socio-economic activities. The definition of solid waste varies among countries. Generally, waste generated from industrial sector, commercial, domestic, institutional and municipal services are included in municipal solid waste (MSW). The ever increasing population, along with rapid urbanization and industrialization directly affects the amount of urban and MSW generated (Singh *et al.*, 2011). Presently, waste is generated faster than other environmental pollutants, including greenhouse gases (GHGs) (Hoornweg *et al.*, 2013). The ever rising population has resulted in immense pressure on demand for food, shelter and on other natural resources leading to various environmental problems including waste generation and waste management. According to Adejobi and Olorunnimbe (2012), industrial advancement, growing urban areas and rapid population growth are the major contributing factors to solid-waste generation in many developing countries.

Waste management is the process of collecting, transporting, processing or disposing, managing and monitoring of waste materials. The term usually relates to materials produced by human activity and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded and these include: packing items, garden waste, old paints containers, vegetables, metals etc. (Enete, 2010). Poor waste management has been a major problem to human health and existence, affecting both rural and urban areas. A clean environment influences good health and good health further affects the productivity of man. Adogu *et al* (2015) reported that proper waste disposal management is essential to sustain healthy living conditions in any environment. Strict adherence to appropriate waste management practices in any community will insulate the inhabitants from detrimental and hazardous environmental conditions and improve the living standard of the people.

According to Al-Khatib *et al* (2015) and Hilburn (2015), most communities in developing countries often turn to waste disposal methods that have proven to be destructive to human health and the environment, such as open dumping and burning (or unregulated landfills) because they feel they have no other options to manage their solid waste. This suggests that most developing countries do not practice sustainable waste management.

Banga (2013) reported in her work that participation in solid waste management activities depends on the level of awareness, household income, educational level and gender. Ayodeji (2012) studied the waste management awareness, knowledge and practices of secondary school teachers in Ogun state and concluded that all the teachers were aware and knowledgeable about waste management even though they possessed negative waste management practices. He reported appreciable awareness and knowledge about waste disposal among people in Nigeria but indicated that they are only aware of the crude and traditional methods and are oblivious of the modern methods such as incineration and recycling. Adeyemo and Gboyesola (2013) stated that, the attitude of people towards waste management can be affected by their level of knowledge and awareness of waste management. They also reported that homes with waste bins engage more in proper way of storing waste than homes without waste bins.

In Ghana, Asuamah *et al* (2012) reported that, people attitude towards recycling and waste management showed no significant effect on gender, employment and educational statuses. Addaney and Anarfiwaah (2015) concluded that some public awareness being created with little supervision yielded results due to the rising indiscriminate disposal and littering in the

municipalities. They added that abysmal solid waste practices have clogged most of the few available drains creating stagnant water for insect breeding and floods during rainy seasons. They also noted large open spaces in the Municipalities dotted with heaps of refuse sited close to residential areas as contributing factors. All these pose risk to both public and environmental health.

Waste management activities generate potential environmental benefits if managed properly (Gentil et al, 2009). There has been hardly any effort in the past to create community awareness, either about the likely perils due to poor waste management or the simple steps that every citizen can take. This could have helped in reducing waste generation and promote effective waste management. But this scenario has changed. Nowadays more and more people are taking interest in environmental issues, as they have started to experience the ill-effects of ecological issues. This study therefore assesses the awareness and practice of household waste management practices in Winneba municipality of Ghana.

METHODOLOGY

Study area

The study site is Winneba, a town and the capital of Effutu Municipality in the Central Region of Ghana. Winneba has a population of about 60,331 (GSS, 2014).

Research design

The study is a descriptive cross sectional survey designed to identify the various methods of waste management employed by people in the Winneba municipality. Also, challenges that affect waste management will be identified to enable stakeholders to effectively manage waste. Questionnaire was the main instrument used to solicit for information for discussion. In addition, informal interview was conducted to enable the researcher obtain more detailed information on waste management in the area.

Population

The target population consisted of all people who live in Winneba Township in the Effutu municipality.

Sample size and sampling procedure

The research involved One Hundred and Twenty (120) people in Winneba in the Effutu municipality. To obtain a sample that was typical of the population under study, the researcher randomly sampled 12 people from each of the ten suburbs. These suburbs were: Lagoon lodge, Roman school, Abasraba, Kojo Bedu, Zongo, Junction, Low cost, Wendrum, Donkoryiermu and Lancaster.

Research Instrument

The main instrument used to collect the data was questionnaire. This was supplemented with interview which was designed and validated by the researcher.

Validity and reliability of the Instrument

To maximize the content validity of the questionnaire, expert advice was sought from a senior Lecturer at the Chemistry Education department of University of Education, Winneba. He ensured that items included in the questionnaire were fit for the objectives of the study. The reliability of the questionnaire was established through the test-retest approach.

Data analysis

Each completed questionnaire was reviewed for completeness prior to analysis. The data collected was sorted and analyzed with SPSS version 20. Tables, frequencies and percentages were generated where necessary.

RESULTS

The result of respondents' awareness on waste management is presented in table 1 below.

Table 1: Awareness of waste management

Items	YES	NO
Did you ever attend any awareness programme conducted by local authorities regarding waste management?	38 (31.7%)	82 (68.3%)
Do you know the principle of waste minimization?	42 (35%)	78 (65%)
Do you think solid waste management in the city is the sole responsibility of the local authorities?	96 (80%)	24 (20%)
Do you know about segregation of waste?	55(45.8%)	65(54.2%)
Do you know the effective mechanism for house hold waste management?	50(41.7%)	70(58.3%)
Do you know the complications of improper waste management	93(77.5)	27(22.5%)
Are you aware of e-waste?	30(25%)	90 (75%)
Do you know how to dispose the e-waste?	20(16.7%)	100(83.3%)
All waste is unwanted or useless.	86(71.7)	34(28.3%)

Table 1 shows that 82 people representing 68.3% of the respondents have never attended any awareness programme conducted on waste management while 38(31.7%) confirmed their participation. On the question of whether respondents were aware of the principles of waste minimization, 42(35%) indicated Yes while 78(65%) indicated No. The study revealed that 80% (96) of the respondent are of the notion that waste management in the city is the sole responsibility of the local authorities. On whether respondents know about waste segregation, 45.8% (55) indicated Yes while 54.2 % (65) indicated No. Among the respondents 58.3% (70) did not know effective mechanism for household waste management while 41.7 % (50) have knowledge of the process. On the issue of complications associated to improper waste management 77.5% (93) ticked Yes with 22.5% (27) ticking No. On awareness of e-waste, 25 % (30) ticked Yes with the remaining 75% (90) indicating No. Majority of the respondents (83.3% (100)) did not know how to properly dispose off electronic waste (e-waste). Also, 71.7 % (86) of the respondents agreed that all waste generated were unwanted or useless.

The result showing waste management methods and practice in Winneba municipality is presented in table 2 below.

Table 2: Waste management methods and practice

Items	Freq	Percentage (%)
Are you committed to minimize waste?		
Yes	37	30.8
No	83	69.2
Do you throw your household waste outside your home?		
Yes	80	66.7
No	40	33.3
Which Waste management method is practised most in your area?		
Open dumping	50	41.7
Burying	28	23.3
Burning	42	35

Composting	0	0
Land filling	0	0
Incineration	0	0
Final dump site		
Presence of centralized dumping site	112	93.3
Absence of centralized dumping site	8	6.7

Table 2 shows that, 30.8 % (37) of the respondents practiced waste minimization while majority of them (69.2% of 120) were not committed to waste minimization. On whether respondents throw household waste outside their homes 66.7% (80) ticked Yes while 33.3 % (40) indicated No. The most common waste management method practised in the area was open dumping and this was indicated by 41.7% (50). This was followed by burning and burying of waste which was indicated by 35% (42) and 23.3% (28) respectively. None of the respondent ticked composting, land filing and incineration as waste management option practised in the municipality. In terms of final dumping site in the area 93.3 % (112) indicated the presence of centralised dumping site while 6.7 % (8) indicated that they had no centralized final dumping site.

The results showing waste storage methods and disposal practices are presented in table 3 below.

Table 3: Waste storage methods and disposal practices

Items	Frequency	Percentage (%)
Method of waste storage		
Bags	62	51.7
Containers with covers	25	20.8
Containers without covers	33	27.5
Frequency of waste collection		
Every day	3	2.5
Once a week	66	55.0
Twice a week	35	29.2
Thrice a week	0	0
Once in two weeks	16	13.3
once in three weeks	0	0
Method of waste transport to final disposal site		
Closed trucks	68	56.7
Open trucks	5	4.2
Wheel barrow	2	1.6
Tricycles	32	26.7
Pick up	13	10.8

Table 3 shows that 51.7% (62) of the respondents stored waste in bags while 20.8% (25) and 27.5 % (33) store waste in containers with covers and containers without covers respectively. Among the respondents 2.5% (3) , 55% (66),29.2%(35) and 13.3% (16) of the respondents indicated that waste is collected every day, once a week, twice a week and once in two weeks respectively. Majority (56.7%) of the respondents indicated that closed trucks carted their wastes while 4.2% (5) indicated the use of open trucks for the same purpose. Also, 26.7%, 1.6% and 10.8% of the respondents revealed that tricycles, wheel barrows and pickups were contracted to cart their wastes respectively.

DISCUSSION

The study revealed that majority of the respondents (68.3%) had never attended any awareness programme conducted by the local authorities on waste management. In a follow

up interview most of them mentioned that the information to attend such programmes did not get to them while others use their work as an excuse. It was therefore not surprising that more than 50% of the respondents were not aware of principles of waste minimization as well as waste segregation. Banga (2013) reported that participation in solid waste management activities depends on the level of awareness, household income, educational level and gender. Most people are of the notion that solid waste management is the sole responsibility of local authorities and this has made people less concern to be involved in waste management practices in the city. Vivek *et al.*, (2013) asserted that large amount of solid wastes are generated from homes and that household waste is a major source of solid waste in the city. Vinod and Venugopal (2010) have also opined that quantity of solid waste grows faster than population. The fact that some people are not aware of proper waste management strategies as well as showing less concern to be involved in household waste management has resulted in the generation of large volume of waste in the city. The findings of the present study, shows that respondents were well aware of the importance and complications of waste management. But they are lacking in the practice of proper waste management. This study findings support the studies conducted by Ifegbesan (2010) and Vivek *et al* (2013). Also, the fact that majority of the people indicated that all waste were unwanted or useless suggests that waste reuse is less practiced in the area. It was also revealed in an interview that there was a decrease in attitude towards social commitment to participate in solid waste management which existed long back in joint families. This confirms the findings of Vivek *et al* (2013).

This study revealed that 75% (90) of the respondents lack awareness about e-wastes and its management. In this era of cybernetics, young generation is being influenced by cyberphilia. As a result, worldwide e-wastes are generated uncontrolled and unchecked. Liu *et al* (2006) stated that Chinese domestic e-waste stockpiles are approaching a peak. In Winneba, used old TV sets, radios, computer monitors and system units, mobile phones and their batteries as well as other electronic gadgets discarded as waste are on ascendency. Similarly, Liu *et al* (2006) indicated that e-waste is the fastest growing segment of the solid wastes in India (0.01-1%). This rate is growing at an alarming pace and a high percentage of electronics are ending up in the waste stream releasing dangerous toxins into the environment. To curb this situation involves the collective effort of government and local waste management authorities, educational institutions and NGOs, to give proper guidance to this neglected area of waste management.

The result indicates that, less than 50% of the respondents were committed to waste minimization. Also, more than 60% of the respondents threw their household waste outside their homes while only few people did not. In a follow up interview, some of the respondents mentioned that household wastes were thrown outside homes and nearby bushes because waste containers were not available in certain suburbs. In addition, they stated that wastes containers were not sufficient to ensure that people travel short distances to dispose off waste. Yadav and Mishra (2004) asserted that if waste is not properly disposed off, the consequences are dangerous. So there is an urgent need to streamline and sensitize young minds on environmental problems. It is education which makes people knowledgeable to environmental problems and the same time has the potential to change human attitude. Similarly, Momoh and Oladebeye (2010) in their studies recorded that containers for waste collection were not sufficient and this has contributed to poor sanitation. One respondent stated that the absence of waste bins at vantage points along the streets coupled with bad attitude of some people towards waste management were the main reasons why people dispose plastic solid waste into gutters and on streets. Open dumping, burning and burying of

waste were the methods of waste management practices in Winneba. Open dumping sites were found to be close to the sea and this is a source of pollution to the aquatic habitat. This study agrees with the findings of Tsiboe and Marbell (2004). In their study, they concluded that in Accra disposal sites are located near the sea and are polluting the Korle Lagoon creating unhealthy environment.

Again, the use of burning as a method of waste disposal by some people in the area causes air pollution and possibly contributes to global warming. Open burning of plastic waste by residents could result in air pollution with associated health problems due to heavy metal additives (Ketibuah *et al*, 2004). Moreover, littering of the environment with plastics also cause environmental nuisance through choking of drains and reducing the aesthetic beauty of the environment. The practice of open dumping in the study area poses health risk to residents close to the dumping sites. Srivastava *et al* (2015) asserted that in open dumping, wastes are casually disposed off in low lying areas in an unacceptable manner without any discrimination resulting in environmental, health and aesthetic hazards.

The interview conducted with the municipal environmental officers mentioned that some household wastes were collected from house-to-house in the municipality and this is mainly done by Zoom Lion Ghana Company. Primarily, the residential solid waste is stored at the household level and in waste container provided in the community while street, commercial and organizational wastes were collected in some stations by the employed Zoom Lion workers. The Zoom Lion workers collect wastes from areas suitable for loading with vehicles/cars that are covered. It was also evident that waste segregation was not done before dumping in the municipality. Also, wide ranges of equipment are used by waste generators in storing their waste. These included metal and plastic containers, basket and carton containers as well as sacks and polythene bags. This finding is in line with that of Addaney and Anarfiwaah (2015). The wastes generated are usually collected once in a week or twice a week. Once in two weeks was not a common practise in the study area. Financial challenge was the main factor inhibiting waste collection in the municipality. The collection efficiency of waste largely depends on economic status of a country or region. In low income countries 80–90 % of total budget for solid waste management (SWM) is spent on collection of waste, yet collection rate is very poor resulting in low collection frequency and efficiency (Srivastava *et al*, 2015).

CONCLUSION

Waste management involves a large number of different stakeholders, with different fields of interest. To ensure effective waste management require the collaboration of all stakeholders. They all play a role in shaping the system of a city, but often it is seen only as the responsibility of the local authorities. In the best of cases, the citizens are considered partners together with the municipality. From this study, achieving a sustainable and integrative approach to Municipal Solid Waste Management (MSWM) depends on a range of programmes and policies which must focus on capital intensiveness and recycling, waste reduction, capacity building of the local government as well as private sector development among others to be applied in varying contexts. It is imperative to note that environmental health cannot be ruled out of economic growth and sustainable development. Change in bad attitude of people towards solid waste management, institutional strengthening as well as intensive education on e-waste management will help enhance the nation's quest for sustainable development.

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