KNOWLEDGE, ATTITUDE AND PRACTICES ON WASTE MANAGEMENT IN SELECTED SECONDARY SCHOOLS IN WESTLANDS SUB-COUNTY, NAIROBI COUNTY

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A thesis submitted to the University of Nairobi in partial fulfilment for the award of Master of Science Degree in Environmental Governance

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DECLARATION

This thesis is my original work and has not been submitted to any other university for the award of a degree.

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Title of the work: "**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICES ON WASTE MANAGEMENT IN SELECTED SECONDARY SCHOOLS IN WESTLANDS SUB-COUNTY, NAIROBI COUNTY"**

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To my beloved parents and siblings, “You are the wind beneath my wings”, be blessed.

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Above all, I thank the almighty God for keeping me healthy, both psychologically and physically.

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
DED	-	Director of Education
EE	-	Environmental Education.
EMCA	-	Environmental Management and Coordination Act
EOL	-	End of Life
JICA	-	Japan International Cooperation Agency
KAP	-	Knowledge Attitude and practices
NCC	-	The Nairobi City County
NEMA	-	National Environment Management Authority
NGO	-	Non-Governmental Organization
SWM	-	Solid Waste Management
TORA	-	Theory of Reasoned Action
UN	-	United Nations
UNEP	-	The United Nations Environmental Program
UNESCO	-	United Nations Education Scientific and Cultural Organization
UNPFA	-	United Nations Populations Fund Agency
UPE	-	Universal Primary Education

ABSTRACT

The population of Nairobi has continued to increase from initial 8,000 people in 1901 to around 3.8 million people by 2015. The increased population has triggered a rise in student enrolment which has subsequently led to constrained resources used for waste management in the schools. The overall objective of this study was to assess knowledge, attitude, and waste practices on waste management in selected secondary school students in Westland Sub-county, Nairobi, Kenya. Descriptive study design was deployed to study and analyze a study population comprising of six public and six private school's students in the Westland Sub-county. Stratified cluster sampling method of sampling was used where (n) =3887 students in 12 secondary were interviewed. Data was collected using structured questionnaires. Descriptive statistics was used in data analysis. From the findings, 61.4% of the respondents came from public schools while 38.6% of the respondents came from private schools and 17 of the respondents were enrolled in public schools while 27 respondents were enrolled in private schools from their former schools. Results indicated most waste in the schools was in the form of food left overs which was followed by pen, flower trimmings, pieces of clothes and fruit & vegetable peels, mostly produced plastics as inorganic waste, empty bottles used for drinks, bags and bookcases and filing cabinets. Attitude, knowledge, and practices were found to be key determinants of waste management in secondary schools in Westland Sub-county. The study concludes that the secondary schools in Westland Sub-county produces different types/ kinds of waste and as such there were waste practices associated with how waste was managed in the respective schools. Waste practices in existing secondary schools in Westland Sub-county and such practices were an important determinant of waste was dealt with in schools. The researcher recommends that the school should come up with environmental topics in the curriculum, educate the public on the effects of environmental pollution, putting proper signage among others.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Wastes have adverse effects on the environment as well as public health, thus, necessitating the need to management and control wastes historically. Hilburn, (2015) reveals the long lived convoluted waste control and management history. The waste management systems originated from the ancient times, with the first attempt to manage wastes by Greeks taking place in A.D, 4thcentury. The challenges the Greeks faced encompasses high population growth, limited space, hygienic complexities among others making the waste management system alignment difficult. As Narayana, (2009) highlights, collection and transportation of wastes form the basic practices in waste management. With the rapid urban development and corresponding escalation in population size, the sanitation conditions worsened as garbage wastes formed the dangerous threat on human health as well as the environmental hygiene to the inhabitants of these places. In the 14th-16th century, vermin perpetrated the plagues in Europe, especially in urban unsanitary environments. At around this time, development of waste management approaches occurred as Nathanson, (2015), reveals, with the aim of combating disease spread despite the political and social limitations during the time.

As a means to deal with and manage wastes, communities in developing countries often turn to knowledge, attitude, practices, disposal techniques of waste (open burning and dumping) as the only option to handle waste materials and promote good hygiene and human health (Al-Khatib *et al*., 2015). As the priority in many developing nations to deal with increased industrial waste, attitude, practices, and knowledge as well as waste type, urbanization form instrumental variables in waste management (Oyake, 2016).

1.1.1 Waste Management Practices

According to Cunningham (2009) some types of household wastes consist of a variety of materials. The best overall household waste composition estimated currently showed a (20%) of garden waste, 5% wooden wastes, 18% paper dirty, 9% sweeping wastes, 17% kitchen wastes, 3% of metallic material waste, 3% of both textile and soil wastes as Julian, (2002), breaks down the components of household wastes. The leading household wastes sources constitutes product packaging materials such as plastic, paper, metal or glass packaging, which, according to Cunningham (2009) constitutes over 50% of wastes.

The burden of managing wastes is negatively impacted by the high rate of population growth in towns like Nairobi in East Africa. The challenges that complicates waste management in urban centers encompasses poor sanitation regulation implementation, limited financial support, lack of appropriate methods to manage wastes. According to Troschinetz and Mihelcic, (2009) over 101 million humans lack good sanitations in East African cities. Dandora, for iinstance, is Nairobi's dumping site, as is the case in many countries with poor management of wastes, where wastes are dumped in queries and abandoned sites, risking the health of the people living near or close to these sites. The wetlands and low lying lands near forests form majority of the dumping site locations in many nations as Global solid waste management report, 2012 indicates. In developing states, these sites are not protected from human access because they are left open, unfenced increasing the risk of human exposure to environmental and public health disease (Oyake, 2016).

According to the 2012 report of Global waste management, by 2025, the cities and urban centers in the world will generate over 2.8 billion tons of waste which is more than twice the current amount of 1.3 billion tones especially in low income generating nations. Less than 26% of wastes are collected on a daily basis in Nairobi as Ikiara *et al.,* (2014) reveals. Evident findings reveal that the waste from domestic sources is 68 per cent, while 14 per cent is from industrial sources, then 8 per cent from roads, 2 per

cent from hospitals, 3 percent from education institutions/schools 1 per cent from markets and the remaining 4 per cent from other sources (UNFPA, 2001).

More than 260,000,000 tons of plastics are produced every year globally, which accounts for almost 8 % of oil production in the world (Oyake, 2016). The same report indicated that almost 1 trillion plastic bags are manufactured and utilized in one year globally. This validates the importance of the use of plastic materials above all others by packaging sector. The urban waste streams end up being the recipient of nearly a half of these produced plastic bags, constituting something between the range of 5% and 10% of the waste stream, likened to Kenyan cities (NEMA, 2003). At the heart of Nairobi County, Westlands Sub-county falls within the statistics of 5% to 10% in use of the synthetic materials.

1.2 Statement of the Problem

Several studies have been conducted on knowledge, attitude, practices and waste management. The research by Adogu *et al.*, (2015) was designed for assessing Owerri municipal Imo state residents in managing wastes in Nigeria. The findings indicated a respondent awareness of 90 % on waste management and a positive attitude towards waste management was at 97.5%. A study by Arora and Agarwal (2011) indicated that there was low attitude towards waste management by university students. Further the findings revealed no correlation between waste management and knowledge, attitude, and practices while there was a significant correlation between knowledge and practices in waste management. Perception and attitude on disposal of wastes study by Fearon, and Adraki (2014) in Tamale Metropolis, Ghana, depicted that household attitude have significant impact on the motives to use dustbins in the future. In the review by Giusti (2009) on practices in managing wastes and their effect on human and environmental health, indicates that many of the inhabitants neighboring the waste dumping sites suffer adverse effects on their health as well as environmental health.

The increased population has also triggered a corresponding rise in the student enrolment in Kenyan public secondary schools, thanks to free education system (Muigai *et al.*, 2015). This has led to a constrain in resources used for waste management in the schools, inadequate sanitation systems in school premises such as; toilets, kitchen, dining rooms, dormitories, class rooms, play grounds, water drainage systems and dust bins (UNEP, 2012). The existence of a wide knowledge gap necessitates the need for environmental researchers to investigate the student attitude and awareness on the issue of managing wastes in our towns and the environment as a whole and provide recommendations to relevant stakeholders (Abang, 2016). The study endeavors to assess the various variables such as the waste practices, knowledge, and attitudes in explaining how they relate to waste management in the secondary schools in Westlands Sub-county, Nairobi. This study focuses on public as well as private high school in the Sub-county and attempted to address knowledge, attitude waste practices and how they relate to waste management in the secondary schools in Westlands Sub-county, Nairobi.

According to the diverse studies on the topic of waste management, beliefs, practices, attitudes, and knowledge directly affects and influences the process of waste management. As to whether different factors determine the waste management have the positive effect on the waste management is remains unresolved despite significant improvements in waste management in Nairobi city. Various researches indicate that there is an association or connection among knowledge, waste type, waste practices and attitude as well as their effect on waste management. This research aimed at studying the types, knowledge, attitude, and waste practices and waste management in secondary schools in Westlands Sub-county in Nairobi.

1.3 Research Objectives

1.3.1 Overall Objective

The purpose of this study is to assess of knowledge, attitude, and practice of waste in towards waste management in selected secondary school in Westland Sub-county, Nairobi, Kenya

1.3.2 Specific Objectives

Aligned objectives include:

i. To examine the types of waste produced and waste management practices in selected secondary schools in Westland Sub-county
ii. To assess how knowledge relates with waste management practices in selected secondary schools in Westland Sub-county
iii. To evaluate the impact of student's attitudes on waste management practices in selected secondary schools in Westland Sub-county
iv. To evaluate the waste management practices in in selected secondary schools in Westland Sub-county

1.4 Research Hypothesis

The hypotheses of this study are:

H_{01}: Waste categories do not have an effect on waste management practices
H_{02}: Knowledge does not have a relationship with waste management practices
H_{03}: Attitude does not have a relationship with waste management practices
$H_{04:}$ Waste practices do not have a relationship with waste management practices

1.5 Significance of the Study

Students spend most of their time at schools than at homes; therefore, schools must meet the required standards of hygiene and sanitation to avoid any inconveniences and crises related to inadequate waste management attitude and practices. Many

studies have indicated that most schools face challenges regarding waste collection and disposal facilities. Westlands' sub-county borders the slum areas of Kawangware. It contains some of the highest income areas in Nairobi, as well as low income areas like Kangemi, Deep Sea and Githogoro which makes a good representation of the population. The increased rate of low income areas in Westlands sub-county is characterized with issues such as; inadequate students' performance, shortage of enough and qualified teachers, increased rate of un-employment in parents making students vulnerable to access of basic needs like food, school fees and shelter (DED, Westlands sub-county 2016).

1.6 Scope and Limitation for the Study

This thesis focused on the main objective, which was the assessment of the knowledge, practices and attitude which the students have towards waste management in the 12 selected schools under 8-4-4 system in Westlands Sub-county, Nairobi County. Among the 12 selected schools, 6 were public schools while 6 were private schools. The study was done in 2016. The study was limited to the objectives highlighted in the study. The busy schedule of the students was a limitation with erroneous and biasness due to human nature forming additional factors that limit the study. The researcher also faced financial limitations as it had a relatively high cost implications and had to stick to the budget schedule for the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Waste Management in Nairobi

According to NEMA (2003) many of Nairobi's low income residential estates are badly littered with garbage. Numerous researchers discovered that the collection of waste in Nairobi households doesn't exceed 25 %, as majorly concentrate in higher income earning areas where private management undertake these activities (NEMA, 2003). Strangely, a huge proportion city population resides in poor or low housing facilities as they cannot afford good housing estates. In the poor populations areas waste littering is attributed to informality, poor roads making it inaccessible, insecurity or high crime rates masking management of wastes to boost sanitation equally difficulty (JICA, 1998). The city of Nairobi has got only one disposal site that is official and is owned and operated by City Council, namely the Dandora disposal site located in Eastlands. About 30% of all the waste collected is taken to this particular site. Industries undertake their own disposal of mixed waste and transport it to Dandora for land filling (AfDB, 2002). This site for waste disposal situated at Dandora has been in existence since 1981.

Normally, Dandora disposal site contains approximately 1,300,000 million cubic meters of wastes but unfortunately this disposal site has already built up a mass of 1,400,000 cubic meters of waste, which is beyond its capacity (AfDB2002). The characteristic poor management of this activity has caused the site to be filled up while there is scarcity of waste transfer facilities in the custody of the City Council of Nairobi (UNEP and NEMA, 2005). Barely 40% of Nairobi's generated waste is collected by City Council. The private sector's limited capability only allows them to collect 20% of the remaining waste (60%), leaving the remaining 40% uncollected. The uncollected waste is subjected to other disposal means including burning, throwing in pits and in other unauthorized places, collected by NGO's, self-help groups in the community and other volunteers (Ikiara, 2006).

In 2007, the Nairobi City Council analysis confirmed the percentage increase of collection to 85, due to the invention of waste recovery and composting initiatives that was adopted by other enterprising companies that greatly enhanced the cleanliness of the adjoining environment (Ikiara 2006). One of the major metropole in Africa faces huge solid waste management (SWM) challenges linked with improper waste disposal such as the clogging of sewers and drainage, the diseases born out of contaminated water, e.g. typhoid, cholera and diarrhoea, the increase of upper respiratory maladies emanating from garbage burning (Fullo and Odhiambo, 2009).

In order to minimize their cost, privately owned firms in waste collection sector resorted to dumping in illegal places and disregarded installation of effective monitoring systems, besides having no law reinforcement controlling waste disposal at the site (NEMA, 2003). Studies have shown that the soil, water and air around Dandora, the only dumping site in Nairobi, is highly polluted resulting into serious health and security problems to the local residents. According to the Constitution of Kenya 2010, Environmental sustainability is one of the major areas of focus. There is a provision of a legal framework in EMCA's article 42 that expounds the human rights of a healthy and clean environment that is essential for the protection of environment that will benefit the current and future generation (Muigai *et al.*, 2015).

According to UNEP (2012) there is a dire need of creating environmental education and awareness, practices, and knowledge in high schools with aim of enhancing environmental monitoring and management in the country for both present and future periods. This will go a long way in enhancing education on environment in an attempt to reorienting education so as to restore environmental competence owing to its basic aim of attaining personal and social competence (Shobeiri *et al.,* 2007). This will augur well by establishing the difference between knowledge/ awareness and practices in managing the environment on one hand, and students' attitude and level of education on the other hand.

According to Crompton and Kasser (2009), environmental education encourages the development articulation of literacy in the citizens whose own environmental concerns are shared regarding their own benefit and the good of those to come in the future generations. There is a striking connection between the learners' level of education and the environment management, of which its establishment will resolve the complicated problems of the environment by integrating Environmental Education at all levels. Ultimately this education will impose a positive change in behavior and attitude which is required for effective participation in managing the environment. However, it will call for considerable efforts on the part of both the government and school management in their bid to arrange for students', teachers' and administrators' workshops and seminars that will facilitate efficient sensitization on the problems associated with environment alongside their consequences (Li, 2016).

2.1.1 Types of Waste

Municipal solid waste (MSW) sources as contended by UNEP (2012) encompasses are business activities, institutions, households, and organizations, with the major elements of MSW comprising of plastics, wood, rags, metal, food among other wastes. Building demolitions and construction wreckages contribute hazardous wastes like batteries bulbs among others in the debris are a health hazard to human and environmental health (UNEP, 2012).

As indicated by UNEP (2012) industrial waste incorporated in this study, bundling materials, waste from food manufacturing and processing, oils, solvents, resins, paints and sludge's, glass, pottery, stones, metals, plastics, rubber, cowhide, wood, fabric, straw, abrasives, and so forth. Similarly, the municipal waste, the absence of a consistently up-dated and methodical database on industrial waste guarantees that the correct rates of age are to a great extent obscure. Farming waste and buildups have likewise been acquired through growing rural creation bringing about expanded amounts of livestock waste, agrarian harvest deposits and agro-industrial results (Zagozewski, *et al*., 2011).

A study conducted by Alam and Ahmade (2013) on the impact and influence of waste on environmental and human health highlighted the sources of types, amount, disposal methods, and adverse effects of poor waste management on health. The liquid, excreta from community and households forms the dangerous health threats from wastes that contribute to causes and spread of infectious infections in the society as the findings illustrates.

According to a study by Li, (2016) industrial wastes include the wastes generated during the production process like traffic, resource development. The study dealt with the various economic industries and their associated wastes like mining, power, chemical, oil, light, and metallurgical industries and the coefficient of waste generation.

Alam and Ahmade (2013), researched on the implications of waste on human and environmental health, identified components of waste, types and quantity, disposal methodology of wastes, and the improper waste management effect on health. The results indicated infections and the risks that come with the wastes in the society and on human as well as environmental health.

2.1.2 Knowledge of Waste Management

Based on the study targeting students of a selected hostel in Rajasthan University by Arora and Agarwal (2011) on the variables comprising of waste management knowledge, attitude and practices. The leading objective in the study was to establish the university student attitude towards waste management, and sample of three students used and the questionnaire, self-administered as collection method, and t test to analyze the data findings. The finding indicated low, less favorable, and moderate in knowledge, attitude, and practice respectively; correlation of knowledge and attitude was absent, practice and knowledge indicated a substantial correlation.

While conducting the research to establish the knowledge and practices on bio-medical waste in a population sample of health workers in health care institutions, Kumar *et al.* (2013) employed a cross section study. A limited percentage of health

care workers, 35.4% had biomedical waste management training and skills, as 31% of them were not vaccinated against hepatitis B diseases.

A study on impact of community health awareness and intervention on knowledge, attitude, and behaviors by Karout & Altuwaijri (2012) on waste product management and disposal. The study adopted a questionnaire as a data collection instrument to gather data. The findings indicated vast knowledge on diseases and health risk associated with waste accumulation for the group that attended the training and education programs, positive attitude on managing wastes, and improved waste handling practices which include recycling household wastes. The observation showed an increase in community participation in cleaning and other environmental protection activities.

2.1.3 Attitude towards Waste Management Practices

Eneji *et al.* (2016) conducted a study on waste disposal and waste management. The study hypotheses tested at 0.05 level of significance. The implication of the results is that the residents of Calabar South have very negative attitude towards waste management and disposal, while the second hypothesis tested also showed a significant influence of indiscriminate disposal of waste and the health status of the residents of Calabar South Local Government Area. The study concluded that because of the negative attitude the residents of Calabar South have towards the management and disposal of their waste, it has some significant influence on their health status.

Barloa (2016) did a study to establish the effect of attitudes, practices, and knowledge on waste management on 2528 Polytechnic university student. The findings indicate that 73.4% of the students indicated knowledge to be satisfactory, 71.4% attitude on strategic waste management issues; while around 43.1% depicted satisfactory levels in practice. The relationship depicted a significant interaction between knowledge and attitude and an $r^2 = 0.11$; $p<0.005$ ratings of student prediction. The student rating KAP indicated the link with social status and a significant association with students from families that are medium-sized with parents earning moderate income.

Waste disposal perception and attitude study was conducted by Fearon, and Adraki (2014) in the Tamale Metropolis, Ghana. From the study findings, there was a strong and significant influence and impact on waste disposal by attitude on households as well as payment for waste collection intentions.

2.1.4 Waste Management Practices

Adogu *et al*. (2015) conducted a study in Owerri municipal Imo state residents in Nigeria and found 90% of the respondents on the questionnaire were aware of the waste management with 97.55% showing a positive attitude toward managing wastes and protection of the environmental health. Further, the results showed a 97.1 % of the household wastes comprising of food residues as well as 95.4% being vegetable wastes. Open dumping 66.3% of the sampled population, and burning 62.4% of the population practiced it forms the two poor waste management approaches illustrated in the study. Wheel barrow transportation stood out as the most famous means of waste transportation to the dumping site. The respondent's education and gender significant impact on attitude, practice, and knowledge, attitude and practice of waste management ($p < 0.05$).

A review of waste management practices by Giusti (2009) investigated the impact on human health in municipal waste, and effect of bio aerosol exposure from sewage plant treatment. Results found that municipal waste had adverse impact outcome on health for the population neighboring dumping sites and nuclear installation. In addition Adeyemi and Adeyamo (2006) also found that the main waste disposal practices in wastes have a significant influence on environmental hygiene and human health.

Increase in population in urban centers such as Nairobi has resulted in increased waste management challenges. Lack of funds in the department of urban sanitation and regulations related to sanitation in the city attributes to the increased challenges above. According to Troschinetz and Mihelcic, (2009), over 100 million individuals lack access to better sanitation in East Africa. Dandora in Eastlands, a former marram

quarry is Nairobi's waste dumping site. The human populations living close or neighboring the dumping sites are at risk of getting diseases and unhygienic environment. The wetlands and forested regions are favourable locations for dumping sites.

2.2 Theoretical Framework

2.2.1 Theory of Diffusion of Innovations (DOI on KAP Model)

Based on the theory proposed by Rogers 1962, the diffusion of innovations, new concepts, methods grow over time by spreading in other areas. The time factor in this theory is instrumental as it accounts to the spreading of the different methodologies and waste management concepts across the country and to a greater extend the world. Innovation diffusion theory have formed the basis of various researches in the recent past, integrating innovation into knowledge, attitude, and practice stages of innovation adoption as indicated by Hubbard & Hayashi, (2003).

Continuous environmental education in schools is a key concept to this theory because it consists of raising students' education and awareness level on environmental management through cultivating student's KAP such as K(knowledge) to perception, A (attitude) to affective, and P (practice) to behavior actions. Behavior actions are a result of students learning some skills while P (practice) leads to behavior change and better practices (Wang *et al.*, 2009).

A great variety of studies about attitudes and knowledge have procured a positive and significant relationship between the above two variables. Bowman and Roth (1984) studied how levels of knowledge and attitude towards nature conservation could be raised to positively affect visitor education. For all measured concepts, the findings indicate a positive relationship between waste knowledge, attitude, and practices and waste management.

The other norm that is more subjective holds that a person's financial/economic status is a great determinant of his action and motivation in accomplishing a given task. Owing to this norm, in his/her financial affluence can be more motivated to undertake a task which he/she would otherwise decline from doing when he/she is financially emaciated. To achieve this, carefully drawn education and awareness strategy must be developed in order to change students' habits and behavior and traditions. However, other theories have indicated that having environmental awareness doesn't necessarily mean having better environmental attitude and practices.

2.3 Conceptual Framework

The independent variables are; types of waste, knowledge, attitude and waste practices while the dependent variable is waste management (Figure, 2.1). Types of waste elements include organic waste, inorganic waste, categories and methods of waste disposal. Attitude was measured by assessing attitude towards waste separation, labelling, information sharing and volunteerism. Knowledge was measured by assessing the respondents' knowledge through awareness programs, environmental topics, health problems and training. Waste practices were assessed by way of warning signs, waste collection, transportation and disposal method.

Independent Variable

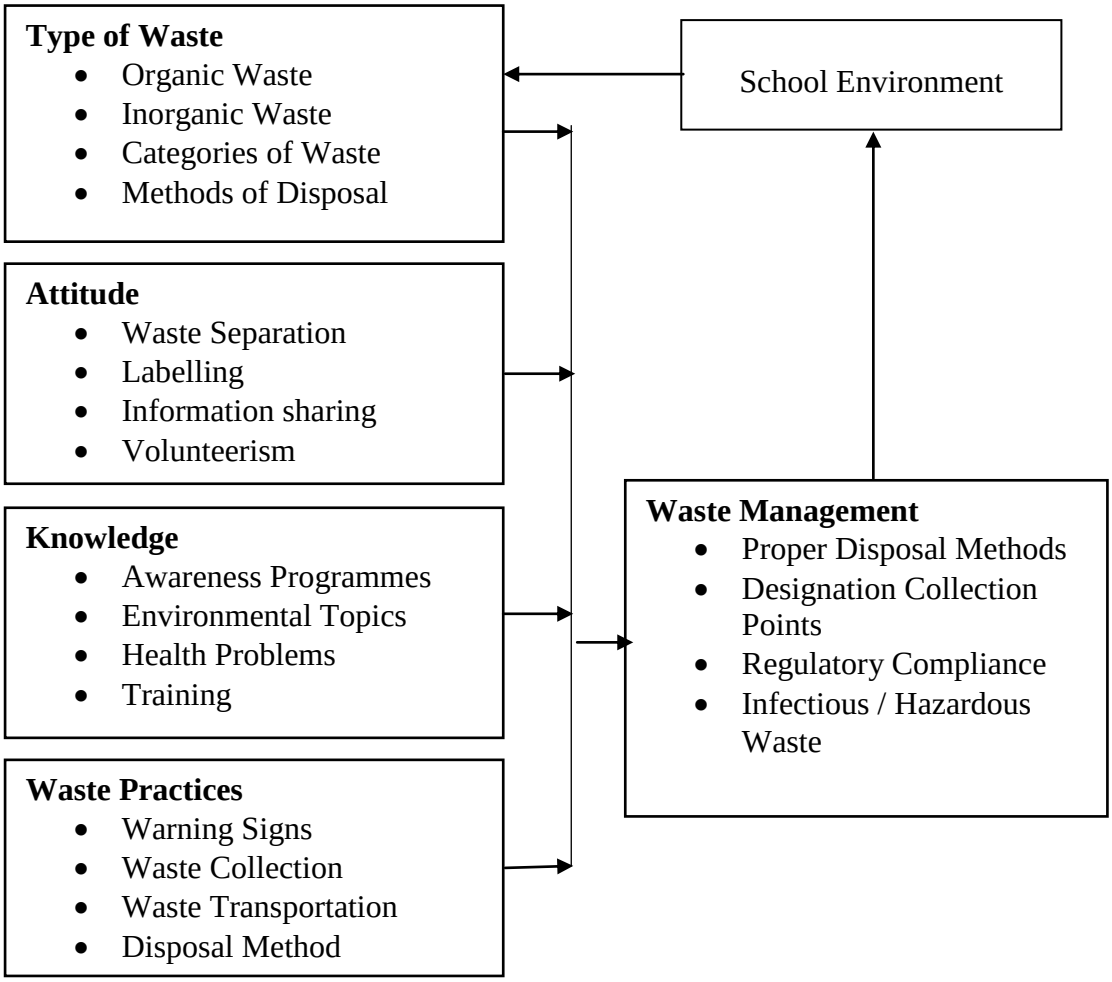

Figure 2.1: Conceptual Framework

Source: Researcher (2018)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Secondary Schools in Westland Sub-county, Kenya

This research was conducted in selected secondary schools of Westland Sub-county and Dagoretti in Nairobi County under 8-4-4 system (Figure 1.1). The administrative demarcations of Nairobi are based on the following divisions: Mathare, Starehe, Westlands, Dagoretti, Makadara, Langata, Embakasi and Kamukunji. Westland Sub-county has got 2 divisions named Westlands and Dagoretti. Many researches are in agreement of the prevailing disparity of densities of population and that of incomes. Those who are generally most affluent are those people living in the suburbs of the west, sharply contrasting with their counterparts who live in the eastern suburbs that are in the lower and middle income levels (NCC, 2010).

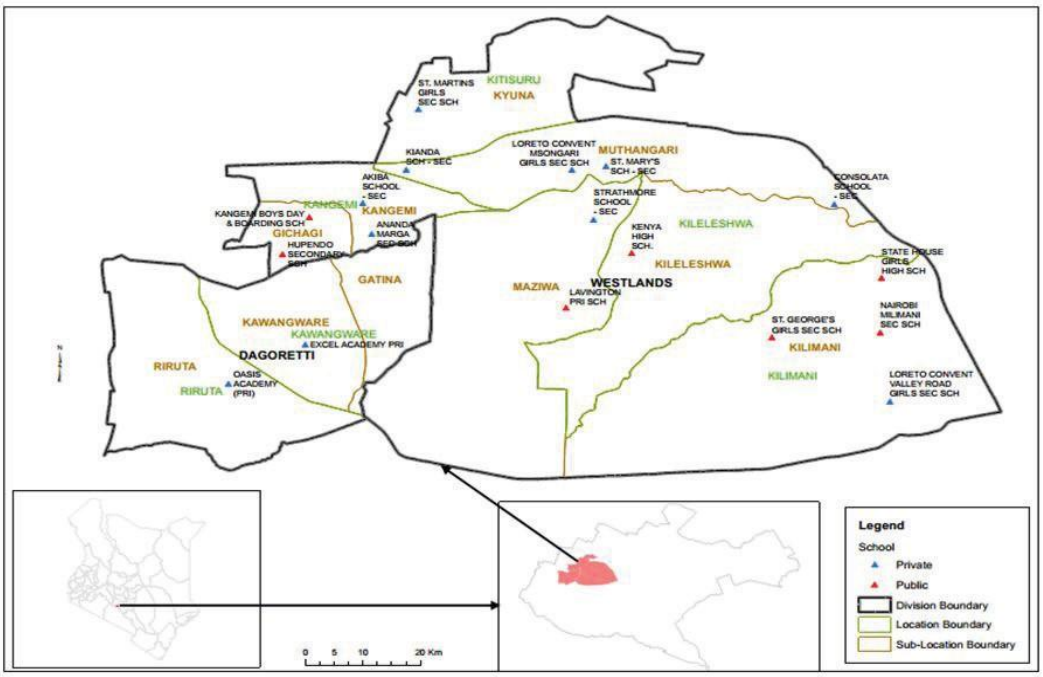

Figure 3.1 Secondary School Distribution in Westlands Sub-county

Source: Sub-county Director of Education Westlands (2016)

Westland Sub-county borders the low income areas of Kawangware. The constituency has an area of 72.4 km^2. It contains some of the highest income areas in Nairobi, as well as low income areas like Kangemi, Deep Sea and Githogoro. Deplorable living conditions and environmental degradation is characteristic lifestyle experience of those living in low income settlements. The brunt of it all is their diminished for low level of participating in social, economic, cultural and political spheres of the city. The most painful of the incidental consequences of these exclusions is the worsening of poverty among the poor (UN Habitat, 2010). Westland Sub-county has 7,188 students with 4,166 in public schools and 3,022 in private schools (Sub-county Director of Education Westlands, 2016).

3.2 Research Design

The research design employed in this study is the descriptive one which refers a systematic and empirical investigation where the researcher has no or little control independent variables due to their inherent nature, thus non-manipulated (Mugenda and Mugenda, 2003).

3.3 Target Population

The total population of students in 20 secondary schools in Westland Sub-county was 7,188 students with 4,166 in public schools and 3,022 in private schools (Sub-county Director of Education Westlands, 2016). The study population comprised all students in the 12 selected schools in Westland Sub-county of which 6 were public schools and 6 were private schools.

Table 3.1: Public Secondary Schools

S/No	Public Secondary School	Boys	Girls	Total
1	Nairobi Milimani Secondary School	174		174
2	Kangemi High School	368		368

3	Lavington Mixed Secondary School	225	161	386
4	St Georges Girls Secondary School		567	567
5	Statehouse Girls		608	608
6	Kenya High School		653	653
S/No	**Private Secondary School**	**Boys**	**Girls**	**Total**
1	Edmwoka			76
2	St Marys School Nairobi	84		84
3	Hupendo School	69	63	132
4	Akiba School	84	57	141
5	Milkan School	69	85	154
6	Oasis			180
7	Excel School	86	124	210
8	Consolata School	135	109	244
9	Kianda School		251	251
10	St Martins Kibagari			265
11	Anandamarga Academy	151	129	280
12	Loreto Convent Valleyroad		283	283
13	Strathmore School	341		341
14	Loreto Convent Msongari		381	381
	Total			**3,022**
	Grand Total			**7188**

Source: Sub-county Director of Education Westlands (2016)

3.4 Sampling Design

Cluster stratified sampling technique was used to determine the sample size. According to The sample size of our study population was calculated using the formula of (Cochran 1963); Formula for calculation of a sample size

$$n = \frac{N}{1+ N (e)^2}.$$

N = Total Population

n = Sample size

e = the desired level of precision (margin of error) (The margin of error is taken to be 10% for economical expediency purposes).

The total number (n) of students in the 12 selected schools (6 public and 6 private schools) was 3887 students.

$$n = \frac{3887}{1+ 3887\ (0.12)^2} = 68.22 \text{ therefore } 70 = \text{sample size}$$

The sample size of each selected school was obtained using proportional allocation through the formula of (Kothari, 2011); Simple random sampling technique was used for questionnaire distribution. The number of students per school determined the number of questionnaires administered to students.

For example; calculation of sample size in St Georges Girls Secondary School which has 567 students

$$PA = \frac{\text{Number of elements selected}}{\text{The total population size}} \times 12 = 567 / 3887 * 70 = 10 \text{ Students}$$

3.5 Data Collection Instrument

Properly designed questionnaires were used in collecting the primary data on waste knowledge, attitude, practices and their influence on waste management. This instrument was convenient, time and financial conserving making the questionnaire as the most favorable instruments to help capture primary data.

3.6 Data Collection Procedure

Data collection entails acquiring and gathering relevant information deployed depending on the research design in question, data collection methods are selected (Kothari, 2004). In administering the questionnaire for the purpose of capturing the primary data, two approaches are used: self-administered and the drop and pick approaches.

3.7 Validity and Reliability

The pretesting of the questionnaire was instrumental and vital to ensure it was faultless and understandable by the respondents. The discussion with two random respondents helped prove the validity and relevance of the questionnaire. The respondents who participated in the reliability test were not included in the final study.

3.8 Data Analysis and Presentation

Data was analysed using descriptive statistics such as frequencies, mean and standard deviation and displayed using tables and figure.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Students Characteristics

4.1.1 Gender and Age of the Respondents

About 52.3% of the respondents were female while 47.7% of the respondents were female. The age brackets were divided into those below 15 years and those above 15 years. Majority of the respondents (72.7%) of the respondents were above 15 years while 27.3% of the respondents were below 15 years.

4.1.2 Proportion of Respondents per School

The respondents were from both the public and private schools. Majority of the respondents (61.4%) indicated that they came from public schools while 38.6% of the respondents indicated that they came from private schools. Public schools included Nairobi Milimani Secondary School, which had had 3 respondents, Lavington Mixed Secondary School having 7 respondents, Kangemi High School with 9 respondents, St Georges Girls Secondary School, Statehouse Girls had 5 respondents and Kenya High School having 4 respondents (Figure 4.1).

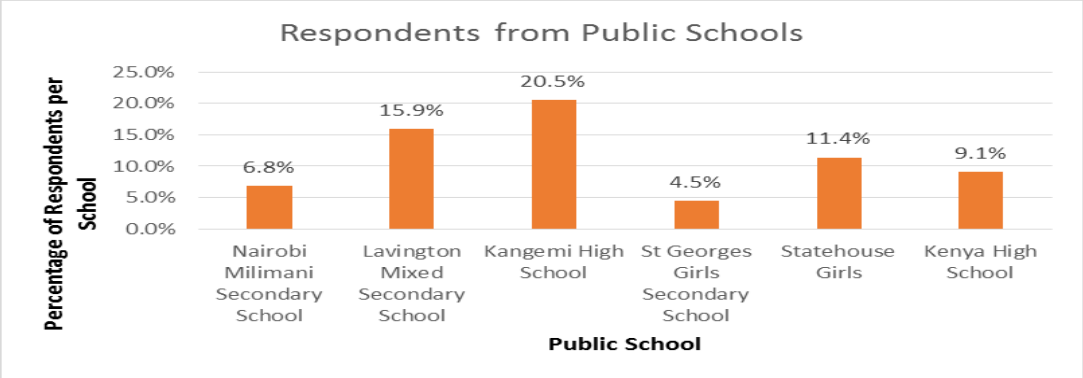

Figure 4.1: Respondents from Public School

Source: Researcher (2018)

The private schools covered in the survey included St Martin Girls Secondary School which had 6 respondents, while Hupendo School had 4 respondents. Milkan Elite School had 2 respondents, and Consolata School had 2 respondents. The findings were presented in Figure 4.2.

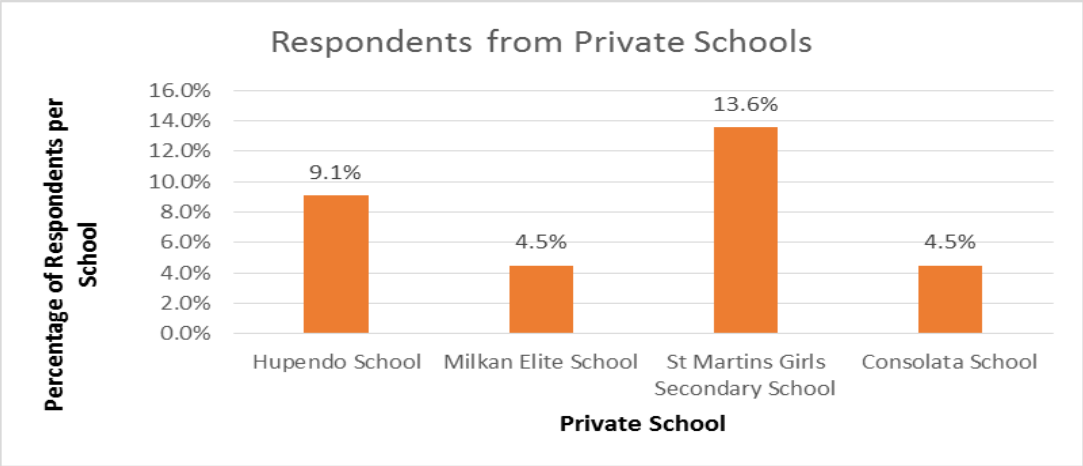

Figure 4.2: Respondents from Private Schools

Source: Researcher (2018)

4.1.3 Year of Student Joining School

Majority of the students (59.1%) joined their respective school in 2017 while 18.2% of the respondents joined their schools in 2016. About 13.6% of the respondents joined in 2013 while 9.1% joined in 2015 as presented in Figure 4.3.

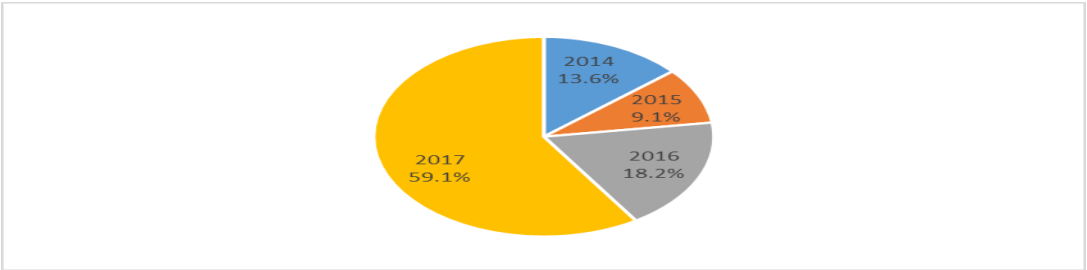

Figure 4.3: Year of Student Joining School

Source: Researcher (2018)

4.1.4 Former Schools of the Respondents

The researcher found out that the respondents came from the following schools before joining their current schools. These include; Bridge International, Brother Beausang Academy, Children Angels of God Academy, Clonne Academy, Embakasi Primary School, Excel School, Gatoto Primary School, Hupendo Primary School, Jamhuri Primary School, Jaribu Primary School, Kamandura Girls, Kangemi Primary School, Kangundo Girls High School, Karura Forest Primary, Kavuko Clusters Primary School, Kibera Primary School and Kins Favor Academy (Table 4.1).

Table 4.1: Former Schools of the Respondents

Former School	Public School	Private School	Total
Bridge International	2	0	2
Brother Beausang Academy	1	0	1
Children Angels of God Academy	0	1	1
Clonne Academy	1	0	1
Embakasi Primary School	1	0	1
Excel School	0	1	1
Gatoto Primary School	1	0	1
Hupendo Primary School	1	0	1
Jamhuri Primary School	1	0	1
Jaribu Primary School	1	0	1
Kamandura Girls	0	1	1
Kangemi Primary School	2	2	4
Kangundo Girls High School	0	1	1
Karura Forest Primary	1	0	1
Kavuko Clusters Primary School	0	2	2
Kibera Primary School	1	0	1
Kins Favor Academy	0	1	1
Kinyanjui Road Primary School	1	0	1
Little Prince Primary School	1	0	1
Maii Central High School	1	0	1
Milkan Primary School	0	1	1
Missions of Hope	1	0	1
Muthiga Academy	1	0	1
Muthiga Girl sHigh School	1	0	1
Ndurarua Primary School	1	0	1
New Kihumbuiini Primary School	0	2	2

Ngetho Primary	1	0	1
Precious Gift, Komarock	1	0	1
Premese Makueni Academy	1	0	1
Ronald Ngala Primary School	1	0	1
Shangilia Primary	1	0	1
Shidodo Primary School	1	0	1
Shining Star Primary	1	0	1
St Joseph Prmary School	0	1	1
St Mary's Girls Thigio	1	0	1
St Pauls Academy	0	1	1
St Peters Clavers	1	0	1
Tumaini Primary School	1	0	1
Total	**30**	**14**	**44**

Source: Researcher (2018)

Others are Kinyanjui Road Primary School, Little Prince Primary School, Maii Central High School, Milkan Primary School, Missions of Hope, Muthiga Academy, Muthiga Girl sHigh School, Ndurarua Primary School, New Kihumbuiini Primary School, Ngetho Primary, Precious Gift, Komarock, Premese Makueni Academy, Ronald Ngala Primary School, Shangilia Primary, Shidodo Primary School, Shining Star Primary, St Joseph Prmary School, St Mary's Girls Thigio, St Pauls Academy, St Peters Clavers and Tumaini Primary School.

4.1.5 Residential Area of the Students

As presented in Table 4.2, among the areas indicated by the respondents included; Dandora, Donholm, Eastleigh, Embakasi East, Huruma, Kangemi, Karura, Kawangware, Kibagare, Kibbra, Komarock, Kyuna, Mathare North, Mountain View, Mukurukwa Reuben, RirutaSatelite, Ruai, Sattelight, Uthiru and Waithaka (Table 4.2).

Table 4.2 : Residential Category of the Students

Residential Area	Hupendo School	Kangemi High School	Milkan Elite School	St Martins Girls Secondary School	Total
Kibagare	0	0	0	14	**14**
Kangemi	3	2	3	0	**8**
Kawangware	3	0	0	0	**3**
Mountain View	2	0	1	0	**3**
Dandora	0	1	0	0	**1**
Donholm	0	1	0	0	**1**
Eastleigh	0	1	0	0	**1**
Embakasi East	0	1	0	0	**1**
Huruma	0	1	0	0	**1**
Karura	0	1	0	0	**1**
Kibbra	0	1	0	0	**1**
Komarock	0	1	0	0	**1**
Kyuna	0	1	0	0	**1**
Mathare North	0	1	0	0	**1**
Mukuru kwa Reuben	0	1	0	0	**1**
Riruta Satelite	0	1	0	0	**1**
Ruai	0	1	0	0	**1**
Sattelight	0	1	0	0	**1**
Uthiru	0	1	0	0	**1**
Waithaka	0	1	0	0	**1**
Total	**8**	**18**	**4**	**14**	**44**

Source: Researcher (2018)

4.1.6 Number of Students in the Class of the Respondents

About 36.4% of the respondents indicated that their class had more than 55 students while 29.5% of the respondents indicated that their class had between 36 and 55 students (Figure 4.4). About 34.1% of the respondents indicated that their respective class had less than 35 students (Figure 4.4).

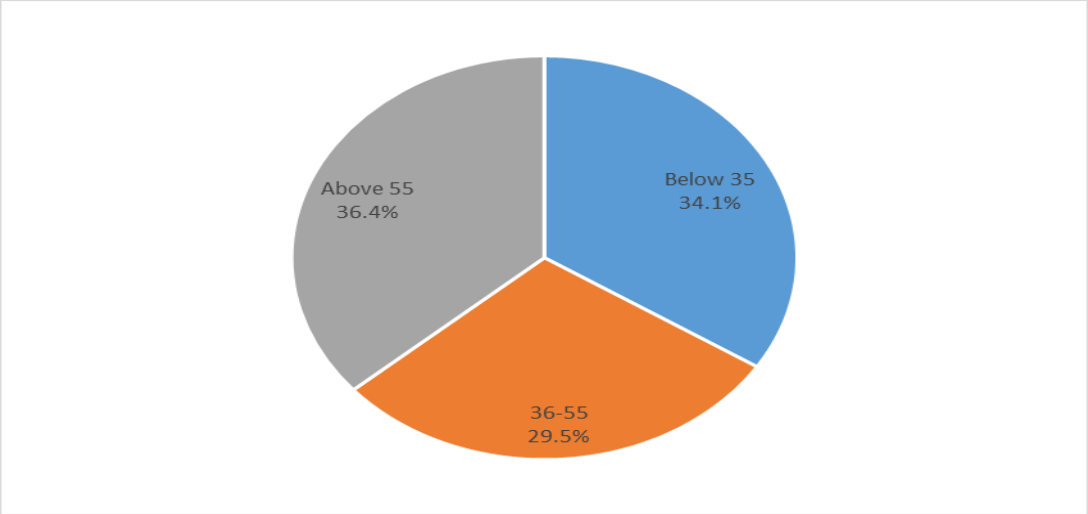

Figure 4.4: Number of Students in the Class of the Respondents

Source: Researcher (2018)

4.2 Types of Waste Produced

4.2.1 Organic Waste

Majority of the respondents (40.9%) indicated that the leading form of organic waste is from used papers and folders. Other waste was in form of food left overs 25%, pencils 13.6% and from flower trimmings 9.1%. According to the respondents, the least kind of waste produced fell in the category of pieces of cloth and fruit/ vegetable peels with 6.8% and 4.5% respectively (Table 4.3).

Table 4.3: Organic Waste

Organic Waste	Frequency	Percent (%)
Used Papers and folders	18	40.9
Food left overs	11	25.0
Pencils	6	13.6
Flower trimmings	4	9.1
Pieces of clothes	3	6.8
Fruit & vegetable peels	2	4.5
Total	**44**	**100**

Source: Researcher (2018)

4.2.2 Inorganic Waste

Majority of the respondents (75%) indicated that the mostly produced plastics as inorganic waste. 15.9% of the respondents indicated that the mostly inorganic waste produced empty bottles used for drinks while 13.6% of the respondents indicated that they mostly produced plates. Some respondents (6.8%) indicated that they mostly produced bags while 2.3% of the respondents indicated that the mostly produced inorganic waste was filing cabinets (Table 4.4).

Table 4.4: Inorganic Waste

Inorganic Waste	Frequency	Percent (%)
Plastics	33	75
Plates	7	15.9
Filing Cabinets	1	2.3
Bags	3	6.8
Total	**44**	**100**

Source: Researcher (2018)

4.2.3 Units producing Waste

Half of the respondents indicated that the highest amount of waste was produced in classrooms which included used papers, folders and pens. Dormitories followed according to the research findings as indicated by 22.7% of the respondents. Another 22.7% of the respondents indicated that the kitchen as a unit produced while the school garden was least as indicated by 4.5% of the respondents (Figure 4.5).

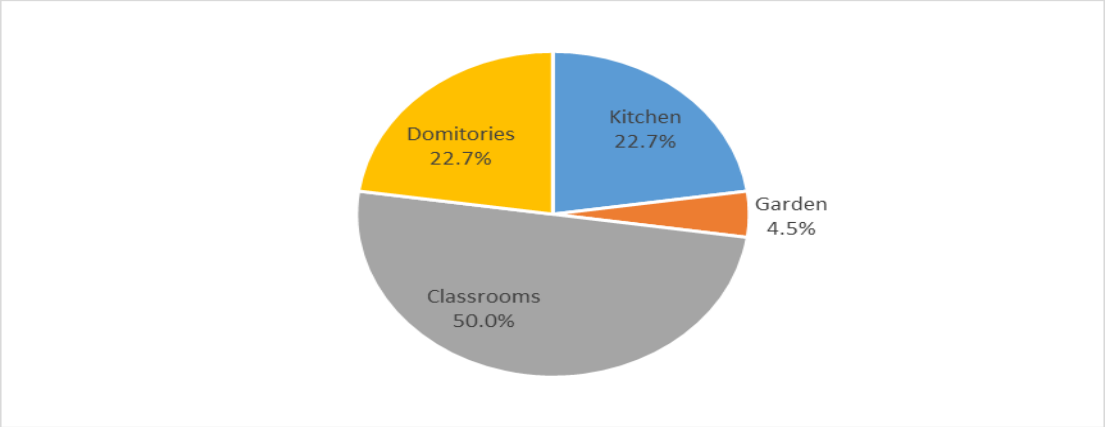

Figure 4.5: Units producing Waste

Source: Researcher (2018)

4.2.4 Categories of Waste

Most respondents (52.3%) indicated that paper waste was found in high amount in their school. According to 69.7% of the respondents' food waste was found in a low amount in their school. 97.7% of the respondents indicated that glass waste was found in low amounts in their school. Most respondents (97.7%) indicated that wood waste was found in low amounts in their respective school. 70.5% of the respondents indicated that plastics waste was found in low amounts in their school. 81.8% of the respondents indicated that cans waste was found in low amounts in their school. Most respondents (84%) indicated that metal waste was found in low amount in their respective institution. 65.9% of the respondents indicated that pens as waste were found in low amount in their school. Majority of the respondents (88.6%) indicated that bones and cardboard were found in low amount in their school. 68.2% of the respondents indicated that pieces of clothes were found in low amount in their institution. Majority of the respondents (88.7%) indicated that charcoal as waste was found in low amount in their school. 32.2% of the respondents indicated other kinds of waste were found in low amount in their school (Table 4.5).

Table 4.5: Perceived Categorization of Waste

Category	Very Low Amount	Low Amount	Middle	High Amount	Very High Amount	Mean	Std. Dev
Paper waste	13.6%	13.6%	9.1%	11.4%	52.3%	3.8	1.54
Pens	34.1%	31.8%	9.1%	13.6%	11.4%	2.4	1.38
Pieces of Clothes	56.8%	11.4%	11.4%	4.5%	15.9%	2.1	1.53
Food waste	39.5%	30.2%	20.9%	7.1%	2.3%	2.0	1.06
Plastics waste	34.1%	36.4%	29.5%	0.0%	0.0%	2.0	0.81
Wood waste	56.8%	40.9%	0.0%	2.3%	0.0%	1.5	0.63
Cans waste	77.3%	4.5%	11.4%	6.8%	0.0%	1.5	0.95
Charcoal	77.3%	11.4%	6.8%	2.3%	2.3%	1.4	0.90
Metal waste	79.5%	4.5%	13.6%	2.4%	0.0%	1.4	0.81
Cardboards	79.5%	9.1%	6.8%	2.3%	2.3%	1.4	0.90
Glass waste	81.8%	15.9%	0.0%	0.0%	2.3%	1.3	0.69
others	28.6%	3.6%	57.1%	7.1%	3.6%	1.2	1.11
Average	**53.5%**	**18.5%**	**14.0%**	**5.5%**	**8.5%**	**2.0**	**1.06**

Source: Researcher (2018)

4.2.5 Waste Disposal Method

Waste disposal varied among schools with 27.3% using open burning of dry waste, followed by incineration at 22.7%. About 15.9% use dust bins and 15.9% uses dump pits respectively. About 6.8% use municipal buckets and another 6.8% of the respondents use recycling while 2.3% was landfill site. Composting of waste was identified as the waste disposal method by 2.3% of the respondents (Table 4.6).

Table 4.6: Waste Disposal Method

Waste Disposal Method	Frequency	Percent (%)
Open burning of dry waste	12	27.3
Incineration	10	22.7
Dust bins	7	15.9
Dump pits	7	15.9
Municipal buckets	3	6.8
Recycling	3	6.8
Landfill site	1	2.3
Composting waste	1	2.3
Total	**44**	**100**

Source: Researcher (2018)

4.2.6 Waste Collection Services

Majority of the respondents (72.7%) indicated that they used private services while 18.2% of the respondents indicated that the county government was responsible for waste collection. 2.3% of the respondents indicated that religious services did waste collection in their school while 6.8% of the respondents indicated that waste in their school was collected using other means. Other means stated by the respondents included the National Youth Service and Garbage collectors (Figure 4.6).

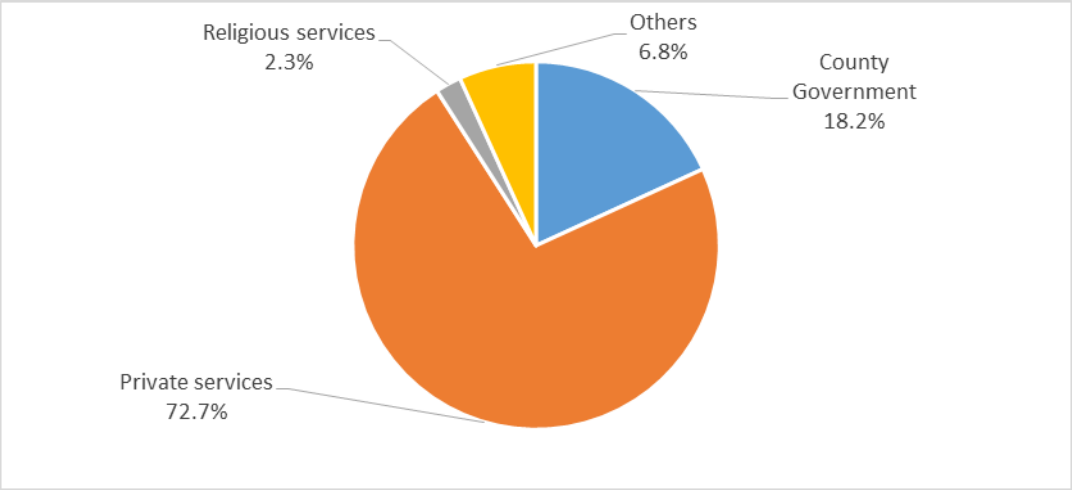

Figure 4.6: Waste Collection Services

Source: Researcher (2018)

4.3 Attitude

4.3.1 Handling of Waste

Majority of the respondents (63.6%) stated that they were not worried about waste being handled in their respective premises. 36.4% of the respondents indicated that they were worried about waste was handled in their respective premises. For those who stated that they were worried, some indicated that burning should not be encouraged as it is harmful to the environment (Figure 4.7).

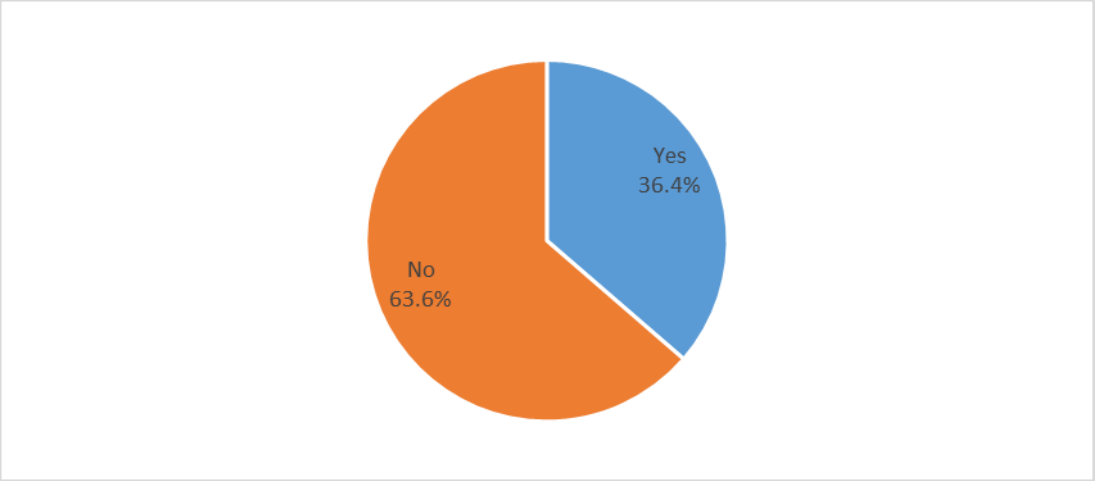

Figure 4.7: Waste Handling

Source: Researcher (2018)

4.3.2 Level of Concern on Waste Handling

Majority of the respondents (47.8%) indicated that they were worried about waste in the school premises. 47.7% of the respondents indicated that they were interested about waste in their respective schools. 72.8% of the respondents indicated that they regarded the way students handled waste in their school as important. Majority of the respondents (63.6%) indicated that they were satisfied with the way students handled waste in their school. Majority of the respondents (81.8%) indicated that they were satisfied with the way the management handled waste. Most respondents (55.5%) indicated that they often reminded other students to separate waste. 72.7% of the respondents indicated that they often shared information on waste management with other students (Table 4.7).

Table 4.7 : Level of Concern on Waste Handling

Response	Not Sure	Not Worried	Worried	Very Worried	Mean	Std. Deviation
Worry on waste in school premises	9.1%	43.2%	20.5%	27.3%	2.7	0.99
Response	**Not Sure**	**Not Interested**	**Interested**	**Very Interested**	**Mean**	**Std. Deviation**
Interest in waste	9.1%	43.2%	22.7%	25.0%	2.6	0.97
Response	**Not Sure**	**Not Important**	**Important**	**Very Important**	**Mean**	**Std. Deviation**
Importance in Handling waste	2.3%	25.0%	36.4%	36.4%	3.1	0.85
Response	**Very Dissatisfied**	**Dissatisfied**	**Satisfied**	**Very Satisfied**	**Mean**	**Std. Deviation**
Satisfaction about how other students handle waste	15.9%	20.5%	34.1%	29.5%	2.8	1.05
Satisfaction about how management handles waste	9.1%	9.1%	47.7%	34.1%	3.1	0.90
Response	**Very often**	**Quite often**	**Often**	**Not Often**	**Mean**	**Std. Deviation**
Frequency in reminding other students to separate waste	31.8%	27.3%	18.2%	22.7%	2.3	1.16
Frequency in sharing information on waste management	38.6%	34.1%	13.6%	13.6%	2.0	1.05

Source: Researcher (2018)

4.3.3 Waste Separation

Most respondents (52.3%) indicated that they did not separate waste before its disposal. 84.1% of the respondents indicated that they had class containers and dustbins in their school. 81.8% of the respondents indicated that they had outside containers/ dustbins for waste disposal. For those that had the containers, 68.2% indicated that the containers were not labelled for separation of biodegradable and non-biodegradable waste. 52.3% of the respondents indicated that did not have an incinerator/ burning chamber in their school (Table 4.8).

Table 4.8: Waste Separation

Separation	Yes (%)	No (%)
Separation of waste before its disposal	43.2	52.3
Access to class containers or dustbins	84.1	15.9
Availability of outside containers/dustbins for waste disposal	81.8	18.2
Labelling of containers on biodegradable and non-biodegradable waste	31.8	68.2
Availability of an incinerator /burning chamber	47.7	52.3

Source: Researcher (2018)

4.3.4 Attitude and Waste Management

Majority of the respondents (86.4%) agreed that they believed that improper waste disposal is a threat to environment. 88.7% of the respondents indicated that waste management was their responsibility and not only that of the school support staff. 63.7% of the respondents agreed that waste disposal was the responsibility of the local authorities. Majority of the respondents (70.4%) agreed that they were responsible for the generation of waste in my school. 95.5% of the respondents agreed that they believed that they had a role in minimizing waste in their respective school. 93.2% of the respondents agreed that they were responsible for reminding other students on proper waste disposal (pick and dispose waste). Majority of the respondents (91.2%) agreed that it was important for them to read and share information on waste management with other students. 95.7% of the respondents agreed that it was important to volunteer in school cleaning activities. The overall mean was 4.1 with a standard deviation of 0.94. These findings imply that attitude was an important determinant of waste management (Table 4.9).

Table 4.9: Attitude and Waste Management

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
Waste disposal is a threat	2.3%	11.4%	0.0%	15.9%	70.5%	4.4	1.11
Responsibility in waste management	6.8%	4.5%	0.0%	20.5%	68.2%	4.4	1.17
Local authorities responsibility	18.2%	45.5%	2.3%	29.5%	4.5%	2.6	1.23
Generation of waste	11.4%	13.6%	4.5%	47.7%	22.7%	3.6	1.30
Waste minimization role	0.0%	0.0%	4.5%	27.3%	68.2%	4.6	0.57
Reminding other students on proper waste disposal	0.0%	2.3%	4.5%	34.1%	59.1%	4.5	0.70
Sharing information with other students	0.0%	2.3%	4.5%	36.4%	56.8%	4.5	0.70
Volunteerism in cleaning activities	2.3%	0.0%	2.0%	36.6%	59.1%	4.5	0.73
Average						**4.1**	**0.94**

Source: Researcher (2018)

4.4 Knowledge and Waste Management

4.4.1 Awareness Programs and Environmental Topics

Half the respondents indicated that there were awareness programs in their respective schools while 72.7% of the respondents indicated that there were no environmental topics in their curriculum on waste management in their school (Table 4.10).

Table 4.10 : Awareness Programs and Environmental Topics

Statement	Yes (%)	No (%)
Awareness programs	50	50
Environmental topics	27.3	72.7

Source: Researcher (2018)

To enhance knowledge and awareness in their schools, some students stated that the school should come up with environmental topics in the curriculum, educate the public on the effects of environmental pollution, putting proper signage among others. Challenges faced in regard to waste management as cited by the respondents included; displacement of waste by children, students not following rules related to waste, lateness or sometimes no picking up of waste by waste collectors, inadequate waste facilities among others. Human health problems caused by inadequate waste disposal as cited by the respondents included; typhoid, cholera, bilharzia, malaria, skin diseases, tuberculosis among others. Environmental health problems caused by inadequate waste disposal as cited by the respondents included; air pollution, soil pollution, water pollution among others.

4.4.2 Knowledge and Waste Management

Majority of the respondents (47.7%) agreed that they attended awareness programmes conducted in schools regarding waste management. 70.4% of the respondents agreed that they knew about principles of waste minimization and segregation of waste. Most respondents (84%) agreed that they knew the complications of improper waste management. Majority of the respondents (95.5%) agreed that they should have environmental topics in their curriculum. 90.9% of the respondents agreed that they knew about environmental problems related to waste. Most respondents (97.7%) agreed that they should be aware of the importance of using protective clothing, i.e. gloves, appropriate cloths, masks, etc. for handling waste. The overall mean was 4.1 with a standard deviation of 0.93. The findings imply that knowledge is an important determinant of waste management (Table 4.11).

Table 4.11: Knowledge and Waste Management

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
Awareness programmes	9.1%	36.4%	6.8%	22.7%	25.0%	3.2	1.40
Principles of waste minimization	2.3%	13.6%	13.6%	54.5%	15.9%	3.7	0.98
Complications of improper waste management	6.8%	4.5%	4.5%	29.5%	54.5%	4.2	1.17
Environmental topics	0.0%	0.0%	4.5%	45.5%	50.0%	4.5	0.59
Environmental problems	2.3%	0.0%	6.8%	65.9%	25.0%	4.1	0.72
Importance of protective clothing	2.3%	0.0%	0.0%	22.7%	75.0%	4.7	0.71
Average						**4.1**	**0.93**

Source: Researcher (2018)

4.4.3 Motivational Training and Improvement

Majority of the respondents (54.5%) indicated that there were motivational trainings in their respective role in waste management. Majority of the respondents (88.6%) indicated that something could be done to improve their knowledge towards waste management (Table 4.12).

Table 4.12: Motivational Training and Improvement

Statement	Yes (%)	No (%)
Motivational trainings	45.5	54.5
Waste management improvement areas	88.6	11.4

Source: Researcher (2018)

4.5 Waste Practices and Waste Management

4.5.1 Waste Practices

Most respondents (54.5%) indicated that there were warning signs indicating that people should not dump waste anywhere but in designated waste bins. 61.4% of the respondents indicated that there is a club in their school that deals with matters of waste and waste management. 95.5% of the respondents agreed that they reminded other people to collect waste in their respective classes in case they dropped it. Most respondents (63.6%) indicated that there were qualified personnel assigned to handle waste in their school. 88.6% of the respondents indicated that they thought there were better practices that could be adopted in waste management (Table 4.13).

Table 4.13: Waste Practices

Statement	Yes (%)	No (%)
Warning signs	45.5	54.5
Presence of a waste club	61.4	38.6
Reminding other people to collect waste in class when they drop it	95.5	4.5
Qualified personnel for waste handling	63.6	36.4
Better waste practices that could be adopted	88.6	11.4

Source: Researcher (2018)

4.5.2 Waste Practices and Waste Management

Majority of the respondents (84.1%) agreed that control of waste at the school was done on a regular basis. 72.7% of the respondents agreed that separation of waste at source points in the school was done to help in waste management. 75% of the respondents agreed that waste collection method and storage of waste was effectively carried out at the school. 68.2% of the respondents agreed that transportation of waste from the school to the disposal sites was done is a professional way by qualified personnel. Majority of the respondents (88.6%) agreed that waste disposal method was determined by the type and nature of waste collected in the school. The overall mean was 3.9 with a standard deviation of 1.12. The findings imply that the schools

had put in place practices aimed at handling and taking care of waste in their respective institutions and that these practices were functional (Table 4.14). The findings are consistent with Alam and Ahmade (2013) and Arora and Agarwal (2011) who studied knowledge, attitude and practices regarding waste management in selected hostel students of University of Rajasthan and found that knowledge, attitude and practices of University students regarding waste management was low, less favorable and moderate respectively and correlation between knowledge, attitude and practices was positive.

Table 4.14:Waste Practices and Waste Management

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
Control of waste at a regular basis	0.0%	15.9%	0.0%	61.4%	22.7%	3.9	0.94
Separation of waste at source points	9.1%	11.4%	6.8%	47.7%	25.0%	3.7	1.24
Waste collection method and storage	9.1%	13.6%	2.3%	38.6%	36.4%	3.8	1.32
Transportation of waste from the school to the disposal sites	11.4%	13.6%	6.8%	45.5%	22.7%	3.6	1.30
Type and nature of waste collected in the school	0.0%	4.5%	6.8%	34.1%	54.5%	4.4	0.81
Average						**3.9**	**1.12**

Source: Researcher (2018)

4.5.3 Waste Practices and Methods

Majority of the respondents (47.7%) agreed they felt that composting waste was adequately done in the school. 47.7% of the respondents agreed that open burning of waste was highly encouraged in the school. 88.7% of the respondents agreed that incineration was the responsibility of the school management and should be encouraged. 90.9% of the respondents agreed they felt that dump bins and dump sites

were well placed in the school premises. 86.4% of the respondents agreed they believed that recycling should be encouraged more than other practices before waste was disposed. The overall mean for waste practice elements was 3.8 with a standard deviation of 1.09. The findings imply that waste practices and methods were important determinants of waste management (Table 4.15). The findings are consistent with those of Fearon, and Adraki (2014) who studied the perceptions and attitudes of waste disposal behaviors in the Tamale Metropolis, Ghana who found a strong determinant of waste management with a positive and significant relationship between attitude and waste management.

Table 4.15: Waste Practices and Methods

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
Composting waste	2.4%	33.3%	16.7%	31.0%	16.7%	3.3	1.17
Open burning of waste	20.5%	20.5%	11.4%	29.5%	18.2%	3.1	1.45
Incineration	4.5%	2.3%	4.5%	43.2%	45.5%	4.2	0.99
Dump bins and dump sites	0.0%	2.3%	6.8%	47.7%	43.2%	4.3	0.71
Recycling	6.8%	4.5%	2.3%	36.4%	50.0%	4.2	1.15
Average						**3.8**	**1.09**

Source: Researcher (2018)

4.6 Waste Management

4.6.1 Waste Management Assessment

Most of the respondents (70.5%) indicated that they were satisfied with the way waste was managed in their respective schools. Majority of the respondents (70.5%) felt that waste was disposed according to schedule (Table 4.16).

Table 4.16: Waste Management Assessment

Statement	Yes (%)	No (%)
Satisfaction with waste management	70.5	29.5
Waste disposed according to schedule	70.5	29.5

Source: Researcher (2018)

4.6.2 Waste Management in Schools

Most of the respondents (93.2%) agreed that waste materials were not disposed to rivers, canals, sea, or vacant lots. Majority of the respondents (90.9%) agreed that waste materials were disposed properly in the designated trash bins. 45.4% of the respondents agreed that waste materials were disposed according to the methods prescribed by the government while 72.8% of the respondents agreed that waste was disposed in the designated collection area. 90.9% of the respondents agreed that paper waste, pens, pieces of clothes, food waste, plastics waste, cardboards, glass waste and other waste substances were disposed properly. The overall mean is 4.1 with a standard deviation of 0.95. The findings indicate that waste management was determined by how well knowledge, attitude and practices in regard to the waste was done as indicated by the overall mean (Table 4.17). The findings agree with those of Adeyemi and Adeyamo (2006) studied waste management practices at the Bodija abattoir, Nigeria and found that the main waste disposal practice at Bodija abattoir is dumping. The researcher found other practices around waste knowledge, attitude and practices and waste management practices was positively associated and hence proper disposal led to better waste management.

Table 4.17: Waste Management in Schools

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
Waste Materials are not disposed to rivers, canals, sea, or vacant lots	4.5%	2.3%	0.0%	27.3%	65.9%	4.5	0.98
Waste Materials are disposed in trash bins.	0.0%	6.8%	2.3%	61.4%	29.5%	4.1	0.77
Waste Materials are disposed according to prescribed methods	11.4%	20.5%	22.7%	29.5%	15.9%	3.2	1.26
Waste disposed in designated collection area.	0.0%	4.5%	22.7%	36.4%	36.4%	4.1	0.89
Infectious Waste, chemical waste disposed properly	0.0%	6.8%	2.3%	27.3%	63.6%	4.5	0.85
Average						**4.1**	**0.95**

Source: Researcher (2018)

4.7 Discussion

From the study findings, results indicated that the schools produced food left overs which was followed by pen, flower trimmings, pieces of clothes and fruit & vegetable peels, mostly produced plastics as inorganic waste, empty bottles used for drinks, bags and bookcases and filing cabinets. The units which produced waste included classrooms, dormitories and kitchen. Practices adopted in dealing with waste included open burning of dry waste, incineration, dust bins and dump pits, municipal buckets and recycling, landfill site and composting waste. Those responsible of waste collection services included private services, county government, religious services and other means. Other means included National Youth Service and Garbage collectors.

The study findings indicated that knowledge was a determinant of waste management. This was supported by majority of the respondents who agreed that they attended awareness programmes conducted by local authority and school regarding waste management and had learnt about principles of waste minimization and segregation of waste. They had also been sensitized on complications of improper waste management, about environmental problems related to waste and that they should be aware of the importance of using protective clothing, i.e. gloves, appropriate cloths, masks, etc. For handling waste. However, these findings are contrary to those of Alam and Ahmade (2013) and Arora and Agarwal (2011) who studied knowledge, attitude and practices regarding waste management in selected hostel students of University of Rajasthan and found that knowledge, attitude and practices of University students regarding waste management was low, less favorable and moderate respectively and correlation between knowledge, attitude and practices was positive.

From the study results attitude was a determinant of waste management. This was supported by majority of the respondents who agreed that waste management was their responsibility and not only that of the school support staff. The respondents also agreed that they were responsible for the generation of waste in my school and that they believed that they had a role in minimizing waste in their respective school. In addition, they agreed that they were responsible for reminding other students on proper waste disposal and that it was important for them to read and share information on waste management with other students. The findings agree with those of Eneji *et al*. (2016) who studied the attitude towards waste management and disposal methods and the health status of Cross River State, Nigeria and their studies showed a significant influence of indiscriminate disposal of waste and the health status of the residents. They are also consistent with Fearon, and Adraki (2014) studied the perceptions and attitudes of waste disposal behaviors in the Tamale Metropolis, Ghana who found a strong determinant of waste management with a positive and significant relationship between attitude and waste management.

The findings indicated that waste practices were a determinant of waste management. This was supported by majority of the respondents who agreed that control of waste at the school was done on a regular basis, separation of waste at source points in the school was ensured to help in waste management, waste collection method and storage of waste was effectively carried out at the school, transportation of waste from the school to the disposal sites was done is a professional way by qualified personnel and that waste disposal method was determined by the type and nature of waste collected in the school. Adeyemi and Adeyamo (2006) studied waste management practices at the Bodija abattoir, Nigeria and found that the main waste disposal practice at Bodija abattoir is dumping. The researcher found other practices around waste disposal included control of waste; separation of waste, waste collection and storage practices and transportation of waste in the most appropriate way.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter presented the summary, conclusion and recommendations for the study.

5.2 Summary of Findings

The first objective was to find out the types of waste produced and waste management practices. Results indicated that the schools produced food left overs which was followed by pen, flower trimmings, pieces of clothes and fruit & vegetable peels. The mostly produced plastics inorganic waste was empty bottles used for drinks, bags and bookcases and filing cabinets. The units which produced waste included classrooms, dormitories and kitchen. Practices adopted in dealing with waste included open burning of dry waste, incineration, dust bins and dump pits, municipal buckets and recycling, landfill site and composting waste. Those responsible for waste collection services included private services, county government, religious services and other means. Other means included National Youth Service and Garbage collectors.

The second objective find out the relationship between knowledge and waste management practices. The findings indicated that knowledge was a determinant of waste management. This was supported by majority of the respondents who agreed that they attended awareness programmes conducted by local authority/ school regarding waste management, they knew about principles of waste minimization segregation of waste, they knew the complications of improper waste management, about environmental problems related to waste and that they should be aware of the importance of using protective clothing, i.e. gloves, appropriate cloths, masks, etc. for handling waste.

The third objective was to assess the effect of attitude and waste management practices. The findings indicated that attitude was a determinant of waste management. This was supported by majority of the respondents who agreed that

waste management was their responsibility and not only that of the school support staff, they were responsible for the generation of waste in my school, they believed that they had a role in minimizing waste in their respective school. The respondents also believed they were responsible for reminding other students on proper waste disposal and that it was important for them to read and share information on waste management with other students.

The fourth objective was to assess the waste practices and waste management practices. The findings indicated that waste practices were a determinant of waste management. This was supported by majority of the respondents who agreed that control of waste at the school was done on a regular basis, separation of waste at source points in the school was ensured to help in waste management, waste collection method and storage of waste was effectively carried out at the school, transportation of waste from the school to the disposal sites was done is a professional way by qualified personnel and that waste disposal method was determined by the type and nature of waste collected in the school.

5.3 Conclusions

The first objective was to find out the types of waste produced and waste management practices. It can be concluded that the selected secondary schools in Westland Sub-county produced different types/ kinds of waste and as such there were waste practices associated with how waste was managed in the respective schools.

The second objective was to find out the relationship between knowledge and waste management practices. It can be also be concluded that the knowledge measures adopted by selected secondary schools in Westland Sub-county were important determinant of waste management.

The third objective was to assess the effect of attitude and waste management practices. It can be concluded that the attitude measures adopted by selected secondary schools in Westland Sub-county were important determinants of waste management.

The fourth objective was to assess the waste practices and waste management practices. It can be concluded that the waste practices adopted by selected secondary schools in Westland Sub-county were an important determinant of waste management

5.4 Recommendations

The researcher suggests that the students should be educated on the importance of using adequately and properly handling waste for example by using gloves, appropriate cloths, masks, etc. for handling waste. The researcher also recommends that the school should come up with environmental topics in the curriculum, educate the public on the effects of environmental pollution, putting proper signage among others. The researcher recommends that the schools should put in place measures to deal with challenges associated in waste management and where possible ask intervention from county authority or the government on the same especially in mitigation of possible human and environmental health problems.

5.5 Governance and Waste Management in Schools

According to NEMA (2014), schools as waste generators should strive to minimize waste by reducing, reusing, rejecting, returning waste or by adopting cleaner fabrication technologies; All waste generated should be segregated at source; The County Governments and the licensed service providers should provide color coded bags or bins for the segregated waste. Reducing waste and recycling can save the school money, energy and natural resources. In addition, it would be an ideal way to teach the students how reducing, reusing, and recycling waste can make a different to their school, community, and the environment. The effectiveness of waste management in schools also influenced by concern and support from the county and political leadership. The study recommends that waste management be recognized as a major factor of consideration affecting the livelihood of the public and the society at large.

5.6 Areas for Further Study

The researcher was not able to conduct her study in Kianda School due to lack of a permit from Research Centre of Kenya which had a high cost implication. The same study can be done in the school to establish whether the findings will hold true as with the other institutions.

REFERENCES

Abang, O. N. (2016). Theories of Career Choice and Motivation. Calabar: Eti- Nwa AssPacyna JM, Pacyna EG (2001) An assessment of global and regional emissions of trace metals to the atmosphere from anthropogenic sources worldwide. *Environ Rev* 9: 269-298.

Adeyemi,I. & Adeyamo, O. (2006). Waste management practices at the Bodija abattoir, Nigeria', *International Journal of Environmental Studies,* 64:1, 71 – 82

Adogu, P., Uwakwe,K., Egenti, K., Okwuoha, A. & Nkwocha, I. (2015). Assessment of Waste Management Practices among Residents of Owerri Municipal Imo State Nigeria. *Journal of Environmental Protection*, 6, 446-456

Afullo, A. & Odhiambo. F, (2009). The Primary Solid Waste Storage Gaps Experienced By Nairobi Households. *Ethiopian Journal of Environmental Studies and Management* Vol.2 No.3. Pp 34-43

Akil, A. & Ho, C. (2014). *Towards sustainable solid waste management: Investigating household participation in solid waste management.* The International Symposium of the Digital Earth (ISDE8) IOP Publishing IOP Conf. Series: Earth and Environmental Science.

Alam, P. & Ahmade, K. (2013). Impact of Solid Waste on Health and the Environment, *Special Issue of International Journal of Sustainable Development and Green Economics* (IJSDGE), ISSN No.: 2315-4721, V-2, I-1, 2

Al-Khatib, I. A., Kontogianni, S., Abu Nabaa, H., Alshami, N., and Al-Sari', M. I. (2015). Public perception of hazardousness caused by current trends of municipal solid waste management. Waste Management, 36323-330.

Arora, L & Agarwal, s. (2011). Knowledge, Attitude and Practices regarding Waste Management in Selected Hostel Students of University of Rajasthan, Jaipur, I*nternational Journal of Chemical, Environmental and Pharmaceutical Research* Vol. 2, No.1, 40-43

Azjen, I. & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.

Bartlett, C. (2005). Stormwater knowledge, attitude and behaviours: a 2005 survey of North Carolina residents. Sacramento, California, Stormwater Unit, Division of Environmental Analysis,(http://www.ncstormwater.org/pdfs/stormwater_survey

Cooper, D.R & Schindler, P.S (2003). *Business Research Methods,* 9th, edition. McGraw-Hill Publishing, Co. Ltd. New Delhi-India.

Cooper, D.R. & Schindler, P.S. (2006). *Business Research Methods*, 11th, edition. McGraw-Hill Publishing, Co. Ltd. New Delhi-India

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approach* (2nd Ed.). Thousand Oaks, CA: Sage.

Cronbach, R.A. (1951). Mortgage Default among Rural, Low- Income Borrowers. *Journal of Housing Research*, 6 (2), 349-369.

Dawda, B., Mohd A. A. S., Latifah A. M., and Azizi B. M., (2012). Assessment of Municipal Solid Waste Composition in Malaysia: Management, Practice, and Challenges. *Pol. J. Environ. Stud.* Vol. 21, No. 3, 539-547

Dierkx, RJ (2001). *Cool Schools for Hot Suburbs: Models for Affordable and Environmentally Responsive Schools in Nairobi, Kenya* (2002). PhD thesis, Eindhoven University of Technology, NL

Eneji, O., Ogar,E., Ngoka, V.N. & Abang, M. (2016). Attitude towards Waste Management and Disposal Methods and the Health Status of Cross River State, Nigeria, *SCIREA Journal of Agriculture*, Volume 1, Issue 2.

Fearon, J. & Adraki, P. (2014). Perceptions and Attitudes to Waste Disposal: An Assessment of Waste Disposal Behaviors in the Tamale Metropolis, Jou*rnal of Environment and Earth Science* Vol.4, No.1

Giusti, L. (2009). Review of waste management practices and their impact on human health, *Waste Management* 29 2227–2239

Hilburn, A. M. (2015). Participatory risk mapping of garbage-related issues in a rural Mexican municipality. *Geographical Review,* 105(1), 41-60.

IRIN (2004) *Office for Coordination of Humanitarian Affairs* (OCHA), Integrated Regional

IRIN (2016). *Information Network* http://www.irinnews.org (education, Kenya)

JICA. (1998). *The study on solid waste management in Nairobi City in the Republic of Kenya*: final report. Japan International Cooperation Agency (JICA); in collaboration with CTI Engineering & Environmental Technology Consultants

Kanwal, Z., Khalid, M., Afzal, M., and Muzaffar, A., (2012). Impact assessment of community par- ticipation in solid waste management projects in selected Areas of Faisalabad City. *Journal of urban planning and development.* 319-327

Kothari, C. (2004). *Research Methodology: Methods & Techniques*, 2nd edition. New age International Publishers, New Delhi, India

Ministry of Finance (MF) (2009). *Position Paper on the Solid Waste Management Sector in India*. Department of Economic affairs, Ministry of Finance, Government of India.

Muigai, S.E., Opata, G.P., & Mwasi, B.N. (2015). An analysis of the household solid waste generation patterns and prevailing management practices in Eldoret town, Kenya. *International Journal of Agricultural Policy and Research*, 2 (2), 076-089.

Narayana, T. (2009). Municipal solid waste management in India: From waste disposal to recovery of resources? *Waste Management,* 29(3), 1163-1166.

NCC, (2010). *Solid Waste Management in Nairobi:* A Situation Analysis Technical Document ac- companying the Integrated Solid Waste Management Plan.

Olson, E.C., Bowman, M., & Roth, R. (1984). Interpretation and non-formal environmental education in natural resources management. *Journal of Environmental Education,* 15, 6-10.

Oyake-Ombis. L., (2016). *Innovations on plastic waste management in Kenya and role of universities*, Prentice-Hall, Upper Saddle River, New Jersey.

Saat. S. A., (2013). Solid waste management in malaysia and ecological modernization theory per- spective. *Journal of Sustainability Science and Management*. Vol.8. Issue 2, Pp. 268-275

Sekaran, U. & Bougie, R. (2010). *Research Methods for Business:* A Skill Building Approach. 5thEdition.Aggarwal printing press, Delhi, ISBN: 978-81-265-3131-8

Shobeiri, S.M., Omidvar, B., and Prahallada, N.N. (2007) A Comparative Study of Environmental Awareness among Secondary School Students in Iran and India. *Int. J. Environ. Res.,* 1(1), pp. 28-34.

Tartiu, V. (2011) Evaluation of attitudes and knowledge regarding municipal waste among students, Case study: Bucharest Academy of Economic studies. J. *Economia. Seria Management,* 14(1), pp. 263-276.

Troschinetz, A. M., and Mihelcic, J. R. (2009). Sustainable recycling of municipal solid waste in developing countries. *Waste Management*, 29(2), 915-923

UNEP, (2012). 21 *Issues for the 21st Century: Result of the UNEP Foresight Process on Emerging Environmental Issues*. United Nations Environment Programme (UNEP), Nairobi, Kenya.

UNEP. (2007). *Environmental pollution and impact on people health*: Implications of the Dandora municipal dump site in Nairobi, Kenya.

Vinod, A., and Venugopal, K. (2010) *Environmental Studies.* 1st ed. Calicut University Central Co-operative Stores, LTD No. 4347

Vivek et al (2013); *Journal of Environment* (2013), Vol. 02, Issue 06, pp. 147-150

Zagozewski, R., Judd - Henry, I., Nilson, S., and Bharadw- aj, L. (2011) Perspectives of past and present waste dispos- al practices: A community based participatory research project in three Saskatchewan first nations communities. *J. Environmental Health Insights*, 5, pp.22

APPENDICES

Appendix 1: Questionnaire

This study is designed to assess **Knowledge, Attitude and Practices on Waste Management** among secondary school students in Westlands's sub-county, Nairobi County. Your School has been selected for this study. Please answer the following questions as truthfully as possible. Kindly note that this is **NOT A TEST** and there is no right or wrong answers. Your participation in this project is highly appreciated.

Specific Objectives

1. To Identify types of waste produced and methods for waste disposal
2. To determine the level of students' knowledge, attitude and practices towards sustainable waste management

Section A: Respondents' Characteristics (Please tick as appropriate)

1) Name of School

……..……..

Year you Joined School ……..

Former school ……..

Residential Area ……..

Number in a Class ……..

2) Category of School

Public [ ] Private [ ]

3) Please indicate your gender

1) Male [ ]

2) Female [ ]

4) Please specify your class

a. Form 1 [ ]

b. Form 2 [ ]

c. Form 3 [ ]

d. Form 4 [ ]

5) Please indicate your age

Below 15 years [ ]

Above 15 years [ ]

To Identify Types of Waste produced and Methods for Waste Disposal

Section B: Types of Waste Produced

This subsection is concerned with assessing types of waste produced.

Among the following types of waste, which do you as a student produce mostly? - please tick the type mostly produced by you as a student

a) Organic waste (Biodegradable waste)

➔ Food left overs, [ ]
➔ Used Papers and folders, [ ]
➔ Pens, [ ]
➔ fruit & vegetable peels [ ]
➔ Domestic animal poop [ ]
➔ flower trimmings [ ]
➔ Pieces of clothes, [ ]
➔ Charcoals, [ ]
➔ Ashes, [ ]

b) Inorganic Waste (Non-biodegradable wastes) - please tick the type mostly produced by you as a student

➔ Plastics of different types, [ ]
➔ Empty bottles used for drinks, [ ]
➔ glasses, metals, radio batteries, [ ]
➔ Off use furniture and equipment(such as fridges, radios, televisions, bikes, kitchen stoves, lamps) [ ]
➔ Plates, [ ]

➔ spoons, [ ]
➔ cups, [ ]
➔ filling cabinets, [ ]
➔ bags and bookcases [ ]

Which units produce waste in your school?

Kitchen, [ ]

Garden, [ ]

Class rooms, [ ]

Dormitories [ ]

Others: please mention……..

Among the above mentioned units which is the largest producer?

……

Why?

……

Please mark (x) in the box which best describes the level of amount of waste found in your school.

Rate your response on a scale of 1 to 5; amount

(**1**= Very Low Amount; **2**= Low Amount; **3**= Neutral; **4**= High Amount; **5**= Very High Amount)

Categories of Waste	**1**	**2**	**3**	**4**	**5**
Garbage waste					
Food waste					
Paper waste					
Glass waste					
Wood waste					
Plastics waste					
Cans waste					

Categories of Waste	1	2	3	4	5
Metal waste					
Pens					
Bones and Cardboard					
Pieces of Clothes					
Charcoal					
others					

If 'Others' Please specify

……

……..

Section C: Methods for Waste Disposal

Among the below methods of waste disposal, which methods do you use- **please tick?**

- ➔ Composting waste [ ]
- ➔ Open burning of dry waste [ ]
- ➔ Incineration [ ]
- ➔ Dust bins [ ]
- ➔ Dump pits [ ]
- ➔ Municipal buckets [ ]
- ➔ Landfill site [ ]
- ➔ Recycling [ ]
- ➔ Don't know [ ]
- ➔ Others; [ ]

If 'Others' Please specify

……

……..

Section D: Waste Collection Services

Which among the below is responsible for waste collection services in your school?

County Government [ ]

Private services [ ]

Religious services [ ]

Others [ ]

If others please specify ……

Section E: Attitude on Waste Management

This subsection is concerned with assessing attitude and its relationship with waste management.

Are you worried about how waste is handled around your school premises?

Yes [ ] No [ ]

If yes, please explain

……

……

If No, please explain

……

……

……..

Please indicate the level of your concern on how waste is handled. Please tick in the appropriate table

To what extent do you worry about waste around your school premises?	Not Sure	Not worried	worried	Very worried
How interested would you say you are in wastes around your school premises?	Not sure	Not interested	Interested	Very interested

How important do you regard the way students handle wastes?	Not sure	Not Important	Important	Very important
How satisfied are you with the way students handle their waste?	Very dissatisfied	Dissatisfied	Satisfied	Very satisfied
How satisfied are you with the way your management handles waste?	Very dissatisfied	Dissatisfied	Satisfied	Very satisfied
How often do you remind other students to separate waste?	Very often	Quiet often	often	Not often
How often do you share information on waste management with other students?	Very often	Quiet often	often	Not often

Separation of Waste

Do you separate waste before its disposal?

Yes [ ] No [ ]

If yes, when did it start? .....

Do you have class containers or dustbins?

Yes [ ] No [ ]

Do you have outside containers/dustbins for waste disposal?

Yes [ ] No [ ]

If yes: Are the containers labeled for separation of biodegradable and non-biodegradable waste?

Yes [ ] No [ ]

If yes, when did it start? .....

If No; Please explain …….

Do you have incinerator /burning chamber?

Yes [ ] No [ ]

Please mark (x) in the box which best describes the extent to which you believe and agree with each of the following statements.

Rate your response on a scale of 1 to 5;

(**1**= Strongly Disagree; **2**= Disagree; **3**= Neutral; **4**= Agree; **5**= Strongly Agree)

Statements on Attitude	**1**	**2**	**3**	**4**	**5**
I believe that improper waste disposal is a threat to environment					
Waste management is my responsibility and not only that of the school support staff					
Waste disposal is the responsibility of the local authorities					
I am responsible for the generation of waste in my school					
I believe I have a role in minimizing waste in my school					
I'm responsible for reminding other students on proper waste disposal (pick and dispose waste)					
It is important to read and share information on waste management with other students					
It is important to volunteer in school cleaning activities					

Section E: Knowledge on Waste Management

This subsection is concerned with assessing knowledge and its relationship with waste management.

Are there any awareness programmes conducted on waste management in your school?

Yes [ ] No [ ]

If yes, when did they start? .....

Do you have environmental topics in your curriculum on waste management in your school?

Yes [ ] No [ ]

If yes, please list some

……
……
……
……

In your opinion, what do you think can be done to enhance knowledge and awareness in waste management?

……
……
……
……

What are the challenges met regarding waste management in schools?

……

……

……..……

What are the human health problems/ diseases caused by inadequate waste disposal?

1……..

2……..

3…….

4……..

What are the Environmental health problems caused by inadequate waste disposal?

1……..

2……..

3…….

4……..

Please mark (x) in the box which best describes the extent to which you believe and agree with each of the following statements.

Rate your response on a scale of 1 to 5;

(**1**= Strongly Disagree; **2**= Disagree; **3**= Neutral; **4**= Agree; **5**= Strongly Agree)

Knowledge Statement	**1**	**2**	**3**	**4**	**5**
I attend awareness programmes conducted by local authority/ school regarding waste					

management					
I know about principles of waste minimization segregation of waste					
I know the complications of improper waste management					
I should have environmental topics in my curriculum					
I know about environmental problems related to waste					
I should be aware of the importance of using protective clothing, i.e gloves, appropriate cloths, masks, etc for handling waste					

Are there motivational trainings on my role in waste management in the school?

Yes [ ] No [ ]

Do you think that something can be done to help improve your knowledge towards waste management in your school?

Yes [ ] No [ ]

If 'Yes' please indicate

……

Section F: Waste Practices and Waste Management

This subsection is concerned with assessing practices and its relationship with waste management

Are there warning signs indicating that you should not dump waste anywhere but in designated waste bins?

Yes [ ] No [ ]

If yes, where are they situated in the school?

……
……
……..……..

Is there a club that deals with matters of waste and waste management?

Yes [ ] No [ ]

Do you remind other people to collect waste in class in case they drop it?

Yes [ ] No [ ]

Are there qualified personnel assigned to handle waste in the school?

Yes [ ] No [ ]

Do you think that there are better practices that could be adopted in waste management in your school?

Yes [ ] No [ ]

If 'Yes' please indicate

……

Please mark (x) in the box which best describes the extent to which you agree with each of the following statements. Rate your response on a scale of 1 to 5;

(**1**= Strongly Disagree; **2**= Disagree; **3**= Neutral; **4**= Agree; **5**= Strongly Agree)

Statement	**1**	**2**	**3**	**4**	**5**
Control of waste at the school is done on a regular basis					
Separation of waste at source points in the school is ensured to help in waste management					

Waste collection method and storage of waste is effectively carried out at the school					
Transportation of waste from the school to the disposal sites is done is a professional way by qualified personnel					
Waste disposal method is determined by the type and nature of waste collected in the school					

Please mark (x) in the box which best describes the extent to which you believe and agree with each of the following statements.

Rate your response on a scale of 1 to 5;

(**1**= Strongly Disagree; **2**= Disagree; **3**= Neutral; **4**= Agree; **5**= Strongly Agree)

Statement	**1**	**2**	**3**	**4**	**5**
I feel that composting waste is adequately done in the school					
Open burning of waste is highly encouraged in the school					
Incineration is the responsibility of the school management and should be encouraged					
I feel that dump bins and dump sites are well placed in the school premises					
I believe that recycling should be encouraged more than other practices before waste is disposed					

Section G: Waste Management

What is waste management?

This subsection is concerned with assessing waste management.

Are you satisfied with the way waste is managed in your school?

Yes [ ] No [ ]

Do you feel that waste is disposed according to schedule?

Yes [ ] No [ ]

Please mark (x) in the box which best describes the extent to which you agree with each of the following statements.

Rate your response on a scale of 1 to 5;

(**1**= Strongly Disagree; **2**= Disagree; **3**= Neutral; **4**= Agree; **5**= Strongly Agree)

Statement	1	2	3	4	5
Waste Materials are not disposed to rivers, canals, sea, or vacant lots					
Waste Materials are disposed properly in the designated trash bins.					
Waste Materials are disposed according to the methods prescribed by the Government					
Waste is disposed in the designated collection area.					
Infectious Waste, chemical waste, sharps waste, toxic substances are disposed properly					

THANK YOU

Appendix 2: LETTER OF INTRODUCTION

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: RESEARCH STUDY

I am a post graduate student studying Master of Science in Environmental Governance, University of Nairobi. I am writing a research project which is a requirement for the award of the degree. The topic of my research is; "**Assessment of knowledge, attitude and practices on waste management in selected secondary schools in Westlands Sub-county, Nairobi County."** I kindly request your assistance by availing time to respond to the questionnaire. All data collected will be treated in strict confidence and used only for purpose of this study.

Your co-operation will be highly appreciated.

Yours faithfully,

Names: Grace Uwamwezi

Reg. No: A60/80826/2015