

**AN ASSESSMENT OF KNOWLEDGE ATTITUDES AND PRACTICES
TOWARDS WASTE MANAGEMENT AMONG NG'OMBE RESIDENTS**

BY

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UNZA



2009

**AN ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES
TOWARDS WASTE MANAGEMENT AMONG NG'OMBE RESIDENTS**

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2009*

HANNAH MUZYAMBA SICHAAZA

**A dissertation submitted in partial fulfilment of the award of the Degree of Master
of Education in Adult Education**

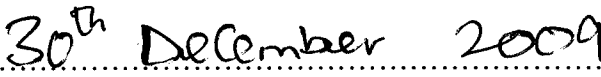
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LUSAKA**

2009

DECLARATION

I, Hannah Muzyamba Sichaaza, hereby declare that the work presented in this study for the degree of Master of Adult Education has been presented either partially or wholly for any other degree and is not being currently submitted for any other degree.

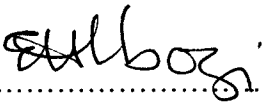
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APPROVAL

This dissertation of Hannah Muzyamba Sichaaza is approved as fulfilling part of the requirements for the degree of Master of Education in Adult Education by the University of Zambia.

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Date.....30th Dec. 2009

Signed.....

Date.....30th December, 2009

Signed.....

Date.....

DEDICATION

I dedicate this research paper to my husband, Derrick, my children Choolwe, Mwembe, Kanji for their educative patience, my mother Georgina Muzyamba Sichaaza for understanding, love and support and my sister Zaben, my nieces Precious, Milimo, Miyoba and Margret for their spiritual encouragement throughout the period of study.

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ABBREVIATIONS AND ACRONYMS

CBE	- Community Based Enterprise
ECZ	- Environmental Council of Zambia
EPA	- Environmental Protection Agency
EPPCA	- Environmental Protection and Pollution Control Act
IPPP	- Industrial Pollution Prevention Programme
ISWM	- Integrated Solid Waste Management
LCC	- Lusaka City Council
MOH	- Ministry of Health
NEAP	- National Environment Action Plan
NGO	- Non Governmental Organisation
PSDU	- Sustainable Development and Poverty Reduction Unit
UNEP	- United Nations Environment Programme
UNIP	- United National Independence Party
WHO	- World Health Organisation
WMU	- Waste Management Unit

ABSTRACT

This report is based on the assessment of knowledge, practices and attitudes towards waste management among Ng'ombe residents in Lusaka district. The main purpose of the study was to assess the knowledge, practices and the attitudes towards waste management. The following research questions were addressed:

- (i) What are the attitudes of the residents towards waste management?
- (ii) What are the knowledge levels of the residents on waste management?
- (iii) What are the practices of Ng'ombe residents regarding waste management?

A mixed design was used in this study. The study used both qualitative and quantitative methods to answer the research questions. For this reason, three methods of data collection were used, the questionnaire, interview guide and focus group discussion. The study population consisted of both male and female adults of 20 years and above from selected households; community leaders, Environmental Health Technicians, Community Based Enterprises (CBEs) workers and Lusaka City Council (LCC) waste management staff.

The study revealed that all respondents were knowledgeable about the risks of having waste in their environment. However, they poorly handled the waste. They lacked knowledge on how to manage waste which included aspects of waste minimisation, recycling, composting, segregation and separation. Results also indicated that health providers were the main source of knowledge about waste management. The other sources of knowledge were Community Based Enterprises (CBEs), megaphone announcement by the council, television, parents and radio.

As regard to practices, the results indicated that only a small fraction of residents used the waste management scheme by the Community Based Enterprises (CBEs) for waste disposal. The majority used illegal dumping, disposing waste in the drainages, roads, unfinished structures, nearby stream and also the bush at the end of the compound. Some residents asked a mad person in the compound to dispose waste for free and anywhere.

The other common methods used were pit digging and burning. The residents did not recycle waste. The common type of waste recycling was that of exchanging finished cooking oil containers with sweeping brooms. The other health hazard type of waste recycling that was being practised was that of refilling empty water bottles with water from the tap and latter reselling to the community. The bottles are picked from places of functions such as weddings and meetings. Residents did not practice composting and did not separate waste or segregate it, they mixed all types of waste in the sacks, in the pits and some burnt all the various types of waste together.

The results indicated that residents had negative attitudes towards waste management. The majority of the respondents indicated that it was the responsibility of the council to manage the waste and not the residents. This was because the council collects ground rates from the public which should enable the council to keep the community clean. Respondents also indicated that the government should employ people to keep the community clean and also that garbage collection should be for free as it was before in United National Independence Party (UNIP) government under Kenneth Kaunda's presidency.

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Background Information

One role of adult education is to address community social problems. Such social problems are dealt through a variety of adult education approaches; one of the community social problems that can be addressed through the process of community education is improper handling of waste. The improper handling of waste could be due to lack of knowledge and poor attitudes that influence practices.

The management of various types of waste has over the years been a very difficult and a challenging issue world wide including Zambia. Research reports elsewhere on waste management show that levels of knowledge, attitudes and practices have an influence on waste management (Brown, 1994; Ghosh, 2001; Palczynski, 2002). In Lusaka, the situation is worsened by the public's attitudes, who litter and appear to have no regard for the beauty of the city. Although most of the large cities have administered waste management practices at different levels of sophistication, many African countries have no official solid waste management policies. For example, Cameroon with a population of about 14 million with half of it living in towns does not have a door to door solid waste collection programme. Solid waste is disposed in the natural streams and rivers, in the surrounding bush or marshland. Also many times, fire is used to burn heaps of waste. This creates toxic smoke, which is detrimental for health (Palczynski, 2002: 2).

In Zambia, waste management has been a challenging issue particularly in the city of Lusaka. This challenge has manifested itself in the perennial outbreak of diseases such as cholera and dysentery, pollution of water resources, contamination of air, soil and land, proliferation of pests and vermin and the loss of aesthetic beauty. Poor environmental conditions are more prominent in the residential townships or compounds. These compounds are densely populated leading to congestion. In fact, the poor environmental conditions are the main cause of diseases (Yamba, 2004).

The government of the Republic of Zambia has responded to the problem of waste management by undertaking the following initiatives: First, there was the enactment of the Environmental Protection and Pollution Control Act (EPPCA) to provide for the control of activities related to environmental protection. The second initiative was the National Environmental Action Plan (NEAP) of 1994. The main objective of NEAP was to integrate environmental concerns into the social and economic development planning process. The third initiative was a six year programme which was called the Industrial Pollution Prevention Programme (IPPP). The main objective of the IPPP was to increase capacity for pollution prevention and monitoring in the industry and creation of Environmental Council of Zambia (Yamba, 2004).

In the City of Lusaka, waste is managed by the Lusaka City Council (LCC) through the Waste Management Unit (WMU) and their responsibilities include the management of solid waste in the city. The council has two waste management systems to serve respectively conventional and peri-urban areas. To support the new waste management system, the Lusaka city council has elaborated the Lusaka city council (Municipal Solid Waste Management) by- laws of 2004. On the basis of these by- laws, which came into force in October 2004, all waste generators in Lusaka, residents , commercial outlets, institutions, industry etcetera, have to register with their respective waste management companies, utilise their services and pay the corresponding fee. All ways of disposal, including the use of refuse pits or the burning of waste even in one's own yard are no longer allowed (Lusaka City Council, 2004).

In order to implement an effective waste collection service in the conventional housing and commercial areas, Lusaka city council has established partnerships with private waste management companies. To facilitate their intervention, the city has been divided into 12 waste management districts. In all these districts with an exception of one, waste collection has now been out-sourced to the private management companies through franchise contracts: A franchise contract provides a private waste collector with the sole right and obligation to collect and transport waste from all premises in a franchised waste management district.

Despite the enactment of laws and initiatives by the government and also the strategic Municipal Solid Waste Management Plan by the Lusaka city council, the city is still facing a critical waste management problem, which is threatening the health of the people of Zambia.

1.1 Problem Statement

Waste management is a major health challenge in Zambia especially in the city of Lusaka. Currently, the Lusaka City Council (LCC) has given the responsibility of waste collection to the private companies by giving them contracts. These companies have introduced the use of containers in Ng’ombe and other compounds where solid waste is being stored in the container and later is disposed of. The expectation of the council and private companies engaged in waste management is that the people in the residential areas will deposit waste in the designated containers. However the levels of knowledge, attitudes and practices of Ng’ombe residents towards waste management remain unknown. The present study was intended to address this knowledge gap.

1.2 Purpose of the Study

The purpose of the study was to assess the knowledge, attitudes and practices of Ng’ombe compound residents in Lusaka district towards waste management.

1.3 Significance of the Study

The findings of this study might help the institutions responsible for managing waste to diagnose the problems of waste management and be able to find appropriate solutions to improve the bad status of waste in the nation. The results may contribute to policy framework in order to improve the health of the people, reduce occurrence of diarrheal diseases and other hazards related to poor waste management. Findings of the study may also contribute to the literature on environmental adult education. The study findings may also stimulate further research in the field of environmental adult education.

1.4 Limitations

Although waste management is a problem in most of the compounds in Lusaka, this study was limited to Ng'ombe compound. This was because it was an academic exercise which needed to be completed within the specified time. The study was also limited by financial constraints and will not, therefore, be extended to other parts of Lusaka and other districts affected by a similar problem.

1.5 Research Objectives

- (i) To assess the knowledge levels of adult residents in Ng'ombe compound on waste management.
- (ii) To assess the attitudes of adult residents in Ng'ombe compound towards waste management.
- (iii) To assess practices of adult residents in Ng'ombe compound regarding waste management.

1.6 Research Questions

- (i) What are the knowledge levels of adult residents in Ng'ombe compound on waste management?
- (ii) What are the attitudes of adult residents in Ng'ombe compound towards waste management?
- (iii) What are the practices of adult residents in Ng'ombe compound regarding waste management?

1.7 Definitions of Operational Terms

The terms used in the study were defined as follows;

Attitudes: Robbins (2001) defines attitudes as evaluative statements which are either favourable or unfavourable concerning objects, people or events. They reflect how one feels about something.

Knowledge: Hornby, (2007) defined knowledge as information, understanding and skills that you gain through education or experience.

Practice: Actions undertaken in the management of the waste such as recycling, composting and segregation or separation of waste.

Source reduction: Yamba (2004) defines source reduction as a design, manufacture, acquisition and reuse of materials so as to minimise the quantity and/or toxicity of waste produced. Waste is eliminated by redesigning products or by a process by which the generation of waste should be minimized in terms of its quantity and its potential to cause pollution.

Waste management: Moller and Uhre (1996) define waste management as integrated systems for management of wastes, including waste reduction, composting, collection and transport, recycling, energy recovery, treatment and disposal.

Waste Minimisation: Yamba (2004) defines waste minimisation as the reduction, to the extent feasible of the waste generated or for the case of hazardous waste subsequent treated, stored, or disposed. It includes any source reduction or recycling activity undertaken by the generator. Try to reduce your waste as much as possible through reuse and separating waste from non-waste.

1.8 Organisation of the Study

This dissertation is organised into six chapters. The first chapter has an introduction which given a synopsis of the background to the present study. Further, an attempt has been made to explain certain concepts that are used in the study in order to make them clear to the reader. The chapter also comprises statement of the problem, purpose, objectives, questions, significance and limitations of the study.

The second chapter reviews related literature on knowledge, attitudes and practice towards waste management. It has attempted to analyse some of the existing literature at a global level, Africa and Zambia.

Chapter three discusses the methods of data collection used in the study. The chapter is divided into sections subsumed under the following headings: the research design, study population, the sample and sampling procedures, data collection procedures, research instruments and data analysis.

The research findings are presented in chapter four. Chapter five consists of discussion and analysis of the findings of the study. Chapter six deals with the conclusion and recommendations. This chapter ends with suggestions for further research. The subsequent pages consist of the references and appendices.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter, literature will be reviewed in relation to knowledge, attitudes and practices. The first set of literature reviewed was one focussing on the appropriate research approach to waste management in the community, the second set was on waste management education and management in Zambia, the third set was on waste management education in United States of America and the fourth set was on waste management practices in Africa and finally on attitudes towards waste management.

2.1 Knowledge, Attitudes and Practices Studies on Waste Management

The significance of knowledge, attitudes and practices (KAP) studies in assessing waste management is highlighted by the fact that KAP studies provide a diagnostic tool to determine the problem and solution. Therefore literature relating to knowledge, attitudes and practices (KAP) was deemed relevant for review. A KAP study measures the knowledge, attitude and practices of a community. In adult education a KAP study serves as an education diagnosis of the community which can be used for designing more reactive adult education programmes. As Kaliyaperumal (2007) observed when beginning the process of creating awareness in any given community, it is necessary first to assess the environment in which awareness creation will take place. Conducting knowledge, attitude and practices (KAP) study can best do this. KAP study tells us what people know about certain things, how they feel and also how they behave. The knowledge possessed by a community refers to their understanding of any given topic on waste management in this case. Attitude refers to their feelings towards this subject, as well as any preconceived ideas that they may have towards it. Practice refers to the ways in which they demonstrate their knowledge and attitude through their actions. Understanding the levels of knowledge, attitude and practice will enable a more efficient process of awareness creation as it will allow the programmes to be tailored more appropriately to the needs of the community.

There was a dearth of literature on KAP studies in the specific area of waste management. A number of studies have been conducted on the general status of solid waste in different sectors such as health and industries, for example studies by Kambole (2002), Moonga (2007), Matenga and Muyakwa (1999). This study will be different in that it will specifically assess knowledge, attitude and practices of a community.

2.2 Significance of Waste Management Education

Waste management education is a critical and necessary element in the management of waste. Lack of knowledge brings about poor waste management practices. This was evident in Jurczak's (1997) study where he observed that generally, generation of total municipal solid waste had significantly increased in Poland due to poor management of waste which in turn was due to lack of knowledge. According to Jurczak (1997) lack of proper knowledge by the tenants resulted into irresponsible management of waste. Jurczak (1997) further indicated that in order to increase public knowledge towards waste management, professional workers such as teachers of subjects related to environmental issues should deliver educational programmes mainly within the formal education system. Joos et al., (1999) pointed out that lack of improvement in waste management was due to the fact that all forms of promotional and educational programmes on sound waste management over the country had not been successful.

The problem to Joos et al (1999), was the absence of acceptance and active participation by the public in the rational waste management. In addition the public did not participate in the segregation and recycling as well as in planning and implementation of the waste management activities.

According to Urio (2004) integrated waste management systems follow a general hierarchy of waste management which includes source reduction, recycling or reusing, composting, incineration and land filling. For each of the processes, there is a dependence upon how effective each preceding element has been. The most favorable is reduction, which suggests using less to begin with and reusing more, thereby saving material production, resource cost, and energy.

individuals are and the more they have knowledge, the less good practice they engage in. This was evident in the study which was conducted in South Africa on the knowledge, attitudes and practices towards water conservation on children from higher income and children from low income groups. Children from higher income groups displayed greater understanding of water, its pollutants and its wastage. They were able to explain the need to conserve water, what pollutes water and the importance of water. The higher income children further reported that they had taken part in schoolbased water programmes, but it appeared that they did not put into practice of what they learnt at school at home. At home they wasted water by opening taps for fun. Thus, the knowledge may be in place for higher income respondents, but attitudes and actions are not at all evident. Knowledge is not always translated into action.

Educational programmes on waste management are an imperative in any given society. Education is a recipe for any sound waste management practice. This study therefore will be significant in that it will seek to assess the knowledge, attitudes and practices among the Ng'ombe residents towards waste management. Moreover, the waste status in Lusaka has not improved; it is still a serious problem. According to Palczynski (2002) less than 14% of the waste generated in the Lusaka city finds its way to the disposal sites and that 90% of the 1,400 tones of municipal waste produced daily is left uncontrolled. This literature highlights the need for assessing the knowledge, attitudes and practices of Lusaka residents regarding waste management.

2.3 Waste Management in Zambia and Waste Management Education

A review of literature in Zambia revealed that the Environmental Council of Zambia (ECZ) is responsible for the environment of the country. Its mission is to regulate and coordinate environmental management, promote awareness and ensure environmental protection through enforcement of regulations and the prevention and control of pollution in support of sustainable development so as to provide for the health and welfare of persons, animals, plants and the environment. As an environmental regulator the council

has a responsibility to ensure that potential polluters have in place systems and procedures to avoid or minimise pollution (Environmental Council of Zambia, 2006).

Waste is anything unwanted or something which is of no use in human life environment. Things such as human waste matter, torn plastic bag papers, banana peels, vegetable cuttings, nshima left over just to mention a few are categorised as waste. Similarly, Kyambalesa (2006) defines waste as garbage, refuse, a culmination of discarded products or parts of products - including broken and non-reusable bottles, metal cans, plastic sacks, containers, newspapers, and automobile parts, automobile bodies and other discarded substances resulting from industrial and commercial operations and from domestic and community activities. Waste is a form of environmental pollution that is mainly a by-product of human activities. Therefore if waste is not managed properly it becomes a health hazard. According to Moller and Uhre (1996), waste management means integrated systems for management of wastes, including waste reduction, collection and transport, recycling, energy recovery, treatment and disposal.

According to Lusaka City Council (2004), in Lusaka city, solid waste management is the responsibility of the Lusaka City Council (LCC) Waste Management Unit. The Waste Management Unit (WMU) has partnered with Community Based Enterprises (CBES). The CBES are responsible for the day to day management of the waste management of the waste system in peri-urban areas. Different waste collection systems are applied within the peri-urban areas. In most areas, waste is collected through large containers (15m³) picked up for emptying by the WMU. In other areas smaller containers have been placed which are emptied at the disposal site by the WMU and in others the tractor-trailer system is used. In both systems the households, business entities and institutions are required to bring their waste to containers, other CBE organise a primary waste collection system. Apart from collecting waste, the WMU is also responsible for the enforcement of waste management regulations in order that all waste generators participate in waste management system, in other words that everybody uses the containers or tractor-trailer and pays for the services provided.

With regard to waste management education in Zambia, there was a dearth of literature on waste management education in Zambia. What is existing on the document by the Lusaka City Council (LCC) Waste Management Unit (2004) is that educating the public on waste management is the responsibility of the Community Based Enterprises (CBEs) in the peri-urban areas. Similarly Palczynski (2002) indicated that in Zambia, the Environmental Council of Zambia (ECZ) through the health sector promotes periodic public information campaigns on the safe handling of solid waste.

In view of the above it is clear that more is desired to be done concerning provision of waste management education in Zambia. The Lusaka City Council (LCC) Waste Management Unit has not designed any educational programmes on waste management education.

2.4 Waste Management Education in United States of America

Because of the dearth in literature on waste management education in Zambia, it was necessary that a review of literature from a developed country with a fully fledged waste management programme was done. In Western Europe is assumed that there fully fledged waste management programmes, but literature for Western Europe countries wasn't available at the time of the study. Choice of United States of America was in part as a consequence of the country having Adult Education programmes in waste management which could be used as point of reference. United States of America is one of the developed countries which has a comprehensive approach to managing waste. The approach includes the most important aspects of waste management being reduction, recycling, composting and waste disposal. This section is based on review of literature on waste management education in two states of the United States of America that is California and Montana.

A review of literature in California State revealed that education has been used as a tool for proper waste management. For example, a school waste management education has been introduced in local schools and informal settings, such as science centres and

museums. This has been implemented by the California Integrated Waste Management Board. The aim of the waste management education is to ensure that current and future waste generators learn to respect and conserve natural resources by making informed waste prevention choices. In schools, the Board provides the classroom curriculum that offers accurate and current waste management information that encourages reducing, reusing, and recycling practices. This curriculum is available to educators at no cost (California Integrated Waste Management Board, 2008).

Overall there are four curricular. The first is vermi the worm, the second is closing the loop, the third is the worm guide and the fourth is the Municipal Solid Waste Module. The Vermi the Worm is an interactive game that teaches 8 to 10year olds about waste management concepts by following Vermi through the school garden.

The California Integrated Waste Management education Board (2008) also cites another curriculum: Closing the loop curriculum, this is an interdisciplinary curriculum emphasising waste prevention, recycling, composting, and vermin composting through fun hands-on activities. The third curriculum is the Worm guide, a vermin composting guide for teachers, a vermin composting guide geared towards starting and maintaining a classroom worm bin. Worm bin building plans troubleshooting tips and new classroom activities make this guide a useful tool for teachers. Finally the Municipal Solid Waste Module; a module that provides interesting experiments and case studies encouraging critical thinking and decision making skills.

In view of the above, the significance of waste management education in California is that it is holistic. The learners, the trainers, the environment of learning and the venue are defined. Another significance of the education in California is the content of the education; addresses the important aspects of waste management practices such as recycling, reusing and composting. The three aspects of waste management practices are a means to waste minimisation. The education also emphasizes on empowering the waste generators with knowledge of how to respect and conserve natural resources. The other significance is that all age groups of people being the adults and children are catered in the provision of the education. The waste management education material such as the

Municipal Solid Waste Module is something the adults can use to improve their skill in decision making.

A review of literature in the state of Montana revealed that education has been used as a tool to clarify the importance of good solid waste management to community members and tribal leadership in America (Montana State University Extension Service, 2008). In the state of Montana, a college curriculum known as Pollution Prevention and Cultural Preservation in Native American Communities: an Educational Tool Kit for Tribal Colleges has been produced by the Montana State University Extension Service for use in all colleges. The college curriculum includes a student handbook, an educational guide, transparencies, worksheets, a test, and evaluations. It has eight lessons that cover different aspects of pollution prevention and are intended to fit into the academic curricula of tribal community colleges. The educational guide illustrates the importance of pollution prevention and how it can help protect tribal lands and enhance pride in Native American culture. The programme's goal is to inspire students to apply concepts they learn in the classroom to their communities and in their everyday lives. There is also an environmental curriculum that incorporates Native American cultural themes to help sensitise students to environmental issues and inspire greater participation in community pollution prevention activities.

The waste management education programme in Montana state links its programmes to programmes developed elsewhere such as the community development at Humboldt University and household waste management developed at Purdue University.

The Centre for Indian Community Development at Humboldt State University produced a 52-lesson curriculum for grades 1 through 12 to cover primary and secondary education. Tribal leaders, educators, and the public identified the goals of the 52-lesson curriculum. The curriculum adopts elements from other waste management instructional materials, but adds several original activities specifically to meet the needs of rural Native American children. It is designed to be empowering and emphasises cultural themes (Humboldt State University, 1995).

Another waste management programmes that offer lessons is the Household Waste Management is a resource created by Purdue University. This programme is aimed at the individual citizen and consumer. It offers reliable information to help readers greatly reduce the amount of solid and hazardous waste generated in the home; safely use, store, handle, and dispose of household hazardous wastes; and increase personal comfort, family safety, and economic security through sensible use and reuse of household products (Environmental Protection Agency, 2005).

Other links developed by the states of Montana to empower the community members and the tribal leadership with information on the importance of good solid waste management is called EAP Education Links. These include Planet protector club, Recycle city, EPA's Office of Environmental Education and EPA Region Pollution Prevention Toolbox.

The Planet Protectors Club: It offers educational activities and games for elementary school students that make learning about solid waste fun. The recycle City: it is a web site of Environmental Protection Agency's (EPA) Region 9: it features a complete virtual community with gaming simulation to demonstrate home and community solid waste management decisions for children. The site tells the story of how reducing, reusing, and recycling solid waste; collecting household hazardous waste; and replacing an open dump with a landfill transformed Dumptown into Recycle City. It holds the attention of young readers using colorful illustrations and easily accessible environmentally conscious characters.

Yet another Environmental Protection Agency's (EPA) structure that provides waste management education is the Office of Environmental Education. This office advances and supports education efforts that develop an environmentally conscious and responsible public and inspire personal responsibility in caring for the environment. EPA Region 5's Pollution Prevention Toolbox , helps teachers integrate pollution prevention concepts in the classroom. It also contains a series of lesson plans on various pollution prevention concepts in schools. Each fact sheet is designed to provide information on how students and teachers can prevent pollution. Topics include energy conservation, household hazardous waste reduction, and pesticides reduction (Montana State University Extension Service, 2008).

The review of literature from the two states revealed that the waste management education caters for all age groups. The education is also culturally acceptable and also has linkage to other organizations. Rural communities are not left out in acquiring knowledge of how to manage waste. The emphasis of education is on reusing, recycling and composting as means of waste minimization.

2.5 Practices of Waste Management in Africa

Literature on waste management in Africa showed that waste management practices vary from country to country. However, a number of African countries have been implementing integrated waste management (IWM). Tchobanoglous, (1993) defined integrated waste management as the selection and application of appropriate techniques, technologies, and management programmes to achieve specific waste management objectives and goals. Integrated waste management is a strategy used to develop a system to identify the level or levels at which the highest values of individual and collective materials can be recovered. As earlier mentioned integrated waste management systems follow a general hierarchy of waste management.

A review of literature in many African countries revealed that, although most of the countries have developed integrated waste management system (IWM), most of the waste generated in these countries remains uncollected. According to Cointreau (1982) garbage

collection services are inadequate or does not exist in most residential areas of developing cities with an estimated 30-50% of solid waste generated within urban centres left uncontrolled. It accumulates on streets and in open spaces between houses, causing or contributing to serious health problems. The poorer households suffer most, since it is overwhelming in poorer areas of the cities that there are no services to collect garbage or the services are very inadequate. For example in Nairobi Kenya, Kibwage (2002) observed that the Nairobi City Council, which is the legal authority responsible for waste management, has no capacity because only 40% of the amount of solid waste generated by the city is collected and disposed.

Similarly, Palczynski (2002) and Yamba (2004) observed that less than 10% of the waste generated in Lusaka city Zambia is collected and disposed of in the undesignated areas. Yamba also indicated that the waste remains uncontrolled especially in the town centres and peri-urban areas. Paris (2000) also indicated that waste generation in Africa is generally high. For example, the major cities in West Africa produce between 150,000 to 300,000 tones of municipal solid waste per year and only 40% to 60% of this waste is even collected.

Looking at the above percentages of waste being generated and also at the percentages collected, it is clear that there is no waste minimisation. Composting organic waste is one way of waste minimisation, however most of the waste is left uncollected on the streets. This is an indication that most of the waste enters the main waste stream causing waste accumulation. It is also an indication that most of the items are not reused or recycled.

Another issue Palczynski (2002) highlights is that of waste management policy. Palczynski observed that, although the majority of large cities have administered waste management practices of different levels of sophistication, many African countries have no official solid waste management policies. For example, Cameroon with a population of about 14 million, with half of it living in towns, does not have a door to door solid waste collection programme. This has resulted in accumulation of waste in the cities due to dumping of waste on the roads and drainages. Palczynski also indicated that in

Cameroon disposal points were of less importance depending on the performance of the official collecting system. At times fire was used to burn the waste which is detrimental to health.

Similar to the above, the Department of Health (1999) in South Africa indicated that one of the major consequences of inadequate waste collection and disposal systems amongst urban poor communities in developing countries is the threat of disease outbreaks. For example, diarrhea diseases such as cholera followed by malaria are the commonest diseases suffered in Zambia and Zimbabwe. Kanyama compound in Lusaka is one such example. In Zimbabwe, 767 cases of diarrhoea and 2,938 cases of malaria were recorded at Gokwe growth point in 1999. WHO (1995) also indicated that, in 1994, 62 thousands cases of cholera resulting in over four thousands deaths were reported in Angola, the Democratic Republic of the Congo, Malawi, Mozambique and Tanzania. Poor drainage in some urban areas contributes to the spread of malaria, which annually kills more than 1.5 million people in Africa (Tavengwa, 1995).

Palczynsiki and Kibwange on the other hand explain that instead of waste being perceived as a problem, it could be translated into a positive tool for improvement of people's lives. For example, in Egypt, Palczynsiki (2002) observed that a large scale innovative and efficient waste recovery, reuse and recycling operation is run by the Zabbaleen, a group of over 50,000 people traditionally involved in the business of waste collection and processing. This is seen as a good practice that brings economic empowerment. Palczynsiki indicated that between 70% and 80% of all collected plastics, metals, glass, paper and other components of the waste stream are recovered and recycled. Organic waste is also composted into fertilizers and also used to raise pigs which are fed on garbage on a commercial scale. In Kenya Kibwange (2002) also indicated that through recycling, urban wastes are transformed into useful products. Waste paper and leaves, in particular, provide a potentially important, alternative source of cooking fuel. Conversion of organic wastes into cylindrical fuel briquettes is being undertaken as a priority by several and Community Based Organisations in the country at Nairobi's Millennium Fuel Project because of its profits.

Cointreau and de Kadt (1991), add that recycling and composting are a survival strategy for the urban poor. Cointreau and de Kadt indicated that in an ideal situation recycling and composting serve as land saving and pollution reducing strategies. They further indicated that recycling and composting play a role of minimizing exploitation of scarce natural resources. Recycling can serve as a source of income to people practicing the process. Similarly, UNEP (1998) observed that the recycling of solid and organic waste is one approach that has positive ramifications in creating informal employment and offering an environmentally sound solution to waste management problems.

De Bertoldi brought out a positive effect of composting for the authorities responsible for managing waste. According to De Bertoldi (1993) composting practice reduces the cost of waste disposal, minimise nuisance potential, and produce a clean and readily marketable finished product. De Bertoldi also indicated that composting helps to increase the recovery rate of recyclable materials and also helps to increase the recovery rate of recyclable materials. Despite its suitability and simplicity for developing countries, it is lowly practiced. Hoornweg and Otten, (1999) also observed that African waste stream is high in organic material with potentially high yields of compost. However, centralised composting is not a significant component of African Solid Waste Management practice.

Another critical practice in waste management reviewed in the literature is separation which is also referred to as sorting or segregation. According to Lardinois and Klundert (1993) sorting is crucial to upscale and improve the safety of waste recycling. They also indicated that source separation reduces the weight and moisture content of solid waste, easing its handling and transport. Hasez (2000) also observed that separation of waste at source has several advantages. One of the advantages of separation is that it enables identification of recyclable items. Another advantage is that at source, separation increases the value of the waste and makes it a more profitable commodity. Separation also prevents contamination of recyclable waste by not mixing with organic waste and serves as a waste reduction practice since not every waste enters the waste stream. For example Egyptians who highly practice separation have been recovering nonorganics

from waste such as plastics, animal bones, metals and iron. These items have been recycled in new products. For example, bones are collected, ground, packed and sold to middlemen who resell them for fertiliser. However, in many African countries separation does not exist. For example, Yamba (2004) observed that in Zambia, there is no separation of the various types of waste, the waste components are usually mixed and dumped in places that are not designated for disposal.

2.6 Attitudes of Waste Management in Communities

Negative attitudes towards solid waste management bring about barriers to performing activities concerning waste management. This was evident in the study which was conducted by the Tucker (2003) on Attitudes and behavioural change in households waste management behaviours. The findings were that negative perceptions about waste management activities are common discriminants of behaviour in household waste management. The study further revealed that attitudes can differ between those who have recently taken up the activities of waste management and those who have not, and between those who formerly participated but have dropped out and those still continuing to participate. The results also revealed that there may be two distinct classes of antecedent attitudes: convenience, factors such as time and effort, which may play little part in initiation but can reinforce persistence; and attitudes of predisposition such as perceptions of vermin and fly problems, waste requirements and aesthetics, which can inhibit initiation. The study also reviewed that initial experience quickly sets attitudes that are stably maintained into the longer term, unless subsequent specific adverse experiences are encountered, when attitudes may weaken and drop out might occur.

Similar to the above study, Kyambalesa (2006) also observed that the accumulation of solid waste in the capital city of Lusaka can be attributed to many factors which include public attitudes that are alleged to be generally characterised by lack of concern for the quality of surroundings. Yamba (2004) also observed that waste minimisation is an attitude of the mind and it requires commitment from all sectors of society, particularly decision makers. Lusaka City Council (2003) also indicated that 60% of the causes of the

problem of solid waste emanates from cultural and social reasons, while only 30% are of financial and technical nature.

It is true that attitude contributes to the accumulation of solid waste in most parts of the city. Most of the people know that it is not health to have waste in their homes no wonder they throw it outside their homes. But it is only that they have an “I don’t care” attitude. The best is to change the mind set of the people by making them understand that waste management is the responsibility of everyone in any given society.

2.7 Key Issues that Arose From the Literature Review on Waste Management

The gap on waste management education, directed energy on conducting a study which is a start point for designing programmes in education that is assessing current knowledge attitudes and practices levels of the country.

With regard to waste management education in Zambia, there was a dearth of literature. Literature revealed that waste management education in Zambia is periodical. Promotion of periodic public education information campaigns are done on the safe handling of solid waste only when there is a disease outbreak such as cholera. The major issue which arose from the literature review on knowledge was that lack of knowledge of how to manage waste brings about poor waste management practices.

The review of literature in the United States of America on waste management education revealed that education is an essential for proper waste management practice. There were four major issues which arose from the literature concerning waste management education in America. The first major issue was the emphasis on the protection and prevention of pollution of the environment.

The second major issue was the content. The content of the educational material is holistic in that it covers all the levels of an ideal waste management hierarchy. The content covers the aspects of safe use, storage, reuse of household products, composting and recycling. The content has also culturally acceptable themes

from all sectors of society.

2.8 Implications of the Key Issues Which Arose From the Literature Review

The implication of the dearth of literature on waste management education in Zambia is that there are no designed educational programmes on waste management for the public. Another implication is that the public has no knowledge of how to manage waste. The periodical education being provided when there are diseases out break imply that the authorities responsible for providing waste management education are reactive and not proactive waste management. There is no information dissemination on waste management.

One would deduce from the literature that as a consequence of the waste management education provided in America, the majority have the knowledge of how to manage waste. Participatory approach implies that waste management in America is a responsibility of each and every individual. Participatory approach also implies that waste management in America is collective; it involves all stakeholders in all sectors of society. The content of waste management education shows that there is waste minimisation since all the important aspects of waste management are included.

Issues arising from literature on waste management practices in Africa are that: first, waste accumulation in most of the African countries will continue to increase as long as composting and recycling are not centralised. Second, if the public is not educated on how to compost and recycle waste, waste will continue to accumulate causing poor waste management related diseases. Third, lack of policies on waste management in some African countries implies that there are no guide lines on how to manage waste.

Literature also revealed negative attitudes towards waste management which signify that more sensitisation is required in order to change the mind sets of the public. Transformative education is essential in changing the people’s attitudes.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The methodology of this study was based on the research survey approach. Robertson (1989) defines a survey as a method of systematically obtaining standardised information about the attitudes, behaviour or other characteristics of population. A survey was appropriate for this study because some of the information which was to be collected needed to be standardised. Therefore, a questionnaire was used with questions which were structured and some semi-structured to assess the people's knowledge, practices and attitudes. Under surveys, each case is investigated only on the particular aspect under consideration; in this case people's knowledge attitudes and practices regarding waste management. The chapter is divided into seven sub-sections which describe the research design, population, sampling procedure and sample size, data collection tools, data analysis, validity and reliability, ethical consideration, and challenges faced in the field.

3.1 Research Design

This study fell into the broad area of descriptive studies. Specifically the survey research approach was adopted within this broad area of descriptive studies. The descriptive design was adopted because it gives an accurate account of the characteristics of a particular phenomenon situation, community or persons (Bless and Achola, 1988). A descriptive study involves the systematic collection and presentation of data. The design basically facilitates the collection of data that provides a detailed description of the phenomenon, group or community as they naturally occur. The main objective of a descriptive study is to acquire knowledge of the phenomenon (Ghosh, 2002). To achieve the main objective, the study collected both qualitative and quantitative data. Quantitative data is data that is presented in numerical values and from which statistical inferences may be made. In this study only descriptive statistics were used. Qualitative data allows us to uncover the meaning of phenomena (Merriam and Simpson, 1995).

3.2 Study Population

A study population is an aggregate or totality of all subjects, objects or members that conform to a designated set of specification (Polit and Hungler, 1995). Five sets of population were identified as source of information in this study. The first study population comprised of the zone leaders. Zone leaders are the community leaders who represent the residents in a particular geographical demarcation called a zone. Ng’ombe compound is divided into 12 zones and each zone is represented by 10 leaders. The zone leaders are responsible for taking up issues affecting the residents to the ward development committee for solution and consideration. One of the issues the zone leaders are responsible for is waste management.

The second study population comprised of adult members of households of Ng’ombe compound. The adult members of households were defined as any adult aged 20 years and above who was capable of giving information on waste management. According to the Central statistics Office (2000), there were about 5,117 in Ng’ombe compound at the time of the study. The third population comprised of the solid waste management collectors who are members of the Community Based Enterprises (CBEs). These are responsible for collecting and disposing waste from households in the community. In Ng’ombe compound, there were two Community Based Enterprises namely; Kutwano and Tiyende Pamodzi.

The fourth study population comprised of the Environmental Health Technicians at Ng’ombe clinic. These are responsible for providing health education to the residents so as to keep the environment clean and prevent diseases. The fifth population was the Lusaka City Council Waste Management Unit staff. This is the population responsible for managing the waste and ensuring that potential polluters have in place systems and procedures to avoid or minimise pollution.

3.3 Sampling Procedure and Sample Size

The first sample of zone leaders was purposively sampled. Since the compound was divided into twelve zones at the time of the study, and each zone had 10 community leaders, out of the 120 community leaders, 24 were selected. This means that two leaders were selected from each zone. Among the 24 respondents, 12 were selected to participate in the focus group discussion and 12 were selected for individual interviews.

The second sample of 60 households out of the 5,117 was sampled using the cluster method. Since Ng'ombe compound is divided in two parts, the old and new, 30 households from old Ng'ombe and 30 from new Ng'ombe were selected and interviewed. Selection of the households to be interviewed was determined by two item criteria. The first criterion was to spread the selection of households so that all the zones of Ng'ombe could be covered. The second was not to interview more than two households in a cluster within a zone. In each zone, household were divided into clusters and participating respondents were drawn from these clusters. The guide was that not more than two households were selected within a selected cluster in a zone. This ensured a spread within the zones.

The third sample comprised of waste collectors. There was no sampling from this population. There were six waste collectors in Ngo'mbe compound at the time of the study; three from each Community Based Enterprise. All the six waste collectors from the two Community Based Enterprises (CBEs) were included. There was no sampling from the fourth population of Environmental Health Technicians. Both (two) environmental health technicians at Ngo'mbe clinic were interviewed. Similarly there was no sampling from the population of members of staff of Lusaka City Council Waste Management Unit (WMU). Both members of staff at Lusaka City Council Waste Management Unit were interviewed. All the members from the last three populations were selected because the numbers were too small to be sampled.

3.4 Data Collection Tools

The study used three types of data collection tools. It used a questionnaire, which was administered by the researcher to the respondents, interview guide to the environmental health technicians at Ng’ombe clinic, Lusaka City Council (LCC) Waste Management Unit (WMU) workers, Community Based Workers (CBEs) and community leaders. Focus group discussion was also used to gather information from the community leaders.

3.4.1 Questionnaire

The semi-structured questionnaire was administered to the adult members of households by the researcher. This was because it was presupposed that not all the respondents would be able to read and write. The researcher read all the questions one by one to the respondents. With this approach, it was easy to clarify any misunderstanding with the respondent regarding the meaning of the questions immediately. The questionnaire was used to collect standardised information from a large population of 60 people in this community. It also provided for 100 per cent retention of all the questionnaires and maximum utilisation of time. The questionnaire had both open ended and close ended questions. The open ended questions enabled the researcher to collect information on the knowledge, practices and attitudes of the residents towards waste management. These questions gave the researcher an opportunity to explore and clarify issues and collect qualitative data as well. The closed questions helped the researcher to collect quantitative data on identified issues.

3.4.2 Semi-Structured Interview Guide

Semi-structured interview guides were used for the Environmental Health Technicians at Ng’ombe clinic, Lusaka City Council (LCC) Waste Management Unit (WMU) staff, Community Based Enterprises (CBEs) workers and zone leaders. The unstructured part of this guide was suitable for the study because it provided in-depth information concerning the knowledge, practices and attitudes towards waste management as per the objectives of the study.

3.4.3 Focus Group Discussion

Focus group discussion was also used to obtain information from the zone leaders. Especially information on waste management education such as sorting waste, recycling and composting. The focus group discussion was used because of its group synergy characteristic which allows stimulation of ideas among respondents. The discussion was facilitated by the researcher and notes were taken. In addition a tape recorder was used to ensure accuracy of data recording. The advantage of focus group discussion is that it allows probing to obtain in-depth information.

3.4.4 Observation Guide

Observation specifically targeted waste management practices and a camera was used to capture the state of waste management practices being recycling, methods of disposal, storage of waste and methods of garbage collection.

3.5 Data Analysis

Data was analyzed quantitatively and qualitatively. The descriptive statistics were used to analyse quantitative data. All answered questionnaire items were organised, quantified, categorised and subjected to descriptive analysis. Quantitative information mainly from questionnaires was analyzed using totals and proportions and presented using pie charts and percentages. These were then summarised into frequencies and percentages with the help of the Statistical Package for Social Sciences (SPSS). This was then presented using graphic presentations in form of pie charts. The researchers transcribed all interview responses; categorised issues using subject themes and compared responses from the different groups or individual respondents.

3.6 Validity and Reliability

Validity and reliability of data was enhanced using the process of triangulation. This study used the triangulation of both methods of data collection and sources of data. The study used four data collection methods and five categories of sources of data. Triangulation increases reliability and validity. Validity further examines the extent to which the results of the study can be generalised to the real world (Bless and Achola,

1997). The questionnaire was pilot tested on five residents in the same area where the study was conducted to obtain validation data and ensure that any anomalies and ambiguous questions were corrected before the questionnaire was finally administered to the sampled population. Interview guides and focus group discussions did not require pilot testing since the modification of questions could be made during the time of study.

3.7 Ethical Consideration

A letter of introduction and request for support was submitted to Ngo'mbe Ward Development Committee chair person. This was done in recognition of their authority and to gain their support and cooperation during the study. The researcher introduced herself and the purpose of her study was explained to the respondents. In addition, verbal permission was sought from each participant who was selected in the sample and confidentiality was assured that no names would be indicated on the questionnaires. No resident was forced to give information when she or he was not willing to do so. Only two women refused to participate in the study and these were replaced with willing respondents. Only six men refused to participate and these two were replaced with the willing respondents.

3.8 Challenges Faced in the Field

The study was not without problems or difficulties. The researcher had difficulties in mobilising the community zone leaders for a focus group discussion. It took three solid weeks for the interview to take place. As a result of not finding the zone leaders at one place, the researcher followed the leaders in their homes to conduct individual interviews. The researcher only managed to conduct a focus group discussion when the zone leaders came for a meeting at the council offices within the community. Interviewing women in households was time consuming because whatever times the researcher went to conduct interviews; women were busy with the house chores. Each interview took about 45 minutes. Four residents (two women and two men) refused to answer questions because they had waste lying about their yards and took it that interviewing them was a way of reporting them to the council. One man also refused to participate because he believed that waste management is the responsibility of women. Some men were also difficult to

interview because they were drunk as early as 10.00hrs. Three male residents indicated that they could not give information unless they were given money to enable them buy beer.

CHAPTER FOUR

PRESENTATIONS OF FINDINGS

4.0 Introduction

The general objective was to assess the knowledge, attitude and practices towards waste management among the residents. The specific research questions which were used to answer the general research questions were as follows:

- (i) What are the knowledge levels of adult residents in Ng'ombe compound on waste management?
- (ii) What are the practices of adult residents in Ng'ombe compound regarding waste management?
- (iii) What are the attitudes of adult residents in Ng'ombe compound towards waste management?

To answer the above research questions the researcher used a semi- questionnaire, semi structured interview guide and a focus group discussion. A questionnaire was used to collect data from the residents aged from 20 years and above. The semi-interview guide was used to collect data from the zone community leaders from all the twelve zones in the compound because they are the overseers of the residents, the environmental health technicians at the health clinic because they are responsible for providing health education to the community and also the Waste Management Unit (WMU) staff at the Lusaka city council because they are the ones responsible for providing service for waste management in the city. The focus group discussion was used to collect data from the zone community leaders so as to have in-depth information.

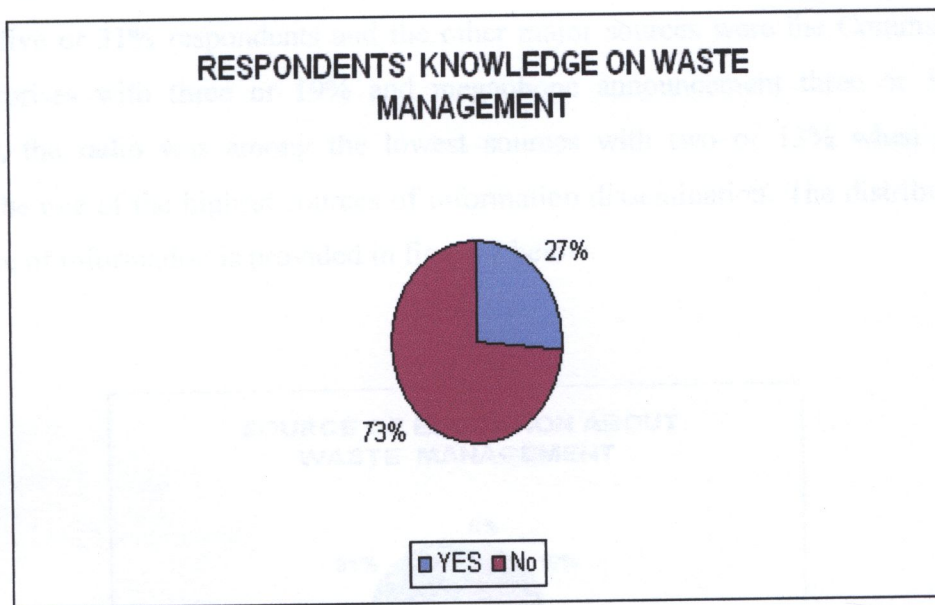
4.1 Respondents' Knowledge about Waste Management

The respondent' knowledge about waste management was assessed on the following: Knowledge of waste description and generation; dangers of waste; knowledge about recycling waste; knowledge about composting waste; knowledge about sorting or separating; and minimisation of waste generation.

4.1.1 Overview of Respondents' Knowledge on Waste Management

The findings from the questionnaire revealed that the majority 44 or 73% of 60 respondents had not received any education about waste management. Only 16 or 27% had received a form of education on waste management. The distribution of the respondents who received education and those who did not is provided in figure 1 below.

Figure:1



Similar to the 44 or 73% above who indicated that had not received any education, findings from the focus group discussion with the community leaders revealed that residents do not receive any education on how to manage waste. No organisation has ever gone to educate the residents on how to manage the waste. The only education that the residents received was about storing their waste in the sacks so that the Community Based Enterprises (CBEs) could come and dispose off waste after paying a fee. The respondents also revealed that the only mode of educating the residents was through the megaphones by the council workers and usually this was done towards the rainy season to sensitise the residents on prevention of cholera.

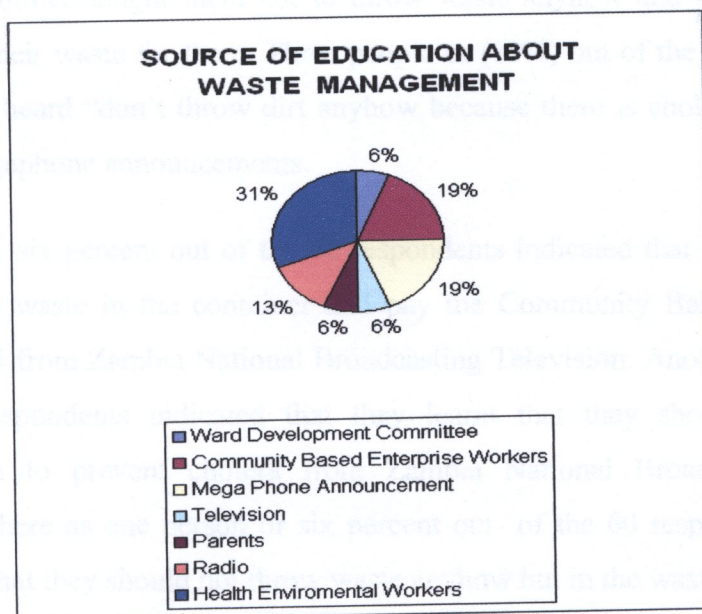
Findings from the health environmental technicians also revealed that they did not educate the community specifically on how to manage waste. They educated the

community on general hygiene such as sweeping the surroundings, washing hands after using the toilets, covering the food and boiling water for drinking.

Sources of Knowledge about Waste Management

The respondents were further asked to indicate their sources of knowledge. The findings from the questionnaire also revealed that 16 or 27% of the 60 respondents received their knowledge from different sources. The main source of knowledge was the environmental health with five or 31% respondents and the other major sources were the Community Based Enterprises with three or 19% and megaphone announcement three or 19%. Surprisingly, the radio was among the lowest sources with two or 13% when it is expected to be one of the highest sources of information dissemination. The distribution for the source of information is provided in figure 2 below.

Figure 2:



With regard to what the respondents learnt concerning waste management from their sources of information, the findings of the study indicated that :

Out of a total of the 60 respondents, 19% or three people were taught by the Community Based Enterprises (CBEs), not to mix waste with soil and stones because the bags become heavy when disposing waste. They were also taught that they should pay for the service so that their waste is disposed off. Where as five people or 31% of the 60 respondents indicated that health workers taught them about keeping their surroundings clean and boil water for drinking to avoid diarrheal diseases such as cholera. Respondents also indicated that it was only in rainy season when they saw health staff sensitising the community on prevention of cholera.

Only one person or six percent out of the 60 respondents indicated that the Ward Development Committee taught them not to throw waste anyhow and that should pay people to dispose their waste for them. Three people or (19%) out of the 60 respondents indicated that they heard “don’t throw dirt anyhow because there is cholera outbreak in the city”, from Megaphone announcements.

Only one person or six percent out of the 60 respondents indicated that they learnt that one has to dispose waste in the container and pay the Community Based Enterprises (CBEs) for disposal from Zambia National Broadcasting Television. Another two people or 13% of the respondents indicated that they learnt that they should keep their surroundings clean to prevent cholera from Zambia National Broadcasting Radio announcements. Where as one person or six percent out of the 60 respondents learnt from their parents that they should not throw waste anyhow but in the waste pit.

Similar to the above, the findings from the interviews with the Community Based Enterprises (CBEs) workers revealed that they only taught the residents to store their waste in the 25kg used mealie-meal bags and not to mix waste with soil and stones for it becomes heavy for them to lift as they are disposing off the waste.

The findings from the interview with the health environmental technician revealed that residents were only educated on how to prevent diseases in their homes by keeping their surroundings clean.

Findings from the interviews with the Lusaka city council (LCC) Waste Management Unit staff revealed that they have given the responsibility for educating the residents to the Community Based Enterprises (CBEs). However, they indicated that they also provided information on waste management through television and radio.

4.1.2 Knowledge of Waste Description and Waste Generation

The findings regarding knowledge of waste description and generation were that the respondents defined waste differently. Among the 60 respondents, some defined waste as dirt, papers, leaves, plastics, and others as anything which doesn't look good and anything which have no use or cannot be used again. On the generation of waste, respondents said that waste is generated in their homes, some indicated that waste starts from *nshima* left over, leaves from trees in dry season, from plastics in which they buy food stuffs from the market, others said it is the wind which blows the waste from the roads to their homes and at times it is the children who picks disposable bottles from the roads and use them as toys and some said it is the carelessness of the people who just throw waste any how especially at the market. They also indicated that waste is generated from where beer is sold in paper packs and bottles, these packs are sometimes used for waste matter disposal.

4.1.3 Knowledge about Dangers of Waste in the Surrounding

The findings revealed that all the respondents 60 or 100% knew about the dangers of having waste in their surroundings. The respondents indicated that a dirty environment causes diseases such as cholera, dysentery, diarrhoea, malaria, hookworms and tuberculosis. However, those who indicated that waste causes malaria and tuberculosis could not provide the technical information on how malaria and tuberculosis come about as a result of poor waste management. Table 1 (page 36) shows responses from residents about what they knew about diseases linked to waste.

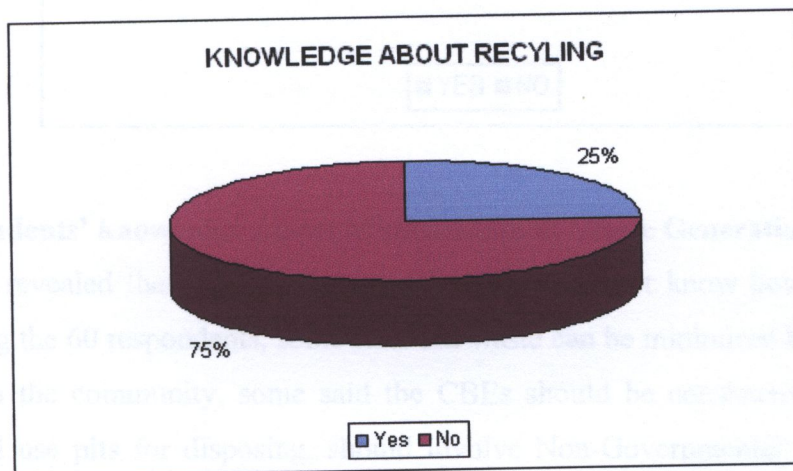
Table 1: Respondents' Knowledge about Diseases and Link to Waste.

COMMON DISEASES	RESPONDENT LINK TO WASTE
Cholera	When flies sit on the food they leave germs which causes cholera.
Dysentery	Flies sit on the food and cause dysentery
Typhoid	Flies sit on the food and cause typhoid
Diarrhoea	Flies sit on the food and cause diarrhoea
Hookworms	Children playing in dirt water during rainy season.
Tuberculosis and coughs	Due to bad smells from the waste

4.1.4 Respondents' Knowledge about Recycling Waste

The findings revealed that the majority of the respondents did not know any company which recycles waste. Out of the 60 respondents, 45 or 75% said they did not know any company which recycles waste and 15 or 25% few said they had heard about a recycling company but they don't know where the company was. The distribution for knowledge and recycling is shown in figure 3 below.

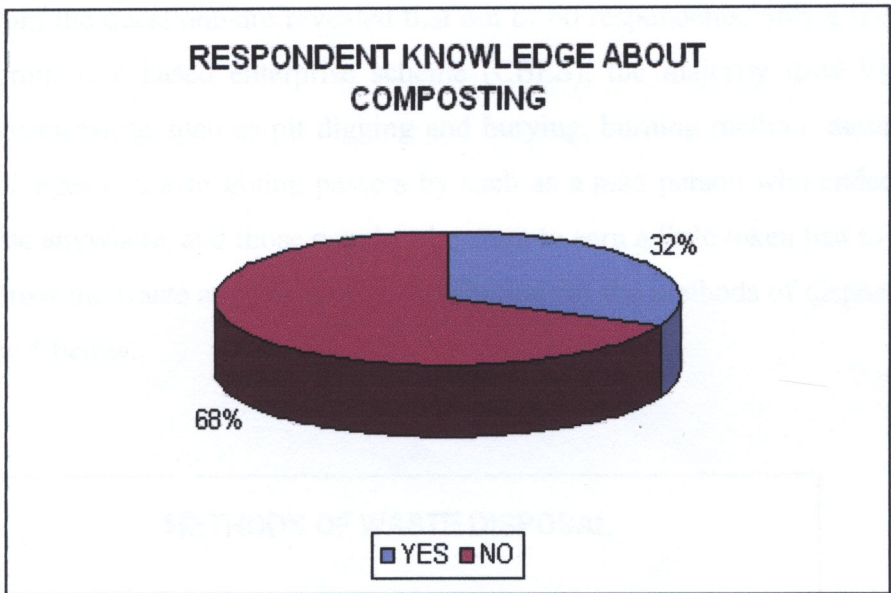
Figure 3:



4.1.5 Respondents’ Knowledge about Composting as a Form of Recycling

The findings revealed that out of the 60 respondents, the majority 41 or 68% did not know how to make compost manure but had heard about it. The few 19 or 32% who said they knew how to make compost manure explained it wrongly as piling of waste together, pouring water on it and leave it to decompose for few days and later use in the garden. Some could not even explain how the manure is made. The distribution of knowledge about composting is provided in figure 4 below.

Figure 4:



4.1.6 Respondents’ knowledge About Minimisation of Waste Generation

The findings revealed that the respondents 60 (100%) did not know how to minimise waste. Among the 60 respondents, some said that waste can be minimised by providing a lot of bins in the community, some said the CBEs should be consistent in collecting waste, should use pits for disposing, should involve Non-Governmental Organisations (NGO) to collect waste and dispose of, store waste in the sacks, we should stop throwing waste on the roads, council should provide transport instead of using human pushed carts,

government should educate women on hygiene, and still others mentioned encouraging burning the waste.

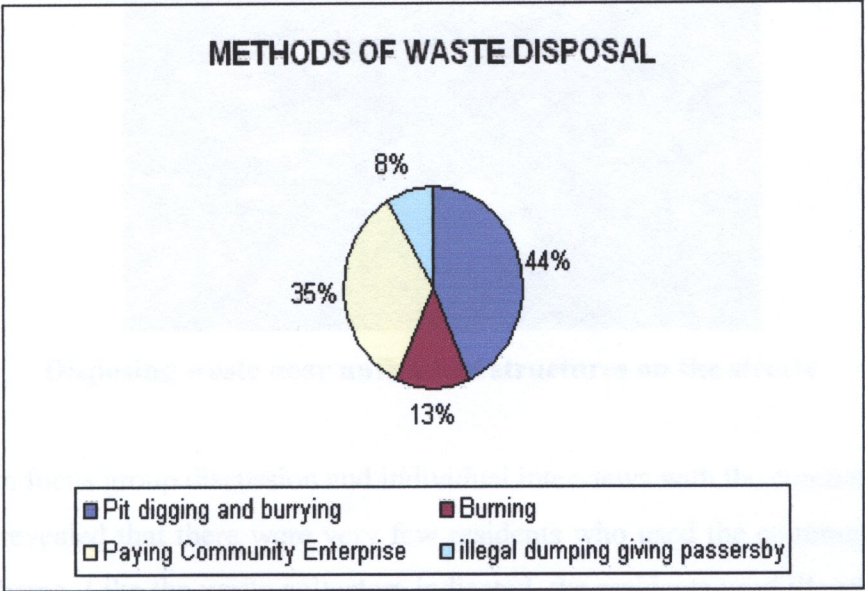
4. 2 Respondents’ Practices Regarding Waste Management

In this study practice has been defined as participation in the management of the waste using different methods by the respondents. The assessment regarding practices included aspects of: methods of waste disposal; minimisation, recycling, composting, sorting or separating and waste collection.

4.2.1 Respondents’ Methods of Waste Disposal

The responses from the questionnaire revealed that out of 60 respondents, only a few 21 or 35% used community based enterprise scheme (CBES), the majority used illegal methods of disposing waste such as pit digging and burying, burning method, dumping on roads and drainages and also giving passers by such as a mad person who ended up throwing the waste anywhere, and those people who want to earn a little token just to buy food who also throw the waste anywhere. The distribution for the methods of disposal is provided in figure 5 below.

Figure5:



Findings from interviews with the waste collectors (Community Based Enterprises) workers similarly revealed that most of the residents do not use the community based enterprises to dispose their waste. The waste collectors revealed that at the time of the study out of 1000 residents only 85 residents were using the service. Most of the residents used illegal dumping; they dispose their waste on the roads, drainages and residents who engaged cash-desperate people and a mad person who threw the waste anywhere. Some residents disposed their waste in the unfinished structures such as semi-finished houses; others disposed their waste in the nearby stream at the end of the compound. Moreover, some in the habit of pit digging and burying waste, burning waste at night, packing waste in 25kg bags and threw them at the end of the compound at night when no one could see them. Some residents got waste from their homes and disposed it near other residents' homes. Others still just heaped their waste on the road near their homes.

Figure6:



Disposing waste near unfinished structures on the streets.

Findings from focus group discussion and individual interviews with the community zone leaders also revealed that there were very few residents who used the community based enterprise scheme. Like the waste collectors indicated, the residents used illegal methods of disposing waste, they revealed that some residents used the services of a mad person to

dispose their waste and also passers by who go round asking for piece rate at a very low cost. The community leaders also said that the majority also threw their waste anyhow, in the drainages, under bridges, on streets and at the nearby stream at the end of the compound. Illegal dumping was done at night when people were asleep around 01 and 02 hours. Some threw waste near the containers at night since the containers were always locked and were only open to the residents who had receipts from the Community Based Enterprises (CBEs) which allowed them to dispose their waste. Some residents dug pits within their yards and when the pits were full they buried those pits and dug other pits. Some residents heaped and burnt waste especially early in the morning and at night when other residents were asleep. Figure 7 below depicts the way residents of Ng’ombe dispose the waste on the roads.

Figure7:



Garbage disposed on the streets of Ng’ombe compound.

Respondents’ Reason for the Choice of Method of Waste Disposal

The findings from the questionnaire also revealed that respondents used different methods of waste disposal due to different reasons. The reasons which were given for the choice of the method of waste disposal are shown in Table 2 (page 41).

Table 2: Respondents' Reason for the Method of Waste Disposal

METHOD OF DISPOSAL	REASON FOR CHOICE OF METHOD
Pit digging and burying	<ul style="list-style-type: none"> -Have enough space in their yard to dig a pit. -Can't afford paying the Community Based Enterprises and moreover the CBES were not consistent in collecting the waste. -Don't have anywhere to dispose their waste. It is better than throwing waste anyhow.
Burning	<ul style="list-style-type: none"> -It is the best since it kills the germs and prevents the waste like papers being blown about by the air. -Burning method was that it prevents accumulation of waste which brings bad smell and at the end brings about diseases caused by flies. -Don't have space for digging a pit in their yard.
Paying Community Based Enterprises (CBEs)	<ul style="list-style-type: none"> -For those who used the CBEs the reasons were that they find it convenient though the Community Based enterprise (CBEs) though it is not consistent in providing the service. - No space for digging a pit -Because CBEs have containers to dispose of waste.
Paying passer by (piece rate workers) a small amount or giving a mad person.	<ul style="list-style-type: none"> -Because passers by (peace rate seekers) are cheaper than Community Based Enterprises (CBEs). - passers by are strong enough to go and throw the waste at end of the compound -For a mad person, no one can punish him even when he dumps waste on the road or drainage.

4.2.2 Recycling of Waste and Composting

Findings further revealed that 60 or 100% of the respondents took drinks in disposable bottles. When asked how they disposed these bottles, some indicated that they gave bottles to their children to use as toys; some indicated that they used bottles for making fire for cooking food; and few said they just threw them anyhow especially when they

were walking along the roads, but when they were at home they disposed bottles together with other waste. For old clothes and shoes they just burnt them. For cooking oil containers most respondents used them for storing and drawing water, some exchanged them for sweeping brooms, others sold them to people who use the containers for serving in *chibuku* beer in bars to customers.

Focus group discussion and interviews with the zone community leaders also revealed that residents did not do any recycling of waste. All the community leaders indicated that they had never come across any resident making compost manure in their zones. The only recycling which took place once in a while but unhygienic and a health hazard was that of some people who picked empty disposable *manzi* bottles at a function, refilled them with water straight from the tap for reselling. The other recycling was that of exchanging finished cooking oil container for sweeping brooms.

Similarly, findings from the interviews with the Community Based Enterprises (CBEs) workers revealed that residents did not recycle any waste apart from exchanging finished cooking oil containers with sweeping brooms.

Figure 8:



Ng’ombe resident exchanging grass sweeping brooms for empty cooking oil containers.

Composting is another way of recycling waste. The findings from the questionnaire revealed that all respondents 60 or 100% did not practice any form of composting. Similarly, findings from focus group discussion and interviews with the community leaders also revealed that the residents did not practice any composting.

4.2.3 Sorting or Segregation of Various Types of Waste

Findings from the questionnaire responses revealed that 60 or 100% of the respondents did not sort or segregate waste before disposal. For those who used the Community Based Enterprises (CBEs) they did not separate the waste or rather sort but just mixed all the types of waste in the used 25kg mealie-meal bags upon awaiting collection. For those who used pits, they also just threw all types of waste in the pit. Similarly, even those who used burning method they just burnt everything together. However, some indicated that whenever they came across a broken bottle, they threw it in the pit latrine immediately.

Figure 9 below depicts the way residents store the waste before disposal.

Figure 9:



Residents mix various types of waste in a 25kg bag.

Similarly, the responses from the Community Based Enterprises (CBEs) waste collectors revealed that residents did not sort the waste. They mixed sand, leaves, broken bottles

and stones. Some residents even used plastic papers and shake-shake papers to defecate and dispose human waste together with other types of waste. Furthermore, few residents used plastic bags to answer their call of nature and. The CBEs also indicated that there were incidents when they found dead foetus as they disposed off waste.

4.2.4 Waste Collection

In Ng'ombe compound, waste is collected by the Community Based Enterprises using human-pushed cart once per week from residents who pay for the scheme. Human-pushed cart is used because the CBEs cannot afford a vehicle. All the waste collected by the CBEs is transferred to the container within the compound. These containers are only accessed by the CBEs because these pay to council a fee of K200,000 whenever the container was full for secondary disposal. Figure 10 below depicts the way Community Based Enterprises collect the waste in Ng'ombe compound.

Figure10:



Tiyende Pamodzi Enterprise collecting waste using human pushed cart.

4.3 Attitudes towards Waste Management

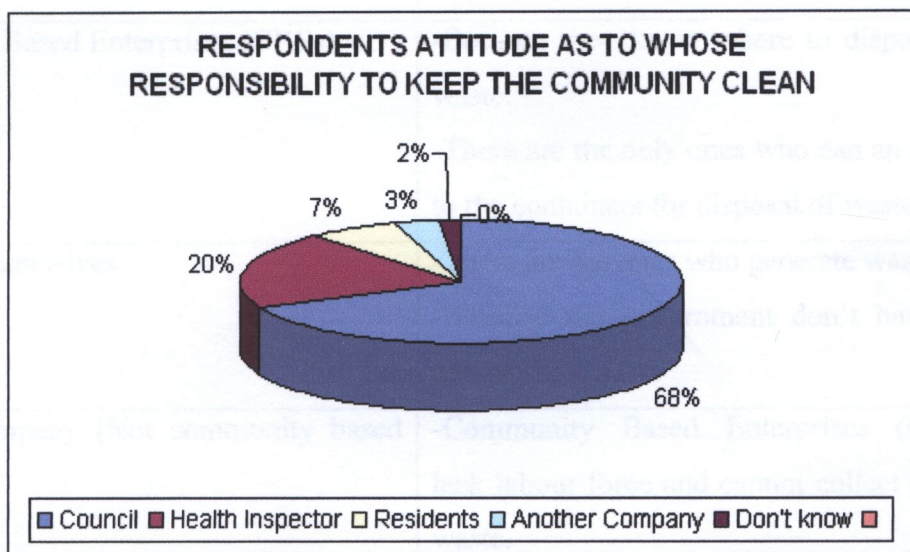
The word attitude in this study has been defined as a feeling towards waste management either negative or positive. Negative attitude can hinder waste management and positive can enhance waste management. Assessment of the attitude towards waste management

included the following: attitudes towards deciding whose responsibility should it be to keep the community clean; attitudes towards which method of disposal should be used; and attitudes towards employing people to manage the waste.

4.3.1 Attitudes towards Deciding Whose Responsibility it should be to Manage Waste

The responses from the questionnaire revealed that negative attitude can hinder good waste management. Out of the 60 respondents, the majority 41 or 68% felt that it is the responsibility of the council to keep the community clean, others 12 or 20% were of the opinion that it was the responsibility of the health inspectors, others 4 or 7% said it was the residents themselves and one or two percent didn't know as to whose responsibility to keep the community clean. The distribution of the attitude towards responsibility for keeping the community clean is provided in Figure 11 below.

Figure 11:



4.3.2 Reasons of who should be Responsible for keeping the Community Clean

The findings from the questionnaire also revealed that respondents had different reasons as to whose responsibility it should be for keeping the community clean. The reasons which were given as to whose responsibility should it be to keep the community clean are shown in Table 3 on page 46.

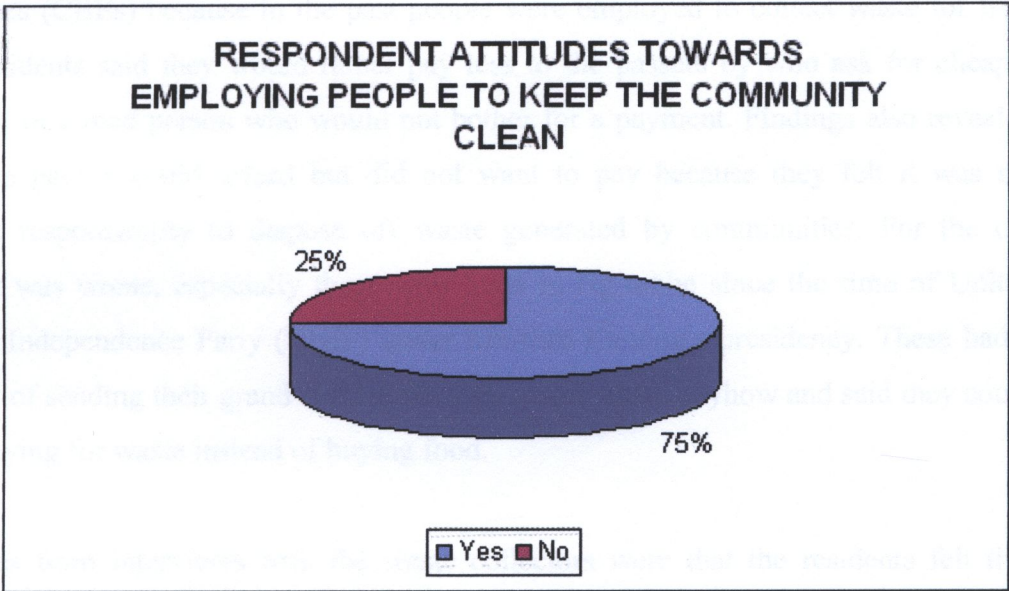
Table 3: Whose Responsibility should it be to keep the Community Clean?

WHO SHOULD BE RESPONSIBLE	RESPONDENT REASON
Council	<ul style="list-style-type: none">-Because has enough financial resources which they collect as ground rates and can manage to clean the community.-Because in Kaunda leadership council collected garbage for free of charge.-It is the council's job to keep the community clean and all along it has been doing that.
Health personnel	<ul style="list-style-type: none">-Because they are the ones responsible for the health of the people.-Because they educate the community how to prevent disease and treat drinking water.
Community Based Enterprises (CBEs)	<ul style="list-style-type: none">-Because they know where to dispose the waste.-There are the only ones who can an access to the containers for disposal of waste.
Residents themselves	<ul style="list-style-type: none">-There are the ones who generate waste-Because the government don't have the resources.
Another company (Not community based enterprise)	<ul style="list-style-type: none">-Community Based Enterprises (CBEs) lack labour force and cannot collect all the waste.-CBEs not consistent in collection of waste, months elapse without collecting the waste.-CBEs have no transport, hence, use human-pushed carts.

4.3.3 Respondents' Attitudes towards Employing People to keep Community Clean

With regard to if people should be employed to keep the community clean, the findings from the questionnaire revealed that out of the 60 respondents, the majority 45 or 75% said people should be employed to keep the community clean and others 15 or 25% said people shouldn't be employed to keep the community clean. The distribution of the attitude towards employing people to keep the community clean is shown in figure 12 below.

Figure 12:



The findings from the questionnaire also revealed that respondents had different reasons for suggesting that people should be employed for cleaning the community. For the 75% or 45 in figure 11 above the reasons were that:

- Because the residents would stop dumping waste on the roads and drainages since the people employed for the job would catch them and take them to the law enforcers.
- People employed for cleaning would put all the effort to keep the community clean because they would be paid for the job.

- Employing people to clean the community is ideal because it would serve as a source of employment in the community characterised by high levels of unemployment.
- Because in the past Kaunda's leadership, people were employed to clean the community and we never had accumulation of waste as it is the case now.
- Community would be very clean and experience less cholera outbreaks.

Similarly, findings from focus group discussion and individual interviews with the community leaders revealed that residents did not want to pay to the Community Based Enterprises (CBEs) because in the past people were employed to collect waste for free. Some residents said they would rather pay less to the passers by who ask for cheaper piece rate or a mad person who would not bother for a payment. Findings also revealed that some people could afford but did not want to pay because they felt it was the council's responsibility to dispose off waste generated by communities. For the old people it was worse, especially those who lived in Ng'ombe since the time of United National Independence Party (UNIP) under Kenneth Kaunda's presidency. These had a tendency of sending their grand children to dispose off waste anyhow and said they could not be paying for waste instead of buying food.

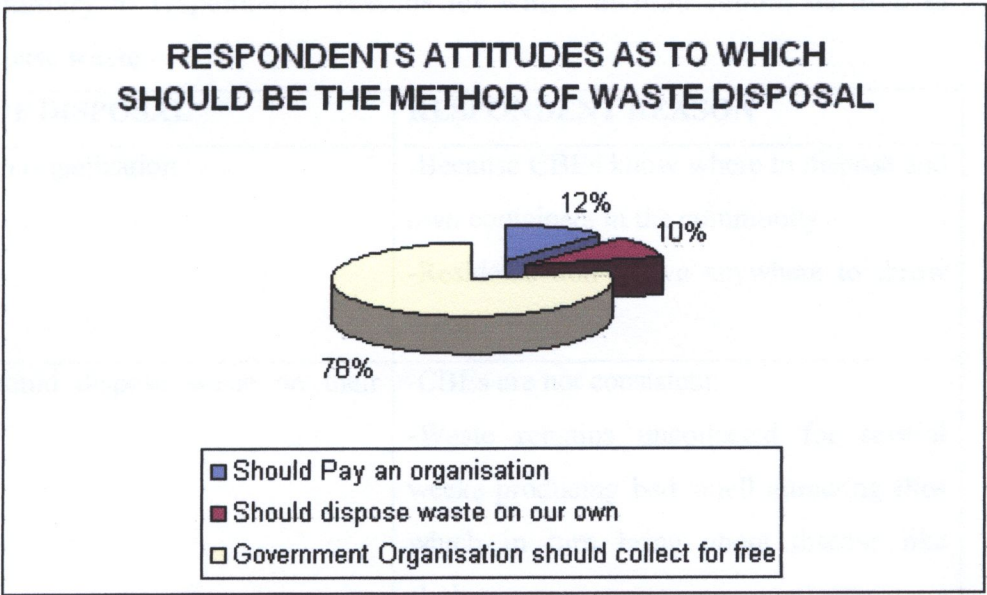
Responses from interviews with the waste collectors were that the residents felt that government should provide free services for waste collection since they could not afford. The workers said many residents were for the idea that the old system where the council employed people to clean and dispose off waste in communities for free should resume.

4.3.4 Respondents' Attitudes towards Methods of Waste Disposal

With regards to which method should be used to dispose waste, responses from the questionnaire revealed that out of the 60 respondents, the majority 47 or 78% indicated that the waste disposal should be done by the government organisation and it should be for free. Ten per cent or six indicated that the community should dispose their own waste while seven or 12% indicated that residents should pay a private organisation to dispose

their waste. The distribution of the attitude and the method of disposal are shown in Figure 13 page 49.

Figure 13:



The findings from the questionnaire also revealed that respondents had different reasons as to which should be the method of waste disposal in their community. The reasons which were are shown in Table 4 on page 50.

Table 4: Summary of respondents’ reasons for which method should be used to dispose waste

METHOD OF DISPOSAL	RESPONDENT REASON
Should pay an organization	<p>-Because CBEs know where to dispose and own containers in the community.</p> <p>-Residents don’t have anywhere to throw waste.</p>
Residents should dispose waste on their own	<p>-CBEs are not consistent.</p> <p>-Waste remains uncollected for several weeks producing bad smell attracting flies which in turn bring about disease like cholera.</p> <p>-CBEs lack labour force; hence, it is difficult for them to collect waste weekly.</p> <p>-It is better to pay the piece workers because they charge less.</p> <p>-Can pay a mad person who accepts any amount of money, can dispose anywhere and no one can punish him.</p>
Government organisation should collect for free	<p>-Cannot afford paying for garbage instead of buying food.</p> <p>-In Kaunda’s government garbage collection was for free.</p> <p>-It is expensive because even water is not free of charge.</p>

4.4 SUMMARY OF THE MAJOR STUDY FINDINGS

The major finding on knowledge was that the respondents lacked knowledge on how to manage waste. Respondents generally didn’t know how to handle waste even though they were aware of the dangers. Respondents specifically lacked knowledge on how to

minimise, sort or segregate how to make compost manure and recycle waste. The majority also didn't know any recycling company in the city of Lusaka.

Major findings on the attitudes of the respondents towards waste management were that respondents had negative attitudes towards waste management. Residents felt that it was the responsibility of the Lusaka city council to collect and dispose waste generated by the residents. Further, residents were of the view that the collection of waste should be for free because they could not afford paying for waste and at the same time buy food, buy water (since they did not have taps at their houses), pay school fees and buy school uniforms for their children. They also indicated that in the days of the United National Independence Party (UNIP) government under Kaunda's leadership, garbage collection was for free and people were employed and paid by the council for the job. Poverty was a contributing factor for the negative attitudes towards waste management by the residents. Residents did not want to pay the CBEs for waste disposal but would rather pay a small amount to the passers by or a mad person who doesn't charge anything.

Concerning waste management practices, the major findings were that respondents used illegal methods of waste disposal such as dumping waste on the roads, drainages and near unfinished buildings and also burning waste. Another major finding was that the respondents were not separating or sorting, composting and recycling waste. The other major finding was that some respondents were practicing a health hazard and illegal type of recycling, that of reselling water direct from the taps in already used maazi bottles. Another form of recycling being practiced is the batter type of recycling, where residents exchange sweeping brooms with empty plastic container and latter sell to the marketers and bar owners.

CHAPTER 5

DISCUSSION OF THE FINDINGS

5.0 Introduction

This chapter discusses the findings from the assessment of knowledge, practices and attitudes towards waste management among the residents. Some findings will be backed with literature reviewed.

5.1 Issues Arising from Findings on Knowledge

Major discussion point regarding knowledge was lack of knowledge on waste management among respondents; specifically regarding waste minimisation, sorting, recycling, composting and general handling of waste.

The finding of the study that majority of the respondents lacked knowledge on minimisation, sorting, recycling and composting is similar to Jurzack's finding. Jurzack (1997) indicated that the public in Poland were not sorting and recycling waste because they lacked knowledge of how to manage waste. Knowledge about waste minimisation enables the generator of waste to undertake activities that reduce any source of waste either by recycling or composting and sorting waste from non-waste. Yamba (2004) has shed more light on the importance of waste minimisation. Yamba indicated that if waste generation is minimised in the first place, few resources would be allocated for its management. Residents' knowledge about waste minimization is therefore critical. Promotion of educational programmes on waste minimisation at household level could help to solve the problem. For example advising the residents to use baskets to carry items from the shops and not using plastic bags.

Lack of knowledge about waste recycling by the respondents in this study was another major point of discussion. Recycling involves reprocessing waste materials which were destined for disposal into a new product. Knowledge about recycling involves identification of recyclable items which can be reused for a different purpose instead of disposing them as waste. If the respondents are knowledgeable about recycling, the

implication is that waste entering the waste stream would be reduced. Introducing educational programmes on how to recycle waste by the relevant organisations such as the Waste Management Unit (WMU) could improve the respondents' knowledge on how to recycle waste. Increasing the respondents' awareness of the recycling companies in Lusaka could also help to mitigate the problem. For example, in Lusaka there is a company for recycling metal materials known as Trade Kings Company in the industrial area but it was not known by all the respondents in this study.

In this study respondents lacked knowledge about composting. The fact that the respondents were unable to explain how compost manure is made, was a clear indication that they do not have the knowledge. Even those who claimed that they knew how to make compost manure explained it wrongly. Residents are supposed to be empowered with knowledge on how to make compost manure because compost manure can be used in agriculture especially that the prices of fertiliser are unaffordable for an ordinary Zambian. Even when the government subsidises agriculture input, it caters only for a few citizens. Therefore, it is imperative that residents are knowledgeable about composting. Moreover, Zambia is high in organic waste and composting would reduce waste accumulation which is left uncontrolled in many parts of the Lusaka city. For example, at Chunga landfill in Lusaka there are volumes of organic waste which can be composted into fertilisers to use in the agriculture sector.

Respondents lacked knowledge on how to sort waste from organic and non organic. This is not a rare finding. In Lusaka whether one lives in a low density area or compound, residents do not know how to sort waste according to categories. Lacking knowledge on how to sort or separate waste is health hazard to the waste collectors and residents as well especially where one disposes a broken bottle with the other waste. Knowledge about sorting waste is critical in waste management because it is the starting point for waste reduction in the environment. Knowledge about sorting waste enables identification of recyclable items and also helps to recover reusable items. Therefore, it is essential that residents are educated on how to sort various types of waste. In Egypt, knowledge about

sorting has helped the residents in producing quality end products. This is because sorting prevents contamination of non organic waste by organic waste.

There were four major reasons why the public lacked knowledge in the management of waste. The first reason was lack of educational programmes and subject matter, second one was lack of qualified trainers in waste management, third reason was lack of appropriate educational methods and the fourth reason was lack of coordinating unit or administration structure for educational programmes which led to inadequate communication channels.

Lack of educational programmes and subject matter on waste management in this study, was one of the reasons why respondents lacked knowledge on specifically how to minimise, sort, recycle and compost waste and generally how to handle waste properly even though were aware of the dangers of waste. The Lusaka City Council (LCC) Waste Management Unit in Zambia unlike United States of America has no deliberate designed waste management educational programmes. The content of what the residents should learn is not defined. Currently the type of education which is there is the periodical type of education by the health sector on general personal hygiene and prevention of diseases done in rain season. Similarly Palczynski (2002) indicated that most of the African countries do not have educational programmes on waste management. Palczynski also indicated that the Environmental Council of Zambia (ECZ) through the health sector promotes periodic public information campaigns on the safe handling of solid waste when there outbreaks of diseases.

The second reason for lack of knowledge among the respondents on waste management in this study was lack of qualified trainers in waste management. The Lusaka City Council (LCC) Waste Management Unit had no qualified trainers in waste management. Currently the Waste Management Unit has given the responsibility of educating the residents in the peri-urban areas to the Community Based Enterprises (Lusaka City Council, 2004). However, the Community Based Enterprises (CBEs) did not have any form of training in waste management at the time of the study. Even as the CBEs try to educate the residents, their emphasis is on paying for their service. This in turn affects the

knowledge of the respondents. For example, 27% of the respondents (see figure 1) who indicated they had received education on waste management misinterpreted it as cleaning and paying for the service to CBEs. Waste management ideally is defined by Moller (1996) as integrated systems for management of wastes, including waste reduction, sorting, recycling, collection and transport, energy recovery, treatment and disposal. Going by the definition of waste management it was clear that the CBEs were not qualified to educate the residents. CBEs were more emphatic on marketing their service for economic purpose and not imparting knowledge on waste management to the respondents because they were not qualified.

Lack of appropriate methods of disseminating information on waste management in this study was the third major reason for lack of knowledge among the respondents on waste management. The Lusaka City Council (LCC) Waste Management Unit at the time of the study used megaphone announcement and television scripts to educate the public on how to manage waste. These methods are useful for sensitisation and not educating the public. There is a distinction between sensitisation and education. Education according to UNESCO (1976) is an organised and sustained communication process designed to bring about learning. Where as sensitisation according to Hornby (2007) is making aware of the public about something especially a problem or something bad. The definition of education by UNESCO confirms the fact that megaphone announcement and television are not appropriate methods for educating the residents on how to manage waste.

In addition to the above, megaphone announcement and television are not appropriate methods for educating the respondents because they are more emphatic on only one aspect of waste management being disposal. Disposal is the last aspect of the ideal waste management hierarchy. According to Urio (2004) the ideal hierarchy of waste management includes waste minimisation, sorting and storage, reusing, recycling or composting, collection and disposal. The disadvantage of educating the public of how to manage waste at the last level is that there can be no minimisation of waste. Megaphone announcement and television are also not appropriate because the methods lack monitoring and evaluation of the knowledge. The methods also do not give feedback of

what the residents know and don't know about waste management. Megaphone announcement by the Lusaka city council (LCC) was second highest cited as source of education on waste management by the respondents (see figure 2) in this study. This also confirms why there was lack of knowledge about waste management among respondents.

The fourth major reason why there was lack of knowledge among respondents on waste management was lack of coordinating unit or administrative structure for waste management educational programmes which led to inadequate communication channels. The communication channel between the Government and the Waste Management Unit are weak and also between the CBEs and the Waste Management Unit. This in turn affects the knowledge levels of CBEs who are supposed to educate the community. Similarly WHO (2000) and Yamba (2004) observed that the inefficiency and inadequate education and communication channels between the government have been the major contributory factor to poor waste management in many African countries. Currently there is no administrative structure that define who the trainers are and their qualifications, one which define the categories of learner and their learning environments, venues where the learning activity should take place and who organises the learners for a learning activity. There is no administrative structure that defines the content of learning and that develop monitoring and evaluation strategies. It is for these reasons why the CBEs are unable to provide a holistic waste management education to the residents. In order to provide a holistic waste management education in Zambia, establishing coordinating unit in waste management education is critical.

In this study, parents were also indicated as a source of information for waste management. This was an interesting finding in that parents who are not teachers were providing education on waste management. However, it is a clear indication as to why respondents lacked knowledge on waste management and also an indication that no one went to educate this segment of community on how to manage waste. Parents are not experts, therefore, can only address one aspect of waste management, waste disposal in this case. It was also surprising that the radio was among the least source of information when it is believed to be the most appropriate mode in terms of information

when it is believed to be the most appropriate mode in terms of information dissemination because it reaches a large number of people. This is an indication that waste management education is not marketed on the radio. This can be explained as an administrative problem. The Lusaka City Council has not defined the methods of information dissemination on waste management.

5.2 Issues Arising from Findings on Practices

Major discussion points regarding waste management practices among the respondents were poor methods of waste disposal which included burning, pit digging and barring, dumping on the roads, drainages and nearby unfinished buildings and also giving the mad person to dispose. Respondents were not practicing sorting, recycling and composting. Waste collection was poorly done.

Despite the dangers of using burning as a method of waste disposal in this study, the majority of the respondents were still using the same method. Very few residents used Community Based Enterprise (CBE) scheme for waste disposal. Burning method of waste disposal is a health hazard in that it pollutes the air. According to Lvovsky (2000), projections indicate that about 3.5 million people will die prematurely each year over the next 20 years as a result of indoor and outdoor air pollution. Lvovsky also indicated that in Sub-Saharan Africa and South Asia (excluding India) most of these deaths will be as a result of air pollution. Respondents' practice of burning as a method of waste disposal can be explained by the economic context that six million people, equivalent to two thirds of Zambian population, are living below the poverty line (Seshaamani, 2000). Paying the CBEs for waste disposal would not be seen as important by the residents in this category of the economic status. This problem could be solved by using cross-subsidies to service low-income areas. Cross-subsidies from levies obtained from commercial or higher income households could be used.

Dumping of waste in the drainages, road sides, nearby unfinished buildings and also giving the mad person to dispose was another improper method of waste disposal which was commonly used by the residents in this study. This finding concurs with Yamba's

undesigned areas such as roads and drainages. Dumping waste in undesigned places is also a health hazard practice for it brings about diseases such as cholera and malaria. Blockage of drainages due to waste bring about stagnant water which becomes a favorable area for mosquito breeding. Waste disposed on the roads attracts flies which in turn contaminates food and water causing diarrheal diseases such as cholera and dysentery. For example outbreaks of cholera every rain season in Lusaka, Kanyama compound has been attributed to indiscriminate disposal of waste. According to the Ministry of Health Ministerial Statement submitted for the parliamentary debate of Tuesday 20th January 2009, Lusaka alone has accounted for 44% cholera cases out of the nine provinces from 3rd October 2008 to 19th January 2009 and all these cases were from compounds. Indiscriminate waste disposal by the respondents can be interpreted as an attitudinal problem. Some respondents had I don't care attitudes towards waste disposal even when all them were aware of the dangers of improper waste disposal methods. Strict law enforcement by law enforcers such as the council police concerning illegal dumping could mitigate the problem.

The other poor method of waste disposal which was used by the respondents in this study was pit digging. Pit digging has disadvantages. One such disadvantage is that if dug near the well it contaminates the water as the waste sinks under ground. Another disadvantage of pit digging is that it brings about cross infection through the flies which sit on the waste and later on the food. Additionally waste from the pit is easily blown by the air leading to accumulation in the drainages and roads. Educating the residents by the relevant authorities such as the health inspectors on the dangers of pit digging would help solve the problem.

According to WHO (2000) in Zambia poor methods of waste disposal are the major causes of diseases. Because of these poor methods of disposal it has led to serious accumulation of waste in the city which is left uncontrolled. This is not a rare finding. Wherever there are poor waste disposal methods world-wide, there are problems of disease outbreaks and waste accumulation. Zimbabwe is one such example and people

have died and are still sick of cholera. India is not an exception; actually history has it that the cholera outbreak started in India due to poor sanitation (Parry, 1979).

The second major discussion point regarding waste management practices among the respondents was that they were not practicing sorting, recycling and composting.

The finding of the study that the respondents were not composting waste is similar to Hoornweg and Otten finding. Hoornweg and Otten (1999) indicated that even though the organic content of the solid waste in the typical African city may exceed 70%, centralised composting, was not a significant component of African Solid Waste Management practice at that time. Composting if practiced by the residents can be a means of waste minimization. The fact that leaves and wood shaving were one of the highest waste materials produced by the respondents in this study, composting is therefore significant for now. Additionally Lusaka's organic content is ranging from 35-80% (Palczynski, 2002). This is an implication that composting in Lusaka is an imperative. Lack of composting practice by the residents may be an overlooked opportunity when waste stream is high in organic material with potentially high yields of compost.

In addition to the above, Cointreau and de Kadt (1991) also indicated that composting is central in waste management. They said composting is a land saving and pollution reducing strategy and minimises further exploitation of scarce natural resources. Composting can be a source of income for the residents. For example in South African cities like Durban and Johannesburg have community composting centres in the suburbs. At community composting centres residents drop off their garden waste and it is composted and resold for household-sized gardens. Like wise composting can be a source of income generation practice for the urban poor in Zambia. The problem of lack of composting practice by the residents in this study can be explained by the Administrative structure context which does not define the content of learning and the infrastructure. Development of educational programmes could solve the problem. Importing technology know-how from countries practicing composting would also help solve the problem.

This was evident in the study by Peters (1998) in Nairobi, where women's groups have started composting organic wastes as means of improving community environmental conditions and generating income through the sale of the compost. The study revealed that significant environmental improvements have been achieved through composting, including improved health, urban agriculture opportunities and better drainage.

According to Yamba (2004) recycling of waste is a vital component in the sound management of waste. However, recycling in this study was not practiced by the respondents. Recycling is a means of waste minimization. For example if residents make baskets out of plastic paper bags it would reduce the number of plastics entering the waste stream. In this study and studies elsewhere in Africa it has been observed that recycling has not been practiced as a means of waste minimization but as a means of survival by the poor. Recycling is carried out by many poor who engage in waste picking as a means of income generation. Most often even the type of recycling practiced is health hazard. One such example in this study was one for using plastic disposable bottles for making fire for cooking food. This is a health hazard in that it produces smoke which pollutes the air. Residents also engage in scavenging for items at dump sites without any protective clothes. In Nairobi the poor engage in waste picking as a means of income generation. For example, in 1992 scavengers collected approximately 20 tones of the 800 to 1,000 tones generated daily (Syanga, 1992). Scavengers sell daily their collections for a small profit to middlemen who in turn sell them to industries.

In addition to the above, the lack of recycling practice by the respondents in this study can be explained as an administrative problem. There is no guideline about which items can be recycled. The Lusaka City Council (LCC) Waste Management Unit has not developed any recycling educational programmes and the council has not sensitized the public about the available recycling companies. For example in this study respondents (see figure 3) could not cite any recycling company. Educating the residents on the recyclable materials and also sensitizing them on the available recycling companies could help solve the problem.

Another reason why recycling is lowly practiced in Lusaka city is that recycling companies are absent, even where they are present, they do not consistently stimulate recycling. For example, in Lusaka there is plastic recycling company but residents do not know where the company is. Another recycling company in Lusaka is known as the Universal Mining Company which recycles metal though at the moment it is just doing trial runs. It is not yet open to the public, but it has started buying metal waste from the public. Recycling is profitable if only measures to enhance it could be put in place. For example, in Egypt a large scale innovative and efficient waste recovery, reuse and recycling operation is run by the Zabbaleen, a group of over 50,000 people traditionally involved in the business of waste collection and processing. They recycle between 70% and 80% of all collected plastics, metals, glass, paper and other components of the waste stream. In addition, they produce fertiliser in the process of organic waste composting and raise pigs which are fed on garbage on a commercial scale. Zambia could benefit from Egypt by importing knowledge of recycling (Palczynski, 2002).

Separation of waste was another point of discussion. According to Lusaka City Council waste management Unit (2004) separating waste from non-waste helps waste minimisation. However, in this study, all the respondents were not separating waste. Separation of waste helps to identify which waste material can be recycled, composted or reused. Similarly Hasez (2000) also observed that separation of waste at source increases the value of the waste and makes it a more profitable commodity. If upon disposing various types of waste, for example, leaves, broken bottles, human waste, plastic bags are mixed, it would be very difficult to reuse a plastic which was mixed with human waste. Separation of waste at source is very essential because in the first place the practice minimises the amount of waste entering the waste stream. Lack of separation of waste has brought about scavenging for recyclable materials by the poor urban. The poor urban go to dumpsites to search for recyclable items in decomposed waste without protective clothes. This is a health hazard to the scavengers.

In addition to the above, as a consequence of not separating waste, it is very difficult for the recycling companies to recover recyclable materials. Zambezi sawmills is one

company which is facing problems in recovering paper for recycling; because paper material is difficult to recover and loses value once mixed with other types of waste. The lack of separation of waste by the respondents in the study can be explained as an administrative problem. Lusaka City Council (LCC) Waste Management Unit has not put programmes of source separation. The problem could be solved by coming up with a programme of educating the residents on the separation of different waste items into different waste streams at point of generation. The Lusaka city council Waste Management Unit could link with the Community Based Enterprises (CBEs), the zone community leaders, the health sector and the education sector in planning of educational programmes. This would also enable waste pickers collect relatively clean and unspoilt waste items for sale. Incomes of the waste pickers would be maximized and also better and effective solid waste management in the city.

As regard to the importance of sorting and separation of waste at source, Kammel adds more light. Kammel (1994) indicated that sorting and separation has proved to be an effective practice in the management of waste. Egypt is one such example; the separation or sorting (organics from non-organics) of waste is conducted by households (of a certain income level), commercial enterprises and institutions. The Sorting and separation of waste also serve as a source of income for the marginalised. In Egypt, 9,000 tones of garbage generated per day is collected and sorted or separated for valuable recyclable materials.

According to WHO (1995) collection is a key link in the chain of Solid Waste Management from the point of generation to ultimate disposal. However, in this study, collection of waste was poorly done. Similarly, Nkansu (1999) observed that in Lusaka, 90% of the 1,400 tones of municipal waste produced daily are left uncontrolled. Lack of proper waste collection practices brings about waste accumulation in the environment. If waste not collected it ends up in the roads and drainages. If the waste accumulates in the drainages it brings about diseases such as malaria and cholera especially during rain season. Elsewhere, reports have indicated that waste collection has become a big problem. Lagos, Nigeria is another example where refuse collection has always been a

problematic issue. Harcourt, Rivers State, is another Nigerian city with severe solid waste problems. Once known as the “Garden City” the place gained a nickname the “Garbage City” because of inadequate collection and disposal practices Mwanthi et al., (1997).

In view of the above, the poor collection of waste problem can be explained as a structural and Administrative problem. The Lusaka City Council has given the responsibility for waste collection to the Community Based Enterprises (CBEs), though the CBEs have no capacity to collect all the waste in the compounds. The type of transport they use makes it almost impossible for the CBEs to collect waste from all households. Human-pushed cart as means of transport is not appropriate for collection of the large amount of waste. The labour force is also not enough. Two people using a human-pushed cart cannot manage going round the entire compound to collect the waste. The CBEs do not make enough money from the service since the majority does not use their waste collection scheme. This has made it very difficult for the CBEs to perform to people’s expectation. The CBEs are not funded, they entirely depend on the little they collect from their clients.

The problem of waste collection of the waste in the study area could be mitigated by developing favorable economic and legal regulations for Community Based Enterprises (CBEs). The council would not give a contract to a CBE which cannot afford appropriate transport for the transportation of waste. The council would also terminate the contract if the CBEs happen not to perform according to the stipulated laws. By-laws obliging the householders to pay for collection services should be developed, for example, as one goes to draw water they should have a valid receipt indicating that she or he pays for garbage collection.

5.3 Issues Arising from Findings on Attitudes

Major discussion point regarding attitudes towards waste management was that respondents had negative attitudes towards waste management.

The finding of the study that negative attitudes towards waste management among the respondents was the main barrier to proper waste management practices, was similar to the finding of Tucker and Speirs. Tucker and Speirs (2003) indicated that negative attitudes towards waste management activities were the common discriminates of behaviour in household waste management. If the residents have negative attitudes towards management of waste, their practices would be poor. For example in this study the respondents believed that keeping their environment clean was the responsibility of the Lusaka City Council. This was because in the first republic the United National Independence Party (UNIP) government under Kenneth Kaunda's presidency the council cleaned the compound and also disposed of waste for free of charge. This negative attitude among the respondents has influenced the poor practices of waste disposal. Residents were dumping waste anyhow on the roads and drainages even when they were aware of the Community Based Enterprise (CBEs) scheme. The respondents were resistance to change. This problem can be explained as a political problem where in the past the government managed without involving the residents. To solve this problem, the Lusaka City Council would embark on Sensitization programmes to make respondents understand that waste management is a cross cutting issue it involves each and every individual.

In this study, the respondents negative attitude towards waste management should also be seen in the light of economic situation in the compound. Poverty made it very difficulty for some of the residents in the compounds to participate in waste management. Residents were measuring the benefit of buying food worth K7,000 to paying the same amount for waste disposal. Poverty levels are high such that one cannot sacrifice some money for payment of waste. It is in the low social economic areas such as compounds where poor sanitary related diseases such as cholera occur. If one was to profile the people who are diagnosed as cholera patients the results would be those who are under educated and from low social economic areas. According to the November basic needs food basket (2008) for a family of six members in Lusaka to live a dignified life, K1,914,450 is needed per month. However, this is not the case. Most families live below the poverty datum line and do not afford two meals per day (Seshamani, 2000).

In view of the above, it is clear that poverty was a contributory factor to the negative attitudes among the respondents towards waste management in the area of study. In order to reduce poverty, income generating programmes could be introduced. Income generating resources should come within the residents' local environment; in this case, waste generated by the residents should be recycled so as to earn income. However, there is need for the government to establish manufacturing centres within the community where residents can be taking the recyclable materials. More budget allocation towards good sanitation is critical. Instead of allocating financial disaster funds, the funds should be allocated for developmental programmes in the community. NGOs such as Women for Change would work in collaboration with the Ministry of Community and Social Development so as to empower the residents on income generating projects.

Negative attitudes were also exhibited in the methods of waste disposal by the respondents. For example, the method of using the mad person to dispose waste shows an "I don't care" attitude because the mad person would not dispose the waste at the right place. Dumping waste on the roads and in the drainages also shows an "I don't care" attitude. All of the residents knew the dangers of disposing waste anyhow. However, the majority were disposing of waste in undesignated places. This is an indication that they don't care about their environment. In the same manner, Kyambalesa (2006) also observed that the accumulation of solid waste in the capital city of Lusaka can be attributed to many factors which include public attitudes that are allegedly to be generally characterised by lack of concern for the quality of surroundings.

In view of the above, the problem can be explained by the educational context. The Lusaka City Council has not designed any educational programmes to conscientise the residents on the importance of their participation in waste management. In order to change the negative attitudes of the residents towards poor waste management, communication programmes should be commenced. The Lusaka city council Waste Management Unit should embark on educational programmes. The residents should in the first place be conscientized or made aware of what is wrong in their environment. Residents should be made to understand that waste management is the obligation of every

individual regardless of their status in society. Whether rich or poor all times should make sure that waste is disposed off properly. Similarly, Yamba (2004) also observed that waste minimisation is an attitude of the mind and it requires commitment from all sectors of society, particularly decision makers.

In addition to the above, the education content should be that of changing the mind sets of the residents towards waste management. The culture of thinking that it is someone and not I to clean should be broken through education. As Freire (1970) observed, education should aim at transformation. One based on the hope that it is possible to change life for the better.

CHAPTER 6

CONCLUSSION AND RECOMMENDATIONS

6.0 Introduction

This chapter presents a conclusion to the findings of the study. The chapter further gives recommendations which could act as a guide to future implementations of waste management programmes among adult residents of Ng'ombe compound.

6.1 Conclusion

The poor management of the waste among Ng'ombe compound residents is more to do with lack of knowledge and negative attitudes towards waste management. If the residents can be empowered with knowledge which can be acquired through education their negative attitude would improve. The practices are poor due to lack of education. What is provided to the residents is sensitisation and not education. The information provided during sensitisation does not address the important aspects of an ideal hierarchy of waste management. There is need for combined efforts from professional organisations such as health institutions, education sector, NGOs who advocates for clean environment to work in collaboration with the Lusaka city council (LCC) management team to promote waste management education. Every effort should be made by the Lusaka city council (LCC) Waste Management Unit (WMU) to ensure that information on the important aspects of waste management is being disseminated to the residents to provide holistic transformative education on waste management.

6.2 Recommendations

The finding revealed that the content of what the residents are taught does not address the aspects of ideals of waste management hierarchy being; minimisation, sorting, recycling and disposal. It is recommended that the Lusaka city council (LCC) Waste Management Unit should embark on educational programmes comprising all aspects of waste management.

The one-way communication method of using a megaphone which was used to for disseminate information on how to manage waste to the residents is not appropriate. It is

recommended that the council should use participatory approach. Demonstration and group discussion would be the appropriate method to use for educating the residents on how to manage waste for the residents are actively involved. This active participatory approach has proved to be very effective in adult education programmes.

The findings revealed that the Waste Management Unit has left the responsibility to educate the residents to the CBEs. However, the CBEs do not have the capacity. It is recommended that the Waste Management Unit (WMU) should train the CBEs before engaging them in the provision of the service. The Unit itself should organise and implement the educational programmes in collaboration with other stakeholders like health experts and adult educators.

Respondents were resistant to change. Their attitude towards waste management is that the council should be cleaning the community using revenue generated from the ground rates and free of charge. Therefore the study recommends that the Waste Management Unit, ward development committee, community leaders should involve the residents in planning, implementation and evaluation of all waste management programmes so as instil sense of belonging in the residents on what is going on in their community.

The findings revealed that garbage collection is poor because the CBEs are not consistent in their collection. It is recommended that Lusaka city council (LCC) Waste Management Unit (WMU) should set standards which the CBEs should meet before starting offering the service to the community such as enough labour force, protective clothes for the workers, vehicle for transporting waste (and not a human-pushed cart) and financial capacity to offer an effective service.

The findings revealed that the major sources of waste which the respondents usually have are the shops and markets where their foodstuff is packed in plastics bags and disposable bottle drinks. It is recommended that the Zambia Bureau of Standards should control the manufacturers on packaging their products in plastics which do not decompose.

The findings revealed that the commonly methods of waste disposal used are dumping waste on the roads and drainages. It is recommended that the Lusaka city council should stiffen the reinforcement of the law regarding illegal dumping. The police being the law enforcers should work in collaboration with the council.

The finding revealed that residents do not practice any recycling and composting. It is recommended that the Waste Management Unit should educate residents about recyclable items and on organic materials for composting. The government should encourage recycling companies and composting industries to motivate the residents to take the recyclable to the companies.

The findings revealed that residents use illegal methods of waste disposal due to shortage of bins. It is recommended that the Lusaka city council should locate bins in each zone where the residents will be able to access and dispose the waste. However, a minimal charge should be introduced.

The public's attitude towards waste management is that other people should be employed to clean the waste. It is recommended that the Waste Management Unit should make the residents understand that waste management is a cross-cutting issue; it involves every individual in the society. The residents should support and participate in anti litter campaign and also play a watch dog role, supporting the waste management system by paying for the service.

Finding revealed that poverty hinders participation in waste management. It is recommended that in order to reduce poverty, income generating programmes should be introduced. Income generating resources should come from within the residents' environment; in this case, waste generated by the residents should be recycled so as to earn income. However, the government should establish manufacturing centers within the community where residents can be taking the recyclable materials.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE FOR HEADS OF HOUSEHOLDS/RESIDENTS

(RESEARCHER ADMINISTERED)

This questionnaire is intended to assess people's knowledge, attitudes, and practices towards solid waste management. The information is for academic purposes only and will be treated with strict confidence.

Age

10 - 35 ()

35 and above ()

2. Sex

Female ()

Male ()

3. Educational level

Primary ()

Secondary ()

Tertiary ()

None ()

KNOWLEDGE

4. How would you describe waste?.....

.....

5. What type of waste do you usually have in your household or home?

.....

6. What do you think could be the source of waste in your home or community?

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

7. In your own opinion why is waste found all over the places such as roads, markets, drainages etcetera?

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

8. What are the dangers of having waste around your house or community?

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

9. In your own opinion what should your community do to reduce waste?

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

10. Do you know any company which uses waste such as plastic bags, newspapers, card boxes to make new products/things.?

.....

11. Has anyone taught you about what to do with waste?

Yes ()

No ()

12. If yes who taught you?

- (a) Health environmental workers
- (b) Waste management unit officers
- (c) Community based enterprise workers
- (d) Any other specify.....

13. If so what did they teach you?

.....

.....

PRACTICE

14. What methods do most people use for waste disposal in your community?

.....

.....

15. What method does your family use?

.....

.....

.....

16. Give reasons for using the method mentioned in question 15

.....

.....

.....

17. If you have various waste such as broken bottles, left over *nshima*, plastics and newspapers how do you dispose them off?

.....

18. Have you ever heard about compost manure?

Yes ()

No ()

19. If yes to question 18 explain how compost manure is prepared.

.....

.....

.....

.....

20. Do you take drinks such as kabana, coca-cola, fanta and sprite in disposable bottles?

Yes ()

No ()

21. If the answer is yes to question 10 what do you do with the bottle after drinking?

.....

.....

.....

.....

22. Do you at times have old clothes and shoes which needs to be disposed of?

Yes ()

No ()

23. If your answer to question 22 is yes how do you dispose them off?

.....

.....

.....

24. What do you use the finished containers of cooking oil for?

.....

.....

25. How do you store the waste awaiting disposal by the organisation (CBE) responsible for waste collection?

.....

26. Do you have metal scrapers in your community?

Yes ()

No ()

27. If yes to question 26 how do they dispose their small unused pieces of metal?

.....

.....

28. Where does the organisation responsible for waste collection throw the waste upon collection?

.....

.....

29. Do you have a container where you throw waste within your community?

Yes ()

No ()

30. If yes to question 29 where is the container located?

- a. Within the compound
- b. outside the compound
- c. Don't know
- d. Any other Specify.....

31. In your own opinion whose responsibility is it to keep the community clean?

- (a) The council ()
- (b) The health inspectors ()
- (c) Any other specify.....

32. Give reasons to your answer in question 31

.....
.....

33. In your own opinion should people be employed to keep the community clean?

- Yes ()
- No ()

34. Give reasons to your answer in question 33?

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

36. What do you think should be the method of waste disposal?

- a. Should pay an organisation to collect garbage ()
- b. Should dispose waste on our own ()
- c. Organisation should collect without paying ()

37. Explain your reasons in 34 above

.....
.....

THANK YOU FOR PARTICIPATING

APPENDIX 2

INTERVIEW GUIDE FOR COMMUNITY LEADERS

1. What type of waste do you have in your community?
2. What methods do your residents use to dispose waste?
3. Do your residents receive any education concerning waste management?
4. If yes who educates the residents?
5. What methods do they use?
6. What are the residents educated on?
7. Do the residents reuse some of the items such as containers, plastic bags, extra?
8. Do your residents know how to make compost manure?
9. If yes who educates them and how do they make the compost manure?
10. Do you have a container for waste disposal in your community?
11. How do the residents store their waste prior collection?
12. How often does the Community Based Enterprises (CBEs) collect the waste in your community?
13. How does your community feel about the idea of involving an organisation in collecting solid waste in your community?
14. How much does the organisation charge for the collection of waste?
15. Do all the residents afford the charge?
16. What happens to the waste by the residents who cannot afford?
17. What problems do you have in your community concerning waste management?

THANK YOU FOR PARTICIPATING

APPENDIX 3

INTERVIEW GUIDE FOR ENVIROMENTAL HEALTH TECHNICIANS

The information is for academic purposes only and will be treated with strict confidence.

1. What is the general status of waste management by the community?
2. Do you provide health education related to solid waste management to the Ng'ombe compound residents?
3. Which is your target group?
4. What method do you use to educate the residents concerning waste management?
5. What do you educate the residents on concerning waste management?
6. Do the residents know the risks of improper waste management?
7. Is there any change in the manner the residents manage their waste following health education?
8. How have they changed in managing the waste?
9. Do you at times receive patients with diseases related to poor waste management from the community at your institution?
10. If yes in question 9, what diseases?
11. What problems do you encounter upon educating the residents on waste management?

THANK YOU FOR PARTICIPATING

APPENDIX 4

INTERVIEW GUIDE FOR REFUSE WORKERS/COLLECTORS

The information is for academic purposes only and will be treated with strict confidence.

1. For how long have you been in this job?
2. How many are you in your organisation?
3. Did you undergo any training related to waste management?
4. What is the type of waste you work with most?
5. What methods do the residents use to dispose waste?
6. How do residents store their waste in their homes awaiting collection?
7. Where do you find the waste upon collection?
8. Are there any containers where the community dispose of waste within the compound?
9. Do all the residents use your services to dispose off the waste?
10. How does the community feel about the waste management Scheme which require them to pay?
11. What happens to the waste by residents who don't use your service?
12. Do you sort the waste according to categories prior disposal?
13. How often do you collect the waste from the community?
14. What happens to the waste from there?
15. Where do you dispose the waste you collect from the community?
16. How often is the container emptied?
17. Who does the emptying of the container?
18. Do you educate the public concerning waste management?
19. What exactly do you educate the residents on?
20. What problems do you encounter during the collection of waste?

THANK YOU FOR PARTICIPATING

APPENDIX 5

INTERVIEW GUIDE FOR LUSAKA CITY COUNCIL WASTE MANAGEMENT OFFICERS.

1. Do you have any educational programmes for the peri-urban residents concerning waste management?
2. If 'yes' to question one, what exactly do you educate the public on?
3. What methods do you use to educate the public concerning waste management?
4. How appropriate are these methods?
5. Who educates the residents?
6. Do you have a particular group that you target?
7. If the answer is yes to question 6, which group and why?
8. Have your programmes been successful?
9. If the answer is no what could be the problem and if yes how?
10. Do you conduct any evaluation of your educational programmes on waste management during and after educating the residents?
11. What aspects of waste management do you evaluate on?
12. Is there any change in the manner the residents manage waste after receiving the education?
13. What other educational links do you have for empowering the public with information on waste management?

THANK YOU FOR PARTICIPATING

APPENDIX 6

OBSERVATION GUIDE

1. Methods of waste disposal
2. Any good practices such recycling
3. Waste storage
4. Methods of waste collection