ASSESSMENT OF THE IMPLEMENTATION OF ONE-HOUSEHOLD ONE-BIN SANITATION INTERVENTION IN ABOKOBI COMMUNITY.

BY

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JULY, 2019
DECLARATION

I, Godwin Yao Deafeamekpor, declare that except for the other people investigations which have been duly acknowledged, this work is the outcome of my own unique research under the supervision of Dr. Justice Moses K. Aheto. This dissertation, either in whole or in part has not been submitted elsewhere for award of any degree.

.................................................. ........................................
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(Student)

..................................................
Dr. Justice Moses K. Aheto                                                               Date
(Supervisor)
DEDICATION

This work is dedicated to my uncle, Mr. Emmanuel Israel Attagba and my Mentor Dr. Vincent Von Vordzogbe and also to all my family and friends for their infinite prayers and emotional assistance throughout my education. May the Good Lord richly bless them.
 ACKNOWLEDGEMENT

Glory be to God for His mercy, grace and favor throughout this program. My earnest thanks and appreciation go to my academic supervisor, Dr. Justice Moses K. Aheto whose guidance gave me more understanding to get this work done. My thanks also go to Professor. Philip Adongo for instrumentality in getting me onboard this study path and his unflinching encouragement. I also acknowledge Justice Elisha Deafeamekpor, Jeffery and Angela Segbawu for their support and commitment during my data collection and also all my study participants from Abokobi for contributing to this research work. My final thanks go to all my lecturers and colleagues at the school of Public Health.
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### DEFINITIONS OF ACRONYMS

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<tr>
<td>1H-1B</td>
<td>One-household One-bin</td>
</tr>
<tr>
<td>AMA</td>
<td>Accra Metropolitan Assembly</td>
</tr>
<tr>
<td>AOR</td>
<td>Adjusted Odds Ratio</td>
</tr>
<tr>
<td>GHC</td>
<td>Ghana Cedis</td>
</tr>
<tr>
<td>GSS</td>
<td>Ghana Statistical Service</td>
</tr>
<tr>
<td>MMDA</td>
<td>Municipal Metropolitan District Assemblies</td>
</tr>
<tr>
<td>OR</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>UNCHS</td>
<td>United Nation Conference on Human Settlement report</td>
</tr>
<tr>
<td>ZGL</td>
<td>Zoomlion Ghana Limited</td>
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ABSTRACT

Background: In Ghana, rapid human population growth without efficient and proper waste management interventions continue to seriously affect sustainable development of waste management practices. In particular, poor solid waste management in rural and urban Ghana associated with unlawful disposal into drainages continues to have attendant negative impacts such as pollution on health, leading to death and value loss. To address this surging indiscriminate solid waste disposal menace around the country, Zoomlion Ghana Limited in 2015 implemented the One-household One-bin Sanitation Intervention in support of rural and urban communities. As part of efforts, registered individual households were provided with free Zoomlion litter bins for proper waste packaging at a monthly disposal cost of between GHS20.00 to GHS30.00 depending on the volume of waste. This intervention notwithstanding, is still a challenge. This study therefore assesses the implementation of the One-household One-bin intervention at Abokobi in the Ga East municipality. Specifically, the following issues are addressed i) what the different approaches to solid waste management by rural and urban communities are ii) in what form(s) households package their waste for disposal iii) what the cost implication(s) is /are iv) what the general perception is about improper waste disposal and consequences are and, v) recognizable challenges with the well-meaning intervention(s) 1H-1B and extent to which its full potential can be achieved

Method: The study used both quantitative and qualitative survey methods to arrive at an outcome. To do so, a total of 204 household respondents, along with 2 Officers each from Zoomlion and the District Assembly respectively were interviewed. For qualitative data, in-depth interviews were recorded and analyzed manually. Quantitative data was also analyzed using Stata version 15 a statistical computer software to obtain descriptive statistics and carry out regression analysis to measure the odds that determine the strength of association between the independent and outcome variables.

Result: In this study, five (5) solid waste disposal approaches are reported; use of plastic/metal dustbins by individual households, common use of community dustbin by different households, incineration, collection by private motorized trucks and illegal dump site use. For packaging of solid waste for the afore-mentioned approaches, 53.93% respondents reported the use of plastic/metal dustbins. Of the above percentage, only 21.08% actually received Zoomlion plastic/metal dustbins supply for household use as an intervention. In terms of waste volumes and relative monthly surcharges for lifting solid waste, 54.1% of respondents reported payment of prices that range from GHC 10.00 to GHC 40.00. On the issue of knowledge of impacts of improper solid waste management by sampled households, 99.51% respondents were notably conscious of such causatives as disease outbreaks. Furthermore, 33.82% of the respondents see solid waste management essentially as an act of collecting and dumping refuse only. A major challenge found with the implementation of 1H-1B intervention in this study is, customer failure to honor timely payment of their monthly surcharges coupled with the high cost of dustbins supplied by the service provider, Zoomlion. In conclusion, after adjusting for the independent variables associated with owning a plastic/metal dustbin by households, the study revealed that household income levels, type of waste generated (e.g. plastic or food waste) and the
free distribution of waste bins as intervention by the service provider are significant predictors of household’s ability to own a plastic/metal dustbins for efficient and effective waste management. The results show that respondents with no formal education had 76% reduced odds of having ownership of dustbins compared to those with some formal education (AOR= 0.24; 95% CI=0.087-0.636), monthly income level ranging from GHC 950 to GHC 1500 (AOR= 4.30; 95% CI=1.416-13.083) and income level above GHC1500 (AOR= 4.04; 95% CI=1.152-14.188)
CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Generally, any unwanted material that is disposed is considered waste or refuse. More often, waste materials or resources have no known value and immediate use. However, it is possible that many waste materials can be of immense use when their potential is harnessed as a resource. There are different classification of waste resources namely domestic waste, E waste, factory waste, construction waste, agriculture waste, food processing waste, bio-medical waste, nuclear waste and waste from oil factoring. Management of waste as a resource from preservation of waste conveyance trucks and discarding facilities, involves first the gathering and collection, transportation and dumping of both refuse and sewage as well as other unwanted products that have no immediate use. Waste management therefore involves managing all procedures and resources for appropriate treatment, in agreement with health codes and ecological regulations (Ewuntomah, 2009). Whereas refuse refers to solid waste, sewage is used to describe liquid waste.

According to Foo (1997), solid waste management has continuously been a main problem in most urban zones throughout the world, mostly in the fast-growing metropolises of the developing world. A rapid population growth with an increase in individual income accounts for the generation of a large bulk of solid waste which has affected the quality of the environment and poses a threat to human health (Snigdha, 2003). Solid waste
packaging and disposal are therefore viewed as essential component of public health and human welfare of any society.

Thus, the industrialization of most cities across the globe has resulted in increased waste generation and the need for putting in place efficient disposal and management practice. For many developed countries with high consumption patterns, industrial and financial improvement has led to diverse solid waste generation. By doing so, ways of managing such wastes have become very complicated. Invariably, most disease outbreaks such as diarrheal and cholera have come about as a result of improper packaging and disposal of waste. More so, the shifting economic tendencies and fast development has worsened the management of solid waste in emerging countries like Ghana leading to increases in both quantity and weight (Bartone, 1993).

In the light of Ghana’s medium to long term development policy goals (Keep the City Clean) it has become necessary to place emphasis on waste management research as a tool for addressing governance, particularly Ghana’s public health and related welfare management.

Ghana, a developing country whose capital city Accra has an approximated population of 4 million has had yearly growing population of 4% making it one of the most rapid increasing metropolis in Africa (Thompson, 2010). This outstanding growth has added to municipal waste creation that exceeds the city’s capability for control and processing. Waste management difficulties in Ghana have prolonged from the state to the homegrown municipalities, and garbage of all kinds, shapes and sizes is common in both urban and countryside areas. These problems are rigorous and difficult to manage in the few dense populated cities in Ghana of which Accra is one of the most noticeable. Ghana has not benefited entirely from the resource deposits in solid waste base on two reasons but not limited to; the incapability of city authorities to develop proper solid waste managing
policies that can best exploit these essential resources, and the unjust conceptualization and operationalization of what solid waste are made up of.

Proper solid waste disposal in Ghana, especially in Accra, is reflective of individual economic or income status. Majority of the Ghanaian population living in Accra are economically or financially poor and for that reason cannot afford to pay for proper disposal of waste.

In the year 2015, the One–household One–bin (1H-1B) intervention package by Zoomlion Ghana limited (ZGL) began. This package was designed to address the surging indiscriminate solid waste disposal due to population density increases in communities around the country. Fig 1. Below shows a line-up of Accra Metropolitan Assembly (AMA) engraved dustbins and Zoomlion waste collection trucks for lifting solid waste

Figure 1: Type of bin distributed
Though the Municipal Metropolitan District Assemblies (MMDAs) are provided with communal containers, these containers are inadequate for placement at all areas. Additionally, communities are expanding on yearly basis and distances to container sites keep increasing. These afore-mentioned reasons, combined with attitudinal inertia of citizens and Zoomlion’s quest to keep Ghana clean, green and healthy, provide basis for introduction of the One-household One-bin sanitation intervention. The One-household One-bin sanitation implementation covers most districts, municipalities and metropolises in Ghana. One of the key tenets of the guidelines for implementation of 1H-1B is that a household is provided with a free litter bin after registering with Zoomlion.

Secondly, the bin is lifted once or twice in a week (or at higher frequencies if so agreed with the client) and the household (client) to pay for the service at the end of each month. The service charge ranges from GHS20.00 to GHS30.00 monthly. The company is responsible for timely lifting and disposal of the waste at the final waste disposal site.

Despite the good intention of this 1H-1B intervention, some difficulties were encountered: Inability of some communities to quickly adopt conventional and safer waste disposal methods. Households resort to crude methods such as burning, use of unapproved dumpsites, disposal on streets and in drains, and others. Customer’s high default rate and poor enforcement of sanitation byelaws by the Municipal Metropolitan and District Assemblies. The focus of this study therefore is on domestic solid waste packaging and disposal.

1.2 Problem statement:

With reference to the United Nation Conference on Human Settlement report (UNCHS, 1996) one third to one half of solid waste produced in most metropolises in developing nations, (including Ghana) are not disposed-off properly. These solid wastes generally
ends up on illegal dumping site such as roads, exposed spaces, waste plots and others. According to Malombe (1993) irregular sanitation services provided to households by Metropolitan Assemblies oblige the households not to dispose-off garbage inappropriately. Improper disposal of solid waste in Ghana has high-risk on public health and these risks include but not limited cholera, diarrhea, typhoid, malaria and acute eye infections.

A number of African metropolises in the 1980’s developed their public solid waste controlling policies and programs without the involvement of the public but only through the government interventions. The popular obstacles that opposed most of the cities were administrative and managerial incompetence and lack of responsibility delegation for various activities of solid waste controlling (Onibokum, 1999). Waste disposal have consequences on health and the environment. Thus, wrongful disposal of solid waste has had major negative effect on the natural environment and the survival of the general public.

Problem related to open space waste disposal consists of bad odor, pests and contamination from surface water. As time goes on, the land on which solid waste are disposed-off gets to its capacity and acquiring new land becomes problematic and expensive and consume time to process. Public health status is determined by its level of environmental sanitation (Karley, 1993). Poor hygiene situations decrease the protection of human health. Improper disposal of solid waste into the environment can damage the ozone layer and this may result in cancer disease. Pollution of air may regularly lead to the development of acidic rain, which is risky to crops, since it accelerates the elimination of soil fertility from the ground. It may also have effects on drainage as solid wastes dumping in drainage passages and gutters prevent proper flow of sewerage. This may result in flooding which may cause loss of lives and possessions. In addition, solid wastes can hinder the growth plants. Dumping of refuse indiscriminately in the environment degrades the land and has effects on residents and business activities. Inappropriate disposal of solid waste inhibits resources
from being reprocessed. For example, the non-segregation of solid waste such as plastics, paper and metals make it difficult for recycling companies to process. Refuse disposal in rivers and other water bodies cause river blindness and endanger aquatic organism. Dumping of waste into water bodies which serve as source of drinking water for the public may result in epidemics such as cholera and mosquitoes breeding grounds which may lead to malaria outbreak.

The above problem applies in Ghana where refuse controlling services are mostly ineffective and unproductive. It is projected that about 83% of inhabitants in the greater Accra dispose-off their waste in unlawful locations in their neighborhood, and due to mismanagement of solid waste, unhygienic environments are created (Bennah et al., 1993). Efficient and effective service provision rest on administrative and managerial effectiveness, accountability, legality, response to the community, clarity in choice making and multiplicity of policy making and decision. (Onibokum 1999). Privatization of solid waste collection started in Ghana in the mid-1990s, in order to meet the high demand of the massive waste being generated (Baud and Post, 2002). Even though solid waste collection was privatized by government, still communities’ collect or dispose-off half of the waste generated in the city. It is against this backdrop that this study seeks to assess the One-household One-bin sanitation intervention undertaken by the Ghana Zoomlion.

1.3 Households Waste Disposal Conceptual Framework

Some individual households without bin dispose-off solid waste generated in the central container (bin) provided by waste management companies (e.g. Ghana Zoomlion) through the metropolis whiles those with the bins dispose-off theirs in their personal containers while waiting for their private companies contracted for lifting.
However, households far away from the central bin and without personal container or bin dispose-off their solid waste in the open such as streets, drainages, markets and other part of the city (Figure 2).

Figure 2: Conceptual framework
1.4 Justification of the study

The need for better sanitation has become the most important developmental issue in Ghana particularly Accra, the capital city. This need has drawn the attention of organizations as well as personalities, all of which are determined to find solution to the issue. This study seeks to explore the One-household One-bin implementation strategies and how households’ solid waste are packaged and disposed-off to ensure good sanitation in the Abokobi Municipal of the Ga East of Greater Accra region. Notwithstanding the extent of this need, very limited research on households’ packaging of solid waste disposal has been carried out in this Municipal. This study will serve as reference point to the Municipal Assembly, waste managing institutions (ZGL) and other concerned institutions to discover household’s challenges as well as better disposal of solid waste in Municipal. This study will provide an in-depth knowledge of what the challenges associated with the implementation of the one-household one-bin sanitation intervention are and what households’ improper solid are made up of waste managing institutions (ZGL). In addition the study will provide information on suitable approaches for tackling these challenges. Furthermore, the study will add to existing information on solid waste management in relation to households’ solid waste disposal and extend more research on the topic in other urban areas and municipalities in the country.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definition and Scope of solid waste disposal in the Greater Accra

Ghana as a country has come across, problems waste management at all levels such as, collection, transportation and final disposal. Public waste disposal services are generally insufficient to serve the need of the population, and the volume of solid waste generated in the urban area are voluminous. While current solid waste dumping services are insufficient to deal with the quantity of solid waste produced, the cost for maintaining waste collection vehicles are high (Sam, 2002). The challenges of waste management places a greater financial load on the government and the assembly as well. Since budgetary provisions for activities and upkeep are insufficient (Mensah, 2005). Majority of the municipal and district assemblies in Ghana employ limited number of disposal vehicles or are inadequately equipped with staffs to manage the growing rate of waste disposal causing by the fast urbanization in the metropolises (Jackson, 2009).

Weak law enforcement is another major issue in dealing with the problem of solid waste disposal in Ghana. Every governments come up with bye-laws for waste management. Sadly, these bye-laws are poorly implemented on the field but only work in written (Ramatta, 2010). Due poor implementation of sanitation laws, many people in Ghana today still dispose of their solid waste across streets and drainages and go free without been punished.

The capital of Ghana Accra presently has 16 waste assembly sectors. These sites were managed by different waste controlling companies whose main aim are to gather and dispose-off solid waste. Accra produced closely 900,000 metric tons of solid waste per year, roughly 67% of which is organic matter. Nevertheless, waste collection services are
only available in a limited areas and only 40% of households in the urban have waste collection bins (Yoada, Chirawurah, & Adongo, 2014).

WHO (2009) study on environmental public health endorsed the usage of cover plastic dust-bins for storage of domestic solid waste. This was to assist cleaning and safeguard the waste from straight connection with flies, insects and vultures and also to avoid bad scent irritation and unpleasantness as noted much earlier by Stanyard (1982).

Zoomlion Ghana limited is one of the main waste controlling company in charge of waste collection in the Greater Accra Region (AMA) and it also does some work on private basis. Ghana Zoom lion, as compare to other waste controlling companies, is not assigned to any specific areas or sectors within the region but operates all over the region.

Solid waste generated in Accra is projected to have augmented three-times over the last two decades due to increase in population growth and improved urbanization, with future predictions indicating the urban residents will double within the next decade (Gabbay, 2010).

Solid waste collection from these assembly grounds has been zoned and allocated to individual private companies. The focus of the AMA is to monitor the private companies involved in waste collection to their final disposal. Only nine private companies are responsible of collecting the waste and receive an amount for the service provided per the agreement with the Accra metropolitan Assembly (AMA). Those companies are paid from government budget allocated to the metropolitan assembly and internally generated funds. Collection of waste is by house-to-house or central container collection. According to Thompson (2010) only 20% of the residents in Accra receives weekly house-to-house collection of solid waste services.

These populations live in a group of high-income low-density localities nestled away from the coast. In those communities, waste collection is done weekly using tricycle, and
residents pay a fee for the service provided including extra fee to rent the rubbish containers.

The rest of the 80% of other communities obtain this service free of charge. Majority of this people are found in low income community groups who cannot manage to pay for proper rubbish disposal and therefore rely on public central bin. The central bins are therefore positioned at special designated point where the population is dense to enable greater number of households to dispose-off their domestic garbage to make the bins accessible for vehicles to lift them for disposal. These public waste collection structures are for only communal zone collection and do not include private institutions or individual households. Residents are to bring their rubbish to a public bin or to an attending waste collecting truck (base on request or call) (Cointreau-Levine, 1994). No household collection points were available. Rather, individuals, especially teenagers, transport those waste materials to the disposal destination, which in some areas are far away from their homes. They therefore end up dumping domestic waste close to their homes, water bodies, gutters, and other unauthorized places. The waste trucks are mandated to collect the waste containers as required but was not so because of the less lucrative nature of the collections. Various measures such “pay-as-you dump” was implemented to provide enough income for good service. This system however has failed due to residents’ avoidance of the central collection bin to rather dispose-off their waste at unauthorized places such as ditches and drains.

2.2 Research questions

• How many households in Abokobi community received dustbin during the implementation of the one-household one-bin intervention?
• What are the perceptions and attitudes towards the implementation of the one-household one-bin sanitation intervention?

• Do households pay for lifting of their dustbin?

• How do households without any waste collection services do dispose-off their solid waste?

• How much does each household pay for lifting of their dustbin?

• What are the socio-economic factors affecting the intervention?

2.3 General objective

• To assess the implementation of the one-household one-bin sanitation intervention implemented by Zoomlion at Abokobi community of the Ga East Metropolis of Greater Accra region

2.4 Specific Objectives

• To determine the proportion of households at Abokobi with plastic dustbin.

• To determine the proportion of households with plastic dustbin under the implementation of one-household one-bin.

• To determine factors associated with household’s dustbin ownership

• To assess knowledge and perception towards the implementation one-household one-bin.

• To determine challenges associated with the implementation of the one-household one-bin intervention.
CHAPTER THREE

3.0 METHODS

3.1 Type of study / study design

The study employs cross-sectional design both quantitative and qualitative research methods for data collection. The quantitative part was conducted among heads of households in the community to determine whether the 1H-1B implementation activities were carried out as spelt out in the strategic plan or deviated while the qualitative part was conducted between the district Zoomlion Officer and District Assembly Officer to determine challenges associated with the implementation. Quantitative data was collected using questioners to interview participants through face-to-face interviews while in-depth interview was conducted to obtain qualitative data. Households in the study area were sampled randomly.

3.2 Description of Study Area

The study area is Abokobi a small town located in the Ga East District in the Greater Accra region. This town is surrounded to the north by the Akwapim North District of the Eastern Region, to the south by Accra Metropolitan Authority, to the west by the Tema Metropolitan Authority and to the east by the Ga West District. Abokobi is situated 30 km from Accra, off the Adenta-Aburi highway. The total land size of the district is around 166km$^2$. Figure 3 shows the map of Abokobi.
Approximately 58.10km² of the land size is urbanized whilst 107.90km² is for farming production. The district is divided into four (4) sectors with sixteen (16) operational areas made up of forty-two (42) communities.

The District is found in the savannah agro-ecological zone. The normal yearly temperature ranges from 25.1°C in August and 33°C in February and March. Farming activities form about 55% of the total active economy of the population. Roughly 70% in the rural zones depend on cultivation for their livelihood. Almost 95% of farmers engage in small scale
farming. The major crops cultivated in the district include but not limited to maize, okra, cassava, pepper, tomatoes, garden eggs and others. Animal farming consist of pigs, sheep, rabbit rearing, goats, grass cutter and poultry farming. Most farmers use simple tools such as cutlasses and hoes. The females regularly farm and process cassava into gari and cassava dough. Another livelihood includes mushroom growing, snail rearing, grass cutter framing, rabbit and poultry farming. Small scale trading, stone cracking and other non-agricultural events are carried out in the district.

Abokobi garbage dump is about 800 square-meters. The geology of Abokobi is covered by Acrisols which is a type of soil that is categorized by a subsurface accumulation of low activity clays and low base.

3.3 Study population

Abokobi has an estimated population of about 1654 (GSS 2010). The study population constitute 12.33% of the total population. The study population consist of households residing in Abokobi in the Ga East Municipality Assembly (Table1).

Table 1: Inclusion and Exclusion

<table>
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<tr>
<th>Inclusion</th>
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<tbody>
<tr>
<td>Adults (18 years and above).</td>
<td>Adults who are bedridden and unable to provide responses.</td>
</tr>
<tr>
<td>Participants and beneficiaries of the One households One-bin intervention.</td>
<td>Adults who might refuse to take part in the study.</td>
</tr>
<tr>
<td>Ghana Zoomlion company and other waste management companies engaged in household waste bin distribution</td>
<td></td>
</tr>
</tbody>
</table>

15
Population is defined as the name for the large general group of many cases from which a researcher draws a sample Neuman (2007). It also refers to the cluster that is of interest to the researcher, the group to which the researcher would like to generalize the findings of the study (Fraenkel and Wallen, 2003).

3.4 Study Indicators and Variables

To have an objective assessment of the level of the 1H-1B operation, some key indicators as shown in Table 2 need to be defined in order to explain the outcomes of the statistical analysis.

To determine the levels of implementation of 1H-1B, the independent variables are measured against the dependent variable. By doing so, relevant information that can assist implementers in assessing the barriers associated with any challenges or success of the intervention can be predicted and accounted for. The dependent variable in this study is “ownership of a plastic dustbin by households” and the independent variables include “income levels, educational level of interviewees, types of solid waste generated, knowledge/perception of interviewees, proportion of households subscribing to the new solid waste disposal method being carried out by the intervention and the level of weaknesses and strengths of the intervention”.

University of Ghana http://ugspace.ug.edu.gh
<table>
<thead>
<tr>
<th>Intervention area</th>
<th>Indicator</th>
<th>Numerator/Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-household one-bin sanitation intervention (Abokobi Municipal).</td>
<td>Households with bins under the implementation of 1H 1B</td>
<td>Numerator: # of households at Abokobi community with a bin under the one-household one-bin implementation. Denominator: Total # of households sampled selected for the study at Abokobi community</td>
</tr>
<tr>
<td></td>
<td>Proportion of households at Abokobi community with plastic bins under the one-household one-bin implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Households with plastic dustbin</td>
<td>Numerator: # of households at Abokobi with plastic dustbin. Denominator: Total # of households study sample selected at Abokobi</td>
</tr>
<tr>
<td></td>
<td>Proportion of households at Abokobi with plastic dustbin</td>
<td></td>
</tr>
<tr>
<td>Knowledge and attitude.</td>
<td>To assess knowledge and perception towards the one-household one-bin project</td>
<td></td>
</tr>
</tbody>
</table>
3.5 Sampling
Purposive sampling following Ogula, (2005 method) was adopted in selecting respondents for the study.

3.6 Calculation of Sample Size
Based on the GSS (2010) population and housing census, a total of 413 households were identified for Abokobi. Yamane’s formula (1967 method) was used to obtain an appropriate sample size for this study as follows

\[ n = \frac{N}{1 + Ne^2} \]

Where, \( n \) is the required sample size, \( N \) is the population size and \( e \) is the level of precision.

In this study, \( N=413 \) at an assumed level of significance of 5\%, margin of error = 0.05 and proportion of 0.5 (maximum sample possible because no data on proportion of households with dustbin at Abokobi is available).

\[ n = \frac{413}{1 + 413(0.05^2)} \]

\( n \approx 204 \). Thus, a sample size of 204 households are used in this study.

Households residing in Abokobi at the time of data collection and with heads of households within the ages of 18 years and above were eligible for interviewing.

3.7 Sampling procedure
First random balloting from the numerous metropolises in the Greater Accra Region where the one-household one-bin project had been implemented was carried out to obtain the Ga-East district as the selected district for the study. Next, simple random sampling was
employed to select the township of Abokobi among the various towns and settlements in the metropolis. After that, both systematic sampling and purposive sampling were engaged in selecting participant households in the Abokobi community.

For systematic sampling, households for the interview at a sampling interval (k) of 2 households (i.e. k=413/204) were selected.

For purposive sampling, the two (2) key informants selected were for in-depth discussion based on their roles in relation to waste management in the community. The interviewees were a Zoomlion District Officer responsible for the implementation of the one-household one-bin intervention and a Municipal Assembly Officer. These two key informants were selected based on their know-how in order to provide in-depth information about the problem facing the implementation of 1H-1B intervention in the area.

3.8 Data collection techniques/ tools

The study considered only primary data sources based on information that participants (households) living at Abokobi Ga East municipal provided using structured and semi-structured questionnaires and face-to-face dialogs using interview guide (Mertens and McLaughlin, 2004 method). Questionnaires were structured to take into consideration all the relevant variables of households that had gotten a bin and their perception about the one-household one-bin intervention implementation. Questionnaire was also discussed with appropriate experts and was pre-tested before concluding it. The result was used to answer the research questions. In all 204 questionnaires were administered from household to household in some zones.

The survey was divided into two groups: one aspect focused on collecting demographic information such as sex, age, academic level, employment and marital status and the second aspect was on the essential variables of a household that obtained a bin as a part of
the one-household one-bin intervention and how their solid wastes are disposed-off as well as factors affecting waste disposal.

3.9 Data coding and transcription (qualitative study only)

Qualitative data collected from the field was analyzed manually. Information obtained from the key informants during in-depth interviews were classified into themes for efficient analyses. The most important stages before analyzing qualitative data was to identify themes (Creswell, 2009). Collected data such as age and, gender, were classified as values. Participants’ responses were directly written as it was during the in-depth interview to support the findings. An audio recorder was used for the in-depth interviews to capture information from key informants such as Zoomlion District Officer and District Assembly Officer.

3.10 Data entry (quantitative study only)

The collected data was organized and corrected in order to clean all mistakes and check for comprehensiveness. Categorical variables were summarized using frequencies and percentages while continuous variables were summarized using mean and standard deviations or median and interquartile range as appropriate. Factors associated with household bin ownership was analyzed using logistic regression analysis. Data was entered manually into Microsoft excel sheet. Participant responses were coded and Stata software version 15 was used to analyze data collected. Association between the outcome and independent variables was measured using Chi-square test of analysis. To determine association between variables, a P-value of less than 0.05 was used. Factors influencing one-household one-bin implementation (outcome of the study) were analyzed using regression analysis to measure the odds. This was computed to determine the strength of association between the independent and outcome variables.
3.11 Data /Statistical Analysis

Microsoft excel was used for data entry, coding and cleaning. Descriptive statistics was used to summarize factors influencing household solid waste disposal practices. Qualitative variables were summarized percentages, proportions and frequencies while Quantitative variables were summarized using the mean and standard deviations. Tables and graphs were used to present percentages and frequencies. Data was analyzed using Stata version 15.

Qualitative data on the other hand, was examined manually. Data collected through interviews were categorized into different themes for appropriate analyses. According to Creswell (2009), one of the most important steps for analyzing data is to identify the various themes. The goal of this study is embedded in the various themes under which analysis were characterized. In certain circumstances, participant’s remarks were directly cited.

3.12 Data collection instrument

The questionnaires enabled respondents to read all questions, understand what is expected of them and then write the appropriate answers or choose from the alternatives provided. Not all the prospective participants had the abilities of reading and writing. For those who could not read and write, the interviewer read the questions to the participants and then recorded the responses provided. The motive for using these instruments are that they have standardized responses that made data collation easier, took less time to run and ensured the anonymity of participants (Fraenkel and Wallen, 2000).

Questionnaires only contained close ended questions. Close ended questions provided alternative answers from which participants were required to choose. Likert scale answers was provided to facilitate measuring participant’s perception. Questionnaires was divided
into two parts. Part one obtained demographic information of participants whilst the second part solicited responses to questions related to the study objectives. Participants were asked to identify/indicate their agreement or disagreement to each piece of information in the questionnaires by using Likert scale provided as: 1 = true    2 = false or      1= Yes, very satisfied    2= quite satisfied           3= No, not satisfied

Permission was obtained from the Assemblyman or community leaders where the study was carried out.

Obtaining information from some households was quite difficult based on their limited time to sit down and answer the questionnaire. In view of this, the researcher allowed some of the households to answers the questionnaire and submit them on agreed or specified date.

3.13 Quality Control/Assurance:

Quality control or assurance involved the efforts and measures put in place to ensure the quality and accuracy of information being gathered using the methodologies selected for a specific research. The research ensured quality control by providing sufficient training to field staff to ensure efficiency of the data collection procedure (Walia, 2015). The researcher kept charge over the field workers by making sure that they followed the right processes and techniques in which they were trained. This provided benefits in terms of quality and control, and ensuring an ethical standard is adopted in the field, and control over double-dealing.

3.14 Ethical Considerations

Protocol was submitted to Ghana Health Service Ethical Committee for ethical approval. After being approved, informed consent was sought from participants (households’ heads in Abokobi) before the interview. Before the start of each interview, participants were
made aware that the interview may last for about 30 to 40 minutes in order to prepare their minds.

Electronic data in the form of paper documents which contained personal information of participants were stored in locked file cupboards and were only accessed by authorized research assistants when needed to be used during the study. Personal data or information stored on portable devices such as flash memory devices and movable external drives were also stored in a strong safe locked file cupboard. Computer “lock out” was set on processors used for data analysis when inactivate. This helped minimized the risk of illegal use of data in situations where the researcher working with the data leaves or forgets to logoff the computer.

This study sought to determine various factors associated with the implementation of One-household One-bin sanitation intervention. Households’ heads were selected randomly to participate in the study. Thus, households for the interview were selected at a sampling interval of two households. Heads of households were briefed on the objectives of the study and how the result from the data collected will be used. This study do not require any sensitive information from participants. The participants were assured of anonymity and confidentiality. Participants had the right to withdraw from the study without any penalty. In line with this, pseudonyms were used when referring to a particular respondent in the data analysis and discussion.

3.15 Training field staff

The fieldwork was conducted within two weeks in June 2019. To administer research questionnaires, five undergraduates were selected, trained and engaged as research assistants. The researcher organized two days training for the field staff before the start of
the data collection. This enabled the research to be conducted in the rightful manner to achieve the purpose of the study.

Guidelines were prepared for research assistants in asking the right questions. These guiding principles comprised:

1. Interviewer be conversant with the research questionnaire.
2. Pose the questions in the order of series as arranged in the questionnaire.
3. Use the precise words given in the form.
4. Each question will be read slowly for participants to understand and provide the response.
5. Questions that are not understood will be repeated.
6. All applicable questions will be posed.

Research assistants were trained in analytical techniques. According to Howell (2013) probing supports in inspiring the participants and make them focus on the exact subject matter. But it is believed that when not well done, can cause bias in the procedure. Below are some of the approaches used for probing practices.

1. Questions were repeated
2. Participants’ answers were repeated
3. Participants were supported
4. Asked for clarification
5. Break was used in proceedings (quiet probe)
6. Unbiased interrogations or comments were used

This research adopted this approach to make sure that data collection is efficient.

3.16 Pre-testing of the data collection questionnaires

Questionnaire developed and used was dependable and effective based on the following:
To begin with, the researcher pre-tested the questionnaires on 20 households in the community of Madina with comparable features of households at Abokobi. This pre-test permitted the researcher to detect any vague, idealistic, and incorrect questions which originated from the participants and improved on them before the real data collection. This pre-testing assisted the researcher to plan and update questionnaires and give more information to the researcher to estimate the duration for the real data collection exercise.

3.17 Revision of data collection tools/questionnaires
Following the pre-test, the researcher was able to identify the depth of participants understanding and perceptions which helped the enrichment of the questionnaires (improve or reconstruct sentences which seem not to be clear in the questionnaire). The response obtained from the trial testing activity assisted in effective restructuring of the questionnaires and interview directory which enable simple understanding of all categories and demographics of households or participant.

3.18 Supervision of fieldwork
Fieldworkers were employed to collect the required data. The researcher provided sufficient observation of their work to make sure efficiency of the procedure is achieved (Walia, 2015). The researcher monitored field staff by ensuring that they go by the processes and practices in which they were trained. This approach facilitated quality control, kept the ethical standards of data collection process and took control of over duplications of data.
CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics of respondents
Out of the 204 respondents, 62.25% females and 37.75% males participated in the study which is equivalent to the ratio of 2:1. This implies that the majority of the respondents in this study were females (Table 3).

4.2 Participants Age classification
The study outcome shows that 30.39% of the participants who took part in this study were within the age range of 20-30 years while 29.41% of the respondents were within the age range of 30-40. Similarly, 9.80% of the respondents ranged between the ages of 60 and above. On the whole, majority of the respondents were between the age ranges of 20 to 40 (Table 3).

4.3 Participants’ educational level
In terms of respondent’s educational level, 21.08% of total number sampled were of junior high school level while 24.51% attained senior high school level. Furthermore, 34.51% had tertiary level education. In all, 20.10% had no formal education. Clearly, this implies that majority of the respondents (55.59%) in this study had formal educational background indicating approximately 3:1 ratio of formal to no formal education (Table 3).

4.4 Respondents employment status
In order to understand the employment status of respondents in relation to the affordability of waste collection services by companies and the willingness to pay higher amounts for improved waste management services, income sources were determined and result obtained show that 43.63% of respondents were fully employed either by Private or Public sector. However, 39.22% were self-employed and 16.67% were either un-employed or
retired/pensioners. Thus, majority of the sampled respondents (82.85%) in one way or the other had a reliable source of income, which implies the ratio of employed to un-employed is 5:1 (Table 3).

4.5 Respondents’ income range

In this study, respondents’ income is presented as a participant’s earning and not household monthly earnings. Out of the total respondents sampled, 25.49% earned less than two hundred Ghana cedis (GHC200.00) as monthly income while 35.78% earned between GHC200.00 to GHC600.00 every month. About 2.94% respondents indicated they earned between GHC600.00 to GHC950.00 each month while 12.75% earned between GHC950.00 to GHC1500.00 monthly. Thus, only 9.8% of the total study participants earned above GHC1500.00 monthly as income (Table 3).

4.6 Respondent’s residential status

As a follow-up to Bullets 4.4 and 4.5 above; the residential status as a measure of the choice, hence accommodation types; family house, caretaker, rented and personal resident, that is linked to income status and affordability of waste management services by companies were ascertained. The result obtained show that 44.12% of the total sampled respondents actually live in rented apartments while 55.88% do not live in rented apartment. However, not living in rented apartment does not necessarily mean owning one’s personal apartment. Rather, responses suggest that some sampled population live in family houses or their personal residence while others as caretakers. This implies that a higher percent of the respondents do not spend money on rental or accommodation (Table 3).
4.7 Respondents who signed-in for waste collection services.

The study result indicates that while 59.8% of participants employed waste management services for appropriate packaging and disposal of solid waste, 40.2% engaged other means such as incineration and use of illegal dump site for their solid waste disposal (Table 3).

4.8 Respondent’s choices of waste management service

In this study, waste management service provision is not limited to the Zoomlion company only but other private trucks and truck-pushers services as well as use of community dustbins. Whereas 44.26% employed only Zoomlion services, 37.7% patronized the use of the common community dustbin and 15.57% employed the private truck services for disposal of their domestic solid waste. Only 2.46% employed the services of truck-pushers. Generally, the community dustbin is commonly patronized by households at Abokobi (Table3 and Figure 4).

Figure 4: Community dustbin commonly used at Abokobi.
4.9 Variation in monthly charges for waste disposal

Of the 204 households sampled, only 122 respondents as part of their expenditure indicated that they pay monthly charges towards solid waste disposal. The remaining 82 households resort to varying approaches of disposal. Depending on the volume of waste generated, varying payments that range from GHC10.00 to GHC40.00 is notable for refuse collection and disposal. Of the 122 respondents, 54.1% indicated that they pay GHC10.00 while 31.97% pay GHC30.00 and 8.2% pay GHC40.00 as monthly levy out of their incomes or earnings as indicated in Bullet 4.5 above for disposing-off domestic solid waste. Only 5.74% of the respondents indicated paying GHC20.00 (Table 3). Figure 5 below also shows the varied payments by households for waste disposal.

Figure 5: Variation in monthly levy of respondents for waste disposal.
4.10 Use of plastic dustbins by households for waste packaging and disposal.

For proper solid waste packaging for disposal, 53.93% representing 110 households and 46.07% representing 94 respondents/households respectively indicated use and non-use of plastic dustbins (Table 3). This implies the ratio of users to non-users of plastic dustbin is 1:1. As part of the 1H-1B sanitation intervention implemented by Zoomlion, where dustbins were supplied for use, only 21.08% representing a total of 43 respondents out the 204 households actually had Zoomlion plastic dustbins. Figure 6. Shows a single household Zoomlion plastic dustbin with excess solid waste filled-in plastic sacks for collection.

Figure 6: A Zoomlion supplied dustbin for single household.
4.11 Awareness of households of 1H-1B intervention (free dustbin distribution)

In terms of Zoomlion’s 1H-1B sanitation intervention, respondents’ awareness of the free distribution of dustbin inquired show that 52.45% of the sampled households admitted their awareness from various sources listed in Table 3 while the remaining 47.55% were unaware.

Out of the total respondents who obtained the information, 12.15% heard it on Radio whereas 5.61% received the information on Television. Further inquest into the source of awareness info on 1H-1B benefit, the study revealed that 40.19% obtained information from friends and relatives while 39.25% indicated that information was directly provided by the service provider (Zoomlion and their Agents). Only 2.8% of the respondents disclose social media as their sources of awareness.

4.12 Challenges associated with the implementation of the 1H-1B sanitation intervention in Abokobi

During in-depth interview with Zoomlion’s implementation of the company’s intervention, the views shared by an Officer during question time and perceived challenges associated with 1H-1B are revised to read as follows:

“Currently a dustbin cost about GHC200.00 and more, customers only pay a registration fee ranging from GHC20.00 to GHC40.00 depending on the number of people in a house and we give them a dustbin. The problem with the free distribution is the high cost [or market price] of the dustbin”.

“At the end of the month some pay GHC10.00, GHC20 cedis, GHC30.00 and others GHC40.00 depending on the amount of waste they generate”.
“Now the problem is that, how long we have to collect those monies to defray the purchase cost of the bin, pay our workers and get some profit? Don’t forget that we are in this for business.”

“Another problem is that customers don’t pay on time, anytime our agents go out to collect payments beneficiaries/customers are usually not at home and this makes it difficult for us to operate because we need money to buy fuel and repair our cars.”

“Another problem we face in our work is the bad nature of roads to some customers’ homes and because of that it is very difficult for us to reach some of them. Currently, we are negotiating with the government for its 1,000,000 bin project to continue with the free distribution because we don’t have money for free distribution.” (Mr. Ernest. Zoomlion District officer in charge of Abokobi).

“The problem of waste management [a District Officer noted] is not the matter of free dustbin, the main problem is the final disposal site.

“Every district assembly is supposed to provide land for waste companies to dispose-off waste collected from that community, but that is not the case because land owners are not willing to give out their lands, they prefer selling it at high price to individuals or estate developers and because of that waste companies have to carry the waste collected from here to a far distance. Only those small truck pushers who dispose-off theirs at the transit site.”

“Transit site is just a temporal place where wastes are disposed-off before being sent for recycling or for scrap waste materials these are sent far outside. But, currently we have about 3 transit sites, one at Achimota and others which I can’t remember now. So, my brother, the problem of waste management in Ghana is not only free distribution of dustbin but the final destination of the collected waste, we all see those refuse collectors
come to our house to collect our waste but who knows where those wastes are sent to?"

(District Municipal officer)

4.13 Alternate means and ways of waste disposal in Abokobi

The study also revealed that 82 out the total respondents/households at the time of this investigation had not signed-in for any waste collection services. Of this number, 92.68% employed incineration as means of disposing off their solid waste. Only 7.32% of that number used illegal dump sites for their solid waste disposal. This means that aside the services of waste collectors, some respondents in this study had alternative means of disposing off solid waste as stated earlier. (Table 3)

4.14 Respondents’ willingness to pay higher amount for improved waste management

For improved waste management services, the willingness to pay higher amount was solicited. Of the sampled households, 60.66% representing 124 respondents indicated that they were willing to pay higher amount for improved waste management services. On the contrary, 80 households representing 39.34% sampled participants were not willing to pay any additional amounts for any form of improved waste management. (Table 3)

4.15 Respondents’ assessment of waste management service providers.

Participants were asked whether they were satisfied with the services provided by waste collection companies. The outcome of the respondent’s assessment shows that 48.36% of them were quite satisfied with the services provided by waste management companies while 35.25% were very satisfied with the services provided by waste management organizations. Finally, 16.39% of the respondents were not satisfied at all with the service provided by waste management companies. (Table 3)
Table 3: Demographic characteristic of respondents in Bullet 4.1

<table>
<thead>
<tr>
<th>Demographic characteristic</th>
<th>Frequency (N=204)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>127</td>
<td>62.25</td>
</tr>
<tr>
<td>Female</td>
<td>77</td>
<td>37.75</td>
</tr>
<tr>
<td><strong>Age of Respondents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>62</td>
<td>30.39</td>
</tr>
<tr>
<td>30-40</td>
<td>60</td>
<td>29.41</td>
</tr>
<tr>
<td>40-50</td>
<td>41</td>
<td>20.1</td>
</tr>
<tr>
<td>50-60</td>
<td>21</td>
<td>10.29</td>
</tr>
<tr>
<td>above 60</td>
<td>20</td>
<td>9.8</td>
</tr>
<tr>
<td><strong>Educational Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior High School</td>
<td>43</td>
<td>21.08</td>
</tr>
<tr>
<td>Senior High School</td>
<td>50</td>
<td>24.51</td>
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<tr>
<td>Tertiary</td>
<td>70</td>
<td>34.31</td>
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<tr>
<td>No Formal Education</td>
<td>41</td>
<td>20.1</td>
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<td><strong>Employment Status</strong></td>
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<tr>
<td>Entrepreneur</td>
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<td>0.49</td>
</tr>
<tr>
<td>Employed</td>
<td>80</td>
<td>39.22</td>
</tr>
<tr>
<td>Self-Employed</td>
<td>89</td>
<td>43.63</td>
</tr>
<tr>
<td>Unemployed</td>
<td>34</td>
<td>16.67</td>
</tr>
<tr>
<td><strong>Households with plastic dustbin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, I have a dustbin</td>
<td>110</td>
<td>53.92</td>
</tr>
<tr>
<td>Basket or carton dustbin</td>
<td>31</td>
<td>15.2</td>
</tr>
<tr>
<td>No, I have no dustbin</td>
<td>63</td>
<td>30.88</td>
</tr>
<tr>
<td><strong>Household owning Zoomlion waste bin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>161</td>
<td>78.92</td>
</tr>
<tr>
<td>Yes</td>
<td>43</td>
<td>21.08</td>
</tr>
<tr>
<td><strong>Signed for waste Collection service</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>82</td>
<td>40.2</td>
</tr>
<tr>
<td>Yes</td>
<td>122</td>
<td>59.8</td>
</tr>
<tr>
<td><strong>Income range</strong></td>
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<td></td>
</tr>
<tr>
<td>Below Ghc200</td>
<td>58</td>
<td>28.43</td>
</tr>
<tr>
<td>Ghc200 - Ghc600</td>
<td>81</td>
<td>39.71</td>
</tr>
<tr>
<td>Ghc600 - Ghc950</td>
<td>12</td>
<td>5.88</td>
</tr>
<tr>
<td>Ghc950 - Ghc1500</td>
<td>30</td>
<td>14.71</td>
</tr>
<tr>
<td>Above Ghc1500</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td><strong>Resident status</strong></td>
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<td></td>
</tr>
<tr>
<td>No rented resident</td>
<td>114</td>
<td>55.88</td>
</tr>
<tr>
<td>Rented resident</td>
<td>90</td>
<td>44.12</td>
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<tr>
<td><strong>Monthly charges for waste lifting</strong></td>
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<td></td>
</tr>
<tr>
<td>Ghc10</td>
<td>66</td>
<td>54.1</td>
</tr>
<tr>
<td>Ghc20</td>
<td>7</td>
<td>5.74</td>
</tr>
<tr>
<td>Ghc30</td>
<td>39</td>
<td>31.97</td>
</tr>
<tr>
<td>Ghc40</td>
<td>10</td>
<td>8.2</td>
</tr>
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</table>
Table 3: Demographic characteristic of respondents in Bullet 4.1 (cont’d).

<table>
<thead>
<tr>
<th>Demographic characteristic</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source of information of free Bin distribution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td>13</td>
<td>12.15</td>
</tr>
<tr>
<td>Television</td>
<td>6</td>
<td>5.61</td>
</tr>
<tr>
<td>Social media</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Friends or relatives</td>
<td>43</td>
<td>40.19</td>
</tr>
<tr>
<td>Zoomlion agents</td>
<td>42</td>
<td>39.25</td>
</tr>
<tr>
<td><strong>Alternative means of waste disposal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incineration</td>
<td>76</td>
<td>92.68</td>
</tr>
<tr>
<td>Waste plot</td>
<td>6</td>
<td>7.32</td>
</tr>
<tr>
<td><strong>Satisfied with service provider</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, very satisfied</td>
<td>43</td>
<td>35.25</td>
</tr>
<tr>
<td>Quite satisfied</td>
<td>59</td>
<td>48.36</td>
</tr>
<tr>
<td>No, not satisfied</td>
<td>20</td>
<td>16.39</td>
</tr>
<tr>
<td><strong>Pay for lifting of waste</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>82</td>
<td>40.2</td>
</tr>
<tr>
<td>Yes</td>
<td>122</td>
<td>59.8</td>
</tr>
<tr>
<td><strong>Willingness to pay higher amount for improve waste services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>48</td>
<td>39.34</td>
</tr>
<tr>
<td>Yes</td>
<td>74</td>
<td>60.66</td>
</tr>
<tr>
<td><strong>Waste company employed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Truck pushers</td>
<td>3</td>
<td>2.46</td>
</tr>
<tr>
<td>Zoomlion</td>
<td>54</td>
<td>44.26</td>
</tr>
<tr>
<td>Private trucks</td>
<td>19</td>
<td>15.57</td>
</tr>
<tr>
<td>Community dustbin</td>
<td>46</td>
<td>37.7</td>
</tr>
<tr>
<td><strong>Heard of Zoomlion free bin distribution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>97</td>
<td>47.55</td>
</tr>
<tr>
<td>Yes</td>
<td>107</td>
<td>52.45</td>
</tr>
</tbody>
</table>
Respondent’s knowledge or perception on waste management is assessed using three evaluating questions. Respondents were asked to choose true or false as answer per their knowledge on waste management. (Table 4)

<table>
<thead>
<tr>
<th>Questions</th>
<th>True (%)</th>
<th>False (%)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Improper waste management causes outbreak of diseases</td>
<td>99.51</td>
<td>0.49</td>
<td>204</td>
</tr>
<tr>
<td>2) Zoomlion manages all waste in Ghana</td>
<td>39.71</td>
<td>60.29</td>
<td>204</td>
</tr>
<tr>
<td>3) Waste management is only an act of collecting and dumping refuse</td>
<td>33.82</td>
<td>66.18</td>
<td>204</td>
</tr>
</tbody>
</table>

Taking the first assessment question into consideration, 99.51%, of the total study sampled representing 203 respondents, established that improper waste disposal or management causes outbreak of diseases. Only 0.49% representing 1 respondent disputed with the view that improper waste management cause’s outbreak of diseases. Table 4 and Figure 7 show the outcome of the first assessment question.
1) Improper waste management causes outbreak of diseases

Figure 7: Improper waste management causes outbreak of diseases.
With respect to the second assessment question, 60.29% of the total sampled representing 123 respondents settled that Zoomlion manages all solid waste in Ghana. Whereas the remaining 39.71% representing 81 of the respondents differed with this opinion. Table 4 and Figure 8 show the graph of respondent’s views.

2) Zoomlion manages all waste in Ghana

![Pie chart showing 60.29% for True and 39.71% for False]

Figure 8: Zoomlion manages all waste in Ghana
Considering the final assessment question, 66.18% of the total respondents representing 135 disagreed with the view that waste management is only an act of collecting and dumping of refuse. However, the remaining 33.82% representing 69 of the respondents established that waste management was only an act of collecting and dumping of refuse. Table 4 and Figure 9 show the graph of respondent’s knowledge/perception in relation to waste management in detail.

3) Waste management is only an act of collecting and dumping of refuse.

![Pie Chart: 66.18% True, 33.82% False]

Figure 9: Waste management is only an act of collecting and dumping of refuse.

4.16 Types of solid waste mostly generated by households

The study discovered that 46.08% representing 94 of the sampled respondents generate plastic and food waste mostly. On the other hand, 28.92% representing 59 of the respondents generate food whiles 21.08% representing 43 of the study sampled generate
only plastic waste most. However, it appears that 2.94% representing 6 of the total respondents generate diapers and yard waste mostly. Only 0.98% representing 2 of the respondents generate paper waste mostly. (Table 5)

4.17 Measures adopted by households for disposal of hazardous materials

In terms of hazardous materials, it is discovered that 52.45% of the respondent’s adopted incineration as means of disposing-off their hazardous waste, representing 107 of the total sampled.

Furthermore, 19.61% adopt backyard burning as for disposal of their hazardous waste materials representing 40 of the sampled respondents. However, respondents who dispose-off their hazardous waste materials in the nearby bushes were 14.22%, representing 29 of the respondents. In addition, the study revealed that 27 of the respondents were selling their hazardous waste materials for recycling, representing 13.24%. Only 1 respondent dump his or her hazardous waste materials in gutters, representing 0.49%. For further explanation, the outcome of this study indicated that majority of the respondent’s dispose-off their hazardous waste materials through incineration and this followed by backyard bury. Only few of the respondents dumped their hazardous materials in the nearby bushes and the rest of the respondents sells them for recycling. (Table 5)

4.18 Measures adopted by respondents to minimize the volume of solid waste generation

With regard to waste volume minimization, 85 out of the total sampled respondents limit the use of polythene bags and daily food waste, representing 41.67%. Furthermore, the study outcome establishes that 31.86% of the respondents minimized the amount of solid waste generated by reused and recycling, representing 65 of the respondents sampled.
About 26.47% used illegal dump site to minimize the volume of solid waste generated, representing 54 of the total respondents. To explain further, it appears that the majority of the respondents minimized the volume of solid waste generated by limiting the use of polythene bags and daily food waste generated. (Figure 10 and table 5)

**Measures taken to reduce waste generation**

![Pie chart showing waste reduction measures]

**Figure10: Measure adopted by respondent to reduce the amount of waste generated.**

According to Akpen *et al.* (2005), no significant distinction was documented on how households reduce the volume of waste generated and the types of solid waste generated by households in Ghana. Even though, the size of households may affect the volume of solid waste generated, there is no distinct variation with the types of wastes produced by households. Regardless of the household size and the volume of waste generated, waste management service providers prefer charging higher cost for improved solid waste rather than small amount.
4.19 Respondent’s views on streets, drains, and community dustbin tidiness.

Out of the total study respondents, 103 are of the view that streets, drains and community dustbin cleaning should be done through communal labor, representing 50.49% of the respondents. Furthermore, 62 of the respondents thought community dustbin, streets and drains tidiness should be the responsibility of the Municipal Authority only, representing 30.39%. However, another 32 of the sample respondent are of the view that neatness of the community should be the duty of both Municipal Authority and private companies, representing 15.68% while 3.44% of the remaining assumed that environmental cleaning (streets, drains and community dustbin) should be assigned to private companies only representing 7 of the respondents sampled. Table 5 show respondents varied views on environmental tidiness.
Table 5: Frequency distribution household’s characteristics

<table>
<thead>
<tr>
<th>Question</th>
<th>Frequency (N=204)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste generated most</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic</td>
<td>43</td>
<td>21.08</td>
</tr>
<tr>
<td>Paper</td>
<td>2</td>
<td>0.98</td>
</tr>
<tr>
<td>Food waste</td>
<td>59</td>
<td>28.92</td>
</tr>
<tr>
<td>Diapers and yard waste</td>
<td>6</td>
<td>2.94</td>
</tr>
<tr>
<td>Plastic and food waste</td>
<td>94</td>
<td>46.08</td>
</tr>
<tr>
<td>How hazardous materials are disposed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incineration</td>
<td>107</td>
<td>52.45</td>
</tr>
<tr>
<td>Dumping in nearby bush</td>
<td>29</td>
<td>14.22</td>
</tr>
<tr>
<td>Gutter</td>
<td>1</td>
<td>0.49</td>
</tr>
<tr>
<td>Burying in backyard</td>
<td>40</td>
<td>19.61</td>
</tr>
<tr>
<td>Sale them for recycling</td>
<td>27</td>
<td>13.24</td>
</tr>
<tr>
<td>Measures to minimize volume of solid waste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reuse and recycle</td>
<td>65</td>
<td>31.86</td>
</tr>
<tr>
<td>Waste plot</td>
<td>54</td>
<td>26.47</td>
</tr>
<tr>
<td>Minimized polythene bags use and daily waste</td>
<td>85</td>
<td>41.67</td>
</tr>
<tr>
<td>Who should clean the community bins &amp; drains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipal authority</td>
<td>62</td>
<td>30.39</td>
</tr>
<tr>
<td>Private company</td>
<td>7</td>
<td>3.43</td>
</tr>
<tr>
<td>Both municipal &amp; private</td>
<td>32</td>
<td>15.69</td>
</tr>
<tr>
<td>Communal labor</td>
<td>103</td>
<td>50.49</td>
</tr>
</tbody>
</table>

4.20 Association between household’s ownership of plastic dustbin (dependent variable)

Bivariate analysis using chi-square test was conducted to determine the association between demographic, background characteristics and household ownership of plastic bins at 5% level of significance. The results revealed that; educational level ($P = 0.002$) and income level ($P = 0.012$) were the demographic characteristics that were significantly associated with the household ownership of plastic dustbins. Other background characteristics such as; measures use to reduce waste generated ($P = 0.004$), employment
waste management services ($P < 0.001$) were also found to be associated with household’s ownership of plastic dustbin.

Table 6: Association between demographic characteristics and ownership of dustbins

<table>
<thead>
<tr>
<th></th>
<th>Ownership of Bin (%)</th>
<th>Total</th>
<th>Chi-square</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>34 (54.8)</td>
<td>28 (45.2)</td>
<td>62 (100.0)</td>
<td>1.000</td>
</tr>
<tr>
<td>30-40</td>
<td>32 (53.3)</td>
<td>28 (46.7)</td>
<td>60 (100.0)</td>
<td></td>
</tr>
<tr>
<td>40-50</td>
<td>22 (53.7)</td>
<td>19 (46.7)</td>
<td>41 (100.0)</td>
<td></td>
</tr>
<tr>
<td>50-60</td>
<td>11 (52.3)</td>
<td>10 (47.7)</td>
<td>21 (100.0)</td>
<td></td>
</tr>
<tr>
<td>60 and Above</td>
<td>11 (55.0)</td>
<td>9 (45.0)</td>
<td>20 (100.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
<td>0.002*</td>
<td></td>
</tr>
<tr>
<td>JHS</td>
<td>17 (39.5)</td>
<td>26 (60.6)</td>
<td>43 (100.0)</td>
<td></td>
</tr>
<tr>
<td>SHS</td>
<td>24 (48.0)</td>
<td>26 (52.0)</td>
<td>50 (100.0)</td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>24 (34.2)</td>
<td>46 (65.8)</td>
<td>70 (100.0)</td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>29 (70.7)</td>
<td>12 (29.3)</td>
<td>41 (100.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
<td>0.436</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>33 (40.7)</td>
<td>48 (59.3)</td>
<td>81 (100.0)</td>
<td></td>
</tr>
<tr>
<td>Self-employed</td>
<td>45 (45.9)</td>
<td>44 (54.1)</td>
<td>89 (100.0)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>16 (47.1)</td>
<td>18 (52.9)</td>
<td>34 (100.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Income level</strong></td>
<td></td>
<td></td>
<td>0.003*</td>
<td></td>
</tr>
<tr>
<td>Below GHC 200</td>
<td>35 (60.3)</td>
<td>23 (39.7)</td>
<td>58 (100.0)</td>
<td></td>
</tr>
<tr>
<td>GHC200 - GHC600</td>
<td>42 (51.5)</td>
<td>39 (48.5)</td>
<td>81 (100.0)</td>
<td></td>
</tr>
<tr>
<td>GHC600 - GHC950</td>
<td>3 (25.0)</td>
<td>9 (75.0)</td>
<td>12 (100.0)</td>
<td></td>
</tr>
<tr>
<td>GHC950 - GHC1500</td>
<td>8 (26.6)</td>
<td>22 (73.4)</td>
<td>30 (100.0)</td>
<td></td>
</tr>
<tr>
<td>Above GHC1500</td>
<td>6 (26.1)</td>
<td>17 (73.9)</td>
<td>23 (100.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Residential status</strong></td>
<td></td>
<td></td>
<td>0.677</td>
<td></td>
</tr>
<tr>
<td>Not rented</td>
<td>54 (37.5)</td>
<td>60 (62.5)</td>
<td>114 (100.0)</td>
<td></td>
</tr>
<tr>
<td>Rented</td>
<td>40 (44.4)</td>
<td>50 (55.6)</td>
<td>90 (100.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at $p<0.05$
Table 6: Association between background characteristics and ownership of dustbins (cont’d)

<table>
<thead>
<tr>
<th></th>
<th>Ownership of Bin (%)</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Total</td>
</tr>
<tr>
<td>Waste generated most</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic waste</td>
<td>14 (32.5)</td>
<td>29 (67.5)</td>
<td>43 (100.0)</td>
</tr>
<tr>
<td>Paper waste</td>
<td>1 (50.0)</td>
<td>1 (50.0)</td>
<td>2 (100.0)</td>
</tr>
<tr>
<td>Food waste</td>
<td>25 (42.3)</td>
<td>34 (57.7)</td>
<td>59 (100.0)</td>
</tr>
<tr>
<td>Diapers waste</td>
<td>5 (83.3)</td>
<td>1 (16.7)</td>
<td>6 (100.0)</td>
</tr>
<tr>
<td>Plastic and food waste</td>
<td>49 (52.1)</td>
<td>45 (47.9)</td>
<td>94 (100.0)</td>
</tr>
<tr>
<td>Improper disposal causes diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>109 (88.6)</td>
<td>94 (11.4)</td>
<td>123 (100.0)</td>
</tr>
<tr>
<td>False</td>
<td>1 (100)</td>
<td>0 (0)</td>
<td>1 (100.0)</td>
</tr>
<tr>
<td>Zoomlion manages all waste in Ghana</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>44 (54.3)</td>
<td>37 (45.7)</td>
<td>81 (100.0)</td>
</tr>
<tr>
<td>False</td>
<td>50 (40.6)</td>
<td>73 (59.5)</td>
<td>123 (100.0)</td>
</tr>
<tr>
<td>Measure use to reduce waste generated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reuse and recycle</td>
<td>19 (29.2)</td>
<td>46 (70.8)</td>
<td>65 (100.0)</td>
</tr>
<tr>
<td>Limit daily waste</td>
<td>47 (55.2)</td>
<td>38 (44.8)</td>
<td>85 (100.0)</td>
</tr>
<tr>
<td>Waste plot</td>
<td>28 (51.8)</td>
<td>26 (48.2)</td>
<td>54 (100.0)</td>
</tr>
<tr>
<td>Employed waste collection service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>58 (70.7)</td>
<td>24 (29.3)</td>
<td>82 (100.0)</td>
</tr>
<tr>
<td>Yes</td>
<td>36 (29.5)</td>
<td>86 (70.5)</td>
<td>122 (100.0)</td>
</tr>
</tbody>
</table>

*Significant at p≤0.05
4.21 Multiple Logistic regression Analyses

Multiple logistic regression analysis was conducted on all demographic characteristics and its association with the ownership of dustbins. Two demographic characteristics, namely; educational level and income level were significantly associated with ownership of dustbins at the multiple logistic regression analyses level (see Table 7).

The results show that respondents with no formal education had 76% reduced odds of having ownership of dustbins compared to those with some formal education (AOR= 0.24; 95% CI=0.087-0.636). Respondents with monthly income level between GHC950 - GHC1500 were 4.3 times more likely to have ownership of dustbins compared to those who earn monthly income below GHC 200 (AOR= 4.30; 95% CI=1.416-13.083). Respondents with monthly income level above GHC1500 were about 4 times more likely to have ownership of dustbins compared to those who earn monthly income below GHC 200 (AOR= 4.04; 95% CI=1.152-14.188) (Table 7).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Ownership of dustbin</th>
<th></th>
<th>cOR (95% CI)</th>
<th>aOR(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>34 (54.8)</td>
<td>28 (45.2)</td>
<td>1.0 (ref)</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>30-40</td>
<td>32 (53.3)</td>
<td>28 (46.7)</td>
<td>0.94 (0.461-1.918)</td>
<td>0.96 (0.435-2.121)</td>
</tr>
<tr>
<td>40-50</td>
<td>22 (53.7)</td>
<td>19 (46.7)</td>
<td>0.95 (0.431-2.104)</td>
<td>1.34 (0.546-3.285)</td>
</tr>
<tr>
<td>50-60</td>
<td>11(52.3)</td>
<td>10 (47.7)</td>
<td>0.90 (0.336-2.442)</td>
<td>1.78 (0.565-5.576)</td>
</tr>
<tr>
<td>60 and Above</td>
<td>11 (55.0)</td>
<td>9 (45.0)</td>
<td>1.0 (0.365-2.771)</td>
<td>1.5 (0.381-5.926)</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JHS</td>
<td>17(39.5)</td>
<td>26 (60.6)</td>
<td>1.0 (ref)</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>SHS</td>
<td>24(48.0)</td>
<td>26 (52.0)</td>
<td>0.70 (0.310-1.617)</td>
<td>0.65 (0.268-1.562)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>24 (34.2)</td>
<td>46 (65.8)</td>
<td>1.25 (0.571-2.749)</td>
<td>0.74 (0.278-1.957)</td>
</tr>
<tr>
<td>No formal education</td>
<td>29 (70.7)</td>
<td>12 (29.3)</td>
<td>0.27 (0.109-0.671)</td>
<td><strong>0.24 (0.087-0.636)</strong></td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>33 (40.7)</td>
<td>48 (59.3)</td>
<td>1.0 (ref)</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>Self-employed</td>
<td>45(45.9)</td>
<td>44 (54.1)</td>
<td>0.67 (0.366-1.234)</td>
<td>1.25 (0.582-2.725)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>16(47.1)</td>
<td>18 (52.9)</td>
<td>0.77 (0.345-1.732)</td>
<td>0.97 (0.322-2.923)</td>
</tr>
<tr>
<td><strong>Income level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below GHC 200</td>
<td>35 (60.3)</td>
<td>23 (39.7)</td>
<td>1.0 (ref)</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>GHC200 - GHC600</td>
<td>42 (51.5)</td>
<td>39 (48.5)</td>
<td>1.41 (0.713-2.798)</td>
<td>1.27 (0.596-2.725)</td>
</tr>
<tr>
<td>GHC600 - GHC950</td>
<td>3 (25.0)</td>
<td>9 (75.0)</td>
<td>4.56 (1.116-18.672)</td>
<td>4.11 (0.881-19.241)</td>
</tr>
<tr>
<td>GHC950 - GHC1500</td>
<td>8 (26.6)</td>
<td>22 (73.4)</td>
<td>4.18 (1.594-10.986)</td>
<td><strong>4.30 (1.416-13.083)</strong></td>
</tr>
<tr>
<td>Above GHC1500</td>
<td>6(26.1)</td>
<td>17 (73.9)</td>
<td>4.311 (1.480-12.558)</td>
<td><strong>4.04 (1.152- 14.188)</strong></td>
</tr>
<tr>
<td><strong>Residential status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not rented</td>
<td>54(37.5)</td>
<td>60 (62.5)</td>
<td>1.0 (ref)</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>Rented</td>
<td>40 (44.4)</td>
<td>50 (55.6)</td>
<td>1.12 (0.645-1.959)</td>
<td>1.14 (0.607-2.129)</td>
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</table>

cOR= crude odds ratios; aOR= adjusted odds ratios
CHAPTER FIVE
5.0 DISCUSSION

5.1 Introduction
This chapter presents the discussion of the findings. It focuses on respondent’s demographic characteristics, challenges with the implementation of 1H-1B intervention, Pearson Chi2 test of association, bivariate and multivariate logistic regression to determine the strength of the association.

5.2 Respondent’s sexual category
Majority of the respondents in this study were females representing 62.25% of sampled population while the males represented 37.75% implying a ratio of 2:1. This is so because females mostly takes care of the home as compared to males, therefore end up generating more waste.

5.3 Respondents Age classification
The study outcome revealed that majority of the respondents were in the age range 20 to 40 years representing 59.80%. This implies that the greater proportion of respondents in this study were within the working class and could afford a dustbin or engage the services of waste management companies.

5.4 Respondents’ employment status
Out of the total sampled respondents, 39.22% were self-employed and 16.67% were either un-employed or retired/pensioners whiles 43.63% of respondents were fully employed either by Private or Public sector. Thus, majority of the sampled respondents (82.85%) in one way or the other had a reliable source of income, which implies the ratio of employed to un-employed is 5:1. In relation to the affordability of waste collection services by respondents and their willingness to pay higher amounts for improved waste management
services, income sources obtained from the result show that the majority of the respondents have a reliable income and therefore can afford the waste management services.

5.5 Respondent who signed for waste management services for disposal of their solid waste

The result points out participants who employed waste management services for appropriate packaging and disposal of solid waste. The study outcome indicated that 59.8% of the respondents had signed in for waste collection service while 40.2% of the respondents adopted different means of solid waste disposal. This shows that majority of the respondents in this study were conscious of the consequences of improper waste disposal and therefore signed in for waste collection services for proper packaging and disposal of their domestic solid waste. These waste service providers in this study are not limited to Zoomlion only but other private trucks, common community dustbin, and truck pushers.

5.6 Respondents’ income range

The breakdown from the result shows that 61.27% representing the majority of the sampled respondents at Abokobi were lower income earners, whose monthly take home ranges below GHC 200.00 to GHC 600.00. This implies a ratio of 2:1. Taking the majority monthly income into consideration, it will be difficult for most respondents at Abokobi to afford a waste plastic dustbin which cost GHC 200.00 minimum. Thus, individual households will not have enough money to take care of their homes as well as spending on waste disposal.

To explain further, taking residential status into consideration, the result obtained show that sizable number of respondents live in rented apartments. This is also linked to income
level of individual households. Household with lower income level living in a rented 
apartment, need more money to pay for rent, food and other social amenities before 
thinking about owning a dustbin. Even though the study indicated that majority were 
willing to pay higher amount for improved waste management services, it is clear that 
level of income will determine their choice of waste disposal. Majority of the respondents 
employed the services of community dustbin and other private trucks or truck pushers 
which is cheaper as compared to the services of Zoomlion. A study conducted by Asase et 
al., (2009), also establish that most households employed the services of community 
dustbin for disposal of their solid waste base on their levels of income. This implies that 
income level influence household’s choice of waste disposal. The logistic regression also 
confirmed that respondents with income levels that range from GHC 950.00 to GHC 
1500.00 are likely to patronize the services of waste management companies such as 
Zoomlion and others. It is therefore clear that respondent’s choices of waste management 
services is dependent on their income levels.

5.7 Awareness of households of 1H-1B intervention.

The study revealed that greater proportion of the sampled households admitted their 
awareness of 1H-1B intervention from various sources. This implies that the various 
advertisement means adopted by the service provider (Zoomlion) such the door-to-door 
advertisement by Zoomlion agents, radio and television has made an impact. Significant 
respondents also got the information from families and friends. However, majority of the 
respondents were not able to get the intervention (free dustbin) base on the related 
implementation challenges such as high purchase cost of the dustbins and customers 
failure to pay their monthly charges on time and many more. According to the Zoomlion 
District Officer, the cost of purchasing a bin from the market has increased to GHC 
200.00. This increase in purchasing cost limited and Zoomlion’s ability to supply free
dustbins to prospective customers who were willing to be part of the intervention. On the other hand, some of the customers had the intervention (free dustbin) but were not aware that the bins were free. Rather they thought the initial registration fee (GHC 20.00) was the cost of the dustbins, and therefore claimed payments were made for the dustbins.

5.8 Proportion of respondent with a metal or plastic dustbin.

The result indicated that 53.93% of the respondents had a plastics dustbin for proper packaging and disposal of their solid waste while 46.07% of the respondents had no plastic dustbin at all. The proportion of households who had a plastic container quite is the same as the result of a study conducted by Azeez (2006) which discovered that 54.3% of the participants used plastic dustbin for storage of their domestic solid waste, while as 32.3% used carton dustbin or baskets.

It is clear that majority of the respondents in this study had plastic dustbins for proper packaging and storage of their domestic solid waste before the solid waste gets to the final destination. However, it appears that, only 21.08% of the sampled respondents had a plastic dustbin or container from Zoomlion. It is obvious that majority of the respondents did not obtained their dustbin from Zoomlion and this can be attributed the challenges associated with the implementation as mentioned earlier. But nevertheless, based on the objective of the intervention we may conclude that the “One-house One-bin” sanitation intervention has achieved its goal partially regardless of the sources of the dustbins.

For respondents without plastic dustbin for packaging and disposal of solid waste, the study discovered that 92.68% of employed incineration as means of disposing-off their solid waste while the remaining used illegal dump sites. According to Ramatta Massa Yoada (2010) “Increasing awareness for the use of plastic bins could reduce indiscriminate disposal and improve collection of waste”.

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5.9 Respondent’s knowledge/perception on waste management

Out of the total study respondents, 99.51% agreed that improper waste management causes outbreak of diseases. The result clearly points out that majority of the respondents in this study had knowledge on the consequences of improper disposal of solid waste. Based on this awareness, the study points out that majority of the respondents employed an appropriate means of solid waste disposal such as the services of waste management companies, community dustbin services, private trucks services, backyard burying and incineration. Even though incineration method may cause air pollution, it is better as compare to dumping of waste on the streets, into gutters, nearby bushes and other illegal sites.

For respondents’ awareness of the various waste management companies in Ghana, the study revealed that majority of the respondents believed that only Zoomlion manages all waste in Ghana. This implies that majority of the respondents in this study had little knowledge about other waste management companies in Ghana. The only waste collection service provider known to them is Zoomlion and this can also be attributed to lack on advertisement on the part of other waste management service providers in the country.

With respect to respondents’ knowledge or perception on appropriate waste disposal, even though the study shows that majority of the respondents disagreed with the notion that waste management is only an act of collecting and dumping of refuse, considerable number of respondents had limited knowledge on what actually waste management is about. A study conducted by Iran. J. (2009) likewise revealed that households’ perception of solid waste disposal is based on their level of education.
5.10 Respondent’s views on tidiness the streets, community bins and drains.

For tidiness of community dustbin, streets and drains, majority of the respondents think it should be done through communal labor but in reality, it is problematic for the community to bring its residence together to clean their environment or the city through communal labor. Nevertheless, the result obtained from the sampled respondents at Abokobi is partially in line with the study outcomes from Norley (2009) who established that the neatness of communities Ghana is perceived as the duty of the Municipal and District Assemblies.

5.11 Factors associated with households owning a plastic dustbin

There are numerous demographic characteristics of households that can influence their willingness to own a dustbin and disposal of solid waste. For instance, Ng’ang’a, B. Njenga, (2012) found a significant association between household choice of waste disposal and education level as well as income level among households in Garissa Township. His study has confirmed the outcome from the multivariate that clearly shows there is a significant association between household ownership of bin/waste disposal methods and their educational and income level. This implies that household with higher level of education will know much about the consequences of improper waste disposal and therefore will want to own a covered dustbin not only for proper waste disposal but also to prevent the bad stink from waste which may result to air pollution. Edwin, Lau (2016) discovered that households with higher level of education dispose-off their solid waste into a distinctive dustbin for waste management companies to transport away. Income level was also significantly associated with household willingness to own dustbin or employ the services of waste management companies. Household with high income level were 4.3 times more likely to have ownership of dustbins compared to those who earn lower monthly income. This implies that when household income level rises, they will
wish to own a dustbin or engage the services of waste management company like Zoomlion who will provide them with a plastic dustbin for proper packaging and disposal of their solid waste. For instance, Simon et al, (2016) revealed that household’s income levels were statistically significant concerning their eagerness to pay higher amount for improve solid waste management services.
CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

6.2 Households with plastic container for proper disposal of solid waste.

The study ought to determine the proportion of households with plastic container under the implementation of the one-household one-bin sanitation intervention. A total of 204 respondents participated in this study and 110 out of them had plastic container representing 53.92% of the total respondents. Only 21.08% of the respondents had a plastic dustbin from Zoomlion. The majority of the respondents in this study were female representing 62.25% while 37.75% were male. The study confirm that respondents were paying an amount of GHC 20.00 as registration fee and had the dustbin free. However, some of the respondents thought the registration fee was the cost of the dustbin, therefore thought they had not received any dustbins free from Zoomlion. Respondents who engaged the services Zoomlion confirmed paying an amount of GHC 20.00 to GHC 40.00 as monthly charges for disposal of their solid waste.

6.3 Waste generated most by households and their willingness to pay for improved waste management services

Most solid waste generated by households in the study were generally food and plastic waste, these waste were dispose-off without segregation and most were stored in covered plastic dustbin of which some were dispose-off at the common community dustbin and others through the services of waste management companies. Only few of the respondents practice incineration method and the remaining use illegal dump site or nearby bushes.
6.4 Household’s perception and attitude towards waste management

Majority of the respondents were aware of the health consequence of improper solid waste disposal. This implies that majority of the respondents had some forms of basic education. On the other hand, majority of the respondents believed that Zoomlion manages all waste in Ghana while others perceived that waste management was only an act of collecting and dumping of refuse. Majority of the participant’s reasoned that improper waste management causes outbreak of diseases and therefore want their households’ solid waste to be collected at least once in a week. To explain in detail, appropriate solid waste management promote quality life of the public as well as the environment while improper waste management or disposal can cause air pollution and may result in different kinds of disease outbreak. The majority of the respondent believed that the cleaning of the streets, gutters and community dustbins should be done through communal labor while others think it should be the responsibility of both Municipal Authority and private organizations. But it is always difficult to see households bring themselves together for a communal labor.

6.5 Challenges associated with the implementation of the one-household one-bin intervention.

The high cost of a dustbin ranging from GHC 200.00 according to one of the Zoomlion officers has made it difficult for Zoomlion to supply more of the free dustbin to respective customers as spelt out in the strategic plan. However, customers who registered with Zoomlion were disappointed with the services provided, especially for not complying with the agreement concerning the weekly collection of their solid waste. Customer’s failure to pay their monthly charges on time has also hinder the effectiveness of the implementation.
6.6 Conclusion

In conclusion, the study outcome has confirmed that the one-household one-bin sanitation intervention has been implemented as outlined in Zoomlion’s strategic plan but high cost of dustbin and customers failure to pay their monthly charges on time had slow the success of the implementation. Most respondents with high level of education had plastic dustbin for disposal of their solid waste and respondents with high income level ranging from GHC 950 to GHC 1500 and above also had dustbin or employed waste management services such as Zoomlion and others.

6.7 Recommendations

For improved public health and quality environment, solid waste management should be a collective responsibility of municipal authorities, stakeholders, communities and all individual citizen as well as waste management service providers.

6.8 Recommendation for Zoomlion

First of all, Zoomlion should provide more dustbin to individual households at Abokobi for packaging and disposal of their solid waste. They should partner with the Municipal Assembly to educate the community on waste segregation, waste management and its benefit to them as community as well as the environment. Waste collection should be done at least once or twice a week in order to prevent households from disposing-off their solid waste at illegal sites. The community waste bin should be frequently dispose-off in order to prevent spillover and environmental pollution. Finally, monthly charges for disposal of solid waste should be affordable for each and every individual in the community.
6.9 Recommendation for Municipal Authority

The Municipal Authority should enforce sanitation laws and proper waste disposal in their communities through the introduction of town council or special units to monitor households’ solid waste disposal. They should collaborate with other waste collection service providers for regular collection of solid waste in the community and also introduce a minimal punishment to all individuals who would be found culpable of disposing off their solid waste indiscriminately. The Municipal authority on the other hand should provide a final dumping site for waste management service providers to prevent illegal dumping of waste collected from the community.

6.10 Recommendation for individual households

Individual households should segregate their waste in order to prevent the mixture of plastic, food and backyard waste. Every individual household should own a plastic dustbin or container for proper packaging and disposal of their solid waste to prevent infections, bad odor and outbreak of disease such as cholera and others.

6.11 Recommendation for government

Government should enforce sanitation laws in the country and collaborate with partners to establish recycling centers in the country. On the hand, government should use the media such as radio, television, newspapers and others to educate citizen on waste segregation and the consequences of improper waste disposal. Government should sanction the production and use of polythene bags and takeaway packs in the country. This is because some of these waste materials especially polythene bags cannot be recycled. Government should continue with the free education to enable majority of the citizen to acquire deeper knowledge on the consequences of improper solid waste disposal.
6.12 Recommendation for further research

The final destination of solid waste collected from individual households by waste management service providers is not captured in this study; therefore there is a need for further research in this area.
REFERENCES


Sam, P.A Jr (2002). Are the Municipal Solid Waste Management Practices Causing Flooding During the Rainy Season in Accra, Ghana, West Africa?


APPENDICES

Appendix A: Questionnaire

One-household one-bin Solid Waste Management within the Abokobi municipal. This questionnaire is administered as part of a study into one-household one-bin sanitation intervention within Abokobi Municipal in partial fulfillment of the requirements for a degree of Master of Science in Monitoring and Evaluation, University of Ghana, School of Public Health 2019.

Any information provided in this study will be kept strictly confidential. It will not to be discussed with anyone outside the research team. Privacy of the information collected by the research team will be protected at every step in the process. All data will be stored under lock and key. Data will never be shown to anyone outside the research team.

Participation in this research is an act of free will. Therefore participants are not pressurized or coerced to in any way to participate. In addition, participants have the right to change their mind and withdraw without penalty at any time.

Please read and answer the following questions accurately and honestly. Tick [ ], circle or fill in the blanks where applicable.

Date: dd/mm/yy

1. Age

20-30 (1) [ ] 30-40 (2) [ ] 40-50 (3) [ ] 50-60 (4) [ ] above 60 (5) [ ]
2. Gender  Male (1) [ ]  Female (0) [ ]

3. Highest level of education reached

Junior High School (1) [ ]  Senior High School (2) [ ]  Tertiary (3) [ ]  No formal education (4) [ ]

4. Employment

Employed (1) [ ]  Self-employed (2) [ ]  Unemployed (3) [ ]

5. Current Salary Range

Below GHC200 (1) [ ]  GHC200-GHC600 (2) [ ]  GHC600-GHC950 (3) [ ]  GHC950-GHC1500 (4) [ ]  Above GHC1500 (5) [ ]

6. Are you in a rented apartment?  Yes (1) [ ]  No (0) [ ]

7. How many people live in the same house with you?

...............................................................

8. What kind of waste do you usually generate? (Tick at least 1 item or at most 3 items)

Plastic (1) [ ]  Paper (2) [ ]  Food waste (3) (fruit, vegetable peels and tins). [ ]

Disposables (eg. Diapers) Yard waste (4) [ ]

9. Which of the above mentioned waste types is generated most?  Plastic (1) [ ]

Paper (2) [ ]  Food waste (fruit, vegetable peels and tins) (3) [ ]  Disposables (eg. Diapers) Yard waste (4) [ ]  Food and Plastic waste (5) [ ]
10. Improper waste management causes outbreak of diseases. True (1) [ ] False (0) [ ]

11. Zoomlion manages all waste in Ghana. True (1) [ ] False (0) [ ]

12. Waste management is only an act of collecting and dumping refuse. True (1) [ ] False (0) [ ]

13. What measures, if any, do you take to reduce the amount of solid waste your household produces?
   Reuse and recycle (e.g. water and beverage bottles) (1) [ ] Limit the use of Polythene bags and waste generated (2) [ ] Pouring into gutters / drains (3) [ ] Waste plot (4) [ ]

14. Have you signed for any waste collection service? Yes (1) [ ] No (0) [ ]

15. If yes, which company or mechanism is employed?
   Truck pushers (1) [ ] Zoomlion Gh Ltd (2) [ ] Private Trucks (3) [ ] Other (4) [ ]

16. If you have no collection service at all, how do you dispose off your waste?
   A Common Community Waste Bin (1) [ ] Burning (2) [ ] Gutters Dumpsite (3) [ ] Waste plot (4) [ ]

17. Does your household (or establishment) have a durable metal or plastic container for storing solid waste? Yes, we have metal or plastic container (1) [ ] Basket or carton container (2) [ ] No, we do not have a container (3) [ ]

18. Have you heard that Ghana Zoolion is distributing free bin to each households? Yes (1) [ ] No (0) [ ]
19. If yes, through which means?  Radio (1) [ ]  Television (2) [ ]  Social media (3) [ ]  Friends / relatives (4) [ ]  Zoomlion service providers (5) [ ]

20. Do you own a waste bin that was provided by Ghana Zoomlion?  Yes (1) [ ]  No (0) [ ]
If No which one? Municipal (1) [ ]  Private Company (2) [ ]  others (3) [ ]

21. a) Do you pay for lifting of your waste?  Yes (1) [ ]  No (0) [ ]
b) If yes, how much do you pay? Ghc 10 (1) [ ]  Ghc 20 (2) [ ]  Ghc 30 (3) [ ]  Ghc 40 (4) [ ]  others (5) [ ]
c) Does this cost affect your choices of waste disposal?  Yes (1) [ ]  No (0) [ ]

22. How often are the waste pickups?
Daily (1) [ ]  Weekly (2) [ ]  Monthly (3) [ ]

23. Are you satisfied with the service provided?
Yes, very satisfied (1) [ ]  quite satisfied (2) [ ]  No, not satisfied (3) [ ]

24. a) How often would you like your household waste to be collected?
Daily (1) [ ]  Weekly (2) [ ]  Monthly (3) [ ]
b) Are you be willing to pay a higher price than what you are paying now if the services improved?  Yes (1) [ ]  No (0) [ ]

25. If this collection does not come on, what do you do with your household waste?
Burning (1) [ ]  Dumping in nearby bush (2) [ ]  Gutter (3) [ ]  Burying in backyard (4) [ ]  others (5) [ ]
26. How do you dispose of hazardous materials (batteries, paint, solvents, home and garden chemicals, fluorescent tubes and bulbs) in your home?

Burning (1) [  ]  Dumping in nearby bush (2) [  ]  Gutter (3) [  ]  Burying in backyard (4) [  ]

27. How do you dispose of yard waste (leaves, grass clippings, and tree trimmings)?

Burning (1) [  ]  Dumping in nearby bush (2) [  ]  Waste bins (3) [  ]  Use as mulch/manure (4) [  ]

28. What new or expanded solid waste services would you like to have made available to you in the future?

More regular collection (1) [  ]  Segregated waste collection (2) [  ]  Collection of recyclable items (3) [  ]

29. Who do you think should clean the streets, community waste bins and drains in your area?

Municipal Authority (1) [  ]  Private Company (2) [  ]  Both (3) [  ]
Communal Labor (4) [  ]

30. (a) Do you have any illegal dumping site in your neighborhood or at any specific known location? Yes (1) [  ]  No (0) [  ]

30 (b) If you do, please identify these locations.

..................................................................................................................................................

31. Please share any additional comments, concerns or suggestions you may have regarding solid waste management in your municipality.
Appendix B: Consent Form

CONSENT FORM FOR HOUSEHOLDS PARTICIPATING IN THE ONE-HOUSEHOLD ONE-BIN SANITATION INTERVENTION

Title of study: ASSESSMENT OF THE IMPLEMENTATION OF ONE-HOUSEHOLD ONE-BIN SANITATION INTERVENTION A CASE STUDY AT ABOKOBI GA EAST MUNICIPALITY.

PARTICIPANT’S STATEMENT

I acknowledge that I have read or have had the purpose and content of the participants’ information sheet read and that all questions have been satisfactorily explained to me in a language I understand [English, Ga, Twi]. I fully understand the contents and any potential implications as well as my right to change my mind and withdraw even after I have sign this form.

I voluntary agree to be part of this research.

Name / Initials of Participant……………………………….. ID Code……………………

Participant signature / thumbprint …………………..

Date ………………….

INTERPRETER STATEMENT

I interpreted the purpose and content of the participant’s information sheet to the afore named participant to the best of my ability in [Twi] [ Ga] and languages to his proper understanding.

Name of interpreter ………………….

Signature of interpreter …………………. Date …………………..
STATEMENT OF WITNESS

I was present when the purpose and contents of the participant information sheet was read and explained satisfactorily to the participant in the language he/she understand (Ga and Twi) language.

Name ........................................

Signature ................................. Or Thumb Print.................................

Date ............................

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarification raised by the participant have been addressed.

Researcher’s Name ..........................

Signature ........................................

Date ..........................
Appendix C: Ethical Clearance

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your study protocol.

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<td>Approval Date</td>
<td>18^th June, 2019</td>
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<td>Expiry Date</td>
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<tr>
<td>GHS-ERC Decision</td>
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This approval requires the following from the Principal Investigator:

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months.
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study.
- Informing ERC if study cannot be implemented or is discontinued and reasons why.
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.
- Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol.

Dr. Cynthia Barnesman  
(GHS-ERC Chairperson)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra