THE PROGRESS
Vol.4, No.4 (December, 2023), Pp.34-51
ISSN (Online): 2958-292X, ISSN (Print): 2958-2911

Original Article **https://hnpublisher.com**

Solid Waste Disposal Practices among Hamerweyne, Mogadishu-Somalia

Adanweli Abdullahi Ahmed[1]

[1]Post-graduate Department in Faculty of Education and Social Science, Master of Educational Leadership and Management at Somali national University, Somalia.
Correspondence: aadanwali000@gmail.com[1]

ABSTRACT

Aim of the Study: The aim of this study was to investigate solid waste disposal practices in Mogadishu especially Hamerweyne district and specifically focused on knowledge level of population regarded to solid wastes and types of solid wastes disposal method used and it affected on health as well in Hamerweyne district. In developing countries, improper handling and disposal of solid wastes contribute to high level of mortality and morbidity even if produce less per capita solid waste (Medina, 2002), because of cities and municipalities cannot cope up with the accelerated rate of waste production and composition in terms of technology, institutional arrangement and cost effectiveness of solid waste management (Modak et al., 2010; Zurbrügg et al., 2004). Since the problem exist as global, particularly Africa. Thus, this paper examined Solid Waste Disposal Practices in Hamerweyne district, Mogadishu-Somalia.

Methodology: Quantitative approach used in this study followed by questionnaire with Sample size about 80 participants who were between the ages of 20 and above 43 years. They were selected through purposive sampling. Mathematically, 40 people were chosen from shop owners or businessmen and 40 participants were selected from household. Data was collected under questionnaire and analyzed in SPSS version 20.0.

Findings: The study found that knowledge level of population regarded to solid waste disposal in HW district is good. This indicated by 82.5% of respondents suggested that the knowledge level of population in HW district was good where 7.5% rated as poor.

Conclusion: It was concluded that the knowledge level of population in Hamerweyne district regarded to solid waste was good as well as population in the district had attention about risk from improper disposal of solid waste. Finally, study concluded that the disposal method used in Hamerweyne was open dumping fallowed by some people who used to dispose a waste in the water bodies. The study recommended to employee the people who are well education and skilled to improve solid waste disposal. Workers should be given enough salary, protective clothes and medical care.

Keywords: Solid Waste, Disposal Health, Hamerweyne, Mogadishu, Somalia.

Article History

Received:
August 05, 2023

Revised:
December 03, 2023

Accepted:
December 20, 2023

Published:
December 30, 2023

Introduction

Background of the Study

Solid waste disposal practices deal with waste collection, reduction and separation as the most preferred elements or terms in solid waste hierarchy, (EPA South Australia, 2014; Sustainable Facility Tools, 2014; US EPA, 2013). It is important to ensure these elements in solid wastes hierarchy because they significantly influence the end-process of solid waste practices otherwise, public attitudes become lax and persisted solid waste management problems develop, Yang Zhou and Xu (2014). In terms of solid waste definition, the term "solid waste" means any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations (US Law-Solid Waste Act 2, 1999). The term "disposal" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid wastes, hazardous wastes, or any constituent may enter the environment or be emitted another air or discharged into any waters, including ground waters, from community activities (US Law-Solid Waste Act 2, 1999). According to Addo I.B., Adei D. (2015) states global municipal solid waste (MSW) generation rose from 1.3 billion tons in 2012 to 2.1 billion tons (0.74 kg/capita/day) as of 2016, which by 2050 is expected to increase by 70% to reach a total of 3.40 billion tons or 1.42 kg/capita/day.

Currently, many low-income countries collect as low as 10% of the garbage generated in suburban areas, which contributes to public health and environmental risks, including higher incidents of diarrhea and acute respiratory infections among people, particularly children, living near garbage dumps UN-Habitat, (2010). Obstacles to effective municipal SWM include lack of awareness, technologies, finances, and good governance said by Hettiarachchi H., Meegoda J., Ryu S, (2018), Scarlat N., Motola V., Dallemand J.F., Monforti-Ferrario F., Mofor L.(2015), Abubakar I.R.(2017). Today municipalities generate approximately 154 million metric tons of waste each year. Although this volume is not the only sources of solid waste in the US. “The primary sources of solid waste are split between livestock (39%), extraction and processing ore minerals (38%), crops (14), municipalities (5%), and industry (3%)”, said by USA EPA. In European countries experienced more problems from the solid waste disposal. These problems from solid waste disposal caused contamination to both environment and health. For several years the MS (member state)’ economic growth, the amount of waste generated in the EU has significantly increased over the last decades. Each European citizen generates around 4 tons of waste in every year when taking into consideration wastes coming from all activities (EEA, 2009). This means that approximately 2 billion tons of waste needs to be handled each year (European Commission, 2009).

In African continent environmental problems has revealed to create a great challenge. This is especially witnessed in the section of solid waste management in different countries of the region. A report by United States Agency for international development (UAID) in 2009 underlined that the rate of solid waste in Africa approximately 0.5kg per person per day. As the survey further explained that only a small amount of these solid waste is directly thrown to landfills and open. While the rest of these waste is either dumped openly without recourse treatment system or left in public area with no one to properly dispose them (Prdhan, 2009). For example, Tanzan is faced with major problems of solid waste disposal practices with an estimation of 30-50% of waste being left uncollected. (A.G. Onibokun and A.J. Kumuyi 1999) In the capital City of Dar-essalaam estimates present that out of 3976 tons of solid wastes generated each day only 1440 tons are collected and sent to landfill for disposal. In addition, approximately more than 70% of the daily waste generated is left near the houses, on the streets, markets or in drainage channels (KizitoNkwabi, 2008). In Congo a parallel situation is also observed in Kinshasa, which is the capital and largest city of the Democratic Republic of Congo where waste is only collected in the minority of households while in the rest of the city it is left scattered as in the case of Dar-es-salaam. (Onibokun et al 1999, UNIDO 2003) reveals that Kenya especially the capital city of Nairobi, solid waste generation

ranges from about 800-1000 tons per day. But the city municipality has a capacity of collecting only 400 tones daily (ADB, 2002).

The problem of solid disposal practices in Somalia follows the same trend as the rest of Africa. Recently, study done by WHO (S.W.P article, 2014) states that Somalia does not have effective government institution in place or an environmental strategy to deal with waste disposal and control in coherent manner. A research done by UNs (as cited in Mwaura, Owillah and Dahir, 2015) recovered that solid waste management is a critical concern in Somalia given the absence of a functional government to manage solid waste disposal. Mogadishu has big companies that produce hazardous wastes those are a harmful to humans and these wastes are not appropriately handled. In addition, for the last two years the Turkish government has been assisting Benadir administration with waste collection. Although these collections are not affective. All kinds of wastes in and around cities were caused by absence of management and control of waste. (E.H S. An in Somalia, 2010). Generally, Population growth, increasing urbanization, changes in consumption pattern, and rapid developments in technology have all contributed to an increase in demand for goods and services which lead to introduction of different products to meet up with consumer need and demand (Odum and Odum, 2006). These factors together with lack of effective recycling activities resulted in an increase in both the quantity and the variety of solid wastes generated and disposed-off as waste. Therefore, this study will investigate the solid waste disposal practices among Hamarweyne district Mogadishu- Somalia. Mainly focus on knowledge level of population regarded to solid waste among Hamerweyne district, Mogadishu-Somalia and solid waste disposal method used in HW.

Problem Statement

Human activities create waste, and these wastes are handled, stored, collected and disposed of. Solid waste must be properly dumped to ovoid environment and health hazards that may occur due to their accumulation. This means that waste should be managed at all costs to limit its effects to the environment (US Environmental Protection Agency, 2006). Most environmental impacts from solid waste are caused by inadequate or incomplete collection and recovery of recyclable or reusable. Urbanization plays part in increasing the rate waste generation (Amuuda et al, 2014). This study further explains; it can be taken as problem especially when the governing bodies fail to cope with the amount of solid waste generated. Globally, it is not only urbanization but also rapid population growth, which can lead to an enormous increase of solid waste generation pre unit area. As the problem exist as Global, the researcher decides to examine the gab related to Solid waste disposal practices among Hamerweyne, Mogadishu-Somalia.

Objective of the Study

General objective:

The purpose of this study is to investigate solid waste disposal practices among H W distract residents, Mogadishu-Somalia.

Specific objective:

- To examine knowledge level of HW distracts residents, Mogadishu-Somalia
- To explore disposal practices for solid waste used in HW distract residents.

Research Questions

- What are the knowledge levels of the population in Hamerweyne distract , Mogadishu-Somalia?
- What are the solid waste disposal methods used in HW distract residents?

Significance of the Study

It is expected that findings and recommendation of the study will be useful to the people who practice Solid Waste disposal in Hamerweyne district, Mogadishu-Somalia, especially households and

businessmen. The research findings will increase the knowledge level of society in case study area as well as reader's awareness on the solid waste disposal practices. The research will also recover the disposal practices for solid waste used in Hamerweyne distracts residents. Furthermore, the study will contribute existing literature by examine solid waste disposal practices and method for solid waste practices.

Limitations of the study include the following;

- Lack of sufficient time for the research because of the fact that the researcher has to extend case study since it has been limited to Mogadishu-Somalia
- Low respondent's cooperation research has shown that many people do not respond to research questionnaires promptly and adequately.
- Financial problem is one of the challenges by the researcher during article publishing printing.

Scope of the Study

The study conducted Hamerweyen, Mogadishu-Somalia which is one of the districts in the capital city of Somalia. This is due to time constraints which do not make it possible to cover as many regions as possible. Geographically, Hamerweyen district in Mogadishu-Somalia located the southeastern in Benadir region Somalia. It has a boundary with Wabiri and Hamarjajab district in west, Shangani district in east and Wardhigley and Bondhere district in north. It has a population of 43,303 in 2005. Famous places located in H/W arre: mothers' houses, Banadir municipality, Somali National University and other places. Solid waste collection service in Hamerweyne include ECO, Green life and Banadir municipality.

Literature Review

Overview of Solid Waste Management in Mogadishu-Somalia

While after collapsed the central government of Somalia in 1991, the country faced poor management of solid waste. "The urban areas in southern-central Somalia suffer from poor solid, municipal and industrial management and non-functional sanitation" said by Ibid. Waste and garbage are piled around cities, creating a situation of uncontrolled and unmanaged hazardous waste and non- hazardous waste. According to World Health Organization, (2011) states that Empty plastic bags, items of domestic waste, rubbish bags filled with human faeces and food products are hanging in trees or scattered around in empty buildings or are left behind at plots of land. The report further explains Urine-filled plastic bottles, chemical waste, used engine and motor oil, oil and petrol spills from petrol stations, and abandoned vehicles are signs that hazardous waste is not properly dumped. Thus, the public is exposed to these hazardous materials on a daily basis through the air, food, water and consumer products Kabil, (A. S. O (2010). A survey conducted by UN revealed that UN-Habitat has also helped to establish solid waste management in the major towns of Somaliland and has commenced similar programs in a number of towns in Puntland.

In Mogadishu, an earlier waste removal programs supported by the International Organization for Migration (IOM) could not be sustained. In cooperation with the Benadir administration, the United Nations Human Settlements Program (UN-Habitat) has started a multi-year program that would also establish sustainable solid waste management systems under public-private partnerships. Article conducted by Somali waste management and disposal providers in mar 21, 2014 explored for the last two years the Turkish government has been assisting the Benadir administration with waste collection and management. Afterwards, the Turkish and Benadir administration take the wastes to the dumping sites. Similarly, private companies including ECCO and Green waste transport waste from the town.

Distribution of Solid Waste

Solid waste generation is experiencing a rapid increase all over the world as a result of continuous economic growth, urbanization and industrialization. Typically, removing garbage from homes and

businesses without greater attention to what was then carried out with it has also been the priority of municipal SWM in several cities of developing countries UN-Habitat, (2009). The majority of developing nations dispose of household waste in landfills or dumps, the majority of which are projected to fill up within a decade. This unattended collection shows us the solid waste distributed fairly in cities of the world, furthermore, world cities distribute about 1.3 billion tons of solid waste per year and this could increase to 2.2 billion tones by 2025, and could more than double over the next twenty years in lower income countries (Hoornweg&Bhada-Tata, 2012). Some researchers include (Coffey& Coad, 2010) stated poor financial resource are concerned with operating collection, finance cost, cost recovery and management funds. Low income is the main reasons for inadequate collection and disposal of solid waste.

To determine sustainability of solid waste disposal systems, investments in systems development should correspond to the level of resources which the society can make available for the waste management. Consequently, solid waste has become a global challenge due to limited resources, increasing population, rapid urbanization and industrialization through worldwide. Census show that the world population reached 6 billion in 2001 with 47% of this population living in urban area. The urban population in developed countries was 75%of total population, while the urban population in developing nations was estimated to be 40%. Global solid waste generated in 1997 was 0.49 billion tons with an estimated annual growth rate of 3.2-4.5% in developed nations and 2-3% in developing countries (Suochebg el al, 2001). Similar report done by Global Waste Management Market Report (2007) confirmed that the Solid waste production rapidly increases all over the world as a result of continuous economic growth, urbanization and industrialization. It is estimated that in 2006 the total amount of municipal solid waste (MSW) generated globally reached 2.02 billion tones, representing a 7% annual increase since 2003. It is further speculated that between 2007 and 2011, global generation of solid waste will rise by 37.3%, equivalent to roughly 8% increase per year. In developing countries, improper handling and disposal of solid wastes contribute to high level of mortality and morbidity even if produce less per capita solid waste (Medina, 2002), because of cities and municipalities cannot cope up with the accelerated rate of waste production and composition in terms of technology, institutional arrangement and cost effectiveness of solid waste management (Modak et al., 2010; Zurbrügg et al., 2004).

In Malesia, especially Kelantan, burying and burning of waste is a common practice for waste disposal in rural and remote areas, (Kamaruddin et al. 2016). The researcher further explained urban or semi-urban areas, stationary waste storage containers are provided mainly at the sides of the main road. Kota Bharu Municipal Council (KBMC) is the local authority responsible in providing stationary waste storage container at collection site of waste within Kota Bharu district, collecting the solid waste approximately 3 times a week by compactor vehicles and transporting waste to the dumpsite located in Beris Lalang, Bachok by Idris A, Inanc B, Hassan M., (2004).However, the flaws of SWM in Kelantan lies primarily in inadequate bin and waste collection provided by local authorities, KBMC mainly constrained by financial issues (Rahim et al 2012). According to this report, solid waste production in Asia was lower in previous decades, but it has since significantly increased and undergone changes in its characteristics as a result of a change in people's lifestyles brought on by rapid urbanization. A lack of training in contemporary solid waste management techniques combined with rapid population growth and economic expansion complicate efforts to improve the solid waste service, (Bhide and Sudersan, 1993). All these factors contributed increasing of solid waste. In 1998 China alone generated 0.14 billion tons of solid waste, (Pokhrel and Virarghavan, 2015). According to Imura, ET. al. (2005), high population growth and urbanization coupled with rapid economic growth greatly accelerates consumption rates in Asian developing cities. Based on estimates, generation in Asia has reached 1 million tons per day TayJooHwa, (2004–05). For instance, in the Philippines, urbanization, poor management, population growth, and a lack of public awareness all contribute to waste accumulation.

However, there are significant amounts of solid waste in many countries, particularly in India, where it is being dumped in various cities. The Central Pollution Control Board (CPCB, 2010) reports that the average Indian produces approximately 490 grams of solid waste per day. Although this amount is

relatively low compared to western countries, the sheer volume is immense. The distribution of solid waste in Indian cities is increasing at a rate of 1.3 percent per year. If this trend continues, it is projected that by 2025, each person will generate around 700 grams of waste per day. Given that the urban population in India is expected to rise to 45 percent from the current 28 percent, the problem is likely to become even more significant unless immediate action is taken (CPCB, 2010). As the overall amount of solid waste produced by society continues to increase, the composition of the waste is also becoming more diverse, with a growing reliance on packaging materials made from both paper and plastic (CPCB, 2010). The report mentions that three decades ago, the solid waste generated by Indian farmers consisted of one-fifth non-biodegradable waste and four-fifths biodegradable waste. In Kenya the capital city of Nairobi, solid waste generation ranges from about 800-1000 tons per day. But the city municipality has a capacity of collecting only 400 tonnes daily (ADB, 2002). Likewise, in Malindi, a secondary largest town in Kenya estimates for 1991 indicates that less than 21% of waste generated reached the dumping sites. A parallel situation is also observed in Kinshasa, which is the capital and largest city of the Democratic Republic of Congo where waste is only collected in the minority of households while in the rest of the city it is left scattered as in the case of Dar-es-salaam. (Onibokun et al 1999, UNIDO 2003).

Different Ways of Solid Waste Disposal

Waste disposal process aim to isolate the waste from the people and the environment in a manner that causes no harm (Study Session, 21 Jul 2018). According to Compactor Management Company (2017-18) states that there are six affective waste disposal methods are exist in the world, , Recycling, Incineration, Composting, Sanitary landfill and Disposal in ocean/sea and Open damping. According to Medina (2002), the major models of disposal of solid waste in the United States are incineration and land filling. People want their refuse taken away and do not want it disposed of near their habitat, or at least not so they can see or smell it. Incineration is the most common one in US. The UN Environmental Protection Agency (2006) states that, incineration is the process of destroying waste material by burning it. Incineration is often alternatively named "Energy-from-waste" or "waste-to-energy"; this is misleading as there are other ways of recovering energy from waste that do not involve directly burning it. Incineration is carried out both on a small scale by individuals and on a large scale by industries UN Environmental Protection Agency (2006). It is recognized as a practical method of disposing of hazardous waste materials, such as biological medical waste. Many entities now refer to disposal of wastes by exposure to high temperatures as thermal treatment.

Total municipal waste generation in the EU countries declined by 3 % in absolute terms and average generation per person by 7 % from 2004 to 2014. However, there has been no uniform trend across countries, with an increase in municipal waste generation per person in 16 and a decrease in 19 countries. In addition to, the European countries came up with improvement towards land disposal practices for solid wastes (including sludge), which may reduce the adverse environmental effects of such disposals and other aspects of solid waste disposals on land (Medina M. 2002).

Reducing the harmful environmental effects of earlier and existing landfills, means for restoring areas damaged by such earlier or existing landfills, means for rendering landfills safe for purposes of construction, and other uses and techniques of recovering materials and energy from landfill. In Africa, there are three major phases of solid waste collection. These are the informal phase, primary and secondary phase. Wastes are usually transported from community transfer points to landfill thus landfill and open dump site are common in Africa international journal of waste resources, (May 14 /2016). In Abuja Nigeria there are numerous private waste collection companies in operation those dump wastes landfill Liyala C (2011).

In general Somalia does not have a recycling program in place therefore two commonly used materials like plastic bags and bottles are dumped in open dump site Somalia Waste Management and Disposal (Mar 21, 2014). Therefore, Hamerweyne district has been facing massive improper collection of solid waste disposal practices, since the Hamer municipality doesn’t collect the Solid Waste. Instead of lacking

this, local companies collect solid waste from Hamerweyne with charge and all the people in the district are not able to pay this fee. This issue has caused to dispose the waste deliberately through public Streets and crowded area in the market.

Methodology

Research Design

This is designed as quantitative study, aiming to investigate solid waste practices among Hamerweyne, Mogadishu-Somalia. This study used descriptive research design among the quantitative methods, survey research was applied in this study.

Population of the Study

The target population of this study was individuals who carry out solid waste disposal practices among Hamerweyne district, Mogadishu-Somalia. Total number of the population were 100. 50 from households and 50 from businessmen. Most of the solid waste practices carried out by households and businessmen members. Therefore, the researcher selected households and businessmen members as target population.

Sample Size Determination

Sample size of this study was 80 participants who were between the age 20- above 43. They were selected through purposive sampling. In statics, 40 people were chosen from shop owners or businessmen including 12 women and 28 men. 40 people were selected from household women and employees hired to work at specific tasks within a household including child care, cleaning, meal planning, and household administration including 27 females and 13 males. The minimum sample size is 80 respondents and was computed by using the Slovin's formula which is n= N/1+N (0.052), where n= sample size, N= study population and 0.05= level of significance margin of error (Amin, 2005).

Sampling Procedure

This being non-probability sampling, there was specific sampling technique. Sampling technique are only necessary when a part of the population is to be selected for study. Sampling is the process of selecting part of the population to present it (Osa, 2013).

Data Collection Instrument

The research instrument of this study was questionnaire as the tool or method of data collection. According to Kothari (2014) stated that the questionnaire does have low cost even when universe is large and widely spread geographically. He added that the questionnaire is free from bias of interviewer as answers come from residents and respondents have adequate time to give thought on the question.

Data Analysis Procedure

According to Kothari, (2014) data analysis is process that involves editing, coding, classify and tabulating the collected data. Therefore, this study used quantitative approach and the data in this research will be analyzed by applying statistical package for social science ((SPSS) version 20.0.

Data Interpretation and Analysis

Table 1: *Gender of respondents*

Gender of respondents	Frequency	Percent%
Female	35	43.8%
Male	45	56.2%
Total	**80**	**100%**

The table above shows the distribution of respondents by Gender. It shows that majority (43. 8%) of respondents were males while 45% were females. This means more males than female involved in the report. This could lead us that majority of businessmen in H/w are males and less number in household.

Table 2: *Age of the respondents*

Age of respondents	Frequency	Percent%
20-25	37	45.0%
26-31	27	32.5%
32-37	11	12.5%
38-43	5	6.2%
Above 43	1	3.8%
Total	**80**	**100%**

The table above shows the distribution of respondents by Age. The table indicates that the majority (45%) of respondents were aged between 20-25 years, while 32.5% of the respondents were aged 26-31years, 12.5% of the respondents were aged 32-37 years, 6.2% of the respondents were aged 38-43 years and 3.8% of the respondents were aged above 43 years. It means that the majority of respondents in this study were youth and they understood fully the questionnaire.

Table 3: *Educational level of respondents.*

Level of Education of Respondents	Frequency	Percent%
Intermediate	23	32.5%
High School	32	38.8%
Diploma	8	6.3%
Bachelor	3	3.8%
Literate	14	18.8%
Total	**80**	**100%**

The table above shows the distribution of respondents by level of education. The table indicates that majority (38.8%) of the respondents had secondary certificate, while 26% of the respondents were intermediate, 6.3% of the respondents had diploma certificate, only 3.8% of the respondents had bachelor degree and 18.8% of the respondents were literate. This means that majority of the respondents had secondary certificate.

Table 4: *Marital Status of respondents*

Marital Status of respondents	Frequency	Percent
Single	49	58.8%
Married	31	41.2%
Total	**80**	**100%**

The table above shows distribution of respondents by marital status. It shows that majority (58.8%) of the respondents were single while 41.2% were married. this means that the most of respondents of the study were single.

Table 5: *Knowledge level of population regarded to solid waste*

Knowledge level of population regarded to solid waste	Frequency	Percent%
Yes	66	82.5%
No	14	17.5%
Total	**80**	**100%**

Findings in table shows us that the majority (82.5%) of respondents do have knowledge about solid waste while 17.5% don not know what to do with solid waste. therefore, this made clear that the most respondents have the knowledge of solid waste.

Table 6: *Campaigning public through media will produce less solid waste*

Do you think that campaigning public through multimedia will produce less solid waste?	Frequency	Percent%
Yes	47	58.8%
No	33	41.2%
Total	**80**	**100%**

Findings in the above table shows that majority (58.8%) of the respondents said Yes while 41% of the respondents said No. the respondents were asked that the complaining public through multimedia will produce less solid waste and the most of the respondents said true.

Table 7: *Do you have an idea about prevention, Reduction, Reuse and Recycling is the order of priority to control non bio degradable waste like plastics, paper, glass, metal and etc.?*

Do you have an idea about prevention, Reduction, Reuse and Recycling is the order of priority to control non bio degradable waste like plastics, paper, glass, metal and etc.?	Frequency	Percent%
Yes	80	80%
No	20	64%
Total	**80**	**100%**

The table above summarizes an idea about prevention, Reduction, Reuse and Recycling is the order of priority to control non bio degradable waste like plastics, paper, glass, metal and etc. the table shows that majority (80%) of respondents have responded Yes while 20% of the respondents have responded No.

Table 8: *Solid wastes are stored in*

What do you store your household rubbish in?	Frequency	Percent%
Plastic bags	36	45%
Cardboard boxes	25	31.25%
Rubbish bin/ drum	10	12.5%
Others	7	8.75%
No storage—direct disposal to dump	2	2.5%
Total	**80**	**100%**

The table above shows that majority (45%) of respondents answered plastic bag, while 31.25% responded cardboard boxes, 12.5% of the respondents responded rubbish bin/drum, 8.75% of respondents answered others and 2.5% of the respondents said no storage-direct disposal to dump. This means the most of the respondent use Plastic bags.

Table 9: *Do you separate different type of waste at your home, business area, and institution centers?*

Do you separate different type of waste at your home, business area, and institution centers?	Frequency	Percent %
Yes	18	22.5%
No	62	77.5%
Total	**80**	**100%**

The table above presents that the majority (77.5%) of respondents do not separate different types of solid waste while 22.5% of the respondents do separate different types of solid waste when they are putting inside the container. This means that the most population in H/W do not use separation of solid waste.

Table 10: *People dump their waste alongside the garbage bins instead of putting it inside those?*

Do people dump their waste alongside the garbage bins instead of putting it inside those?	**Frequency**	**Percent%**
Yes	45	56.2%
No	35	43.8%
Total	**80**	**100%**

The above table shows 56.2% of the respondents believe that the people dump their waste alongside the garbage bins instead of putting it inside those while 43.8% of the respondents believe that the people dump their waste alongside the garbage bins instead of putting it inside those.

Table 11: *Composition of solid waste*

What is the composition of your generated waste?	**Frequency**	**Percent%**
Kitchen waste	21	26.3%
Solids	11	13.8%
Plastic	25	31.3%
Papers	23	28.8%
Total	**80**	**100%**

The table above shows that majority (31.2%) 0f respondents generate solid waste with highest composition is plastics, while 28.8% of participants responded papers, 26.2% of the respondents responded kitchen waste and 13.8% of the respondents answered solids.

Table 12: *if yes, why in your opinion people behave like this?*

If Yes, Why in your opinion people behave like this?	**Frequency**	**Percent%**
Difficult to put waste inside the bin due to height of the bin	8	10%
Difficult to put waste inside the bin due to waste and litter spread around the bin	16	20%
Stray animals (dogs, mouse and birds etc)	6	7.5%
Others	17	21.25%
Total	**47**	**58.75%**

The table above shows that the majority (21.25%) of the respondents said others, while 20% of the respondents said difficult to put waste inside the bin due to waste and litter spread, 10% 0f the respondents believed that it is difficult for the people to put waste inside the bin due to height of the bin and 6% of the respondents said people could not put the waste inside the bin due to Stray animals (dogs, mouse and birds etc.). it means that population in Hamerweyne district do not put the waste inside the bin due to reasons like lazy and careless as respondents underlined.

Table 13: *Solid waste disposal method are used in your HW*

Which of the following solid waste disposal method are used in your district?	**Frequency**	**Percent %**
Open dumping	63	78.25%
Controlled tipping/burial	1	1.25%
Incineration	1	1.25%
Sanitary landfill	3	3.75%
Composting	1	1.25%
Gridding and discharge into sewer	4	5.0%
Dumping into water bodies	7	8.75%
Total	**80**	**100%**

The table above shows that majority (78.25%) of the respondents said "that the population in H/W used Open dumping'', 8.75% of the respondents answered dumping into water bodies, 5% 0f the respondents responded gridding and discharge into sewer, 3.75% of the respondents chose Composting, 1% of the respondents said Sanitary landfill and 1% of the respondents said Incineration. Therefore, the final disposal method was used in Hamerweyne was Open dumping.

Table 14: *Distance between house/business area and dumping site*

What is the distance between your house/bossiness area and dumping site?	**Frequency**	**Percent%**
1-500 meters	6	7.5%
500-1000 meters	9	11.2%
1-30 kilometers	65	81%
Total	**80**	**100%**

The table above shows that majority (81%) of the respondents said the distance between houses and dumping site was 1-30 kilometer, 11.2% of the respondents believed only 500-1000 meter were between their houses/business and dumping sites area and 7.5% of the respondents responded between their houses/business and dumping sites were 1-500 meters. Therefore, most of the respondents have responded that distance between their houses business area were kilometer not meter

Table 15: *Frequency of collection service*

How often do you use the collection service?	**Frequency**	**Percent%**
Once a week	25	31.25%
Once a month	34	42.5%
Two days in month	21	26.25%
Total	**80**	**100%**

The table above shows that majority (42.5%) of the respondents used collection service once a month, 31.25% of the respondents used once a week and 26.25% of the respondents used two days in month. It means that solid waste in Hamerweyne was taken once month.

Table 16: *Type of collection service*

Which collection surface do you use?	**Frequency**	**Percent%**
Public	6	10%
Private	70	87.5%
Other	2	2.5%
Total	**80**	**100%**

The table above shows that majority (87.5%) of the respondents said 'that the majority of population in H/W districts used private collection service'' while 10% of the respondents answered private collection service and only 2.5% of the respondents responded others.

Table 17: *Charge per month*

How much do they charge per month?	**Frequency**	**Percent%**
$0-3	19	23.75%
$3-6	43	53.75%
$6-10	18	22.5%
Total	**80**	**100%**

The table above indicates that the majority (53.8%) of the respondents paid $3-6 per month for collection service, only 23.8% 0f the respondents charged $0-3 per month and 22.5% of respondents paid $6-10 per month for collection service.

Table 18: *Satisfaction of collection service*

Are you satisfied with your current waste collection service?	Frequency	Percent%
Yes	47	58.8%
No	33	41.2%
Total	**80**	**100%**

The table above shows that the majority (58.8%) of the respondents satisfied with their current waste collection service while 41.2% of the respondents dissatisfied with their current waste collection service

Table 19: *Reason for satisfaction/dissatisfaction*

What is the main reason for your level of satisfaction/dissatisfaction	Frequency	Percent %
Costs	26	32.5%
Unreliability	12	15.0%
Improper collection	21	26.2%
Reliable	18	22.5%
Cooperative	3	3.8%
Total	**80**	**100%**

The table above shows that the majority (32.5%) of the respondents satisfied their collection service regarded to cost, 26.2% of the respondents did not satisfied with their current service collection because of improper collection of solid waste, and 22.5% of the respondents satisfied their collection service regarded to their punctuation, 15% of the respondents felt dissatisfaction with their collection service because of they did not came on time and 3.8% of the respondents had satisfaction with collection service regarded to cooperation between them.

Table 20: *Improper disposal of solid waste is responsible for some diseases like measles and respiratory disease.*

Do you think improper disposal of solid waste is responsible for some diseases like measles and respiratory?	Frequency	Percent%
Yes	62	77.5%
No	18	22.5%
Total	**80**	**100%**

The findings in the above table shows that the majority (77.5%) of the respondents proved that the improper disposal of solid waste is responsible for some diseases like measles and respiratory disease while only 22.5% of the respondents answered improper disposal of solid waste is not responsible for some diseases like measles and respiratory disease.

Table 21: *Do you think that rodents, animals and birds scavenging through waste dumps spread diseases*

Do you think that rodents, animals and birds scavenging through waste dumps spread diseases?	Frequency	Percent
Yes	53	66.2%
No	27	33.8%
Total	**80**	**100%**

The table above shows that the 66.2% of the respondents answered that rodents, animals and birds scavenging through waste dumps spread diseases while 33.8% 0f the respondents rejected.

Table 22: *People near dumps and landfill are suffering from respiratory problems, eye diseases and water borne disease.*

Do you think that people near waste dumps and landfill are suffering from respiratory problems, eye diseases and water borne disease?	**Frequency**	**Percent%**
Yes	55%	68.8%
No	25%	31.2%
Total	**80%**	**100%**

The table shows that the majority (68.8%) of respondents said Yes while 31.2% 0f the respondents said No. this means that most of the respondents underlined that people who are near dump sites are suffering respiratory problems, eye diseases and water borne disease.

Table 23: *Disposal of solid waste.*

Where do you dispose your generated waste?	**Frequency**	**Percent%**
nearby container	4	6.2%
open space	7	18.8%
near home	27	28.8%
inside the container	42	46.2%
Total	**80**	**100%**

The table above shows that the majority (46.2%) of the respondents disposed their generated waste inside the container before final disposal, 28.8% of the respondents disposed solid waste near home, 18.8% of the respondents used open space for dumping of solid waste and 6.2% of the respondents put their generated waste nearby container.

Interpretation of the Final Result

The study investigated the solid waste disposal practices among Hamerweyne district, Mogadishu-Somalia. The questionnaire was based on two objectives of the report. The first objective of this study was to determine the knowledge level of population in Hamerweyne resident regarded to solid waste, with reference to knowledge level of population regarded solid waste, campaigning public through multimedia produced less solid waste, idea about prevention, Reduction, Reuse and Recycling is the order of priority to control non bio degradable waste like plastics, paper, glass, metal and etc, separation of solid waste, composition of solid waste and solid waste disposal method used in your H/W district. It was absorbed that majority (82.5%) of respondents do have knowledge about solid waste, 58.8% the respondents were asked that the public campaign through multimedia produce less solid waste and the most of the respondent's scale of Yes, the majority (70%) of respondents did not separate different types of solid waste while 36% 0f respondents generated solid waste with highest composition is plastics. Moreover, the paper underlined that the knowledge level of population in Hamerweyne district regarded to solid waste were good.

In Solid Waste Disposal method, The respondents were asked different questions related to solid waste disposal methods including solid waste disposal method used in Hamerweyne district, where dispose your generated waste, distance between house/business areas and dumping site, times to be used collection service, most common type collection service used in H/W district and satisfaction of this collection service and satisfaction and main reason for the level of satisfaction/dissatisfaction. It was absorbed that majority (78.25%) of the respondents said "that the population in Hamrweyne used Open dumping, he majority (46.2%) of the respondents disposed their generated waste inside the container before the final disposal, majority (80%) of the respondents said that the distance between their houses and dumping site was 1-30 kilometer, that majority (42.5%) of the respondents used collection service once a month,

majority (70.0%) of the respondents said 'that the population of H/W districts used private collection service'' and the majority (58.8%) of the respondents satisfied with their current waste collection service. The report found out that disposal method used in Hamerweyne was open dumping followed by dumped into water bodies. **Health issues about Solid Wastes** this section related to awareness about health problems from solid waste disposal among Hamerweyne districts in Mogadishu-Somalia. Most of the respondents were rated to have awareness about Solid Wastes' effect on health. Therefore, the study proved that the population in Hamerweyne had attention about risks from improper disposal of solid waste.

Discussion

This section drawed the discussion of the study in line with purpose statement, and consonance with the findings already made in the above sections. The purpose of the study was to investigate solid waste disposal practices among HW district, Mogadishu-Somalia, but with specific focus on knowledge level of population regarded to solid waste and solid waste disposal method used in Hamerweyne district, Mogadishu-Somalia. The study found out that the knowledge level of population in H/W district regarded to solid waste is good and is one of the most impart factor for solid waste disposal practices in Hamerweyne district up to 82.5%.Although some respondents argued that the distribution of solid waste among Hamerweyne district, Mogadishu-Somalia or unattended of solid waste disposal caused by less knowledge of solid waste disposal practices by population. Up to 78.25% of the respondents demonstrated that the only open dumping method is used except small number of respondents pointed out as method dumping into water bodies. The study also found out the collection service used in H/W is private and take money from the people each month $3-6 by 53.8%. In fact, many people were not able to pay this money and they directly dispose solid waste to environment, result in contamination. Improper disposal of solid waste is responsible for some diseases like measles and respiratory disease in H/W districts by up to 75.5% and 55% of the respondents said "population in H/W were more concerned that improper disposal of solid Damage to scenic beauty.

Conclusion

The study investigated 2 objectives followed by one section of health problems from improper disposal of solid waste. Consequently, objectives contained 15 key findings. Firstly, the study found out that knowledge level of population regarded to solid waste disposal in Hamerweye district was good. Secondly, stablished solid waste disposal methods in HW district and the most of the respondents were estimated to have concept about solid waste disposal methods. 82.5% of respondents rated to have knowledge about solid waste where 7.5% did not. In solid waste disposal methods, 78.25% of the respondents said "that the population in H/W used open dumping and 1% of the respondents rated it composting method. More respondents underlined that the awareness of population to solid waste disposal methods as poor. Based on these findings and summery of discussion, the study concludes that the most disposal method used by population in H/W district is open dumping. This is because it approximately 78.25% of the respondents ticked this method. This means that others methods are not used and the solid waste are not utilized.

Recommendations

Based on the findings, the researcher has recommended:

- To employ the people who are well education and skills of management hygiene if they have no experience to give a good training.
- That the federal government, Hamerweyne municipality, relevant institution and all stakeholders concerned with sanitation to transport solid waste from the district without money.
- Benadir administration should guide the overall policy and strategic of development the management of solid wastes.

- To make suitable transportation of solid waste
- To make appropriate of disposal solid waste.
- Benadir municipality and waste collectors should provide programs to inform the community the danger and the consequences of wastes and help Hamerweyne residents reduce sanitation activities that have led to several health hazards in the town.
- To improve solid waste disposal, workers should be given enough salary, Protective clothes, medical care and increasing stakeholder's participation.
- Government should make programs for non-biodegradable waste include plastics and metals to reduce waste.
- Population should take care solid waste during collection or operation.

Acknowledgment

None.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Funding Source

The authors received NO funding to conduct this study.

ORCID

Adanweli Abdullahi Ahmed [1] https://orcid.org/0009-0003-8819-8815

Reference

Abate, B., &Goshu, G. (2017). Waste management in lake tana basin—Case of rapidly urbanizing Bahir Dar City. *Social and ecological system dynamics, 6*, 581–593.

Abubakar, I.R. (2017). Household response to inadequate sewerage and garbage collection services in Abuja, Nigeria. *J. Environ. Public Health*, 5314840. doi: 10.1155/2017/5314840.

Addo I.B., Adei D., Acheampong E.O. (2015). Solid Waste Management and Its Health Implications on the Dwellers of Kumasi Metropolis, Ghana. Curr. *Res. J. Soc. Sci. 7*, 81–93.

Alam, P., &Ahmade, K. (2013). Impact of solid waste on health and the environment. *International Journal of Sustainable Development and Green Economics (IJSDGE), 2*(1), 165–168.

Amuda OS, AdebisiS, jamoda L, Aleda A (2014). Challenges and possible panacea to the municipal solid wastes management in Nageria. *J. Sust. Deve. Studies, 6*(1), 64-70.

Baqui, A. (2009). *Global urbanization: Trends, patterns, determinants, and impacts.* Maryland: Bloomberg Publishing.

Coffey, M & Coad, A. (2010) *collection of municipal solid waste in developing countries.* Gutenberg; Malta: Guternberg press.

Cointreau-Lavine, S. (1994*). Pravite sector vparticipation in municipal solid waste services in developing countries ,. Urban management progamme discussion paper;* World Bank.

Dolk, M. (1997), *Residents near waste landfill sites and risk of non-chromosal congenital malformations.* EUROHAZCON: Collaboration study group, New York.

EC, 2015, *Proposal for a Directive of the European Parliament and of the Council amending Directive 2008/98/EC on waste (COM (2015) 595 final of 2 December 2015*

EEA (2009*).* EEA's portal on waste and resource management. Accessed June 2018 from http://www.eea.europa.eu/themes/waste.

Environmental Policy, the National Environmental Management Act of (2002), and the Waste Regulations Act of (2000). (Accessed, 21/7/2018, 4:20 AM).

European Commission (2009): European Commission's portal on Waste. Accessed June 2009 from http://ec.europa.eu/environment/waste/index.htm.

Eurostat (2016a). Waste database municipal waste' http://appsso.eurostat.ec.europa.eu/nui/ show.do?dataset=env_wasmun&lang=en.

Eurostat (2016b). Waste database generation of waste'(http://appsso.eurostat.ec.europa.eu/nui/ show.do?dataset=env_wasgen&lang=en).

Foo, T. (1997). Recyclingof domestic waste : early experienceinSingopore . Hbitatint, 21, 277-289

Hoorweg, D. &-Teta , P. (2012). *Aglobal review of solid waste management.*

Imoh EU, Udofia EP (2005). Domestic Solid Waste Management in a Rapidly Growing Nigerian City of Uyo. *J. Hum Ecol. 36*(3):232.

Imura, H.; Yedla, S.; Shinirakawa, H.; and Memon, M.A. (2005). Urban Environmental Issues and Trends in Asia – An Overview. *International Review for Environmental Strategies, 5,* 357-382.

Kabil, A. S. O. (2010). Somalia's Situational Environmental Health Assessment of Three Zones: Somaliland, Puntland and South Central Mogadishu (2010). Available:http://www.wardheernews.com/Articles_10/Nov/Situational%20Environmental%20hea lth% 20Assessment-Somalia.pdf.

Kizito N. (2008). Solid Waste Manager Kinondoni Municipal Council (Interview 23/04/08.

Lichter, D. T., & Brown, D. L. (2011). Rural America in an urban society: Changing spatial and social boundaries. *Annual Review of Sociology, 37,* 565–592.

Liyala C, M (2011). *Modering solid waste at municipal level: institutional Arragement in Arban Centers of East Africa. Wageningen Academic, 30*(4) 781-796.

Marshal, E. (1995*). Analytic study to evaluate associations between dumpsites and birth effects. ATSDR CO.LTD: Atlanta. (Accessed, 15/7/208, 8:19 AM).*

Medina M**.** (2002). Globalisation development and municipal solid waste management in Third World Cities.Tijuana, Mexico: El Colegio de la Frontera Norte http://www.gdnet.org/pdf/2002AwardsMedalsWinners/outstandingResearchDevelopment/martin medinaMartinezpa per.pdf.

Medina M. (2002). Globalisation, development and municipal solid waste management in Third World Cities. Tijuana, Mexico: El Colegio de la Frontera Norte http://www.gdnet.org/pdf/2002AwardsMedalsWinners/outstandingResearchDevelopment/martin medinaMartinezpa per.pd (accssed, 21/7/2018, 8:32 AM.)

Medina, M. (2002). Globalization, development, and municipal solid waste management in third world cities. *Institute of Advance Studies, Mexico,1 –23.*

Modak, P., Jiemian, Y., Hongyuan, Y., Mohanty, C.R. (2010*).* Municipal solid waste management: Turning waste into resources. *Shanghai Manual–A Guide for Sustainable Urban Development in the 21st Century.*

Monyoncho, G. (2013). Solid waste management in urban areas Kenya: A case study of Lamu town. *Department of Real Estate and Construction Management, University of Nairobi, Kenya.*

Odum HT, Odum EC (2006*).* The prosperous way down. *Energy 31*, 2132.

Ogwueleka TC (2009). Municipal solid waste characteristics and management in Nigeria. Iran. *J. Environ. Health. Sci. Eng. 6*(3), 173- 180.

UNIDO (2003), and community participation in Municipal Solid Waste management, case of Arusha and Dar es Salaam Tanzania.(Accessed, 18/7/2018, 11:0 PM)

Onibokun, A. GandKumuyi, A. J. (1999). Managing the Monster: Governance and Waste Management in Africa. *International Development Research Centre (Canada).*

Hettiarachchi, H. (2018). Organic Waste Buyback as a Viable Method to Enhance Sustainable Municipal Solid Waste Management in Developing Countries. *Int. J. Environ. Res. Public Health, 15*, 2483. doi: 10.3390/ijerph15112483.

Pokhrel. D., Viraraghavan, T., (2005). Municipal solid waste management in Nepal: practices and challenges. *Waste management 25,* 555-562.

Renzoni A**.** (1994). *Contaminants in the environment: a multidisciplinary assessment of the risk to a man and other organisms.* London: Lewis Publishers.

Renzoni, A. (1994*). Contaminants in the environment: a multidisciplinary assessment of the risk to a man and other organisms.* London: Lewis Publishers.

Scarlat N., Motola V., Dallemand J.F., Monforti-Ferrario F., Mofor L. (2015). Evaluation of energy potential of municipal solid waste from African urban areas. *Renew. Sustain. Energy Rev. 50,* 1269–1286. doi: 10.1016/j.rser.2015.05.067.

Solomon, C. (2011). Assessment of municipal solid waste management service in Dessie town. *Somalia Waste Management and Disposal Providers in Mogadishu, Somalia, www.dlca.logcluster,org>servlet>mobile*.

TayJooHwa, Solid Waste Management: Issues and Challenges in Asia, ©APO 2007, *ISBN: 92-833-7058-9, Report of An official peer-reviewed journal published by SAMAR STATE UNIVERSITY42cdRJ APO Survey on Solid-Waste Management 2004–05http://www. apo-tokyo.org/publications/files/ ind-22-swm.pdf*

UNEP, (2009). Practices, Systems and issues on Solid waste Management in catbalogan City, Samar Philippines, published by Samar State University in January 2013 at Philippine.

UN-Habitat. (2010). Solid Waste Management in The World's Cities: Water and Sanitation in the World's Cities 2010, United Nations Human Settlements Programme. Earthscan; London, UK.

United Nations Environment Program Agency (2006). Informal Solid Waste Management.http://www.unep.org?PDF/Kenyawastemngntsector/sector/chapter1.pdf

United Nations Environment Program. Agency (2006). *Informal Solid Waste Management.*http://www.unep.org?PDF/Kenyawastemngntsector/sector/chapter1.pdf. (Accessed, 15/7/2018, 8:11 AM).*United Nations Framework Convention on Climate Change (UNFCCC)*

US Law-Solid Waste Act 2(1999). Definition of Solid Waste for RCRA Subtitle C Hazardous Waste. http://www.epa.gov/osw/hazard/dsw.

WHO (2011). Environmental health situation analysis in Somalia; available on WHO website: http://www.who.int/hia/en/index.html. (Accessed, 24/2/208, 6:57 PM).

World Bank (1992). *A report on Governance and Development*. Washington DC: World Bank.

Wrensh, M. (1990). Hydrogeologic assessment of exposure to solvent contaminated drinking water. New York: Archives of environmental health. (Accessed, 13/7/208, 11:36 AM)www.dlca.logcluster,org>servlet>mobile.

Zerbock, O. (2003). Urban solid waste management, waste reduction in developing countries. USA: School of Forest Resource and Environmental Science, Michigan Technological University.

Zurbrugg, c. (2002). *Solid waste management in developing countries .Duebendorf; Swizerland: swiss federal institute for environment science and technology (accesed 10/7/2018,4:23Am).*