SCHOOL OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF PUBLIC HEALTH

UNDERSTANDING AND DESCRIBING HOW E-WASTE IS BEING MANAGED AT MTENDERE MARKET

By

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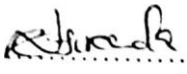
DECLARATION

I **CHRISTINE NYIRENDA** do hereby declare that this dissertation is my own original work. It has been guided and marked by my supervisor in accordance with the guidelines for Bachelor of Science in Public Health at University of Lusaka. It has not been submitted elsewhere for a degree at this or another University.

Signature…  ……Date…….30/12/21……

Certificate of completion

I CHRISTINE NYIRENDA do hereby declare that this dissertation is my own original work. It has been guided and marked by my supervisor in accordance with the guidelines for Bachelor of Science in Public Health at University of Lusaka. It has not been submitted elsewhere for a degree at this or another University.

Signature……**Date...** 30/12/21……

I, Col MWANAMAKWA SAMANYAMA guided, read this dissertation and approved it for presentation. I am satisfied that this is the original work of the author under the name it is presented. I confirm that the work has been completed satisfactorily and ready for presentation.

Supervisor's signature…… Date…30/12/21……..

DEDICATION

My dedication goes to my mother Margaret Mumba and my Aunty Chilufya Mumba for their never-ending support and encouragement. May God continue blessing them for their good works.

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I thank God Almighty for granting me strength and good health despite the current problem being faced in the country for this dissertation.

My sincere appreciation goes to my supervisor Mr. Col Mwanamakwa Samanyama persistent guidance, patience and working tirelessly throughout the entire writing of this dissertation.

Finally, I am deeply indebted to the participants who allowed me to enter their market and get some information of how they are managing e-waste. Their resilience and sense of determination was quite inspiring and may God grant them their life endeavors so that they become lived testimonies for generations to come. Without their participation and contribution, this dissertation would have not taken place.

Contents

ABSTRACT

Introduction: E-waste refers to any finished electronic products that no longer have use to the purchaser, these electronic products include things such as computers, televisions, stereos and more of the most common electronic appliances, some of these appliances can be reused, recycled and also refurbished. waste is created when the electrical products are discarded after they are out of use, trying to understand and describe the disposal of e-waste is our main interest because it is not only an issue in a certain area but in almost all communities, societies and nations The aim of the study was to understanding and describing how e-waste is being managed at Mtendere market.

Method: The made use of a cross sectional qualitative study approach, data was collected through semi structured interview guides and was analyzed through themes and coding. The sample size was 21 and the sampling technique was a purposive sampling. Thematic analysis was used to analyze the data that was collected.

Findings: The study found that (23.8%) had not attended any level of education, (42.9%) at least made it to primary school and the rest (33.3%) attained secondary education. Despite the majority attaining some level of education. most of the participants (86.4%) had no knowledge on e-waste management despite their education background. The knowledge on e-waste was highly dependent on the level of education

The study revealed that participants (86%) were not aware of the existence of electronic waste only (14%) had an idea on what e waste was and the social factors like education and knowledge indeed played a part in the management of e waste. Most of the participants did not know what e waste was, as everything was generally treated as cabbage. Most of the participants believed that economic factors such as income, infrastructure had a huge impact on the management of e waste and the entire basis of careless disposing of e waste is to come up with a better income or those that are economically stable tend to deposited more e waste

Conclusion: The study concluded that management of e waste is affected by social, economic and public health problems and there is need to educate members of the community on the management of e was

CHAPTER ONE

1.1 Introduction

E-waste refers to any finished electronic products that no longer have use to the purchaser, these electronic products include things such as computers, televisions, stereos and more of the most common electronic appliances, some of these appliances can be reused, recycled and also refurbished (Peralta, 2006). E-waste is created when the electrical products are discarded after they are out of use, Trying to understand and describe the disposal of E-waste is our main interest because it is not only an issue in a certain area but in almost all communities, societies and nations , the well-being of people living in areas where the used electronic appliances are thrown or discarded could be affected because most of the electronic appliances contain some potentially harmful materials like lead, cadmium, beryllium, The exposure to high levels of these materials may result in a person having kidney and brain damage, weakness, anemia , affects the organs such as the liver, heart, nervous system and also the lymphatic system it can also lead to death, The recycling and disposing of the E-waste may involve significant risk to the health of workers and as well as the community.

Because E-waste contains so much toxins it is important that we know and understand how it is being disposed, if it is disposed improperly it can lead to those toxins entering groundwater which will at some point lead to these toxins entering the many surface streams, lakes and also ponds of which many animals rely on the water from these rivers/ lakes for nourishment thus these toxins can make the animals sick and may also cause the imbalance in the planetary ecosystem. These toxins also leach into the soils which will influence the plants and trees that are growing from the same soil; thus, these toxins can enter the body of a human which will then lead to birth defects and also a good number of people having other health complications.

E-waste also affects the environment because if it is disposed improperly and it ends up in landfills, the chemicals which are toxic are released impacting the earths air, human health, contaminates livestock, crops and wildlife. (McAllister, 2013)

The expansion and upgrade of innovation in technology is also a contribution to discarding more of the electronic appliances because people these days are not usually recycling the used

products because the toxic materials in the products actually make it impossible to recycle them back into electronic products.

1.2 Statement of the problem

The main reason why E-waste was seen as a problem is the composition of the waste (electronic waste) such as computer screens, television screens and cell phones contain a lot of toxic materials like lead, mercury, cadmium and lead. E-waste was very harmful to the environment and human beings because it brings about negative health effects, the leakage of e-waste toxic chemicals into the environment can cause diseases such as cancers, brain, kidney, heart, skin disorders and liver damage (Menon, 2004). Because of the expansion and innovation of technology and the way it was increasing rapidly in countries all around the world, It was helping the society improve the quality of life and at the same time technology created massive problems if not recycled properly, because e-waste was not being properly disposed it occupied the environment with heavy metals containing toxins that would have the negative effect on the soil resulting into contamination of the plants and water, these toxins could cause the land not to be fertile and could also cause illness. When the toxins enter groundwater it will reach rivers, ponds, dams and streams, this will be unsafe for the animals and plants and the communities too, because of the acid and chemicals in the rivers, it can damage the ecosystem. (McAllister, 2013). Therefore, the proposed study is aimed at understanding and describing how e-waste is being managed at Mtendere market.

1.3 Justification of the study

The study on understanding and describing how e-waste is being managed at Mtendere market in Lusaka was beneficial to the people that were living there and the whole country of Zambia, as it was discussing more on how e-waste was being managed. It provided evidence-based information on the factors that were associated with e-waste management and would also help the Ministry of Health in policy formulation and contribute to the existing body of knowledge. This study brought out information that was of use to the researcher and also the people who lived in Mtendere and the whole country of Zambia.

1.4 General objectives

To understand and describe how e-waste was being managed and the Mtendere market in Lusaka.

1.5 Specific objectives

1. To assess the social factors (i.e., education level and motivation) associated with management of e-waste in Mtendere.
2. To determine economic factors (i.e., income and infrastructure) associated with management of e-waste in Mtendere.
3. To assess the public health concerns (i.e., disease outbreaks and pollution) associated with management of e-waste in Mtendere.

1.6 Research questions

1. What are the social factors associated with management of e-waste in Mtendere?
2. What are the economic factors associated with management of e-waste in Mtendere?
3. What are the public health concerns associated with management of e-waste in Mtendere?

CHAPTER TWO

2.0 LITERATURE REVIEW.

2.1 Introduction

This chapter brings about the relevance of the literature done by other authors that are similar to the topic. Furthermore, this chapter went on and showed the studies that were done on understanding and describing how e-waste is being managed. The conceptual and the theoretical framework have been represented in this chapter to provide visualisation in a diagrammatic perspective.

2.2 Social factors associated with management of E-waste.

2.2.1 Attitudes

Haron et al (2018) study noted that people with positive attitudes were more likely to take part in recycling e-waste than those who had a negative attitude. Correspondingly, Delcea et al (2020) established that respondents had a positive attitude towards E waste management as they viewed it as a responsibility of all citizens. It was established that having a pro-environment behaviour was positively associated with an individual's e-waste recycling behaviour among the respondents.

Furthermore, Marinescu et al (2016) also revealed that people with higher positive attitudes were more likely to engage in the management of e-waste compared to people with negative attitudes. It was also said that people with good morals would know the right thing to do when it comes to e-waste management compared to people with no morals. Kimeli et al (2014) showed that willingness is associated with better e-waste management. Furthermore, Ogunsola et al (2017) also revealed that people with positive attitudes towards e-waste management would engage more in recycling compared to people with negative attitudes. However, Otto et al (2018) noted that changing people's behaviour on how they viewed e-waste led to the increase in number of people who were taking part in the management of e-waste

2.2.2 Education

Haron et al (2018) study noted that being educated on the effects of e-waste was associated with the recycling of the E waste products. It was shown that people who were educated were more likely to engage in recycling behaviour than those who were not educated. Similarly, Oindo et al (2016) also revealed that people who were educated were more likely to engage in the recycling of E-Waste because of higher levels of education. However, Shevchenko et al (2019) also noted that people with higher levels of education were more likely to engage in e waste recycling than people who are not educated. In addition, Delcea et al (2020) study noted that social media had some form of influence when it comes to managing e-waste because they shared links which led to the discussion of how E-waste could be managed. It was also established that respondents having knowledge about the toxic nature of e-waste and their polluting effects demonstrated the recycling behaviour of the waste, it was also established that some respondents took responsibility and managed their E-waste. However, the study noted that respondents will have to involve their families and friends in the management of e-waste. In addition, it was also noted that some respondents got influenced when they got the view of other people on how they could manage e- waste products. However, Ogunsola et al (2017) also revealed that they were advising each other on how they would be able to manage E-waste. Therefore, Okoye et al (2014) noted that environment education was also one way of making people know the effects of e-waste and how they could manage it. Lakshmi et al (2017) Study noted that the registered recyclers had to educate people about the effects e-waste had on their human health. Another study by Askari et al (2014) noted that most people were not educated therefore they did not know how to manage e-waste. Similarly, Doan et al (2019) The government and the private sectors came together so that they could come up with ideas so that they could put them together to come up with better ways of how e-waste was going to be managed. Kaijage et al (2017) noted that education is associated with proper management of e-waste.

2.2.3 Awareness

Nduneseokwu et al (2017) Lack of awareness of the E waste concept was associated with the mismanagement of solid waste. It was shown that low levels of awareness of e-waste concept was associated with mismanagement of solid waste, it was also established that people with lack of knowledge will not know how to dispose e- waste as to those who have some knowledge. Therefore, Asiimwe et al (2012) also stated that they had no recycling policy on

how the e-waste will be managed hence the mismanagement, moreover studies noted that they may be in need of the usage of the e-waste control policies to guard the environment. In addition, Respondents acknowledged the importance of multilateral environmental agreements in international E-waste management. However, Marinescu et al (2016) also revealed that people with higher knowledge would engage in the awareness of e-waste recycling compared to people with low knowledge. Similarly, in Kimeli et al (2014) it was shown that putting management measures to prevent the e-waste and its toxic chemicals from accumulating in the environment. It was studied that they would need to know electronic manufactures as well as importers so that they could share responsibilities on how they would manage the environment and how they will recycle the E-waste. Furthermore, Ogunsola et al (2017) also noted that engaging the community in keeping the environment clean would help in the management of e-waste. Furthermore, Turaga et al (2019) showed that people gained some knowledge on how to manage e-waste through public awareness that was done through television, radios, newspaper, social media forums etc. It was shown that lack of awareness resulted in people not knowing about the management of e-waste as compared to when they are aware about the problem e-waste may cause. Similarly, Okoye et al (2014) also showed that low levels of awareness were associated with low levels of e-waste managed while high levels of awareness by the government would result in a lot of community members engaging in the management of e-waste. It was established that public awareness was also a tool that was being used to achieve environmental attitudes and behaviour towards e-waste management. Correspondingly, Rode et al (2012) showed that lack of awareness among people in the society led to the mismanagement of e-waste. It was studied that lack of awareness was a huge problem in most regions therefore they were a challenge in managing e-waste. Kaijage et al (2017) stated that the absence of awareness on e-waste and its effects on the environment and on human health leads to the mismanagement of e-waste.

2.2.4 Motivation

Shevchenko et al (2019) Respondents studied that motivation will increase the performance on the e-waste recycling. However, Okoye et al (2014) also revealed that making people understand what e- waste is and what problems it brings about was a way of motivating them to take part in the e-waste management. Whereas, Otto et al (2018) showed that environmental motivation was one of the biggest tools that were used to make sure that people knew why they were getting involved in the management of the environment. Otto et al(2018)

Also stated that people's behaviour had a huge impact on other individuals in that they tend to get motivated to engage in the e-waste recycling once they see other people also getting engaged, Similarly Guruauskiene et al (2008)also showed that most individuals were motivated by the environmental awareness meaning they had to be more of making the environment aware of what e-waste is and what effects it had on the environment and human health, people's behaviour towards the management of e-waste was motivation enough for other individuals. Furthermore, Wang et al (2019) went on and noted that education level, economic income etc. were one of the motivating factors that lead people to getting involved in the recycling of e-waste because they understood what it is and could also manage to dispose it without fail because they had income that would take care of it including its transportation

2.2.5 Laws

Ogunsola et al (2017) Study noted that there was a need to place laws in the society which would help in managing e-waste. Similarly Rode et al (2012) revealed that laws were implemented for people to be taking their e-waste for recycling. However, Askari et al (2014) also noted that the absence of policies concerning how to manage e-waste was one of the reasons that led to the mismanagement of e-waste; it was established that placing strict regulations on how e-waste should have been managed. It was shown that the producers of the electronic appliances which were being supplied to their consumers did not have any laws and regulations to give their consumers upon purchasing the product so that they could be aware of e-waste. Laws were important in that people were able to follow them on how they had to protect the environment and take part in the management of the e-waste. Similarly, Doan et al (2019) noted that other regions were lacking policies that would have helped in engaging people in e- waste management. Recycling laws were also implemented in households to improve how individuals manage e-waste, laws and legislation on how people should protect the environment were also implemented. Kaijage et al (2017) also showed that lack of laws and regulations leads to the mismanagement of e-waste.

2.3 Economic factors associated with management of E-waste

2.3.1 Income

Haron et al (2018) study noted that income was a predictor of recycling as people who had income were more likely to take their E waste material for recycling than those who did not

have income. Oindo et al (2016) study also showed that people with higher levels of income were more likely to take part in recycling than people with low income. Similarly, Shevchenko et al (2019) studies noted that people with higher income were more likely to get their e-waste materials recycled compared to people with low income. However, Lakshmi et al (2017) stated that people with higher levels of income were finding it easier to transport their e-waste materials for recycling. Wath et al (2010) Also noted that income was very important in the management of e-waste in that it helped in coming up with proper ways of disposing e-waste and that it involved money and the government also played a role in its management in that they could help in coming up with policies and also involving technology which could take care of part of the e-waste, However revealed Osibanjo et al (2007) that that people with higher income tend to use a lot of electronic appliances hence they contributed to a lot of e-waste products in the community, Correspondingly, Nnorom et al (2008)showed that in developing countries there was so much of e-waste issues because they did not have a proper way of disposing it due to the unavailability of technology and no policies and regulations implemented by the government

2.3.2 Infrastructure

Nduneseokwu et al (2017) study found that infrastructure was a moderating variable in the relationship between attitudes, perceived control and environmental knowledge and intention to participate in formal e-waste collection. Correspondingly, Shevchenko et al (2019) also revealed that environmental knowledge will help people with information that will help them into engaging in e waste recycling. Askari et al (2014) also stated that lack of infrastructure was also a challenge because there was no were to dispose of e-waste materials. Similarly, Doan et al (2019) also stated that people who were lacking infrastructure did not know where to dump e-waste and did not know how to manage it. Kakiage et al (2017) also showed that lack of. infrastructure was associated with the mismanagement of e-waste. Wang et al (2012) Noted that limited infrastructure leads to dumping of e-waste materials anyhow because there is are not containers from the government that have been put in certain areas where people could be dumping there e-waste materials, However Oteng-Ababio et al (2010)lack of proper infrastructure as in to where the e waste should be disposed need to make the government aware that there should be need of them coming with some form of engineered landfill where people will be able to dispense there e-waste

2.4 Personal factors associated with management of E-waste

2.4.1 Gender

Delcea et al (2020) study noted that women and girls do not really know how to dispose of e-waste as men. Similarly, Oindo et al (2016) studies have shown that males are more involved in the recycling of E Waste than females. Furthermore, Shevchenko et al (2019) went on and also revealed that men get more involved in e waste recycling more than women, However Rode et (2012) noted that women were less educated about the effects of e-waste hence they did not know how to manage it. They revealed that the absence of man power was limited so managing e-waste was a challenge.

2.4.2 Age

Oindo et al (2016) Studies found that people who are younger have more knowledge on the recycling of E waste than older people. Similarly, Okoye et al (2014) noted that younger people had more knowledge on technology hence being involved in e-waste management was not as hard compared to older people who do not have enough knowledge on technology. Prakash et al (2010) Showed that people that need to be targeted are those aged 14 and above because in most cases they are the ones that are involved in dealing with e-waste hence there should be emphasis on how they should be disposing of the e-waste. However, Ramzan et al (2019) revealed that in most instances it was shown that people aged 18-30 were the consumers of the of most of the electronic products hence there was need of asking them how they dispense their dead electronic appliances (e-waste)

2.5 Public health concerns associated with management of E-waste.

2.5.1 behavioural change

Parajuly et al (2020) stated that behavioural change was one of the most used in the sector of public health; this intervention was limited when it comes to pro-environmental behaviour promotion. Changing the behaviour of people towards how they view e-waste may be used in helping with the promotion of health and preventing diseases by getting involved as a whole country in the management of e-waste. Thi thu Nguyen et at (2019) Stated that the behavioural reasoning will help in keeping the environment safe and won't let people dispose of e-waste anyhow knowing what it will do to the environment. However, Dhanorka et al (2020) showed

that people need to understand more on how behaviour towards e-waste will determine whether to get involved in the recycling of e-waste...Nixon et al (2007) revealed that encouraging people to have positive behaviour will help in keeping the environment healthy and also will help in prevent certain diseases in the community.

According to the literature reviewed, a lot was shown on how people can manage e-waste using different factors and also the problem it has in other parts of the globe. Furthermore, authors went on and talked about how people and the government will get involved in e-waste recycling by implementing laws and regulations, awareness, environmental education etc. considering that most people on the market have low levels of education. However, a few things have been reviewed on understanding e-waste in Zambia because the literature available on e-waste management in Zambia did not cover the willingness of e-waste dealers to get some information on the effects of e-waste on the environment and human health.

2. 6 Figure 1: Conceptual Framework on factors associated with management of E-waste.

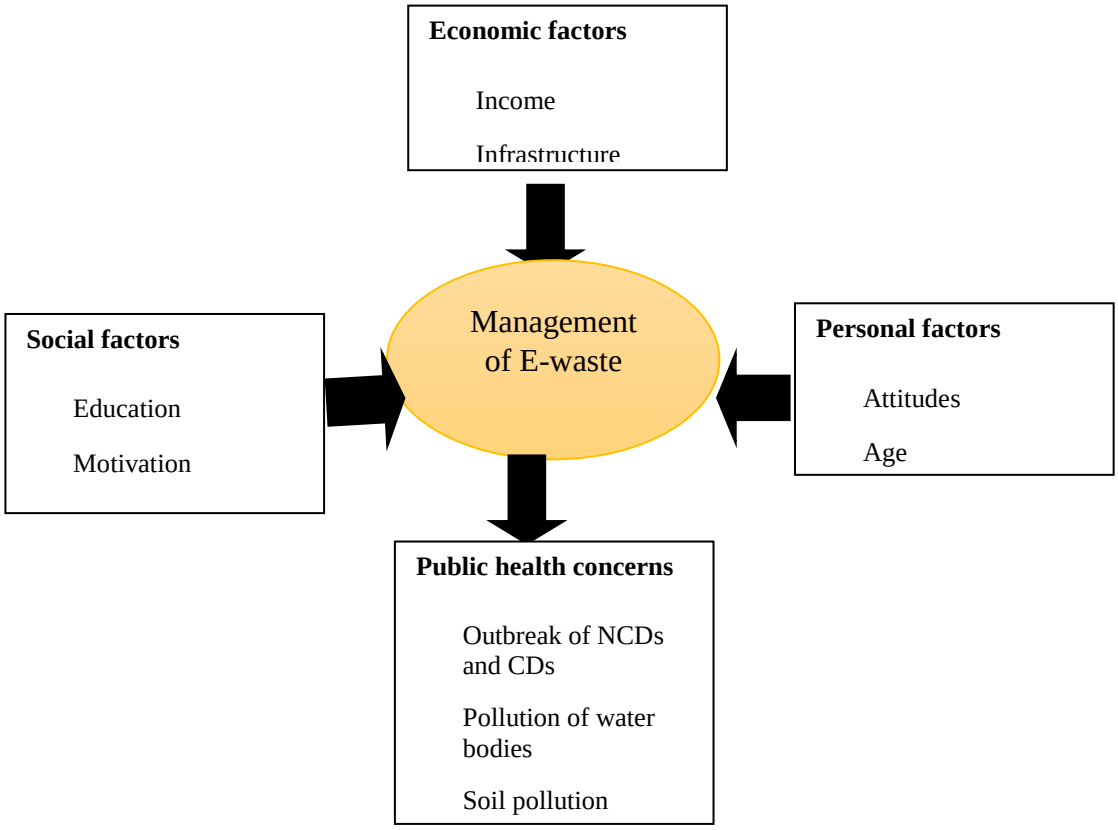

Figure 1 revealed that social factors associated with e-waste management include education, motivation and laws. Other factors that are associated with e-waste management include personal (i.e., attitudes and age) and economic (i.e. Income and infrastructures). E-waste if not managed well can lead to outbreaks of diseases, water, soil and air pollution.

2.6 Theoretical Framework

The theory of planned behaviour was used to understand and describe how e-waste is being managed at Mtendere market.

The theory of planned behaviour started as the theory of reasoned actions (Ajzen, 1985), who's main aim is that an individual's behaviour is determined by their intentions, attitudes, and also subject norms. It believes that an individual's behavioural achievement relies on motivation and behavioural control.

Intention can be explained by behaviour using three determinants that explain behavioural intention stated by Azjen.

1. Attitudes: This is a personal opinion that one has to come up with, it has to show whether the behaviour is good or bad, negative or positive. The attitude needs to be specific because it is used to predict the resulting behaviour.
2. Subjective norms: These are opinions of other people about an individual's behaviour.
3. Perceived behavioural control: This is the ability to perform certain behaviours.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter will discuss the methods that will be used to conduct the research study and analyze the data. The methods showed the following elements: research design, research location, study population, sampling procedure, sample size, data collection techniques, variables and data management analysis. This chapter will also show the ethical consideration during this phase.

3.2 Study design

A cross sectional qualitative study approach is being used in collecting the data. It is suitable for this type of study because it involves factors that are associated in the management of e-waste at Mtendere market in Lusaka province. A cross sectional qualitative study also helps to understand reasons behind certain behaviours, it can also be cheaper when it comes to collecting data. A cross sectional study is beneficial because it involves and allows researchers to do a lot of different variables at one time, these variables can include the peoples age, level of education, gender and also their income levels (Sedgwick, 2014).

3.4 Study area

The study was conducted from Mtendere Market in Lusaka, Lusaka province of Zambia. Mtendere Market has got the population of

3.5 Target population

The study was conducted at Mtendere market among the people who deal e-waste materials such as

Inclusion Criteria.

People dealing with e-waste products such

Men and women aged at least 18 years

People willing to participate in the study

Exclusion Criteria

Those who are not able to talk

People who are fluent with Nyanja language

3.6 Sample Size Determination

The sample size was determined by the data saturation, this means that researchers will only stop doing the data collection once there is no new information to be added to their existing finding of the study (Saunders, 2018).

3.7 Sampling procedure

Purposive sampling method was used. This method was used because it was targeting a particular subset of people. A purposive sampling requires a researcher to reject all the individuals that do not fit into the inclusion criteria of the study (Tongco, 2007).

Variables

The following are the variables that shall be considered in the study.

4. **Demographic variable**

- ✓ Age
- ✓ Gender
- ✓ Education
- ✓ Knowledge of managing e-waste

5. **Social economic variables**

- ✓ Income

6. **Personal variables**

- ✓ Attitude

3.8 Data Collection

In order to get a view from the participants on how they are managing e-waste an in-depth interview will be conducted with them. These interviews were necessary because they allowed participants and researchers to have a face-to-face discussion which allowed participants to be freer when giving them information (Boyce, 2006). The in-depth interview is good because it makes sure the participants bring out detailed information in their discussion, the researchers also make sure that the topics that need to be covered are specific and are talked about in this interview (Nedovic, 2007).

3.9 Data Analysis

The collected data was checked for internal consistency in order to verify the trustworthiness of the data. Thematic analysis was used to analyze the data collected because it makes sure that the data collected is summarized and interpreted in a way that it should make sense (Ahluwalia, 2012). A thematic analysis helps researchers understand if they do not come up with proper answers because the participants might not be those with higher levels of education (Javadi, 2016). The data that was collected was grouped into key thematic areas such as; demographic, social economic and personal variables.

Pretest

The pretest of the questionnaire was done among 10 people who dealt with e-waste materials at Ngombe Market in Lusaka. The purpose of pretesting the questionnaire is necessary because it helps in determining how effective the survey is and shows its weakness and its strengths. Questions in the questionnaire are tested to check if they are reliable or valid.

3.10 Validity and reliability

Validity was ensured through appropriate structured questions that were used the language going to be used shall not be difficult for them to understand terms to the questions and also interpret the questionnaire in most spoken languages. Reliability of the questionnaire was tested on a small sample population prior to data collection and a checklist was used to ensure

consistency. To improve the probability that participants answering the questions were give a true account, the researcher ensured anonymity; their names were not put on the questionnaire, the questionnaire were administered on a one-to-one basis. Reliability was assessed through the questionnaire responses, where responses to questions asked in one part of an individual questionnaire checked for logical agreement with related questions

3.11 Ethical Considerations

Approval for this study was obtained from the University of Lusaka Research Ethics Committee and Lusaka District Health Office. Permission to conduct a study among people dealing with e-waste at Mtendere market was obtained from the local authorities. Full consent was obtained from the participants of the research prior to the study. The study adhered to confidentiality and any type of communication which related to the research which were done honestly and transparently. Voluntary participation of the responder was important. However, participants who were not willing to take part in the research had the right to withdraw from the study.

CHAPTER FOUR

4.0 FINDINGS

4.1 Introduction

This part of the study presented the findings of understanding and describing how e-waste is being managed at Mtendere market. The demographic characteristics of respondents are followed by the findings on; social, economic factors and public health concerns associated with management of e waste.

4.2 Demographic Characteristics of the Participants

The study was composed of 21 participants aged between 18 to 45 years. Most of the participants were aged less or equal to 25 years. Furthermore, the study participants were composed of 9(48.2%) females and 12(57.1%) males.

All the female study participants (47.6%), additionally, an equal number (28.6%) of males were single and married. Most of the participants had secondary education (33.3%), followed by those with primary education (42.9%) as indicated on table 4

Table 4.0; Gender, age and marital status of the participants

Variables		**Number of participants**		
		Male n (%)	**Female n (%)**	**Total n (%)**
Age (Years)	Less or equal to 25	3 (14.3)	7 (33.3)	10(47.6)
	From 25 and 30	1(4.8)	2(9.5)	3(14.3
	Above 30	8(38.1)	0(0.0)	8(38.1)
	Total	***12(57.1)***	***9(42.9)***	***21(100)***
Education level	None	2 (9.5)	3(14.3)	5(23.8)
	Primary	4(19)	5(25.8)	9(42.9)
	Secondary	6(28.6)	1(4.8)	7(33.3)
	Total	***12(57.1)***	***9(42.8)***	***21(100)***
Marital status	Married	6(28.6)	9 (42.9)	10(47.6)
	Single	6(28.6)	0(0)	3(14.3
	Total	***12 (57.1)***	***9(42.9)***	***21(100)***

4.3 Social factors associated with management of e-waste

4.3.1 Education

It was noted that the majority of the participants (14.4%) who attended secondary school had very little information about e-waste management. Participants did not know how to dispose of e-waste and that led them to be disposing of e-waste like any other waste. Therefore, most of the participants (86.4%) had no knowledge on e-waste management despite their education background. Participants reviewed that electronic product that are not working, outdated, or unwanted are usually disposed together with other wastes because they do not know how it should be disposed and others just keep them in their houses. However, participants requested for the government to spend time teaching them one waste and the importance of proper disposal.

"Electronic materials that are of no use and have to be disposed of…"

"Most us have not been to school, so the management of e-waste comes as news and something we are learning about just now. Most of us just ended in secondary school but all we know is waste and waste is all disposed of together."

4.3.2 Knowledge

It was shown that participants were not aware about the management of e-waste. Some of the participants stated that they did not have any knowledge on how e-waste should be managed. Therefore, these participants stated that the disposal of e-waste is done just like any other waste in the surrounding. Other participants stated that it's not emphasized enough to the level of public awareness on the management of e waste therefore making the entire e waste management process not familiar at all.

"…we don't really know much on waste so the government should spend time teaching us on these things and their importance"

"we have no idea where or how e waste is managed as far as we know everything is deposed off the same way"

4.3.2 Motivation

The study reviewed that most participants were not motivated in management of the e-waste. Hence, they stated that government officials should teach and motivate them in the management of e-materials. It was noted that some of the participants stored e-waste materials in their homes; others threw the e-waste along road sides. Furthermore, the participants stated that they needed bins for storing e-waste. Furthermore, motivation should be there for it creates a sense of agency in addressing problems that can affect the community and all its members

Variables		Male n (%)	Female n (%)	Total n (%)
Knowledge/education on e-waste	Yes	3(14.4)	0(0.0)	3(14.4)
	No	9(43.2)	9(43.2)	18(86.4)
	Total	**12(57.6)**	**9(43.2)**	**21(100.0)**

4.4 Economic factors associated with management of e-waste

4.4.1 Income

It was shown that income had a lot to do with e-waste as the goal or the main emitters of electronic waste are those with high income trying to purchase this electronic waste or those trying to make money fixing these appliances. Furthermore the participants stated that they were to blame for the poor management of e-waste because most of them deal with them on a daily basis especially those who deal with phone fixing and welding as they do not even know how to properly dispose such waste after use while other participants said that that income is the reason why there is more e-waste in this area and people don't mind the management of e-waste because they know less about its effects as they are only trying to earn a living by dealing with it.

4.4.2 Infrastructure

It was stated that infrastructure was essential to the successful implementation of electronic waste recycling. Infrastructure determines the process, methods and amounts of waste that can be processed. It includes transportation, collection, recovery, and resale establishments. Therefore, participants asked if there could be a way in which they could put up a box specifically for electronic waste so that people can be putting all their electronic waste there and also by showing them how to properly dispose of e waste. Similarly, many participants mentioned that they had no idea where or how e waste is managed as far as we know everything is disposed of the same way.

4.5 Public health concerns associated with management of e-waste

The public health concerns study explored the extent to which public health concerns associated with management of e-waste and some of the concerns that were raised. It was stated that outbreaks of NCDs and CDs would arise, pollution of water bodies and soil pollution would be affected if e waste is not being managed properly.

4.5.1 Disease outbreak

Poor waste management is an issue of concern not only for its impacts on the environment, but also on human health. WHO( ) estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution.

Most of these environment-related diseases are, however, not easily detected and may be acquired during childhood and manifest later in adulthood**.** Participants further confirmed that poor e-waste management poses a great challenge to the well-being of city residents, particularly those living adjacent to dumpsites due to the potential of the waste to pollute water, food sources, land, air and vegetation."

It was also noted that with the little knowledge the participants had, they knew the dangers of improper management of waste and the danger of disease outbreak.

"...people who burn their waste tend to do it and mostly, not concerned which waste is being burned emitting different substances in the atmosphere. While others just throw the waste anyhow blocking the sewar system causing contamination of water leading to outbreak of diseases in these compounds ..."

"...the government should put up safe and environment-friendly e-waste recycling facility that should be set up to reduce e-waste in order to reduce excessive burning of waste and disposing anyhow"

4.5.2 Pollution

Pollution caused by e-waste impacts some animal species more than others**,** which may be endangering these species and the biodiversity of certain regions that are chronically polluted. It was stated that air pollution can affect water quality, soil and plant species, creating irreversible damage in ecosystems.

A participant mentioned that members of the community should stop burning waste anyhow for it affects our health, we easily catch a cold and some of us are pregnant and it is very uncomfortable, participants also mentioned that there is a need to initiate sustained mechanism to create awareness and more should be done to create an awareness by announcing in cars, putting up posters on the importance of managing e waste.

"...management of electronic waste is important as mis management causes pollution which affects the population at large ..."

; "...just like any other waste, if not taken care of it can cause land pollution, blocking of water supply and congesting the environment".

CHAPTER FIVE

5.0 DISCUSSION

5.1Introduction

The chapter presents the discussions of finding of the study on at the understanding and describing how e-waste is being managed at Mtendere market the findings had been discussed in line with the literature under the following sub-heading social factors, economic factors and public health concerns (associated with management of e-waste in Mtendere as shown below

5.1.1 Social factors associated with management of e-waste

The social factors associated with management of e waste listed in the study were as follows Education Knowledge Motivation, participants stated that they had little or no knowledge on how e-waste is being managed despite their level of education, they also reviewed that they were not aware of e-waste management, Similarly Haron et al (2018) study also noted that being educated on the effects of e-waste was associated with the recycling of the E waste products. It was shown that people who were educated were more likely to engage in recycling behaviour than those who were not educated. Similarly, Oindo et al (2016) also revealed that people who were educated were more likely to engage in the recycling of E-Waste because of higher levels of education It was noted that majority of the participants The few who attended secondary school had very little information about e-waste management.The study reviewed that most participants were not motivated in management of the e-waste. Hence, they stated that government officials should teach and motivate them in the management of e-materials.

Furthermore, Askari et al (2014) added the law as one of the factors influencing management of e waste, he also noted that the absence of policies concerning how to manage e-waste was one of the reasons that led to the mismanagement of e-waste, it was established that placing strict regulations on how e-waste should have been managed. It was shown that the producers of the electronic appliances which were being supplied to their consumers did not have any laws and regulations to give their consumers upon purchasing the product so that they could be aware of e-waste.

Laws were important in that people were able to follow them on how they had to protect the environment and take part in the management of the e-waste. Similarly, Doan et al (2019) noted that other regions were lacking policies that would have helped in engaging people in e- waste management. Recycling laws were also implemented in households to improve how individuals manage e-waste, laws and legislation on how people should protect the environment were also implemented.

5.1.2 Economic factors associated with management of e-waste

It was shown that income had a lot to do with e-waste as the goal or the main emitters of electronic waste are those with high income trying to purchase this electronic waste or those trying to make money fixing these appliances.

Similar to a study that was conducted by Wath et al (2010) Also noted that income was very important in the management of e-waste in that it helped in coming up with proper ways of disposing e-waste and that it involved money and the government also played a role in its management in that they could help in coming up with policies and also involving technology which could take care of part of the e-waste,

However, revealed Osibanjo et al (2007) that that people with higher income tend to use a lot of electronic appliances hence they contributed to a lot of e-waste products in the community, Correspondingly, Nnorom et al (2008) showed that in developing countries there was so much of e-waste issues because they did not have a proper way of disposing it due to the unavailability of technology and no policies and regulations implemented by the government

It was stated that infrastructure was essential to the successful implementation of electronic waste recycling. Infrastructure determines the process, methods and amounts of waste that can be processed. It includes transportation, collection, recovery, and resale establishments likely to get their e-waste materials recycled compared to people with low income. However, Lakshmi et al (2017) stated that people with higher levels of income were finding it easier to transport their e-waste materials for recycling.

Kaijage et al (2017) also showed that lack of. infrastructure was associated with the mismanagement of e-waste. Wang et al (2012) Noted that limited infrastructure leads to dumping of e-waste materials anyhow because there is are not containers from the government

that have been put in certain areas where people could be dumping their e-waste materials, However Oteng-Ababio et al (2010) lack of proper infrastructure as in to were

5.1.3 Public health concerns associated with management of E-waste.

It was confirmed from the study participants that outbreaks of NCDs and CDs would arise, pollution of water bodies and soil pollution would be affected if e waste is not being managed properly. Parajuly et al (2020) stated that behavioural change was one of the most used in the sector of public health; this intervention was limited when it comes to pro-environmental behaviour promotion. Changing the behaviour of people towards how they view e-waste may be used in helping with the promotion of health and preventing diseases by getting involved as a whole country in the management of e-waste. Thi thu Nguyen et at (2019) Stated that the behavioural reasoning will help in keeping the environment safe and won't let people dispose of e-waste anyhow knowing what it will do to the environment.

Poor waste management is an issue of concern not only for its impacts on the environment, but also on human health. WHO(2009) estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution. Most of these environment-related diseases are, however, not easily detected and may be acquired during childhood and manifest later in adulthood**.**

Pollution caused by e-waste impacts some animal species more than others, which may be endangering these species and the biodiversity of certain regions that are chronically polluted. It was stated that air pollution can affect water quality, soil and plant species, creating irreversible damage in ecosystems.

Dhanorka et al (2020) showed that people need to understand more on how behaviour towards e-waste will determine whether to get involved in the recycling of e-waste...Nixon et al (2007) revealed that encouraging people to have positive behaviour will help in keeping the environment healthy and also will help in prevent certain diseases in the community.

Furthermore, other participants went on and talked about how people and the government will get involved in e-waste recycling by implementing laws and regulations, awareness, environmental education est. considering that most people on the market have low levels of education. However, a few things have been reviewed on understanding e-waste in Zambia

because the literature available on e-waste management in Zambia did not cover the willingness of e-waste dealers to get some information on the effects of e-waste on the environment and human health.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Introduction

The chapter presented the conclusions, limitations and recommendations of the study which investigated the understanding and describing how e-waste is being managed

6.2. Conclusion

The study revealed that participants were not aware of the existence of electronic waste and the social factors like education and knowledge indeed played a part in the management of e waste. Most of the participants did not know what e waste was as everything they did not use was generally treated as cabbage

More participants believed that economic factors such as income, infrastructure had a huge impact on the management of e waste and the entire basis of careless disposing of e waste is to come up with a better income or those that are economically stable tend to deposited more e waste

The study found that public health issues that can arise from poor management of e waste include pollution and disease outbreaks that may be a danger to human existence. Most participants born in rural areas had positive attitudes than those born in urban areas.

6.3 Limitations

- The study sample was too small; hence, the findings could not be generalised accurately.
- The study sample involved only a few business owners. A comprehensive one was required
- The study was a cross sectional study and qualitative in nature, hence, the findings might be subjective and not objective.

6.4 Recommendations

- Future Researchers should conduct the same study using a large sample that is representative so that the results can be generalised accurately.
- Future Researchers should endeavour to conduct a cohort or retro-progressive study on the management of e waste
- Government should offer More education on the management of e waste for the communities
- Ministry of Health should embark on sensitization programs in local communities aimed at reducing or eliminating mis management of e waste

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APPENDICES

Appendix 1: Information Sheet

This research will be based on "describing and understanding how e-waste is being managed at Mtendere market in Lusaka". The intention of gathering this information during this research will purely be for academic purposes only.

The participants will be interviewed on describing and understanding how e-waste is being managed. Questions will also be asked on other matters relating to the topic.

Permission to conduct this research will be sought from the Ethics board of the University of Lusaka, Lusaka District Health Office and the local authorities.

Purpose of the research

Nyirenda Christine of the Department of Public Health is carrying out this study. This study is being done in partial fulfilment of the Bachelor of Science in Public Health, which will be submitted to the school of Medicine and Public Health of University of Lusaka. If you have any questions about the study, you can direct them to the following people on contact addresses: Principle Investigator,Mr. C. K. Chungu, The Head of Public Health Department, P.O Box 36711, Lusaka, Cell Phone number – 0973424744.

You are being asked to take part in a research which aims at assessing ***'Describing and understanding how e-waste is being managed at Mtendere Market'.*** The study is aimed at interviewing people dealing with e-waste.

Risks, Discomforts and Benefits

There are no risks and discomfort that arise due to taking part in this study. The benefits are that the study brings out information on ***describing and understanding how e-waste is being managed*** and help policy makers to put some strategies that would help in the improvement of managing e-waste.

Appendix 2: Consent Form

My name is Christine Nyirenda; I am an undergraduate student at the University of Lusaka in the school of Medicine and Health Sciences. This study is being carried out to enable me partially fulfil the requirements of the Degree of Public Health. You have been selected as a respondent and I would be most grateful if you spared a few minutes to answer the questions in my interviews. This is a study on understanding and describing how e-waste is being managed at Mtendere market in Lusaka province. The information that will be offered will be dealt with the greatest secretiveness and will only be used for the Public Health Dissertation. I would be very grateful if you could give me sincere answers to the questions.

You will not receive direct benefits from the study or monetary gain but the information that you will provide will help the community at large by knowing the factors associated with e-waste management.

Consent granted (please tick)

Yes ☐

No ☐

Name of participant signature date

……. …….

……..

Name of person taking consent signature date

……. …….

……..

Appendix iii. Interview Guide

TOPIC: understanding and describing how e-waste is being managed at Mtendere market in Lusaka.

You are required to either tick on the right answer or give a brief explanation for your answer.

SECTION A

SOCIAL-DEMOGRAPHIC DATA

1. Age ……..
2. Education level ……..
3. Income level per month?
   - K800-k1500 [ ]
   - K1500-3000 [ ]
   - 3000 and above [ ]
4. Explain the effects of e-waste

   ……

5. Do you know any policy on e-waste management?
   - Yes
   - No
6. Explain how you manage your e-waste?

.....

7. Are you happy with the way e-waste is being managed?
   - Yes [ ]
   - No [ ]

8. Explain your response in question 7
   - .....
9. What improvements do you think should be made in the management of e-waste?

.....

10. What are the public health concerns you know associated with poor e-waste management?

.....

11. Do you have adequate infrastructure for managing e-waste?.....
12. What should be the approach to creating mass awareness on e-waste?.....
13. Do you think that the level of awareness is right or should it increase to minimize the volume of e-waste?.....
14. What do you think should be done in motivate people on proper e-waste management?.....

The end

Appendix D. Activity Table

Activity	**Responsibility**	**2021 Dec**	**2021 Jan**	**2021 May**	**2021 Jun**	**2021 Jul**	**2021 Aug**	**2021 Sep**	**2021 Oct**	**2021 Nov**	**2021 Dec**
Preparation of research question and submitting to the university											
Proposal Writing and submission											
Questionnaire development and testing											
Preparation for Field Work											
Data Collection											
Data Clearing analysis and interpretation											
Dissertation Submission											

The table above indicated the activities that were involved in coming up with dissertation.

Appendix V. Budget Plan

Items	**Cost (ZMK)**
Stationery and Airtime	K450.00
Transport	K350.00
Printing and binding	K200.00
Total	**K1000.00**

UNIVERSITY OF LUSAKA

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SCHOOL OF MEDICINE AND HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

Ref no: IORG0010092-060/2/21

Date: 26th August, 2021

CHRISTINE NYIRENDA BSPH18110544

Re: Research Title – UNDERSTANDING AND DESCRIBING HOW EWASTE IS BEING MANAGED AT MTENDERE MARKET

The above research was submitted to the research ethics committee for review. The study has no major ethical problems and is approved subject to the following:

1. The study cannot be changed without express permission of the UNILUS Research ethics committee
2. Approval from the Lusaka District health Management or equivalent health authorities should be sought.
3. The study tools should be added.
4. An informed consent form should be attached and filled by all study participants (If dealing with primary data)
5. The risks and benefits should be included in the consent form.

Congratulations and the committee wishes you success in your work.

Prof Kasonde Bowa

MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)

Chairman- UNILUS REC

Professor of Urology and Consultant Urologist

Executive Dean

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Date: 26th August, 2021

……

……..

……..

PERMISSION FOR **CHRISTINE NYIRENDA STUDENT No BSPH1811054** TO CONDUCT A RESEARCH STUDY AT YOUR FACILITY/ INSTITUTION/

ORGANIZATION

Reference is made to the above subject matter

The University of Lusaka, School of Medicine and Health Sciences here by requests for permission for **Christine Nyirenda** a Public Health Student to conduct research at your facility/ institution/ organization, entitled**; UNDERSTANDING AND DESCRIBING HOW E-WASTE IS BEING MANAGED AT MTENDERE MARKET.**

The research is in partial fulfillment of the requirements for the degree of Bachelor of Science Public Health. This is purely for academic purposes and information gained in such a way will not be used in the public domain without prior authorization from the institutions/ organizations involved.

The research topic has been cleared by the University of Lusaka, School of Medicine and Health Sciences Research Ethics Committee as per the attached copy. Data collection is expected to be done from **30th August, 2021 to 30th October, 2021**.

The University of Lusaka avails itself of this opportunity to review to your office the assurances of its highest considerations and looks forward to your timely and favorable response.

Prof Kasonde Bowa

MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)

Chairman- UNILUS REC

Professor of Urology and Consultant Urologist

Executive Dean University of Lusaka and University Teaching Hospital School of Medicine and Health Sciences.